BBMRI-ERIC®
The European research infrastructure for biobanking and biomolecular resources in health and life sciences

ESBB
European, Middle Eastern & African Society for Biopreservation and Biobanking

EUROPE BIOBANK WEEK CONGRESS 14-17 MAY 2024

POSTER SESSIONS

Abstracts

Produced by the Europe Biobank Week Programme Committee and BBMRI-ERIC's Department of Outreach, Education and Communications

TABLE OF CONTENTS

Poster Session One

PS1. Role of biobanks in the future of healthcare research

P1: Being an advanced Practitioner at the KHP Cancer Biobank

Susan Ndagire (1)
(1) KHP Cancer Biobank

Introduction

As the UK pathology workforce decreases amongst a rising workload, there is an increasing demand for Advanced Practitioners to take on some roles, including biobanking. The Biobank Advanced Practitioner works closely with histopathologists but remains responsible for the timely and legal acquisition of surgical material into the research biobank and can also support clinical trial and observational studies.

Role

- Work with clinicians and investigators to identify appropriate surgical specimens to support of biobank, clinical trials and observational studies.
- Expert in histological dissection of complex, fresh diagnostic or therapeutic surgical specimens.
- Maintain of a program of quality control/quality assurance.
- Pathology and sample data input and extraction.

Training and competency

Biobank Advanced Practitioners are senior and experienced Biomedical Scientists who undertake a training programme for a specific tumour type, which is overseen by the Lead Consultant Histopathologist.
Training:

- Completing a training manual
- Observation of dissection and sampling
- Supervised dissection and sampling
- Indirectly supervised dissection and sampling

Competency assessment

The AP needs to demonstrate the physical dissection skills, understanding of the pathology of the disease, participate in slide/case reviews, histopathological knowledge, work within limitations of experience and knowledge.

Conclusion

Biobank Advanced Practitioners have an increasingly important role as more Histopathologist time must be spent on molecular diagnostics. Further, the rapid expansion of digital pathology means that fewer pathologists are co-located near laboratories and are less able to dissect specimens within the time limits required for current research use.

Keywords

Biobank Practitioner

P3: Comprehensive Integration of Biobanking in Clinical Routines and Research at the University Hospital Schleswig-Holstein

Inga MATTHIES (1), Antje TORGE (1)a, Andre FRANKE (2), Ralf JUNKER (1), Jeanette FRANZENBURG (1,2)
(1) Institute of Clinical Chemistry, University Hospital Schleswig-Holstein, (2) Institute of Clinical Molecular Biology, University Hospital Schleswig-Holstein

Description

Research in personalized medicine requires access to clinical data and biomaterials from extensive patient cohorts. However, physicians in hospital settings face time constraints managing consents, clinical data integration and biobanking. The University Hospital Schleswig-Holstein (UKSH) has established the Healthcare-embedded Biobank (HEB) with the primary objective to support future health research by providing an integrated biobanking service across the hospital. To achieve this goal, a broad consent has been implemented, allowing the biobanking of residual biomaterials independent of specific research projects. The HEB operates within the Institute of Clinical Chemistry which processes about 4,000 samples for routine diagnostics daily. Interfaces of the biobank with the hospital's order entry system, the laboratory information system and the laboratory automation for routine diagnostics have significantly enhanced the data availability, efficiency and quality of the biobank.

Biobanking can be routinely requested by healthcare personnel. Once stored in the biobank, sample availability is shared with the Medical Data Integration Center (MeDIC) providing clinical data, consent oversight and interfaces for pseudonymization.
To date, the infrastructure has collected more than 300,000 samples comprising serum, plasma, buffy coats, urine, saliva and PBMC. More than 25,000 samples from the biobank have been outsourced contributing to over 40 distinct research projects. One example is a large population-based genetic study that utilized 11,000 buffy coat samples of the HEB derived from residual blood obtained during blood counts. The comprehensive integration of the HEB infrastructure into clinical routines has solidified its position as a central component in medical research at the UKSH.

Keywords

Healthcare-Embedded, University Hospital, Liquid Biobanking, Biobank Interfaces

P5: Implementation and benefits of iLES: The new BIMS of the Radboud Biobank.

M.A.M. van den Brand (1), D.W Swinkels (1), P. Manders (2)
(1) Radboud Biobank, Radboud university medical center, Nijmegen, the Netherlands, (2) iVention Lab Automation, Zwolle, the Netherlands

Description

The Radboud Biobank (RB), a central, hospital-integrated biobank facility has successfully implemented a new biobank information management system (BIMS). iVention Lab Execution System (iLES) is a cloud platform that brings numerous benefits to the biobank's operations. The implementation process was aimed at improving data management processes, increasing efficiency and guaranteeing quality of biobank samples.

One of the key advantages of iLES is the connection with the electronic health record system and the Laboratory Information Management System for the placing and managing of biobank orders. This allows to abolish complex paper order forms and enables to further automate biobank processes.

Furthermore, collection owners can get access to their own collections. This feature promotes collaboration and allows collection owners to have full control over their materials. Issuances can be requested and handled directly in iLES, which makes the process efficient and transparent.

For biobanks it is very important to determine if biomaterials are fit for purpose. SPREC (Standardized PREanalytical Code) is a tool used to assess and evaluate biomaterials in terms of their suitability for specific research purposes. iLES is designed to automatic calculate SPREC for all processed liquid samples stored in the RB. This data contributes to continuous quality improvement efforts, ensuring the consistent delivery of high-quality biomaterials for research purposes.

With the aforementioned summary of some benefits of our new BIMS, we hope to be of help for biobanks also considering a new BIMS. We would be happy to discuss the implementation process and answer all your questions.

Keywords

Data integration, Data Sharing, Biobank

P7: Establishment of Biobank of SARS-CoV-2 positive patients and its usage in COVID-19 research

Kamenarova, K (1,2), Kachakova-Yordanova, D (1,2), Beltcheva, O (1,2), Baymakova, M (3, Georgiev, M (1,2), Mihova, K (1,2), Georgiev, D (1,2), Petkova, V (1,2), Argirova, R (4), Atanassov, P (5), Kunchev, M (3), Andonova, R (3), Zasheva, A (3), Koleva, V (4), Penev, A (4), Lekova-Nikova, D (4), Drenska, R (5), Pantileeva, D (5), Dimova, I (2), Ivanova, N (1,2), Plochev, K (3), Ivanov, I (5), Popov, G (3), Gabrovsky, N (5), Leseva, M (5), Mitev, V (1), and Kaneva, R (1,2)

(1) Molecular Medicine Center, Department of Medical Chemistry and Biochemistry, Medical Faculty, Medical University – Sofia, (2) Laboratory of Genomic Diagnostics, Department of Medical Chemistry and Biochemistry, Medical Faculty, Medical University – Sofia, (3) Military Medical Academy, Sofia, (4) Acibadem City Clinic, Multidisciplinary

Hospital for Active Treatment „Tokuda", Sofia,, (5) University Multidisciplinary Hospital for Active Treatment and Emergency Medicine "N.I. Pirogov", Sofia

Introduction

The COVID-19 pandemic has made the strengths of biobanks and research partnership of tremendous need. The availability of stored positive cases combined with biological samples and clinical data from the same individuals has enabled a large number of host-pathogen genetics studies. Molecular medicine center in cooperation with several clinical departments took the initiative to collect, process and store biospecimen from COVID-19 volunteers in frame of a cohort study for COVID-19 research project.

Material and methods

Volunteers who were positive for SARS-CoV-2 were recruited through the three of the biggest hospitals in Sofia, Bulgaria (Military Medical Academy, UMHATEM "N.I.Pirogov", and Acibadem City Clinic), from October-2020 to April-2022. Biological samples were collected in a specially established COVID-19 Biobank. Data based on demographic data, COVID-19 symptoms, co-morbidities etc., were collected via a questionnaire, which was completed in presence of qualified medical staff. All participants have signed a study specific informed consent.

Results

More than 400 COVID-19 cases participated in the study. For the study purpose, they were divided into phenotypic groups depending on the clinical severity, to critical/severe, moderate and mild/asymptomatic COVID-19 cases. The most frequent comorbidities were oncological (63.9%), cardiovascular (40.8%), hypertension (37.5%), and diabetes (13.3%).

Discussion and Conclusion

The large number of samples collected from COVID-19 studies can potentially be used in conjunction with epidemiological data and general health data to promote research of COVID-19 pathophysiology. This is the first large-scale genetic analysis of COVID-19 using a Biobank of Bulgarian patients.

References

Butler-Laporte et al.,2022

Keywords

COVID-19 biobank, biological samples, genetic analysis, future studies

P9: Bridging the gap between industry and medicine: biobanks and their role in IVDR

Simutytė Martyna (1), Naumovas Daniel (1)
(1) Vilnius Santaros Klinikos Biobank, Vilnius University Hospital Santaros Klinikos, Vilnius, Lithuania

Introduction

The new In Vitro Diagnostic Regulation (IVDR) which governs in vitro diagnostic (IVD) devices in the European Union (EU) has brought new challenges to the IVD manufacturing sector. The main challenges that have arisen after IVDR became effective are that some IVD devices were reclassified leading to changes in their regulatory pathway and stricter performance evaluation requirements.

Methods

To fully understand the role of biobanks in this EU regulatory process, we must therefore understand the IVD devices release process and its critical milestones. Regulatory documents such as IVDR, Lithuanian National Bioethics and Biobanking laws, the necessary permissions for conducting clinical trials and clinical performance studies in Lithuania, and ISO standards related to the field were analysed.

Results

The foundation of a good IVD device lies in a well-established, verified, and validated device design which meets clinical evidence requirements. Clinical evidence of the IVD device must be reasoned by demonstrating it's scientific validity, analytical and clinical performances. Each of these stages are essential in the IVD device design, necessitating access to actual biological material and associated data.

Conclusions

The analysis displayed that by providing biological material and associated data, biobanks play a crucial role in ensuring the safety, effectiveness, and compliance of IVD devices. However, their role goes beyond providing samples and data. Biobanks can also assist in navigating national laws and preparing

protocols for clinical performance evaluation, as well as obtaining the necessary permissions for conducting biomedical research and clinical performance studies.

Keywords

IVD, IVDR, biobanks

P11: cardiovascular BioCor Biobank: our first 5 years of activity

Laura Valentina Renna (1), Marco Versuraro (1), Arianna Pinton (1), Ambra Cerri (2), Ignazio Frusciante (2), Alice Capuzzo (2), Mattia Ricotti (2), Lorenzo Menicanti (2,3), Rosanna Cardani (1)
(1) Biobank BioCor, IRCCS Policlinico San Donato, San Donato Milanese, Milan, Italy, (2) Scientific Directorate, IRCCS Policlinico San Donato, San Donato Milanese, 20097 Milan, Italy, (3) Department of Cardiac Surgery, IRCCS Policlinico San Donato, San Donato Milanese, 20097 Milan, Italy.

Introduction

The cardiovascular research biobank BioCor was established in 2019 for the collection of biological samples and associated clinical data from cardiovascular patients attending the IRCCS- Policlinico San Donato. During Sars-CoV-2 pandemia, BioCor collected samples and data mainly from COVID19 patients. Methods. In 2019, BioCor started with 1 dedicated -80°C freezer, 1 LN2 tank, 2 refrigerated centrifuges and the equipment for controlled rate freezing of cells. To date, after 5 years of activity, BioCor is equipped with 5 dedicated -80°C freezers, 1 refrigerator +4°C/freezer - 20°C, 3 LN2 tanks, 3 certified Class II biosafety cabinets for biosamples handling and 5 refrigerated centrifuges. All freezers and tanks are connected to an uninterrupted power supply and monitored by h24/day alarm system. In 2022, the software EasyTrack2 with both barcode and QRcode scanning technology was implemented for the registration and traceability of biomaterial. Results and Conclusions. From January 2019 till December 2023, 18 study protocols involving biobanking have been developed in our Institute, and 13 of them were aimed to study cardiovascular related disorders. Whole blood and derivates, urine, stool and tissue samples were collected from a total of 4054 subjects, and 1007 of them have been resampled for follow-up analyses, generating more than 120.000 aliquots of different biosamples. To operate according to international guidelines and the biobank standard ISO 20387, more than 70 documents and procedures have been produced and used for biospecimen collection, processing, storage, shipment and redistribution. Finally, the process to apply for biobank Accreditation according to ISO 20387 has been started.

Keywords

BioCor, cardiovascular diseases, biobanking, accreditation

P13: Translationel research based on material and data from the Danish CancerBiobank – a unique possibility

Estrid Høgdall (1); Claus K. Høgdall (2)
(1) Department of Pathology, Molecular Unit, Bio- and GenomeBank Denmark, Herlev Hospital, Copenhagen University, Borgmester Ib Juuls Vej 73, 2730 Herlev, Denmark, (2) Department of Gynecology, Rigshospitalet, Copenhagen University, Blegdamsvej 9, 2100 København Ø, Denmark

Introduction

Bio-and GenomeBank, Denmark (RBGB) is a Nationwide infra-structure. Danish CancerBiobank (DCB) is a biobank in RBGB. The study describes the degree of biological material collected and stored in DCB for patients diagnosed with primary ovarian cancer (OC) registered in The Danish Gynecologic Cancer Database (DGCD). Furthermore, it presents the possibilities for research by combining biologic al material and clinical information.

Methods

Data extraction from DGCD and DCB.

Results

Biological materials are present for 1.347 (62%) of 2.172 patients with primary OC. The median age of OC patients were 68 years (range: 18-90 years). Median age of patients with biological material in DCB was 67 years and for patients without biological material in DCB 69 years ($P<0.0001$). The histological subtypes for the 1,347 OC patients with biological material were 911 (68%) serous adenocarcinoma, 97 (7%)

endometrioid adenocarcinoma, 80 (6%) mucinous adenocarcinoma, 58 (4%) clear cell carcinoma and for 201 (15%) no information were registered.

Discussion/Conclusion

Combining clinical data and biological material including pre-analytical data regarding the biological material present unique possibilities for translational research.

Keywords

Bio- and GenomeBank Denmark, ovarian cancer

P15: Utilizing diagnostic excess samples to enrich the biobank collections

Roosa E. Kallionpää (1), Perttu Terho (1), Anna Linko-Parvinen (2), Jukka Hytönen (3), Lila Kallio (1)
(1) Auria Biobank, University of Turku and Turku University Hospital, Turku, Finland, (2) Clinical Chemistry, Tyks Laboratories, Turku University Hospital, Turku, Finland; Department of Clinical Chemistry, University of Turku, Turku, Finland, (3) Institute of Biomedicine, University of Turku, Turku, Finland; Clinical Microbiology, Tyks Laboratories, Turku University Hospital, Turku, Finland

Introduction

Finnish hospital biobanks routinely collect one blood sample from each donor based on the biobank consent. In addition, biobanks can use the diagnostic excess samples after the diagnostic assays have been performed. Auria Biobank started to collect excess samples from diagnostic flow in 2019 to enrich its sample catalog.

Methods

Auria has constructed a method for targeted collection of excess samples from the sample flow of clinical diagnostics at the Turku University Hospital. The samples from consented individuals that fulfill pre-defined clinical characteristics (e.g. diagnoses) are flagged. When the samples are no longer needed for diagnostic use, biobank collects the flagged samples. In Auria Biobank, the handling of the liquid samples is accredited (SFS-EN ISO 20387:2020).

Results

In four years, 2800 plasma, 3100 whole blood, 9900 serum and 800 cerebrospinal fluid samples have been collected from the daily sample flow of the hospital. Urine has been collected from 2500 cancer patients, and disease-specific blood collections have been established, such as hospitalized Covid-19 patients (1000 samples), patients with rheumatoid arthritis (500 samples) and patients treated with immune-checkpoint inhibitors (600 samples).

Discussion

The use of diagnostic excess samples allows the enrichment of the biobank collection without requiring any effort or additional samples from the sample donor. The protocol allows the full use of the most valuable samples like cerebrospinal fluid and enables fulfilling study-specific needs such as requirement for large sample volume. Importantly, excess samples allow establishing cohorts with serial follow-up samples from each patient based on the clinical characteristics and biobank consent.

Keywords

sample collection, diagnostic excess samples, cohorts, blood, cerebrospinal fluid, urine

P17: Healthy Donors Biobanking: Current Challenges

José Maximino (1), Andreia Lopes (1), Ionela Toader (1), Ângela Afonso (1), Cláudia Faria (1,2,3), Sérgio Dias (1,3)
(1) Biobanco-iMM, Instituto de Medicina Molecular João Lobo Antunes, Lisbon, Portugal, (2) Unidade de Neurocirurgia, Departamento de Neurociências e Saúde Mental, Hospital Santa Maria, CHULN, EPE, Lisbon, (3) Faculdade de Medicina, Universidade de Lisboa, Lisbon, Portugal Correspondence: jose.maximino@medicina.ulisboa.pt

Introduction

Healthy Controls, broadly defined by the lack of a known disorder/disease, are increasingly relevant in biobanking activities, and resulting research projects. However, lacking clinical information may affect research outcomes due to missing data for sample selection, such as comorbidities[1].

The Biobanco-iMM aims to provide researchers with precise information and guidelines about Healthy Controls' characteristics, to ensure a clear definition and selection criteria.

Materials/Methods

Sample donations were voluntary, obtained during public campaigns, after informed written consent. Donors' clinical information (status) was self-reported, validated on-site by a healthcare professional. Those who reported disorders/diseases existing as sample-collections at the Biobank were excluded from healthy controls collection. Using the clinical information, descriptive analysis was conducted, and graphs plotted.

Results

After excluding 338 donors due to ineligibility, 2548 remained, predominantly female (68.91%), median 37 years of age. Overall alcohol consumption (74.65%) was higher compared to tobacco (34.77%). Most spend their day sitting (26.20%), however only 9.24% reported no exercise activity whatsoever. The predominant reported comorbidities were arterial hypertension (15%), rhinitis (11,5%), asthma (9,6%), and elevated cholesterol (9,3%).

Discussion/Conclusion

To set up relevant and useful Healthy Controls sample-collections, the clinical information should include a detailed description of comorbidities, avoiding future research misinterpretation stemming from "healthy controls" selection (e.g. hypertension increases cancer risk[2]). Habits description will enhance the perception of health, and lastly, data analysis may reveal collection gaps (lack of male donors and older age groups).

Additional variables, like therapeutics could also be included to supplement the information provided by comorbidities.

References

(1)doi:10.5604/01.3001.0010.5272
(2)doi:10.1016/j.trecan.2020.12.010"

Keywords

Biobanking, Healthy Controls, Clinical Data, Analysis

P19: APProVe: project tracking and sample allocation in the context of the German conprehensive cancer center UCT Frankfurt-Marburg

Goetze, Kristina (1), Schneider, Timo (1), Patzek, Jaqueline (1), Przypadlo, Elvira (2), Middeke, Martin (3), Brucker, Daniel (1), Brandts, Christian (3)
(1) interdisciplinary Biobank and Database Frankfurt (iBDF), University Hospital Frankfurt, (2) Comprehensive Biomaterial Bank Marburg (CBBMR), Philipps-University Marburg, (3) Comprehensive Cancer Center Marburg, University Hospital Giessen and Marburg GmbH

Description

Biobanking is the basis for new developments in translational research by providing high-quality patient samples and data. In consortia structures especially, the necessary cross-site search for available samples and the subsequent authorization process in various committees is a bottleneck for a fast allocation of requested samples.
The UCT Frankfurt-Marburg is a Comprehensive Cancer Center consortium funded by the Deutsche Krebshilfe and an "Oncology Center of Excellence". Both sites in Frankfurt and Marburg have independent biobanks (the interdisciplinary Biobank and Database Frankfurt (iBDF) and the Comprehensive Biomaterial Bank Marburg (CBBMR)), which are essential for cancer research.

To digitize the process for sample requests and provision in the biobank, the iBDF developed the software APProVe. Here, researchers can request samples online and follow their proposal through the subsequent approval process. Initially, the tool was used locally but in the context of the CCC consortium was implemented at both sites. The individual instances are connected to enable insight into cross-site projects, that were only submitted in one biobank. Furthermore, APProVe has also been given a modular structure to allow for an easy adaptation to local needs.

The use of APProVe at both sites has facilitated and accelerated the search for and provision of suitable samples for scientists and has thus resolved the bottleneck mentioned at the top. This way it has contributed to the overall success of the UCT Frankfurt-Marburg.

Keywords

APProVe, sample request, project management

P21: How to set up harmonised centrally organized biobanking for development of novel safety biomarkers

Stege, Alexandra (1), Briesemeister, Dana (1)
(1) Charité-Universitätsmedizin Berlin, Central Biobank Charité

Description

The IMI-funded TransBioline project unites 27 partners from pharmaceutical companies, small and medium-sized enterprises, and academic institutions across ten European countries. Together, they aim to evaluate innovative safety biomarkers for drug induced damages for kidney, liver, pancreas, vasculature, and nervous system that also can be repurposed as diagnostic, prognostic and response to therapeutic intervention biomarkers.

Critical to identifying and qualifying biomarkers is the utilization of biosamples processed and stored in a standardized manner. To ensure this, the Central Biobank Charité has been tasked with establishing standardized processes and procedural instructions in collaboration with project partners. Biosample central storage, including annotation, occurs at ZeBanC. Following a standardized query process, eligible biosamples are transmitted to analysis companies. The project also strives to implement FAIR principles for the sample and data collectives.

A comprehensive sample and data workflow has been developed within the project, spanning from recruitment sites to analysis and data management partners, encompassing ID management. This framework facilitated the collection of standardized, well-annotated samples from over 25 patient groups with diverse diagnoses and five cohorts of healthy volunteers. A harmonized informed consent, forming the basis for ethics committee submission, aims to ensure sustainable storage and use of samples and data post-project.

Successful establishment of standardized sample and data collection necessitates close collaboration and shared understanding before project commencement. Collaborative development and description of objectives and processes that are integrated into routine operations is critical. Training and constant communication are an important tool for maintaining process standards, especially with dynamic personnel and under time pressure.

Keywords

Centralised and harmonized Biobanking, multicenter studies, safety biomarker, TransBioLine

P23: Fit for purpose biobanking concept for a large research-oriented University Hospital in Southern Germany

Marei-Theresa Bott (1), Anita Delor (1), Helene Kraus (1), Ute Häußler (2), Daniel Erny (3), Nicolas Neidert (4), Maike Hofmann (5), Özlem Sogukpinar (5), Bertram Bengsch (5), Till Keller (6), Simone Nübling (7), Remi Peyronnet (7), Bernd Rolauffs (8), Peter Nöllke (9), Dirk Lebrecht (9), Brigitte Strahm (9), Kilian Eyerich (10), Günther Schlunck (11), Daniel Böhringer (11), Stephan Ehl (12), Bodo Grimbacher (12), Marta Rizzi (13), Dietrich Rueß (14), Kristina Maas-Bauer (15), Peter Bronsert (16), Martin Werner (16), Julia Huber (16), Susanne Auer (16), Melanie Börries (17), Julius Wehrle (15), Michael Quante (18), Rhena Klar (15), Florian Scherer (15), Sabine Bleul (15), Christopher Berlin (14), Peter Hasselblatt (18), Henriette Bertemes (19), Siegbert Richard Rieg (20), Stephan Rusch (1), Gerhard Kindle (1), Alexandra Nieters (1)
(1) Center for Biobanking, FREEZE-Biobank, Medical Center - University of Freiburg, Faculty of Medicine, University of Freiburg, Freiburg, Germany, (2) Experimental Epilepsy Research, Department of Neurosurgery, Medical Center - University of Freiburg, Faculty of Medicine, University of Freiburg, Freiburg, Germany, (3) Institute of Neuropathology, Medical Center-University of Freiburg, Faculty of Medicine, University of Freiburg, Freiburg, Germany, (4) Department of Neurosurgery, Medical Center - University of Freiburg, Faculty of Medicine, University of Freiburg , Freiburg, Germany, (5) Department of Medicine II (Gastroenterology, Hepatology, Endocrinology and Infectious Diseases), Medical Center-University of Freiburg, Faculty of Medicine, University of Freiburg, Freiburg, Germany (6) Clinical Cardiology, University Heart Center Freiburg-Bad Krozingen, Faculty of Medicine, University of Freiburg, Germany, (7) Institute for Experimental

Cardiovascular Medicine, University Heart Center Freiburg-Bad Krozingen, Faculty of Medicine, University of Freiburg, Germany, (8) G.E.R.N. Research Center for Tissue Replacement, Regeneration & Neogenesis, Department of Orthopedics and Trauma Surgery, Medical Center- University of Freiburg, Faculty of Medicine, University of Freiburg, Freiburg, Germany, (9) Department of Pediatrics and Adolescent Medicine, Division of Pediatric Hematology and Oncology, Medical Center-University of Freiburg, Faculty of Medicine, University of Freiburg, Freiburg, Germany, (10) Department of Dermatology and Venerology, Medical Center-University of Freiburg, Freiburg, Germany, (11) Eye Center, Medical Center-University of Freiburg, Faculty of Medicine, University of Freiburg, Freiburg, Germany, (12) Institute for Immunodeficiency, Center for Chronic Immunodeficiency, Medical Center - University of Freiburg, Faculty of Medicine, University of Freiburg, Freiburg, Germany, (13) Department of Rheumatology and Clinical Immunology, Center for Chronic Immunodeficiency, Medical Center - University of Freiburg, Faculty of Medicine, University of Freiburg, Freiburg, Germany, (14) Department of General and Visceral Surgery, Medical Center - University of Freiburg, Faculty of Medicine, University of Freiburg, Freiburg, Germany, (15) Department of Medicine I, Medical Center-University of Freiburg, Faculty of Medicine, University of Freiburg, Freiburg, Germany, (16) Institute for Surgical Pathology, Medical Center-University of Freiburg, Faculty of Medicine, University of Freiburg, Freiburg, Germany, (17) Institute of Medical Bioinformatics and Systems Medicine, Medical Center-University of Freiburg, Faculty of Medicine, University of Freiburg, Freiburg, Germany, (18) Department of Internal Medicine II, Medical Center-University of Freiburg, Faculty of Medicine, University of Freiburg, Freiburg, Germany, (19) Center for Personalized Medicine, Medical Center - University of Freiburg, Faculty of Medicine, University of Freiburg, Freiburg, Germany, (20) Division of Infectious Diseases, Department of Medicine II, Medical Center - University of Freiburg, Faculty of Medicine, University of Freiburg, Freiburg, Germany

Description

To accommodate the biobanking needs of the Medical Center - University of Freiburg, a powerful strategy should be developed within a five years implementation phase, capable of addressing emerging challenges in precision and personalized medicine.

To this purpose, the center for biobanking, FREEZE-Biobank, was implemented providing a roof and central coordination to an otherwise decentralized structure organized in specialized “hubs” to consider the spatial conditions and to leverage the strong expertise of the supporting partner biobanks and clinics. Initially, we implemented a professional BIMS, a concept to manage our FREEZE broad consent and established a partnership with the clinic’s data integration center to ensure clinical annotations. Subsequently, concepts for innovative sample types such as liquid biopsies, cell-based samples and organoids were developed. We are partner of the German Biobank Alliance, biobanked more than 900.000 samples from approximately 37.000 participants, initiated over 100 cohorts/projects, and collected and digitalized more than 15.000 broad consents. We are part of large multicenter studies in COVID/Long-COVID, cancer entities, and take leading roles in the biobanking of inflammatory and rare immune-based disorders. Our newly integrated hubs are currently widening the portfolio to the fields of neurological/neurodegenerative, skin, heart, and eye diseases as well as regenerative medicine. Following the successful completion of the implementation phase both supporters (University Hospital/Medical Faculty) recently approved sustainable funding.

We will present our concept of FREEZE as a “one-stop shop” for biobanking providing tailored services to clinicians and researchers and discuss obstacles and opportunities affecting the ongoing integration and harmonization process.

Keywords

Cell-based Biobanking, Decentralized Hub-structure, Organoid Biobanking, Personalized Medicine

P25: Digital imaging biobank for targeted therapies in personalized medicine

Cozzolino A.M. (1), Barba M. (1), Ciccarone F. (2), Moro F. (2), Appicciafuoco B. (1), Nero C. (2), Scambia G. (2), Testa A.C. (2), Parolini O. (1)

(1) Biobanca di ricerca per la medicina personalizzata-Fondazione Policlinico Universitario A.Gemelli IRCCS, (2) Scienze della salute della donna, del bambino e di sanità pubblica-Fondazione Policlinico Universitario A.Gemelli IRCCS

Introduction

Personalized medicine requires access to a wide range of samples and data for targeted therapies. Biobanks are crucial repositories for preserving biological samples and donor information, and the emergence of digital biobanks aims to standardize data acquisition and analysis. Our goal is to integrate imaging data with our existing Biobank at the Fondazione Policlinico Gemelli IRCCS (FPG) Hospital, facilitating the translation of imaging biomarkers into clinical practice.

Materials & methods

Imaging data will be collected from patients accessing the gynecological unit at FPG who also provide biological samples to our Biobank. Additionally, our biobank will be implemented with a collection of samples and data from healthy donors undergoing gynecological screening at FPG. The data will be securely stored in a dedicated cloud folder within the FPG informatics system.

Results or findings

To date, our biobank has collected biological samples (including whole blood, plasma for ctDNA, serum, PBMC, and OCT tissue), and clinical information from approximately 1900 patients. Currently, our focus is twofold: correlating imaging data with biological samples from all biobank participants, and enrolling 500 healthy donors. These cohorts will enable the identification of imaging biomarkers useful in personalized medicine research for prognostic, diagnostic, and preventive purposes.

Discussion

The significance of digital image data from biological and biomedical imaging technologies is continuously increasing. The storage and analysis of this data will aid researchers in understanding physiological and pathological processes. The ultimate goal is to ensure that the data are FAIR (Findable, Accessible, Interoperable, and Reusable), emphasizing its broader utility and impact.

References

- Bonizzi G, Zattoni L, Fusco N. Biobanking in the digital pathology era. Oncol Res. 2022 Aug 31;29(4):229-233. doi: 10.32604/or.2022.024892.
- Coppola L, Cianflone A, Grimaldi AM, Incoronato M, Bevilacqua P, Messina F, Baselice S, Soricelli A, Mirabelli P, Salvatore M. Biobanking in health care: evolution and future directions. J Transl Med. 2019 May 22;17(1):172. doi: 10.1186/s12967-019-1922-3.

Keywords

personalized medicine, biobanks, digital biobanks, imaging data, FAIR data

P27: Strategic approach in planning a joint biobank of university and university hospital. The cooperation project JKU -KUK

Gruber, Franz (1), Bernhard, David (1), Doppler, Christian (1), Ivek Propadalo, Elena (1), Kubasta, Christa (2), Langer, Rupert (3), Mühlgrabner, Matthias (4), Spiegl-Kreinecker, Sabine (1)
(1) Center for Medical Research, Johannes Kepler University, Linz, Austria, (2) Institute for Medical and Chemical Laboratory Diagnostics - Blood Depot - Tissue Bank, Kepler University Hospital, Linz, Austria, (3) Clinical Institute of Pathology and Molecular Pathology, Kepler University Hospital, Linz, Austria, (4) Medical Informatics and Information Technology of Oberösterreichische Gesundheitsholding GmbH, Linz, Austria

Introduction

The medical faculty of Johannes Kepler University Linz was founded in 2014. The faculty is located next to the university hospital, Kepler Universitätsklinikum. Implementation of a new, centrally organized biobank will enrich the local biomedical research output.

A detailed concept project was carried out in order to plan a biobank that fits well with the local requirements and resource settings.

Methods

The planning process of the biobank was segmented into various fields, such as strategic focus of the biobank, infrastructure, biobank information management system (BIMS), finance and staff, consent management and

data protection, governance and rules of use. The Austrian biobank node BBMRI.at served as a valuable network.

Findings

Accommodation of sample-related biobanking activities at three central points was judged as the appropriate model in the local settings. One BIMS and one QM for all 3 central points shall frame the biobank. In the course of planning, a time staggered approach turned out to be expedient, starting with focus on tissue banking and following with liquid sample biobanking.

Conclusion

Setting up a new biobank is strongly influenced by local conditions and needs a flexible approach to find an attractive setting. Strong interaction with networks such as BBMRI.at and BBMRI-ERIC is strongly beneficial. Intense work is needed to balance available resources and appropriate equipment and IT solutions in order to serve best the goal of producing high quality samples and data for upcoming research projects.

Keywords

biobank planning, concept project, modular approach

P29: Blood Service biobank fueling future research with FinnGen

Juvila, Julianna (1)
(1) Finnish Red Cross Blood Service biobank

Background

The FRC Blood Service biobank has participated the FinnGen study by providing DNA samples from over 58 000 blood donors. The next step was to collect high-quality plasma and live frozen PBMC samples from blood donors earlier genotyped in the FinnGen. The aim was to collect biobank samples from different regions in Finland to gain insight in clinical, functional, and metabolic consequences of Finnish enriched variants.

Methods

All samples were collected during blood donation from blood donors who had given a biobanking consent. Plasma was separated from EDTA-whole blood and frozen under 4 hours from donation. Buffy Coat fraction of the donated blood was used for isolation of PBMCs the day after blood donation. Live PBMCs were frozen in liquid nitrogen for later analysis.

Results

Collecting biobank samples from different regions in Finland, significantly increased the potential to collect Finnish enriched variants. The analysis of collected samples revealed that the majority of the variant carriers were heterozygotes, but some homozygotes were also detected. We collected most of requested Finnish enriched FinnGen variants at least once in this project. All collected samples showed good quality in later analysis.

Conclusions

This project demonstrated a good capacity to collect high-quality biobank samples from different regions in Finland. Collected sample types are suitable for multiomics, complex immunophenotyping and other sensitive analyses. The specific in-depth data returned from the FinnGen initiative to the Blood Service biobank will be available for future research projects, enabling future studies in a cost-effective way.
About the FinnGen study:
https://www.finngen.fi/en

Keywords

Biobanking, healtcare, research, plasma, PBMC, Finland, FinnGen

P33: Aligning Biobanks and Data Integration Centres Efficiently in Germany

C. Engels (ORC ID: 0000-0003-1448-7190) ([1,2]), M. Lablans ([3]), M. Hummel ([1,2])
(1) German Biobank Node (GBN), Charité – Universitätsmedizin Berlin, Berlin, Germany, (2) Charité University Hospital Berlin, Berlin, Germany; German Cancer Consortium (DKTK), partner site Berlin, and German Cancer Research Center (DKFZ), Heidelberg, Germany, (3) DKFZ Heidelberg, German Cancer Consortium (DKTK), partner site Heidelberg, and German Cancer Research Center (DKFZ), Heidelberg, Germany

Description

The Medical Informatics Initiative (MII) launched by the German Federal Ministry of Education and Research (BMBF) in 2018 aims to integrate

patient-related clinical data across all university hospital locations in Germany. Initially excluding biosamples, it became apparent that integrating biobanks with local data centres would enhance research value. Thus, the ABIDE_MI (Aligning Biobanks and Data Integration Centres Efficiently) project, in collaboration with the German Biobank Node (GBN) was established. GBN introduced three tools from BBMRI-ERIC Common Service IT (CS-IT): the BBMRI-ERIC Directory, Sample Locator, and Negotiator that enhance sample visibility and accessibility of biobanks and biosamples in Europe. Integrating BBMRI-ERIC with the German IT- infrastructure is deemed crucial for participation in European projects, while extending MII feasibility tools for querying different patient cohorts was a primary project goal. Organisational frameworks were aligned to make routine care data and biobank sample data discoverable and accessible across MII sites. IT developments merged clinical and biobank data, linking them to the Research Data Portal for Health (FDPG). Materialised data integration ensured compatibility with BBMRI-ERIC, with tools like TransFAIR enabling data sharing between the data integration centres and the biobank information management systems. Project delays due to the pandemic and technical upgrades extended until June 2023, improving functionalities and expanding FDPG use. Collaboration between data integration centres and biobanks progressed unevenly across sites but laid foundations for future alignment and scalability within MII. But the opening of the national infrastructure towards Europe-wide collaboration in preparation for EHDS still needs to be addressed in follow-up projects.

Keywords

Dataintegration, Data Sharing, Biobank

PS2. Pre-analytic impact on sample quality – means & measures

P35: Stabilization and Room Temperature Storage of Whole PB Samples

Martín-Ayuso, Marta (1), Hernández, Ana (1), García-Álvarez, Miguel (1), Morgado, Mario (1)
(1) 300K Solutions SL, Salamanca, SPAIN

Description

Peripheral Blood (PB) is a widely used biospecimen since it plays a key role in clinical research. Applications such as flow cytometry, requires fresh blood samples for accurate results, which is not always possible due to time or transport constraints. The most common choice to preserve these samples is cryopreservation of PBMC. This requires ultra-low freezer facilities, complex shipment procedures and even more, several studies describes the selective cell loss during PBMNCs isolation and variability in the recovery after thawing that may induce a bias in subpopulation distribution.
The technique here evaluated includes an innovative approach consisting of stabilizing the sample with a precision freeze-drying technique. We evaluated the suitability and applicability of this stabilization system where PB samples were processed in fresh, stored at -80ºC and part of the sample was dried and stored at room temperature (RT) (Fig.1).

When compared in the same samples (fresh, frozen, and dried) the frequency of the different subsets by Flow cytometry, they showed similar recovery that frozen and thawed samples and the frequency of the populations remained stable for the main subsets with an r2>0.9 (Fig.2). DNA extraction was performed both in fresh, frozen, and dried aliquots, showing similar quality and functional profile.

The alternative here evaluated offers the possibility of stabilizing and storing whole PB at RT to be used for a wide range of downstream applications, including Flow cytometry or genomic techniques such as NGS. This implies that precision drying is an innovative, sustainable, and accurate choice for RT PB storage.

Keywords

long-term, freeze drying, peripheral blood, flow cytometry, sustainability

P37: Automatization in biobanking

Laeremans, Hilde (1)
(1) Lifelines

Description

Lifelines collects health-related data, measurements, and biological samples from a population cohort of more than 167.000 participants, including children, adults, and elderly, over a 30-year period. Samples are collected with an interval of five years. The strength of Lifelines is this repeated collection of samples and data. For example, the impact of changes in the environment can be studied on biological samples from different timepoints.

To perform these studies, it is necessary that pre-analytical and processing steps are identical or at least validated when methods or materials are switched.

Lifelines has an elaborated validation system for pre-analytical steps and the processing of primary samples. However, the main variable in this process remains to be the human steps. Therefore, Lifelines is ameliorating the steps from sampling to processing by automatization of as many steps as possible and developing a custom LIS system that is more adapted to biobanking.

To this end, Lifelines is looking into not only an automated blood drawn mechanism, but also to automatize sample aliquoting linking this system to a long-term storage facility. Furthermore, optimalization of storage to reduce costs are in development.

Keywords

Standardization, automatization

P39: Novel Dry Technology for Stabilization and Room Temperature Storage of Tissue Sections for Genomic Studies

Martín-Ayuso, Marta (1), Hernández, Ana (1), García-Álvarez, Miguel (1), Morgado, Mario (1), Fraile, Susana (2), Rodrigues Teixeiro, Telmo (2), del Carmen García-Macías, María (2)
(1) 300K Solutions SL, Salamanca, SPAIN, (2) Department of Medicine and Cancer Research Center, University of Salamanca

Description

Preservation of tissues with high quality for downstream applications is extremely important for basic medicine and genomic studies. At this point, lyophilization may represent a valuable approach for room temperature (RT) storage of tissues without losing sample quality. In this study we have evaluated if nucleic acid integrity is preserved in lyophilized mouse tissues (lung, liver, kidney), as well as the suitability of these tissues for histology and immunohistochemistry (IHC) analysis.

Stabilization buffers with different excipients were used to evaluate and compare the quality of freeze-dried mouse tissues with either formalin-fixed, paraffin embedded (FFPE) or frozen tissues based on the downstream application of each sample. Specifically, FFPE tissues were used as control for histology/IHC studies, whereas frozen tissues were used as control for DNA/RNA quality. After lyophilization and RT storage, dried tissue samples were treated separately in 2 different ways: one was used for histology/IHC (CD31, Vimentin and Ki67) analysis and the other one was used for DNA/RNA purification and quality control (QC) assessment based on purity and integrity.

Our results showed that an appropriate combination of protocol and lyophilization cycle, preserved tissue IHC markers (Fig.1) and DNA/RNA purity and integrity (Fig.2).
The technology here proposed offers protection during the freeze-drying process of tissues resulting in RT stability and allowing its use for both IHC analysis and DNA/RNA extraction. Importantly, nucleic acids obtained from freeze-dried tissues showed a level of quality that could lead to its use in genomic studies, which demand is increasing nowadays in the clinical field.

Keywords

long-term, freeze drying, tissue sections, sustainability

P41: Validation of centralized biobanking workflows for Nuclear Magnetic Resonance based Metabolomics

Altmann, Heidi (1)
(1) University Hospital Dresden

Background

Assessing the sample quality is an important aspect of the BioBank Dresden. The metabolic

profile obtained from NMR Spectroscopy has shown to provide excellent quality information about a sample. Here, we performed a series of experiments to determine the rate of change of up to 152 different metabolic parameters, depending on pre-centrifugation delay and post-centrifugation delay. Specific time-delays were chosen to simulate a realistic scenario of a working central biobank. The main goal was to investigate the stability of a large metabolic parameter panel and to generate a model to predict metabolic sample quality based on time stamps.

Material & Methods

Blood was drawn from healthy volunteers in three coagulation tubes. The samples were left at RT at specific intervals (0-8h) with either a constant pre-centrifugation delay or constant post-centrifugation delay. Aliquots were immediately frozen and measured by NMR Spectroscopy.

Results

Linear mixed models were employed investigate the impact these processing delays. Further, a stability timepoint (time for 30% change to original value) was calculated for each metabolic parameter. These data were then used to create an interactive QC-Panel. The QC-Panel allows the judgement of sample cohorts where all the pre-analytical information was tracked. The pre-analytical information times can be entered and the change for each parameter is expressed.

Conclusion

In automated biobanks the pre-analytical information of samples needs to be fully characterized. The data presented here allows characterization of the pre-analytical effect on metabolic measurements. The QC-Panel allows researchers to judge their own study cohorts and investigate which parameter or sample should be excluded.

Keywords

Biobank, NMR, Quality Control, Model

P43: Dutch biobanking standard: towards harmonized, evidence-based collection, processing and storage of human biomaterials

Hilde Brouwers – da Silva (1,2), Jörg Hamann (1,3), Dorine Swinkels (1,4)

(1) Health-RI, (2) Erasmus MC, (3) Amsterdam UMC, (4) Radboud UMC

Introduction

An important prerequisite for obtaining reliable results in biomedical research is quality of biomaterials. Collection, processing and storage (pre-analysis) of these materials needs to be harmonized and well documented as variation in sample quality can lead to undesirable variation in post-analytic outcomes, potentially leading to incorrect conclusions and thereby, research waste. For many years, biobanks in the Netherlands follow guidelines for pre-analysis that are based on expert knowledge and consensus. Under the auspices of the national infrastructure for health and life sciences data, Health-RI, we aim to develop and implement a novel evidence-based, fit-for-purpose biobanking standard. We further aim to create awareness and a collective responsibility for the importance of pre-analytic standardization within the work field.

Methods and Preliminary Results

Standards will be generated for a variety of human biomaterials, commonly used in biomedical research, starting with circular cell-free DNA (ccfDNA) and genomic DNA, using a pre-defined methodology. Scientific evidence for the standards will be obtained by systematic review of literature and international standards. Scientific evidence will serve as input for creation of the first version of the standard. In a subsequent Delphi Survey the standard will be fine-tuned with predefined stakeholders who serve as practice experts to ensure input of expert opinion, feasibility and collective responsibility. Implementation of the standards will be reached together with stakeholders representing professionals and users in health care and medical research.

Conclusion

We have initiated development of a novel evidence-based, fit-for-purpose biobanking standard. This will improve quality and interoperability of biomaterials in health research innovation.

Keywords

standard, evidence-based, fit-for-purpose

P45: Assessing the quality of long-term stored samples within a biobank network to boost the utilisation for research

Pang SHM (1,2), Villanueva D (1,2), Graham L (1), Hume S (1), Marquez J (1), Mountain AJ (1), Rudge A (1), Michalak EM (3), Newman P (3), Drummer HE (3,4,5), Ng W (1,2), Higgins S (1,2)
(1) Victorian Cancer Biobank (VCB), Victoria, Australia, (2) Victoria Cancer Registry, Cancer Council Victoria, Victoria, Australia, (3) Burnet Institute, Victoria, Australia, (4) Department of Microbiology, Monash University, (5) Department of Microbiology and Immunology at the Peter Doherty Institute for Infection and Immunity

Introduction

Victorian Cancer Biobank (VCB) Consortium through its five member tissue banks have accrued 460,000+ samples, that may be stored over an extended period prior to utilisation. It's imperative to understand the impact of prolonged storage on these samples to ensure they continue to be a paramount resource for cancer research. We established a QC Scientific Testing Program to examine a subset of VCB samples to improve understanding on fitness for purpose.

Methods and Results

In this pilot study, 140 plasma, 140 serum and 83 snap frozen tissues (SFT) derived from Breast, Colorectal and Lung cancers collected between 2007 to 2019 were selected and tested for haemolysis (blood derivatives), RIN and DIN (SFT). Aligning with current literature, the acceptance criteria for haemolysis in blood samples was limited to ≤ 2mg/mL free haemoglobin, and RIN and DIN values ≥ 6 in SFT, hence suitable for gene sequencing. Results show that the selected plasma and serum samples passed the haemolysis measurement, and over 89% and 91% of SFT had RIN and DIN values ≥ 6, respectively.

As of 2023, the overall utilisation of VCB samples is 15.7% since inception (International benchmark: 10%). In the last 3 years, the average annual transaction is 21,738 aliquots with a utilisation to collection ratio of 0.625.

Conclusion

This initial outcomes indicate that VCB's long-term stored samples are fit-for-purpose for client's downstream applications with possible variance between tumour streams. Such information is important to encourage the utilisation of our banked samples in creating to advancement of sciences.

Keywords

Quality, QC, Utilization, Cancer

P47: Comparison of Automated Nucleic Acid Purification Systems on High Molecular Weight (HMW) DNA Extraction Efficiency

Goh, Catherine (1)
(1) Revvity

Description

With automation being increasingly employed in laboratories performing nucleic acid purification, a more consistent integrity of nucleic acids is generally expected. A high integrity of nucleic acids should also be obtainable with automation to meet requirements of demanding downstream assays such as NGS, long read sequencing, and MLPA, while ensuring long-term storage stability. However, differences in mechanical processes and kit chemistries between commercial automation platforms may result in variation of nucleic acid integrity which can impact downstream results. Here, we evaluated two systems of magnetic bead-based automated nucleic acid purification using blood samples. Nucleic acids were assessed in terms of yield and purity. Integrity of DNA as seen by the extraction efficiency of high molecular weight (HMW) DNA was also assessed.

Keywords

biobanking, nucleic acid isolation, automation

P49: Fast processing of gynecologic tissue samples in Danish Cancer Biobank makes them well-suited for biomarker studies

von Wowern, Frederik (1), Høgdall, Estrid (1)
(1) Department of Pathology, Herlev Hospital, Denmark

Description

Gynecologic cancers remain a frequent and, in the case of ovarian cancer, deadly diagnosis.

Ovarian cancer is often diagnosed in the later stages, leading to a poor prognosis. Hence, to enhance precision medicine, new biomarkers are needed. In order to detect clinically applicable biomarkers, a large sample size and control of pre-analytical variables is required. Samples from the Danish CancerBiobank may be well-suited for such studies, as the biobank contains samples from more than 100.000 cancer patients, and the samples are annotated with pre-analytical variables.
For this study, data from the Danish CancerBiobank on gynecologic cancer tissue samples collected between 2020-2022 was extracted. Nationwide data for processing- and transport time for the tissue samples was included in this study, and the difference in processing and transport time was analyzed between the different centers and cancer types.

The average processing time for gynecologic tissue samples collected between 2020-2022 was found to be 1.13 hours (SD = 1.31). Furthermore, the processing time was found to be significantly different between the centers ($P < 0.001$), and between the gynecologic cancer types ($P < 0.05$). Additionally, transport time was found to be significantly different between the centers ($P < 0.001$), indicating transport time plays an important role in the differing processing times.
In conclusion, while differences in processing and transport time across the centers and cancer types was found, the majority of the gynecologic tissue samples are optimal for biomarker studies, which may be important for guided treatment of patients.

Keywords

Cancer, Gynecologic cancer, Biomarkers, Precision medicine, Processing time

P51: Digitization and Integration of Reference Sections for Tissue Samples

Neumann, Michael (1), Birkenkamp, Alexander (1), Molnar, Hansgeorg (1), Rambow, Matthias (1), Jahns, Roland (1)
(1) Interdisciplinary Bank of Biomaterials and Data Würzburg (ibdw), Würzburg, Germany,

Introduction

Reference sections (thickness 5-6µm) for fresh frozen tissue samples are prepared to document the respective sample status after sample reception or after sample release.

Material and Methods

Sample sections are digitized using a semi-automatic scanner (VENTANA DP200, Roche). The scanner reads the sample ID on the slide barcode automatically identifies the region of interest and limits the scan area accordingly. In addition to an overview scan, the scanner generates scans in different resolutions. The resulting images are stored in DICOM format on a file system. A background process automatically transfers the images to a PACS image archive. Before the transfer, the process extracts the sample ID and copies it into the Patient ID field in the DICOM header. In parallel, the script generates a file containing metadata of the transferred DICOM images. A downstream process uses the metadata to generate the corresponding link of the reference section scan for the associated associated sample in the biobank management system.

Results

Digitization of reference sections and their automated archival and integration into the biobank management system provides a safe and reliable way of documenting the status of tissue samples. Linking tissue sample and its corresponding reference section scan(s) further enhances accessability and usability in daily routine.

Conclusion

Archival of digitized reference sections even in a routine PACS is compliant with data protection rules as no patient or donor information is stored with the digital images. A 'virtual patient' represents each sample and its subsequent reference sections are stored as different study instances.

Keywords

Digitization, Tissue Samples, Reference Section, Automation

P53: Impact of different pre-analytical conditions on the measured serum levels of biochemical analytes in samples collected for biobanking

Sara Magnacca (1), Augusto Di Castelnuovo (1), Maria Benedetta Donati (2), Licia Iacoviello (2,3), Amalia De Curtis (2)

(1) Mediterranea Cardiocentro, Napoli, Italy; (2) Department of Epidemiology and Prevention, IRCCS Neuromed, Pozzilli, IS, Italy; (3) Department of Medicine and Surgery, LUM University, Casamassima, Italy

Background

Pre-analytical conditions are critical in maintaining the high quality of blood samples before biobanking. We planned experiments to test the stability of some analytes before biobanking under extreme pre-analytical conditions, simulating delays in centrifugation times and in testing times after centrifugation.

Methods

We prepared three serum samples from 66 apparently healthy subjects aged ≥45 years (51.5% women). After blood collection, the blood vacutainer was left at room temperature before centrifugation for 30 min, 2 or 4 hours. After centrifugation each serum sample was stored in 4 cryovials at room temperature for 30 min., 1, 2 or 4 hours before the analysis. At the specified times, 9 biochemical analytes were tested by an automatic analyzer (ILab TAURUS Instrumentation Laboratory, Milan, Italy).

Results

The serum levels of AST and ALT, total cholesterol, HDL-cholesterol, triglycerides, creatinine, albumin, and uric acid measured when centrifugation was performed 30 min, 2 or 4 hours after blood collection were comparable, while glucose levels were decreased (for mean values equal to 100 mg/dL (SD=17.2 mg/dL), 95 mg/dL (17.6), and 88 mg/dL (17.3) at 30 min, 2 or 4 hours before centrifugation, respectively; $p<0.0001$).
Measurements performed at increasing times after centrifugation showed levels of all 9 analytes higher compared to those measured immediately, especially 4 hours after centrifugation (4-9 %, $p<0.0001$).

The mechanisms underlying such changes are presently under investigation.

Conclusions

These results underline the relevance of following procedure times suggested by SOP after sample centrifugation before biobanking and also before centrifugation if glucose levels are the target.

Keywords

sample quality, biobanking

P55: Unveiling preanalytical variation: insights from SPREC codes and incidental events

Núria Peiró-Gabà (1), Cèlia Segura-Torres (1), HCB-IDIBAPS Biobank Group (1), Aina Rodríguez-Vilarrupla (1), Ada Soler-Ventura (1), Teresa Botta-Orfila (1).
(1) Biobank from Hospital Clínic Barcelona (HCB) - Institut d'Investigacions Biomèdiques August Pi i Sunyer (IDIBAPS) (HCB-IDIBAPS Biobank), Fundació Recerca Clínic Barcelona-Institut d'Investigacions Biomèdiques August Pi i Sunyer (FRCB-IDIBAPS), Barcelona, Spain.

Introduction

Annotation of preanalytical variables is essential in biobanking for ensuring high-quality biologic material and associated data, aligning with best practices and accreditation standards. Managing and tracking these variations is vital for the optimal interoperability between biobanks. The Standard preanalytical Code (SPREC) provides a framework for defining key variables in sample manipulation, e.g. pre- and post- centrifugation delay and long-term storage. This study examines the correlation between SPREC and incidental events to understand how preanalytical variation affects sample quality and identify opportunities for process optimization.

Materials and methods

A retrospective analysis was conducted on a dataset including samples collected at HCB-IDIBAPS Biobank between 2020-2023. SPREC coding was applied both retrospectively and prospectively to each processed sample, and incidental events, such as sample degradation or unexpected findings, were documented.

Results

Preliminary findings reveal no discernible connection between preanalytical variation and DNA sample quality within the biobank dataset. However, a correlation was observed between pre-centrifugation delay and hemolysis. Strong tendencies regarding incidental events were also noted depending on the sample collection circuit.

Conclusions

We addressed reproducibility concerns by examining variability in modern biobanking practices and proposing strategies for improvement. Understanding preanalytical variation is crucial for enhancing the quality of the biobank samples, especially considering the increased demand for high-quality samples for novel technologies. SPREC coding registry is key for the monitoring of preanalytical quality and should be considered as a necessary datum. Further research with expanded datasets is necessary to validate and refine these initial findings, enhancing research integrity and outcomes.

Keywords

SPREC, preanalytical variation, incidental events, quality management, reproducibility, high-quality samples.

P57: Influence of Preanalytical Factors on the Quality of Tissue Samples in Biobanking

Tercan-Avci, Sanem (1), Özkalay, Beste (1), İnci, Yeliz (1), Celebi, Caglar (1), Ulker, Ceren (1), Uzun, Ece (1), Birincioğlu, Serap (1), Atabey, Nese (1)
(1) Izmir Biomedicine and Genome Center

Description

Access to high-quality biosamples is one of the most important prerequisites for biomedical research. In this study,we aimed to investigate the effects of transfer conditions and freezing methods on tissue quality in three different tissues of rats: brain, liver, and muscle.

For this aim, we first compared the effects of three different transfer conditions (direct transfer, transfer in DMEM, and transfer in vacuum begs) and cold ischemia durations (0-2h; 2-8h and 8-24h) on sample quality. Then, we compared the influence
of three freezing methods snap freezing, isopentane treatment, and controlled rate freezer, on the sample quality. We tested tissue integrity with histopathological analysis. RNA quality was analyzed by Bioanalyzer. Furthermore, the effect of transfer conditions and time on primary cell line preparation was tested.

We observed that each tissue type requires different transfer and freezing conditions to protect sample quality, and their stability under cold ischemia is differential. The transfer of the liver tissues at +4C without media was sufficient to keep sample quality. In contrast, transferring brain tissues in the DMEM and the muscle in vacuumed conditions had better sample quality in prolonged ischemia. The freezing method did not cause any significant difference in sample quality for any of the tissue types tested.
In conclusion, tissue transport methods and time impact the quality of tissue samples, and these conditions need to be optimized according to the origin of biobanked tissues.

Keywords

biobank, pre-analytical factors, transfer condition, freezing condition, vacuum, biosample quality, morphology, RNA, primary cell culture

P59: Comparison of visual and spectrophotometric measurement of plasma quality in cancer patients and healthy donors

Daniel Alba Olano (1)
(1) CNIO Biobank

Introduction

Hemolysis is one of the main reasons for the rejection of blood samples in clinical laboratories. Therefore, proper management of these samples is crucial in the development of new blood-based biomarkers, as it significantly influences the accuracy and reliability of various medical test results.

The assessment of hemolysis is commonly performed by visual discrimination, where the degree of hemolysis is determined by inspecting the colour of the blood plasma. Although visual assessment is one of the simplest ways to report plasma quality, it can lead to inaccurate results. Detailed studies have shown this method to be unreliable compared to spectrophotometric and automated detection techniques.

Material & methods

We compared the visual estimation of hemolysis together with the absorption at 385 and 414 nm of EDTA and citrate plasma samples collected at CNIO-Biobank analyzing more than

500 plasma samples from both cancer patients and healthy donors.

Results or findings

Although visual examination is a quick and easy method to estimate hemolysis at the time plasma is isolated, the results obtained by different operators were not always reproducible, even using a colour scale as a reference.

Despite the limitations of both methods, we found a correlation between hemolysis measured by visual examination and spectrophotometry.

Discussion and conclusion

Despite the ease of measurement of hemolysis by visual inspection, spectrophotometry analysis renders quantitative measurement of plasma hemolysis more reliably and consistently that visual examination, although it also has some limitations that must be taken into account when implementing this method for quality control purposes.

Keywords

biobank, plasma, quality control, spectrophotometry

P61: Analysis of the volume of biological material obtained from whole blood drawn into the Sarstedt aspiration-vacuum system

Agnieszka Ochocińska (1), Edyta Czekuc-Kryskiewicz (1), Lidia Ponikowska (1), Ewa Skorupa (1), Zuzanna Woźniak (1a), Wiktoria Laprus (1a)
(1) Department of Clinical Biochemistry, The Children's Memorial Health Institute, Warsaw, Poland, (1a) Intern in the Department of Clinical Biochemistry, The Children's Memorial Health Institute, Warsaw, Poland

Introduction

The volume of serum/plasma separated from the whole blood is influenced by many factors (e.g. hydration, pregnancy, diseases).

Purpose

Recognition of the variability of serum/plasma volume obtained from blood taken into the Sarstedt aspiration-vacuum system.

Materials and methods

The volume of serum/plasma obtained from a blood sample correctly collected into a 1.2 ml and 2.7 ml Sarstedt tubes with a CAT or K2EDTA as part of routine tests performed in the Department of Clinical Biochemistry (CMHI, Warsaw, Poland) was determined. Blood was centrifuged under the same conditions (2000g; 10 min; 4°C) .

Results

The volumes were measured in n=92 and n=55 of serum samples and in n=100 and n=94 of plasma samples in case of 1.2 ml and 2.7 ml tubes, respectively. The mean volumes of supernatants achieved from 1.2 ml and 2.7 ml tubes respectively were (mean±SD; µl): 506±124 and 994±181 for serum, and 445±109 and 1246±253 for plasma. The minimum/maximum serum and plasma volumes obtained were 200/800 µl and 200/700 µl, respectively for 1.2 ml tubes, and 600/1400 µl and 600/1650 µl, respectively for 2.7 ml tubes.

Discussion

Due to the very large variation of the amount of supernatants separated from the same volume of whole blood, it may be insufficient to specify in scientific/clinical research protocols the amount of material estimated in the form of the volume of primary samples. It seems to be reasonable to create common guidelines/standards for the patients regarding their preparation before collecting biological material for biobanking.

Keywords

blood processing, serum/plasma volume variability

P63: Do haemolysis and lipaemia affect the quantification of EVs in plasma of breast cancer patients?

Piccotti, Francesca (1,2), Morasso, Carlo (2), Albasini, Sara (1,2), Forleo, Giulia (1,2), Invernizzi, Laura (2), Bonizzi, Arianna (2,3), Signati, Lorena (2,3), Truffi, Marta (1,2), Corsi, Fabio (1,3,4)
(1) Bruno Boerci ICSM Biobank, Istituti Clinici Scientifici Maugeri IRCCS, (2) Nanomedicine and Molecular Imaging Lab, Istituti Clinici Scientifici Maugeri IRCCS, (3) Department of Biomedical and Clinical Sciences "Luigi Sacco", University of Milan, (4) Breast Unit, Surgery

Department, Istituti Clinici Scientifici Maugeri IRCCS

Description

The membrane destruction of erythrocytes and other blood cells is defined as haemolysis and it represents the most common cause of preanalytical interference [PMID: 3711796 - doi: 10.1080/10408363.2019.1664391]. Extracellular vesicles (EVs) are particles with a lipid bilayer membrane secreted from many cell types that recently resulted as promising cancer biomarker, in particular in breast cancer (BC) [doi: 10.1007/s10549-021-06474-3]. The influence that preanalytical factors on the quantification of plasma EVs however is still not known properly. It is thus important for the quality of biobanking activities to assess the influence that factors such as haemolysis and lipaemia might have on clinical studies on EVs [doi: 10.1002/jev2.12385].

From 2021 to 2023, the blood samples of 36 BC patients referred to the EUSOMA-accredited Breast Unit at Istituti Clinici Scientifici Maugeri (Pavia, Italy), and 36 healthy controls (HC), were collected, processed in order to obtain plasma and stored at the “Bruno Boerci” ICSM Biobank, a certified ISO 9001 biobank, member of the Italian Node of BBMRI-ERIC. Haemolysis and lipaemia of plasma samples were determined spectroscopically by NanoDrop [doi: 10.4155/bio.13.344] and EVs levels were measured using an in house developed assay based on the SiMoA technology [doi: 10.1007/s10549-021-06474-3].

Spectrophotometric analysis of haemolysis did not highlight any significant difference between BC and HC ($p = 0.61$). No correlation was found between EVs measured levels and presence of haemolysis and lipaemia, presuming that the EVs plasmatic concentrations are not affected bypreanalytical factors. The results obtained will be further validated on a larger scale.

Keywords

Haemolysis - Lipaemia - Biomarker - EVs - Sample quality

P65: GenomeMET: Metrology for genomic profiling to support early cancer detection and precision medicine

Cornelia Stumptner (1), Peter M. Abuja (1), Melina, Hardt (1), Katrin Panzitt (1) and the GenomeMET consortium
(1) Medical University of Graz, Austria

Introduction

In Europe, cancer caused 1.26 million deaths in 2020 and the number is expected to increase in future. Genomic profiling diagnostic tools such as next generation sequencing are important in cancer treatment, particularly to develop personalised targeted therapy and to aid early diagnosis.

However, quality and comparability of genomic profiling from patient samples, including biobank samples, varies significantly with standards and metrological means to support the field being in their infancy.

Material & methods

GenomeMET, a project funded under the European Partnership for Metrology programme (22HLT06) comprising 17 partners from metrology institutes, sequencing centers and pathology & cancer institutes, focuses on the development of novel metrological capability, reference materials and reference measurement systems to support standardisation, regulatory compliance & quality/comparability of cancer genomic diagnostics.

Results/findings

GenomeMET uses tissue and liquid biopsy samples from lung and colorectal cancer as cancer models. Major outcomes of the project will be i) reference measurement systems to support validation, quality assurance and external quality assessment (EQA), ii) reference measurement procedures for cancer biomarkers and quality control parameters within genomic workflows, iii) assessment of existing and newly developed reference and EQA materials, and iv) a framework for measurement uncertainty determination.

Discussion/conclusion

Overall, this development of the needed metrological structure will help make genomic profiling for cancer prevention and treatment

accessible across Europe and greatly contribute to the Horizon Europe's Mission on Cancer. Also, cancer research and biobanks using genomic profiling may benefit from more standardization in genomic profiling.

Keywords

reference material, quality / quality control, sequencing, standardization, pre-analytics, cancer, regulatory compliance

P67: NGS library preparation: comparison between two automated platforms in biobanking

Stela Golovco (1), Alessia Farinazzo (1), Valentina Sandrini (1), Nicola Sperandio (1,2), Cinzia Cantù (1,2), Giada Bonizzato (1,2), Sonia Grimaldi (1,2), Aldo Scarpa (2,3), Rita T. Lawlor (1,2)
(1) ARC-Net Applied Research on Cancer Center, University and Hospital Trust of Verona, Verona, Italy, (2) Department of Engineering for Innovative Medicine, University of Verona, Italy, (3) Department of Pathology and Diagnostics, University of Verona, Verona, Italy.

Introduction

The aim of the study is to investigate different methods of library preparation for next-generation sequencing using different platforms and observe the effect on the quality of the sequencing outcomes.

Material & methods

We used DNA extracted from FFPE tissue, selected based on post-sequencing quality control (QC) scores from initial manual preparation with a mix of warning and OK values. Libraries were prepared using the Agilent Magnis platform and then tested with the Hamilton platform. Both platforms were performed using Agilent SureSelectXT HS Kits. The two instruments displayed differences in operator intervention during the library preparation procedures. We considered post-sequence QC values, average depth, average coding depth, average SNP depth and discordant percentage as quality parameters.

Results

Based on post-sequencing values, 20% (2 out of 11) of samples had a warning score with Magnis while 30% (4 out of 11) of samples prepared with Hamilton showed a warning score and the rest were acceptable. These results concurred with the results for the three sequencing parameters except for one sample on each platform where the discordant percentage was diverse.

Conclusion

Our preliminary data suggest that overall QC indicates the quality of post-sequencing parameters. The Magnis platform showed better scores than the Hamilton platform potentially due to the affinity of the Agilent kit protocol with the Magnis instrument. Conversely, the protocol was re-created for the Hamilton instrument that is designed to be protocol independent. To further investigate the findings, we intend to increase the sample cohort and test other independent protocols.

Keywords

Next generation sequencing, library preparation, quality control, automated platforms

PS5. Success stories – Biobanks fostering medical progress

P69: Invasive Fungal Disease in Chronic Liver Transplant Failure – an Underestimated Burden

Katharina HOFMANN (1), Aleksandra V. PUZALKOVA b, Tilman PFEFFER (1), Isabel M. Klein (1), Arianeb MEHRABI (3), Uta MERLE (4), Roland PENZEL (2), Albrecht STENZINGER (2), Christa FLECHTENMACHER (2), Peter SCHIRMACHER (1,2)
(1) Tissue Bank of the German Center for Infection Research (DZIF), Institute of Pathology, Heidelberg University Hospital, Germany, (2) Institute of Pathology, Heidelberg University Hospital, Germany, (3) Department of General, Visceral and Transplantation Surgery, Heidelberg University Hospital, Germany, (4) Department of Gastroenterology, Infectious Diseases and Intoxication, Heidelberg University Hospital, Germany

Background

Invasive fungal infection (IFI) is a significant complication in solid organ transplant patients and a diagnostic challenge. To elucidate occurrence and significance of IFI in chronic liver transplant failure, retrospective histo- and molecular pathological analyses were

performed at the Institute for Pathology Heidelberg in collaboration with the accredited Tissue Bank of the German Center for Infection Research (DZIF).

Methods

FFPE tissue samples and pathological findings from all explanted liver transplants due to chronic failure from the liver transplant database of Heidelberg University Hospital (1991-2021, ≥90-day graft survival) were reexamined. Additional staining with periodic acid-Schiff and Grocott methenamine silver was used in the light-microscopic investigations to uncover occurrence, severity, and associated conditions of IFI. Molecular fungal species identification was performed chip-based by DNA-DNA hybridization.

Results

Light-microscopic examination revealed fungal infection in 41 (27.7%) of the 148 analyzed cases with 2/3 being newly specified. Female patients presented a slightly higher risk for IFI. The biliary tract was generally affected, accompanied by acute inflammation with frequent abscess formation (78.1%). Cases involving smaller bile ducts or blood vessels were detected less frequently. In 36 cases, molecular identification of the fungal species was achieved, showing mixed infections in 27.7%. Candida albicans was the most common pathogen (72.2%).

This project shows the underestimated prevalence and high diagnostic and clinical relevance of IFI in chronic liver transplant failure and highlights the diagnostic challenges and needs. The contribution of structured registries and qualified biobanking is evident in such retrospective, but also prospective studies and improves targeted diagnostics and development of adequate therapeutic strategies.

Keywords

Liver transplants, fungal infection, fungal disease, mycosis, DZIF Tissue Bank

P71: Decentralized biobanking in NAPKON - 1000 sample requests later

Verena KOPFNAGEL (1), Stefanie MÜCKE (1a), Sonja KUNZE (2), Bärbel FÖSEL (2), Inga BERNEMANN (1), Patrick CHRIST (1), Chistoph DOLCH (1), Norman KLOPP (1), Nadine LINDEMANN (2), Bettina LORENZ-DEPIEREUX (2), Thomas ILLIG (1), Gabriele ANTON (3) on behalf of the NUKLEUS Biosample Core Unit
(1) Medizinische Hochschule Hannover, HUB Hannover Unified Biobank, Hannover, Germany; (2) Helmholtz Munich, Institute of Epidemiology, Munich, Germany, (3) Central Biobank of Bielefeld University (ZBUB), Bielefeld University, Bielefeld, Germany

Abstract

Decentralized biobanking in multicenter studies offers the advantages of rapid local processing and storage of biosamples. However, it also poses challenges and risks in harmonization between established sites and in sample requests across sites.

Within the National Pandemic Cohort Network (NAPKON), 7092 patients are recruited for COVID-19 research at 36 university hospitals across Germany. The collected biosamples are stored locally. Data and biosamples are available for research projects via a central use & access procedure. The various infrastructure core units of the NUM Clinical Epidemiology and Study Platform (NUKLEUS) process approved project applications and provide the required data and biosamples. The coordinating biobanks of the NUKLEUS biosample core unit, Hanover and Munich, request the required biosamples from the respective recruitment sites and forward the collected biosamples to the corresponding applicants.

Since the start of the project in 2020, over 1000 of these project-related sample requests have been processed by the local sites. A total of 58,788 biosamples were sent to applicants between 2020 and 2023. Over 400 biosample shipments were monitored with temperature loggers to ensure high sample quality and subsequently evaluated. Over 99% of the requested samples were available and correctly selected by the sites and arrived with high quality at the coordinating biobanks. The average time from the request to the arrival of the samples was 23 days. However, the use of a wide variety of aliquot tubes at the local sites led to considerable additional work in sample processing on the part of the applicants.

Keywords

decentralized biobanking, sample logistic

P73: Building thematic biobank networks: 20 years' experience of the French liver cancer biobank network, a success story

Bruno CLEMENT (1,2), Muriel FRANCOIS-VIE (1), Bruno TURLIN (1,2), Mireille DESILLE (3), Eric FRISON (4), Léa GUILLEMIN (4), Thomas DECAENS (5), Simone MATHOULIN-PELISSIER (6), Valérie PARADIS (7)
(1) Liver cancer biobank network, (2) Institute of Nutrition, Metabolism and Cancer, Inserm, Rennes, France, (3) CRB-Santé, CHU Rennes, France, (4) ISPED, CIC 1401 and CHU Bordeaux, (5) University and CHU Grenoble Alpes, France, (6) Institut Bergonie and University of Bordeaux, France, (7) CHU Beaujon, Clichy, France

Description

Liver cancers (hepatocellular carcinomas, cholangiocarcinomas) are common cancers worldwide, being the third most common cause of cancer mortality. Thus, identifying efficient tools for early detection of liver cancers and innovative targeted-drugs remains a major issue. In the early 2000s nine liver centers in France set up a network to organize the exchanges of information and biological materials, requiring standardized procedures for the collection and preservation of liver samples and linked-information related to demographics, clinical, biological and histological data, in line with the recommendations for Biological Resources Centres (BRC) released by OECD. This has led to the creation of a Liver cancer biobank network, recognized by the Ministry of research and the Ministry of health and sponsored by the main research agencies, namely Inserm and INCa. Samples are collected and stored locally, whereas related annotations are remotely collected within a central data warehouse. Samples are made available to research groups following acceptance of research projects submitted to the Scientific Committee and the Executive Board of the network.

Today, the network gathers biological samples (tumor and non-tumor tissues, blood) and clinico-biological data (644 clinico-biological variables, including 307 mandatory) from 3944 patients. The Liver cancer biobank network contributed to > 100 articles aiming at identifying key genomic alterations occurring in the development of tumors, as well as new set of biomarkers, including transcriptomic and proteomic signatures, and candidate targets for anti-cancer drugs. Current challenges include real-life patients studies, IA based imaging, and extension of the network to european partners.

Keywords

Network, liver, cancer

P75: Biobanked samples as a foundation for a nationwide SARS-CoV-2 sequencing program

Juozapaitė, Dovilė (1), Naumovas, Daniel (1), Laurinaitytė, Inga (1)
(1) Vilnius Santaros Klinikos Biobank, Vilnius University Hospital Santaros Klinikos, Vilnius, Lithuania

Introduction

SARS-CoV-2 spread in the world revealed that society is not ready for the pandemic. Evidence-based preparation for the next pandemics should begin with the analysis of lessons learned during the COVID-19 pandemic. Retrospectively, we analyzed the role of Vilnius Santaros Klinikos Biobank in the management of the pandemic in Lithuania and present the first initiative in Lithuania to understand the prevalence of SARS-CoV-2 variants.

Methods

Vilnius Santaros Klinikos Biobank has started the collection of SARS-CoV-2 positive nasopharyngeal swabs early in the pandemic and continues it to this day. In January 2021, we sequenced 1,000 biobanked COVID-19-positive samples from the period of December 2020 and January 2021 with Thermo Fisher Scientific Baltics.

Results

The sequencing results revealed that the variant of concern alpha had not yet become widespread in Lithuania while B.1.177 was responsible for the most COVID-19 positive cases. The results of this study were presented to the Government of Lithuania, which then financed a country-wide sequencing project. Six institutions contributed to this project. On average 12.5% (approximately 2,600 samples) of positive cases have been sequenced each month (approximately 2,600 samples per month). All virus sequences have been deposited into the GISAID database.

Discussion & conclusion

Uninterrupted collection of COVID-19-positive samples in Vilnius Santaros Klinikos Biobank ensures the effective utilization of samples not only to gain scientific knowledge but also to help make nationwide decisions based on scientific evidence.

Keywords

COVID-19, sequencing, nationwide, variants

P77: Evolution of Excellence: University of Szeged's State-of-the-Art Biobanking Infrastructure and Collaborative Initiatives

Zoltán Veréb (1), Anett Dancs (1), Gábor Dobó (2), Nikolett Kaszler (1), Zsuzsanna Tóth (1), Éva Horváth (1), Katalin Boldog (1), Gábor Markovits (1), Márta Széll (1)
(1) University of Szeged Biobank, Szeged, Hungary, (2) Strategic Management Directorate, 1University of Szeged, Szeged, Hungary

Introduction

With over 70 years of history, the University of Szeged has continuously evolved its biobanking activities. It began as a single working group and expanded into 19 independent biobank sites in 2011. 2017, the SZTE Biobank network was established, providing a unified regulatory framework. The university's commitment to uniform biobanking, regulation, and quality management led to developing state-of-the-art infrastructure and adopting modern architectural solutions.

Materials and methods

The University of Szeged's new biobanking infrastructure was built using the latest architectural and building engineering solutions. Specialized building monitoring and security systems and intelligent technologies for precisely controlling environmental parameters were integrated. The LICONIC semi-automatic system was donated to our university.

Results

The facility covers two stories, integrating specialized monitoring and security systems and intelligent technologies for precise environmental control The biobank's controlled environment ensures sample preservation, accommodating various storage needs from room to ultra-low temperatures (-20°C, -80°C, -196°C liquid nitrogen). In addition to conventional deep freezers, semi-automatic storage systems allow for the storage of millions of samples. The infrastructure includes two BSL-2 biological laboratories for researching and storing infectious samples. Administrative areas facilitate efficient operations, while educational spaces promote knowledge sharing.

Discussion and conclusion

This advanced infrastructure facilitated the University of Szeged's membership in the BBMRI-ERIC, making it the first in Hungary. It aligns with the ISO 20387:2018 standard, enhancing transparency and reliability. The standard is set to be introduced in 2022 and ensures continuous high-quality biobank operations. The SZTE Biobank has collaborated with industrial and academic partners for sample storage and developing biobank technologies and instrumentation.

Keywords

ISO 20387, automated storage system, smart technology

P79: Introducing the Copenhagen Hospital Biobank: housing clinical samples from 500,000 patients

Sørensen, Erik (1), Wegner Thørner Lisa (1), Nissen, Jana (1), Vesterager Pedersen, Ole (2), Rye Ostrowski, Sisse (1)
(1) Copenhagen Hospital Biobank Unit, (2) Clinical Immunology, Zealand University Hospital

Introduction

We have established the Copenhagen Hospital Biobank (CHB), based on excess blood from routine patient samples. The general purpose of the biobank is to provide enhanced access to patient samples for research in health and disease.

Material & methods

Since 2009, excess blood samples used for routine blood type testing and red cell antibody screening of patients from hospitals in the greater Copenhagen area have been stored. The biobank is established as a central facility at the Capital Region Blood Bank, relying on existing infrastructure for data collection, handling, and storage of samples. Almost 500,000 patient

samples have been collected using automated pipettors.

Results

Several large-scale genetic studies based on CHB are being conducted. Thus, a total of 281,000 patient samples (with an additional 50,000 in the pipeline) have been analysed in Genome-Wide Association Studies based on the Illumina Global Screening Array covering approx. 650,000 SNPs. Examples of current protocols, covering the following diseases (with number of patients indicated): cardiovascular disease (169,000), brain diseases (266,000), cancer (100,000), chronic inflammatory diseases (219,000), degenerative diseases (219,000), cardiometabolic disease (276,000), reproductive health (50,000) and covid-19 (171,000).

Discussion

The central advantage of the biobank lies in its ability to provide samples from patients with a wide range of diagnoses, from an expansive collection of blood samples. When coupled with access to demographic and medical data through integration with the comprehensive Danish registry system, this extensive biobank presents exceptional opportunities for biomedical research and development of precision medicine .

Keywords

large scale biobanking, genome wide association studies, biobanking from routine clinical samples

P81: CAGging the Culprit: Brain Bank Insights and Validation of Pathological HTT CAG Repeats in Tauopathies

Teresa Botta-Orfila (1), Cèlia Painous (2,3,4), Sergio Pérez-Oliveira (5,6), Iban Aldecoa (1,7), Aina Comas-Albertí (1,8), Tatiana Moreano (1), Gemma Aragonès (1), Aina Rodríguez-Vilarrupla (1), Biobank HCB-IDIBAPS Group (1), Yaroslau Compta (2,3,4), Raquel Sánchez-Valle (1,8), Victoria Álvarez (5,6), Laura Molina-Porcel (1,8) (1) Biobank from Hospital Clínic Barcelona (HCB) - Institut d'Investigacions Biomèdiques August Pi i Sunyer (IDIBAPS) (HCB-IDIBAPS Biobank), Fundació Recerca Clínic Barcelona-Institut d'Investigacions Biomèdiques August Pi i Sunyer (FRCB-IDIBAPS), Barcelona, Spain, (2) Parkinson's Disease and Movement Disorders Unit, Department of Neurology, Hospital Clinic of Barcelona, Barcelona, Spain, (3) UB Neuro Institut de Neurociències, Maeztu Center, University of Barcelona, Barcelona, Spain, (4) Fundació de Recerca Clínic Barcelona- Institut d'Investigacions Biomèdiques August Pi i Sunyer (FRCB-IDIBAPS), Barcelona, Spain, (5) Laboratory of Genetics. Hospital Universitario Central de Asturias, Oviedo, Spain, (6) Instituto de Investigación Sanitaria del Principado de Asturias (ISPA), Oviedo, Spain, (7) Pathology Department, Biomedical Diagnostic Center, Hospital Clínic de Barcelona, University of Barcelona, Barcelona, Spain, (8) Alzheimer's disease and other cognitive disorders unit. Neurology Service, Hospital Clínic de Barcelona, Fundació de Recerca Clínic Barcelona- Institut d'Investigacions Biomèdiques August Pi i Sunyer (FRCB-IDIBAPS), University of Barcelona, Barcelona, Spain.

Introduction

The Neurological Tissue Bank (NTB) at HCB-IDIBAPS Biobank serves is a pivotal core facility, collecting, processing and characterizing postmortem human biological samples for scientific projects. The differential neuropathological study is vital for clinical diagnosis and contributes to a comprehensive for future studies. This study focuses on validating the histological detection of HTT gene CAG repeats in tauopathies, enhancing the role of the NTB from the Biobank in our understanding of the etiopathogenesis of these diseases.

Material and methods

We analyzed the striatal region in 30 individuals with corticobasal degeneration (CBD), 98 with progressive supranuclear palsy (PSP), and 26 controls using the 1C2a antibody. Blinded quantification and morphological characterization of nuclear staining were performed. Histological results were compared with genetic data to assess pathological and intermediate CAG expansions.

Results

Polyglutamine staining in the nucleus alone proved nonspecific. However, observing a higher number of stained nuclei with intranuclear inclusions identified three subjects (2 PSP, 1 CBD) with pathological CAG repeats. Subjects with a high number of stained nuclei or

intranuclear inclusions had normal repeats. No intermediate alleles were identified histologically.

Conclusions

The prevalence of carriers with pathological CAG repeats in tauopathies (PSP and CBD) exceeds general expectations. Histological detection is feasible, recommending its routine use in postmortem neuropathological studies. Its inclusion in brain bank sample data is advised, unlocking greater potential for understanding neurodegenerative diseases.

Keywords

histopathology, tauopathy, CAG HTT gene repeats, neurodegenerative disease, brain bank

P83: Generation of a model to access to fresh biospecimens for preclinical research purposes

Casulleras, Mireia (1), Sanchez, Natalia (1), Sainz de la Maza, Pilar (1), Pujal, Pol (1), Xapelli, Jordi (1), Arredondo, Estephan (1)
(1) Cytes Biotechnologies S.L

Introduction

Human in-vitro models are the gold standard in preclinical research. However, quality fresh biospecimens obtention is a challenge due to complex legal framework, poor quality and scare biospecimens sources. We developed a model with procurement Spanish centres capable of coordinating the donation and processing of fresh human biospecimens for research.

Methods

Biospecimens were obtained according to the following steps: a)Inclusion/exclusion criteria definition, b)Hospital potentiality assessment c) Implementation of biospecimens recovery protocols, d)Ethical Committee approval, e)Biospecimens donation and processing and f)Traceability.

Results

From 2016, fresh liver resections from donors undergoing surgeries of tumours were collected. Nine hospitals were involved with 300 alerts for donations and 150 utilized tissues. The average tissue weight is about 50- 300g, with an ischaemia time of 4h. Liver biospecimens were used for optimization of human liver cells' isolation protocols and generation of 2D/3D models.

Since 2022, fresh lung collection project was created. 95 alerts and 57 utilized tissues were processed. Both humoral (0,5-3g) and normal adjacent tissue (NAT) (6-48g) were processed for isolation of pulmonary cells.

In 2024, pancreas collection of tissue started last year in one centre. Five tissues were successfully obtained. We were able to obtain tumour biopsies (0,5g avg) and NAT biopsies (0,5-2g) which promoted the development of immortalized cell line that until now it proliferates in culture.

Conclusions

The model created makes possible to provide quality fresh tissue for the investigation, and development of in-vitro models. This model presents a tool for
early-stage discovery and entry of novel compounds into the clinic.

Keywords

tissue for research, fresh tissue, primary human cells, Spain

PS12. Bioinformatics, -omics, and big data – Posters

P85: Integrating -Omics Data in Innovative Biobanking – lessons learned from the Molecular Biomarkers for Individualized Therapy (MOBIT) Project

Michalska-Falkowska, Anna (1); Niklinski, Jacek (2)
(1) Biobank, Medical University of Bialystok, (2) Department of Clinical Molecular Biology, Medical University of Bialystok

Introduction

The shift towards personalized and precision medicine within the oncological domain necessitates innovative methodologies. The MOBIT project has emerged to address the intricacies associated with tailored oncology treatment, establishing an integrative framework for precise diagnosis and therapy in lung tumors.

Materials and Methods

The MOBIT project systematically investigated the challenges and opportunities inherent in the integration of genetic information, -omics data, and clinical records within Biobank, emphasizing best practices amid the era of extensive datasets. Comprising five work packages, the project strategically employs whole genome sequencing, global microRNA profiling, and integrated metabolomics and proteomics analysis. The Biobank at the Medical University of Bialystok systematically collected comprehensive tumor tissues, liquid biopsies (whole blood, serum, plasma), and urine biospecimens. Advanced imaging techniques, notably radiomics PET/MRI analysis, contributed to the development of personalized lung cancer diagnostics grounded in tumor heterogeneity and integrated genomics and transcriptomics.

Results

The outcomes of the MOBIT project demonstrate successful integration of diverse datasets, unraveling nuanced insights into lung cancer biology and identifying potential biomarkers. Employing advanced bioinformatic approaches has facilitated the navigation and analysis of the intricate web of extensive data, ensuring the robustness and reliability of research results.

Discussion and Conclusions

As an exemplar in the realm of personalized oncology, the MOBIT project seeks to captivate the attention of national and international scientific communities, fostering collaboration to establish individualized and precise procedures. The integration of novel targeted therapies and advanced imaging techniques emerges as a cornerstone for the realization of personalized medicine in oncology.

Keywords

omics; whole genome sequencing, RNAseq; big data; transcriptomics; metabolomics

P87: Returned data from biobank studies – Samples accrue interest

Koskinen, Satu (1); Kallionpää, Roosa E. (1); Pitkänen, Niina (1); Terho, Perttu (1); Perälä, Merja (1); Kallio, Lila (1)
(1) Auria Biobank, University of Turku and Turku University Hospital, Turku, Finland

Introduction

Auria Biobank provides biological samples and related clinical data for research projects. After finishing the biobank study, the researchers must return the raw data resulting from the analyses and assays to the biobank. The returning data is linked to the sample and thereby expands the sample-related data for future needs. Possible clinically relevant findings can also be communicated to the sample donor.

Materials and Methods

Auria Biobank has operated since 2014 and was accredited in 2022 (SFS-EN ISO 20387:2020); scope liquid sample handling. Biobank has provided materials to nearly 300 biobank studies. The data to be returned is specified in the access request and the schedule is defined in the Material Transfer Agreement.

Results

The size of the returned datasets range from megabytes to terabytes. The returned data is diverse and contains, for instance, immunohistochemical stainings, genotypes, T-cell signatures, somatic variant data, and redox-state alterations. Certain clinically relevant results have been communicated to the patient and health care with the patient's permission. In some cases, the data has been used to guide the treatment of the sample donor.

Discussion and Conclusions

Data returned from biobank studies accumulates in the biobank and add value to the samples. If the physical sample has been used up, the data produced from the sample can still be utilized in further studies. Incidental and clinically significant findings may be returned to the sample donor if those have been evaluated to be relevant for the treatment of the patient.

Keywords

Hospital biobank, Returned data, Data collections, Big data

P89: The Minimum Information About Biobank Data Sharing (MIABIS) standard

Engels, C. (1, 2); Strug, A. (3); Anton, G. (4); Silander, K. (5); Neumann, M. (6); Eklund, N. (7)

(1) German Biobank Node (GBN), Charité – Universitätsmedizin Berlin, Berlin, Germany, (2) Charité University Hospital Berlin, Berlin, Germany; German Cancer Consortium (DKTK), partner site Berlin, and German Cancer Research Center (DKFZ), Heidelberg, Germany, (3) Medical University of Gdańsk, Department of Medical Laboratory Diagnostics, Gdańsk, Poland, (4) Medizinische Fakultät OWL, Universität Bielefeld, Bielefeld, Germany, (5) THL Biobank, Finnish Institute for Health and Welfare, Finland, (6) Universitätsklinikum Würzburg, Würzburg, Germany, (7) BBMRI-ERIC HQ, Graz, Austria

Description

The Minimum Information About Biobank Data Sharing (MIABIS) initiative seeks to standardise the description of biobanks, biosamples, and associated data, fostering interoperability in biobank data sharing. MIABIS Core 3.0 defines general attributes for biobanks, collections, research resources, and networks at an aggregated metadata level.

To ensure that the MIABIS standard represents actual needs of the biobanking community, it has joined forces with BBMRI-ERIC in 2016 and established a governance model which organises definition-work into focused components, each with a predefined scope based on specific use cases. The work involves working groups with participants from BBMRI-ERIC National Nodes and domain experts, and the final approval of MIABIS components and entities rests with the BBMRI-ERIC Management Committee.

The MIABIS Core, with version 3.0 (Eklund et al. 2024, in press), crucial for initiating collaboration and enabling sample and data exchange, comprises four main entities: Biobank, Collection, Research Resource, and Network. It refines attributes necessary for contact and collaboration, providing a modular structure for easy adherence and extension. In response to the need for more detailed information, MIABIS has extended its terminology to include individual-level components, describing samples, sample donors, and events (Eklund et al., 2020). These components enhance the ability to perform sophisticated queries.
Ongoing developments include additional components describing Dataset Types; Digital Pathology Imaging – complementing the component for Imaging (DICOM-MIABIS) published in (Scapicchio et al. 2021); Biobank Capabilities and Standard Operating Procedures (SOPs) contributing to the continuous evolution of the MIABIS data standard.

Keywords

Data Sharing, Standard, MIABIS, Biobanks

PS16. Epidemiological Biobanking

P91: The interest of salivary samples for large-scale genotyping/sequencing in large cohorts: feedback from the CEPH-Biobank/CNRGH

Zaneguy, N. (1); Beaudoin, J.C. (1); Gressin, L. (1); Morel, V. (1); Sebaoun, J.M. (1); Delaloge, S. (2); Le Folgoc, G. (3); Severi, G. (4); Zins, M. (5); Bacq, D. (6); Olaso, R. (6); Boland, A. (6); Deleuze, J.F. (7); Blanché, H. (7)
(1) Name, (2) Gustave Roussy, (3) INSERM UMR1078, (4) INSERM U1018, (5) INSERM UMS011, (6) CNRGH-CEA, (7) Fondation Jean Dausset-CEPH _ CNRGH-CEA

Description

There is growing interest in saliva sampling for large-scale epidemiological studies, due to its non-invasive nature, the possibility of self-sampling by volunteers, an ease of transport and stability over time at room temperature for at least 5 years.

The CEPH-Biobank and the CNRGH-CEA have carried out several collaborative projects on over 40,000 DNA samples, extracted from OG-500 and OG-600 kits (DNA-Genotek), analyzed on Illumina genotyping and sequencing platforms. Salivas were collected for the POPGEN project (Genomic Diversity of the French Population), the MyPeBS (My Personal Breast Screening) and the E3N-Generations (Epidemiological Study of Women in the French Education System and families) cohorts. MyPeBS and POPGEN kits were extracted within weeks of collection, while E3N samples were stored since 2010 at room temperature/4°C/-30°C prior to DNA extraction.

All saliva samples were extracted on an automated extraction system, ChemagicPrime (Revvity), using magnetic beads. DNA integrity and PCR amplification capability were checked

for 10% of samples on a Fragment Analyzer (Agilent).

After quality controls, 95-98% of extracted DNAs were transferred to CNRGH for genetic characterization. Despite the presence of bacterial DNA, genotypic success rate around 99% was obtained. This shows that these saliva samples remain stable irrespective of sample storage time and conditions. WGS data generated on 4000 POPGEN DNAs also showed a high success rate.

In conclusion, high-quality genotypic data are generated from DNA extracted from OG-500 or OG-600 kits on the ChemagicPrime, emphasizing the interest of saliva sampling for genetic studies independently from storage conditions.

Keywords

Saliva, genotyping, sequencing, cohort, MyPeBS, E3N-Générations, POPGEN, CEPH-Biobank, quality, DNA

P93: Cantabria Cohort, a large population cohort from a small region in Spain

José Marín Vidalled, María (1); Alonso-Peña, Marta (1); Santiuste, Inés (1); Martínez Magunacelaya, Nerea (1); Sanz-Piña, Elena (1); Sanchez, Eduardo (1); Arozamena, Jana (1); Canales, Laura (1); de la Fuente, Amanda (1); Madureira, Rebeca (1); Peleteiro, Ana (1); Diaz Martínez, Marta (1); Unzueta, Maite García (2); López-Hoyos, Marco (2); Cantabria Cohort Collaborators
(1) Valdecilla Research Institute (IDIVAL), (2) Marqués de Valdecilla University Hospital/IDIVAL

Description

The Cantabria Cohort is a prospective, population-based, multipurpose cohort covering a specific territory in northern Spain, the autonomous community of Cantabria. Cantabria has an area of 5,330 km2 and a total population of 584,507 inhabitants. Cantabria Cohort was launched in 2021 and it will recruit 50,000 residents aged 40–69 years at baseline, representing almost 20% of the target population. The study stems from a research and action initiative lead by researchers from Valdecilla Research Institute (IDIVAL).

The project's main objective is to identify and follow up a cohort that would provide baseline information on lifestyles, socio-economic aspects, and morbidity of the Cantabrian population. Besides, Valdecilla Biobank is responsible for processing and storing the volunteers biological samples (serum, plasma, DNA, surplus tissues), under strict protocols to ensure the traceability and quality.

Currently, around 35,000 volunteers have been enrolled. All participants will be invited for a re-assessment every three years, while the overall duration is planned for twenty years. The repeated collection of biomaterials combined with broad information from participant questionnaires, medical examinations, actual health system records and other secondary public data sources is a major strength of its design, which will allow to address biological pathways of disease development, identify new factors and biomarkers involved in health and disease, design disease prevention strategies and advance precision medicine. It is conceived to allow access to a large number of researchers worldwide to boost collaboration and medical research. Recruitment updates and procedures to access data and samples from Cantabria Cohort are available at www.cohortecantabria.com.

Keywords

Population-based cohort, Biological samples, Biobank, Lifestyle, Socio-economic factors, Big data, Precision medicine, Longitudinal study, Spain

P95: biobank.cy: The Biobank of Cyprus past, present and future

Loizidou, Eleni M. (1); Kyratzi, Maria (1); Tsiarli, Maria A. (1); Kakouri, Andrea C. (1); Charalambidou, Georgia (1); Antoniou, Stella (1); Pieri, Stylianos (1); Veloudi, Panagiota (1); Mayrhofer, Michaela Th. (2); Wutte, Andrea (2); Kozera, Lukasz (2); Habermann, Jens (2); Muller, Heimo (3); Zatloukal, Kurt (3); Sargsyan, Karine (3); Michaelides, Alexandros (4); Papaioannou, Maria (5); Schizas, Christos (5); Malatras, Apostolos (1); Papagregoriou, Gregory (1); Deltas, Constantinos (1)
(1) biobank.cy, Center of Excellence in Biobanking and Biomedical Research, University of Cyprus, Nicosia, Cyprus, (2) Biobanking and BioMolecular Resources Research Infrastructure-European Research Infrastructure

Consortium (BBMRI-ERIC) Graz, Austria, (3) Diagnostic & Research Institute of Pathology, Medical University of Graz, Graz, Austria, (4) RTD Talos, (5) Cyprus National e-Health Authority

Background

The Cyprus-Biobank collects biosamples and medical, biological, and lifestyle information with the aim of reaching 16,500 Cypriot volunteers aged ≥18-years, by year 2026. Volunteers are both from the general population and from disease cohorts of focused research projects, who amongst others will contribute to canvas the architecture of the Cyprus human genome.

Methods

Within three years (2019-2022), 1348 participants of the general population were enrolled in the Cyprus-Biobank pilot study (CBPS). Extensive information was collected from each participant at enrolment, including biochemistry, complete blood count, physiological, anthropometric, socio-demographic, diet, and lifestyle characteristics. Prevalent health conditions along with medication use and family history were recorded. With a systematic recruitment campaign, the Biobank enriches both the general population cohort and separate disease cohorts.

Results

The CBPS enrolled 1348 participants (579 men and 769 women), aged between 18-85 years (median 48-years). Fifty-eight biomarkers were recorded, based on blood and urine samples. Statistically significant differences were found between men and women regarding their education level ($p < 0.001$), marital status ($p = 0.01$) and employment status ($p < 0.001$) but not their age ($p = 0.29$). The most prevalent medical conditions recorded within the studied population are hypertension (17.2%), osteoporosis (6.9%) and diabetes (6.0%).

Conclusions

The Cyprus-Biobank comprises a rich data resource used to examine the risk factors leading to public health burdens and develop strategies for disease prevention. In the same context, the first 1000 whole exomes, as the Phase-1 of the Cyprus-Human-Genome Project, CYPROME, have been completed and are being analysed.

Keywords

Biobank, Cohort Study, Public Health, Population Health, Non-communicable diseases

P97: A collaborative biobank project provides mutual benefits to the biobanks and the research community

Sauramo, Minttu (1); Silander, Kaisa (1); Kyttälä, Aija (1); Joensuu, Anni (1); Wahlfors, Tiina (1)
(1) Finnish Institute for Health and Welfare

Introduction

FinnGen, a large public-private sector collaborative biobank project, utilizes samples and data from 500,000 Finnish biobank donors and combines genomic and health register data for research on personalized medicine. Following the Finnish Biobank Act, the novel data produced in the project is returned to the biobanks to benefit future research.

Material and Methods

THL Biobank hosts 18 nation-wide and population-based research collections with a variety of samples, genomics, other omics and phenotype data. THL Biobank has provided to FinnGen DNA samples or existing genome data from 160,000 study participants. The FinnGen project has generated additional more focused projects in which new data is created from biobank samples, and sample donors are recontacted for new clinical studies.

Results

The FinnGen cohort of 140,000 sample donors currently available in THL Biobank includes imputed GWAS data along with sampling age, sex, BMI and smoking habits. Access to the larger 400,000 donor dataset from multiple biobanks can be applied through www.fingenious.fi. The FinnGen dataset can be supplemented with various samples, omics data and phenotype/clinical data from the biobanks and national health registers.

Discussion

This collaborative project has helped to develop the biobank infrastructure, and familiarized the research community with the biobanks. The FinnGen analysis-environment is a fertile ground for new research ideas leading to projects that can be executed through the biobanks. Further,

once new data is created, it is returned to the biobanks for future studies on diverse research areas. This provides an excellent example of the mutual benefits emerging from a collaborative biobank project.

Keywords

collaboration, biobank research, genomic data

P99: Vitamin D status in population and benefits of supplementation – new data

Karlikova, Marie (1); Topolcan, Ondrej (2); Kucera, Radek (1); Simanek, Vaclav (2)
(1) Charles University Faculty of Medicine in Pilsen, (2) University Hospital Pilsen

Introduction

Although vitamin D status in population living at latitudes around 50°, including the Czech Republic, is a highly debated issue due to frequent vitamin D deficiency, there is very little published data from population studies.

Material and methods

In March and April 2023, a study on 2700 healthy adults was organised by the University Hospital in Pilsen together with the Biobank of the Faculty of Medicine and University Hospital Pilsen. Participants provided their blood sample and the detailed information about their vitamin D supplementation. Serum 25 OH vitamin D levels (nmol/L) were measured using a routine chemiluminiscent immunoassay test and evaluated statistically with the respect of supplementation habits. Aliquots of serum were deep frozen (-80°) in the Biobank.

Results

A generally accepted optimal vit D status is above 75 nmol/L, suboptimal 50 – 75 nmol/L and deficient below 50 nmol/L. In our study, the vit D average level was 61,8 nmol/L. In the groups with regular supplementation, irregular supplementation and no supplemention, the vit D level averages were 73.7 nmol/L, 58.7 nmol/L and 51.9 nmol/L, respectively, the differences between groups being statistically significant ($p< 0.0001$).

Conclusion

Our study demonstrated that vit D status in selected Czech population at the end of winter was optimal only in the group of regular supplementation. These findings are in accord with other published studies and underline the benefit of vit D supplementation and also the importance of public awareness.

This study was supported by the project BBMRI.cz, reg. no. LM2023033.

Keywords

vitamin D; serum; cohort; supplementation; status

P101: The Novara Cohort Study and UPO Biobank: an integrated project for the identification of determinants associated with healthy aging and age-related diseases

Capello, Daniela (1); Bettio, Valentina (1); Vittoria Cracas, Silvia (1); Garro, Giulia (1); Venetucci, Jacopo (1); Mazzucco, Eleonora (1); Antona, Annamaria (1); Varalda, Marco (1)
(1) University of Piemonte Orientale

Description

Ageing represents a major challenge of the 21st century. Large biological samples-based prospective and cross-sectional epidemiological studies will help researchers to understand the molecular mechanisms of healthy aging and to identify predictive markers and risk factor of age-associated disabilities, to find new ways to prevent and treat them.

The Novara Cohort Study (NCS) project will offer the valuable opportunity, to associate biological data with individuals' biographic information to identify factors associated with healthy or accelerated aging. The NCS will involve, in 7 years, at least 10.000 subjects from the Novara area. Individuals from the general population aged 18 years will be invited to participate in the project. Local Health Authorities, administrative bodies, and citizen committees have been invited to participate proactively in the project design and objectives.

Each participant will provide i) general and more specific lifestyle, health, and socio-economical information, collected by questionnaires, ii) biological samples: peripheral blood, saliva, and urine; iii) anthropometric and functional parameters. Samples and matching information will be collected in the UPO Biobank and will be accessible to the scientific community.

UPO Biobank was established in 2020 as an institutional, disease, and population biobank within the University of Piemonte Orientale (UPO) to promote and support high-quality, multidisciplinary research. As a member of the BBMRI network, UPO Biobank has been developed by implementing the quality standards for sample collection and the ethical and legal issues about privacy and data processing.

Keywords

cohort study; population biobank

P103: AETCP Cohort: Health Status of Passenger Cabin Crew

González, Inmaculada Almenara (1); Olano, Daniel Alba (1); Solórzano, Cecilia Sobrino (1); González, María Jesús Artiga (1)
(1) CNIO Biobank

Introduction

The cabin crew collective is a professional group that faces a multitude of health risks attributed to their jobs, such as the changes or effects of cabin pressure during air travel, which may be related to the high incidence of cardiovascular diseases. Also, they are exposed to ionizing radiation, which can lead to melanomas and other types of skin cancer. In addition, their circadian rhythm is disrupted, causing changes in diet and sleep factors, increased stress levels, ...

Objectives

Our objective is stablishing a longitudinal cohort by obtaining diverse high-quality samples and associated data from healthy donors affiliated with the Spanish Cabin Crew Association, turning it into a valuable tool for research on predictive biomarkers of occupational risks.

Methodology

We collect several types of samples annually with a questionnaire containing diverse information about personal details, lifestyle habits, professional risks, clinical backgrounds, etc. We process the samples following standardized operating procedures, which are tested and optimized to allow the analysis of multiple metabolites from each sample.

Results and conclusions

At present, acquisition of 120 donors, whose high-quality samples and data, are processed following Standard Operating Procedures, which are tested and optimized to allow the analysis of multiple metabolites from each simple, and are available to the scientific community.

Keywords

AETCP, occupational risks, high-quality sample, high-quality data

P105: Centralized biobanking in a multi-center research organization: a valuable source of harmonized samples and data for precise medicine in diabetes and metabolic diseases

Schellenbauer, Amelie (1); Fröhlich, Brigitte (1)
(1) DZD

Description

Precision medicine approaches for preventing and treating diabetes are still lacking. The DZD Biobank provides a unique collection of liquid and tissue biospecimen for diabetes and metabolism research. It is associated with clinical data from deeply phenotyped individuals with prediabetes, diabetes type 1 or 2, gestational diabetes or controls. The DZD Biobank collection is made possible by the German Center for Diabetes Research (DZD), a research organization merging ten clinical study sites in the diabetes and metabolism area. The aim is to deconstruct (pre)diabetes and metabolic diseases to subtypes, discovering subtype-specific biomarkers on disease development.

One success story is the definition of distinct prediabetes subtypes, based on large DZD data. Further analysis aims to characterize these subtypes by proteome analysis in 1500 samples available in the DZD.

Now the DZD aims for establishing a centralized high-quality biobank derived from the ten clinical study sites. The DZD initiated a gradual transition from decentralized clinical study biobanks to establish a central and independent DZD Biobank. This came with some challenges:

- Standardize data assessment based on the defined DZD Core Data Set across the DZD network and beyond. Mandatory for DZD clinical studies, this

dataset is the vital link between clinical trials and the DZD Biobank.
- Digitalization (e. g. implementation of a centralized web-based LIMS)
- Standardize collection processes and logistics
- Stakeholder Management with a clear communication strategy to the clinical study centers

With the establishment of centralized biobank activities the DZD advances research in the diabetes and metabolism domain, fostering transparency, and overcoming operational challenges.

Keywords

Centralization, challenges, diabetes, metabolism, subtypes

P107: The OUTLIVE-CRC cohort - collection of biosamples and data from young adults with colorectal cancer

Maushagen, R. (1); Crumbach1, J. (2); Heidenreich, A. (2); Tornow, Sebastian (3); Kubetzko, Lea (3); Sina, Christian (3,4,5); Katalinic, A. (2); von Bubnoff, N. (6); Derer-Petersen, S. (4); Oberländer, M. (1)
(1) Interdisciplinary Center for Biobanking-Lübeck, University of Lübeck, Lübeck, Germany, (2) Institute of Social Medicine and Epidemiology, University of Lübeck, Lübeck, Germany, (3) Institute of Nutritional Medicine, University Hospital Schleswig-Holstein, Lübeck, Germany, (4) Department of Medicine I, University Medical Center Schleswig-Holstein, Campus Lübeck, Lübeck, Germany, (5) Fraunhofer Research Institution for Individualized and Cell-Based Medical Engineering, Lübeck, Germany, (6) Department of Haematology and Oncology, University Hospital Schleswig-Holstein, Lübeck, Germany, on behalf of the OUTLIVE-CRC consortium

Background

The incidence of colorectal cancer (CRC) in younger adults is increasing in Germany and other high-income countries[1,2]. For basic research, health maintenance, early detection and follow-up care the Federal Ministry of Education and Research in Germany is funding four research networks for the prevention of CRC in younger and future generations. Within the network OUTLIVE-CRC, the Interdisciplinary Center for Biobanking-Lübeck (ICB-L) is responsible for all biobank activities from patients with early-onset CRC (EOCRC).

Methods & Results

The overall goal of OUTLIVE-CRC is to improve the prognosis and quality of life of EOCRC patients with a focus on tertiary prevention. From the analysis of biosamples and the multi-OMICS data obtained from them, a multi-marker risk panel is to be developed with the inclusion of clinical parameters as well as functional data from patient-derived colonic 3D organoid cultures in order to detect the recurrence of CRC at an early stage and to identify patients with an increased risk of recurrence. In addition to investigating the influence of personalized nutrition, OUTLIVE-CRC is characterized by the participation of patient representatives.
Based on ICB-L standard operating procedures, high-quality biospecimen from EOCRC patients and controls are being collected. Furthermore, the ICB-L provides its IT-infrastructure to collect data from patient surveys querying EOCRC patients for their experiences regarding e.g. therapy or quality of life.

Conclusions

Linking sample, clinical and patient data from questionnaires enables researchers to submit targeted search queries to the biobank for addressing complex inter- and transdisciplinary research questions in the context of EOCRC.

[1]Waldmann A, Borchers P, Katalinic A. Temporal trends in age- and stage-specific incidence of colorectal adenocarcinomas in Germany. BMC Cancer. 2023 Dec 1;23(1):1180.
[2]Sinicrope FA. Increasing Incidence of Early-Onset Colorectal Cancer. N Engl J Med. 2022 Apr 21;386(16):1547-1558.

Keywords

Early onset colorectal cancer (EOCRC), quality of life, biobanking, liquid biopsy, patient representatives

P109: The Belgian Virtual Tumourbank (BVT): how researchers can easily trace residual tumour samples

Vande Loock, K. (1); Van der Stock, E. (1); Debucquoy, A. (1); Emmerechts, K. (1); Petit, A.D. (1); Huizing, M. (2), on behalf of the Steering Committee of the Belgian Virtual Tumourbank

(1) Belgian Cancer Registry, Koningsstraat 215 bus 7, 1210 Brussels, Belgium, (2) Biobank Antwerpen, Drie Eikenstraat 655, B-2650 Edegem, Belgium

Introduction

The Belgian Virtual Tumourbank (BVT) consists of a network of eleven biobanks affiliated to Belgian university hospitals. To facilitate the search for tumour samples scattered among those different institutions, one central database collects data from residual material of human tumours. High quality of the data is guaranteed by automatic and manual controls performed by the BVT team at the Belgian Cancer Registry. The data collected at sample level is made available after pseudo anonymization for researchers via the online BVT catalogue. The catalogue contains general, patient, medical and technical data. Currently, more than 138,000 samples are available.

Materials and Methods

For a rapid and convenient verification of the number of samples of interest in the BVTc, researchers can complete an online form (Sample Availability Request) to receive the total count of available samples along with the contact details of the local biobanks hosting these samples.

Results

So far, we have received 49 Sample Availability Requests (SAR), primarily from Belgian academic researchers. However, seven of the requests (14%) came from industry while six of the requests originated from abroad (outside of Belgium). Most common requested and specified tumour localisations are liver, lung and colorectal cancer. For fifteen requests (31%), tumour localisation was not specified and all sample localisations could be included in the search. The requests will be thoroughly analysed and presented.

Discussion and Conclusion

The SAR is an easy tool that provides researchers with the number of samples of interest available in the BVT network.

Keywords

oncology, tumours, network, requests

P111: DwarnaBio – The Maltese population biobank: Insights from the genomes of Malta

Spiteri, Jasmine; Ellul, Bridget; Martin, Gillian; Ryabova, Lydia; Santucci, Eric; Muscat, Richard; Pace, Nikolai P.*
*Corresponding author: Department of Anatomy, Faculty of Medicine & Surgery, Biomedical Sciences Building, University of Malta, Msida

Background

DwarnaBio is a national initiative led by the University of Malta with the primary goal of establishing a central population-based genomic biobank representative of the general Maltese population.

Aims

DwarnaBio aims to establish a reference databank of relevant phenotypic data collected at baseline, with corresponding biospecimen storage consented for downstream multi-omic analysis. It is following rigorous standardised procedures during sample collection, transportation and storage to ensure strict control over pre-analytical variables. DwarnaBio uses a dedicated portal (dwarna.mt), prioritising public engagement in research and facilitating return of relevant findings to consenting participants.

Rationale

Several studies provide preliminary support for a distinct genetic architecture in the Maltese population, with strong evidence for a genetic affinity with the Middle East. Important differences in the genetic architecture for common traits, such as inflammatory bowel disease, diabetes and amyotrophic lateral sclerosis, and evidence for enrichment of deleterious alleles and founder effects have been described and will be presented.

Conclusion

DwarnaBio aims to leverage the power of a small island state characterised by a centralised health care system and one national tertiary research institute. DwarnaBio is the seed for a multi-omics longitudinal study that will enable researchers to investigate different clinical outcomes. It will facilitate the annotation and analysis of a reference Maltese medical genome, thus contributing to public genetic diversity datasets. Through genomic analysis of

this representative cohort, DwarnaBio will also seek to evaluate the population burden of polygenic risk scores, and identify disease-causing variants and carrier frequency for recessive Mendelian disease in an island population.

Keywords

DwarnaBio, island population, biobank, genomics

PS20. Artificial Intelligence in Precision Medicine

P115: Deep Learning for Detecting Patients Affected by COVID-19

Marconi, Andrea (1), Armano, Giuliano (2), Gnocchi, Matteo (3), Milanesi, Luciano (1)
(1) National Research Council - Institute of Biomedical Technologies, Italy, (2) University of Cagliari - Dept of Mathematics and Computer Science, (3) National Research Council of Italy - AtdRMI4, Italy

Introduction

The lack of quickly and reliably diagnostic tests contributed to the spread of the COVID-19. RT-PCR and antigen-tests shown a low sensitivity resulting in many false negatives. Medical imaging – in particular CT - is an alternative tool to accurately detect COVID-19. Unfortunately, analysis of CT scans is a demanding activity for radiologists. To deal with this issue we devised a DL-based approach to automatically detect COVID-19 by analysing chest CT scans.

Material & method

The study is based on the CC-CCII dataset which includes scans from patients affected by both COVID-19 and common pneumonia as well as from normal controls. The devised approach is based on a soft-voting ensemble model built on 3D-Inception-CNNs. To avoid overfitting, an online image augmentation process is enforced while training the networks.

Results

Experiments have been carried out to assess the proposed approach according to different aspects including assess how the scan depth affects the model performance. Results highlight a slight improvement of the performance compared to a small increase in the scans depth. A comparison with related works found in the literature show the effectiveness of the proposed approach.

Discussion and conclusion

The experimental results show the ability of the Inception-based classifiers to deal with the problem at hand. The ensemble strategy made it possible to improve the overall performance. The approach can be easily adapted to other classification tasks based on CT scan analyses. This activity has been supported by BBMRI-it, a research infrastructure financed by the Italian Government.

Keywords

Deep Learning, Ensemble Learning, CNN, medical imaging

P117: Regina Elena National Cancer Institute Biobank BBIRE: Standard operating procedures digital pathology and image analysis increase bio-specimen annotation

Simona di Martino (1*), AnaMaria Brindusa Arteni (1*), Enzo Gallo (1), Valentina Laquintana (1), Celeste Accetta (1), Chiara Mandoj (2), Giovanni Cigliana (2), Iole Cordone (2), Edoardo Pescarmona (1),Gennaro Ciliberto (3)
(1) Tissue Biobank, Department of Pathology, IRCCS Regina Elena National Cancer Institute, Rome, (2) Body Fluids Biobank, Clinical Pathology, IRCCS Regina Elena National Cancer Institute, Rome, (3) Scientific Direction, Regina Elena National Cancer Institute, Rome
*Equal contributors"

Description

Biobanking nowadays is actually recognized as an essential resource for cancer research. The future of molecular and translational research heavily depends on having access to high-quality biospecimens, along with corresponding data on real clinical outcomes. A consolidated approach to biobanking offers several benefits including increased awareness of specimen availability, greater accessibility for researchers due to larger sample pools, improved sample quality and consistency through standardized collection procedures, and efficiencies. In 2014 the tumor Biobank of Regina Elena National Cancer Institute (BBIRE), was established as a joint initiative between the Clinical Pathology and Pathology Unit with the financial support of the Scientific Directorate. The primary purpose

of the biobank is to collect tissue (T) and body fluids (LB) samples in accordance with ELSI requirements and standardized cryopreserve criteria, providing biological material for approved cancer research projects. The main goal is to ensure a uniform and optimal quality of the biological samples for research purposes. This standardized approach enhances the reliability and reproducibility of data, facilitating meaningful scientific discoveries and advancing cancer research. Particularly we obtain high-quality biological samples by standardizing tissue sample preservation protocols for molecular investigations and bio banking procedures that include Digital Pathology (DP) and Image Analysis as a powerful tool to ensure enhanced accuracy, reproducibility, and standardization of study inclusion criteria and outcomes. The extensive data collection and networking capabilities of this system enable a more comprehensive and reliable assessment of the morphology in individual cells or relevant tissue components.

Keywords

biobanking, tissue , digital pathology, artificial intelligence

PS21. Tools to achieve quality – (new) standards for biobanks

P119: Implementation of OpenSpecimen for biosample management at Amsterdam UMC Biobank

Erik van Iperen (1), Aran Hartlooper (1), René Minnaar (1), Maureen van der Arend (1), Jörg Hamann (1), Adrie Kromhout (1)
(1) Amsterdam University Medical Center, Amsterdam, The Netherlands

Introduction

Amsterdam UMC Biobank currently stores more than 350 collections containing >2.5 million biospecimens. In 2023, a new biobank information management system (BIMS) went live, which boosted the quality of collection storage and the efficacy of work processes.

Methods

Initially, Amsterdam UMC Biobank developed a harmonized sample data model based on existing national and international standards. Subsequently, a thorough requirements analysis was done involving various stakeholders, and market research was conducted to facilitate the identification and selection of potential BIMS suppliers. The chosen suppliers demonstrated their application and submitted a written response addressing the list of requirements. Finally, the various BIMS were assessed and scored.

Results

A total of seven BIMS vendors were selected for the demo round. After a thorough evaluation process, OpenSpecimen was chosen as the new BIMS based on the scoring conducted by the working group. Over the course of the past two years, a comprehensive implementation project has been undertaken that encompassed data migration, workflow implementation for pre-analysis, integration of two LIMS systems, and data extraction to an organizational research data platform.

Conclusion

The implementation of OpenSpecimen by Amsterdam UMC Biobank was based on efficiency, standardization, and a FAIR approach. By focusing on these principles, we have implemented a data-entry workflow that not only standardizes the various processes but also ensures the integrity and (re)usability of the collected information. Data and meta-data will be published in different (inter)national catalogs

Keywords

BIMS, FAIR, Standardization, workflows

P123: Quality verification of the material stored in the biobank of Masaryk Memorial Cancer Institute (MMCI)

Eva Růčková (1), Jana Gottwaldová (1), Kristína Greplová (1), Roman Hrstka (1)
(1) Bank of Biological Material of Masaryk Memorial Cancer Institute, Žlutý kopec 7, Brno

Description

The main objective of biobanks is the storage and provision of biological material and clinical data in excellent quality. The biobank at Masaryk Memorial Cancer Institute is significantly focused on quality issues and since 2023 is accredited to international standard ISO

20387:2021. An integral part of the Quality Management System (QMS) is the quality verification of stored biological material.

In our biobank, tissue, blood serum and plasma, whole blood, DNA, primocultures or PBMNCs are long-term stored. We focus mainly on fresh frozen tissues and blood serum and quality is therefore monitored for these types of material. Due to different nature of each type of material, special approach to verification is required. In case of tissue, a parallel paraffin block is prepared for each fresh-frozen sample and reviewed by a pathologist. For further quality evaluation, 24 tissue samples (approx. 3% of total sample number) are randomly selected annually. The RNA is isolated and its integrity (RIN) is measured using the Agilent 2100 Bioanalyzer. Since no universal marker for the quality of serum is available, we chose a different approach and prepared a mixed sample pool, where specifically defined biochemical parameters are monitored during the storage period.

Our goal is not only to preserve biological samples in the highest quality possible in accordance with all aspects of QMS, but to contribute to broadening the knowledge regarding the effect of long-term storage conditions on samples.
The work was supported by the project BBMRI.cz no. LM2023033.

Keywords

biobank, QMS, quality verification

P125: Ensuring sample quality with certified sample containers

Kretschmer, René (1), Häßner, Tobias (2), Krieger, Lena (3), Meinung, Bettina (4), Mühlfriedel, Sven (5), Geiger, Joerg (6)
(1) Center of Cryo Compentence in Life Sciences, Institut für Luft und Kältetechnik gemeinnützige Gesellschaft mbH, Dresden, DE, (2) LVL technologies GmbH & Co. KG, Crailsheim, DE, (3) DIN e.V., Berlin, DE, (4) German Biobank Node, Charité - Universitätsmedizin Berlin, Berlin, DE, (5) Greiner Bio-One GmbH, Frickenhausen, DE, (6) Interdisciplinary Bank of Biomaterials and Data Würzburg (ibdw), University and University Hospital of Würzburg, Würzburg, DE

Introduction

The storage and retrieval of samples is the central task of biobanks. Although there is a wealth of guidance on how to prepare biological material for storage and on appropriate storage conditions, specifications for storage containers are lacking. While biological material has only transient contact with consumables during sample preparation and processing, it often remains in storage containers for years, which can significantly affect sample properties.

Material and Methods

In the Biobanking Working Group of the DIN Technical Committee "Biotechnology", material scientists, manufacturers and biobankers developed a specification for containers for the long-term storage of biological material.

Results

The standard addresses key aspects of biobank sample containers, including stability, robustness, leak resistance, and potential issues such as loss, alteration, or contamination of biological material during storage. Durable labeling and suitability for automated processes are critical for sample handling and retrieval and are specified accordingly. Appropriate test criteria and methods for demonstrating compliance and documentation requirements are also part of the standard. The standard was published in 2022 as DIN 13279:2022.

Discussion and Conclusion

This standard allows manufacturers to demonstrate and verify the suitability of sample containers for the intended use, biological material, and storage conditions. With this standard, biobanks will be able to demonstrate that sample storage is adequate to ensure that biological materials are fit for their intended use and meet defined quality goals.

Standardization of sample containers will facilitate the exchange of biological materials from different biobanks for large-scale research projects and use in automated processes.

Keywords

Sample container, Cryo-vials, Biobank Samples, ISO Standard, Sample Storage, Long-term Storage, Automation

P127: Optimizing biobank services by effective research metadata registration

Nielsen, Jock (1), Wegner Thørner, Lisa (1), Sørensen, Erik (1)
(1) Copenhagen Hospital Biobank Unit, Copenhagen University Hospital, Copenhagen, Denmark

Introduction

Administering biobanks is not only storing, finding, and providing samples for research. It is also ensuring that the material (both data and samples) is used for maximum scientific impact. To achieve this, biobank administration should:

1. Strive to maximize diversity and quality of research. Most importantly - but not limited to - avoiding accidental duplication of research within its framework
2. Maintain running statistics on the derived results and publications
3. Make sure that the research projects follow one of the protocols that have been approved by legal and scientific ethics committees.

Methods/results

The Copenhagen Hospital Biobank and The Danish Blood Donor Study are two of the largest public biobanks in Europe and they share administrative resources. Often samples from both biobanks are used in the same studies. So far between 300 and 400 diverse research projects have been initiated in this context. To help us achieve the three points above we have designed a “biobank environment domain model”. Based on this we have developed an application that:

1. Harvests data from current and previous project descriptions making them searchable and version controlled
2. Allows creation of metadata and establishment of relations between entities such as ethics/legal protocols and project synopses
3. Shows projects per researcher, projects per protocol, overview of health register data per protocol
4. Presents metadata for use in searching other data collections such as Medline and similar resources

This presentation will describe the functionalities and data model of this application and adress pitfalls and suggest best practice for research metadata registration

Keywords

Biobank administration; research metadata

P129: Installment of the Sciensano biobanks and their data quality management : lessons learned from the practical implementation of data quality control measures

Triest, David (1), Espinoza Rimachi, Katherine (1), Vodolazkaia, Alexandra (1), Dierick, Katelijne (2)
(1) Central Biobank Platform, Laboratory of Medical Microbiology, Scientific Department of Infectious Diseases in Humans, Sciensano, (2) Scientific Department of Infectious Diseases in Humans, Sciensano

Description

The biobanks of the Sciensano health institute were installed in accordance to the Belgian biobanking legislation of 2018. This in order to keep preserving and using Sciensano’s existing as well as future collections of human body material for scientific research. In 2020, the Central Biobank Platform (CBP) has been developed at Sciensano to support these divers Sciensano biobanks, having 171.345 samples of various types being currently preserved. Since its installment, the CBP has optimized the biobanking data management procedures and implemented various data quality control measures.

After a requirements collection, a biobanking laboratory information management system with audit trail (SLIMS from Agilent) was introduced and configured for the Sciensano biobanks. Critical data fields were defined taking into account the applicable legislative framework as well as quality standards for these biobank registers (i.e. datasets). The ALCOA and FAIR principles were hereby followed. Several data security measures were also implemented in SLIMS together with CBP admin support and end-user trainings. Completeness and consistency of these biobank datasets is managed by defining rules and required field attributes as well as findable and reusable data by applying regular quality control checks.

Several lessons were learned by the CBP over the years after introducing the SLIMS system for biobanking data management at Sciensano. One of the most important conclusions is that data entries can only be streamlined by applying a strategy including a close end-user support with regular data quality checks. Only then will high-quality data be maintained and be available for future research with biobanked samples.

Keywords

Quality, Control, Data, Sample-registers, LIMS

P131: Negotiator – Open Source access negotiation system for Research Infrastructures

Tomasik, Radovan (1), Lang, Konrad (1)
(1) BBMRI-ERIC, Austria

Description

The BBMRI-ERIC Negotiator is an open-source system designed for expediting access to resources or services offered by the given RI. In our domain the negotiator is used for provision of resources such as samples, data and services provided by Biobanks to researchers.

The Negotiator Service provides a platform to assist in the communication for Biobankers with requests to access their resources. This allows for an easy and simple way to facilitate communication between researchers requesting access to resources and Biobanks providing these resources.

The communication process until an agreement for provision of requested resources is reached can be lengthy, involving the exchange of confidential information regarding the intended use, and the exchange of legal documents such as data transfer agreements (DTAs) or material transfer agreements (MTAs). All this communication is provided by the Negotiator service with its tools to either reach one or all providers of resources and facilitate the negotiation process in a secured communication environment.

Keywords

Biobank, Sample access, Negotiation

P133: Challenges in Biobanking and Risk Assessment Plan Implementation

Ionela Toader (1), Andreia Lopes (1), José Maximino (1), Ângela Afonso (1), Cláudia Faria (1,2,3), Sérgio Diasa. (2,3)
(1) Biobanco-iMM, Instituto de Medicina Molecular- João Lobo Antunes, (2) Faculdade de Medicina da Universidade de Lisboa, (3) Centro Hospitalar Universitário Lisboa Norte

Introduction

Occupational Health and Safety (OHS) represents both a legal imperative and an increasingly vital requirement for laboratory activities. Core elements, such as risk assessment, the implementation of preventive measures, worker training, and regular monitoring, are crucial for mitigating risks and ensuring the well-being of employees ([1]).

Objectives

The study implemented at the Biobanco-iMM aims to establish a comprehensive Risk Assessment Plan specifically tailored to biobanking activities, to enhance worker safety and refine standard procedures.

Material/Methods

Employing direct observation and worker interviews, within the daily laboratory routines, tasks were systematically evaluated using the Simplified Method (SM)(2), by quantification and prioritization of the severity of existing risks through intervention levels (III to I, according to severity calculated from SM).

Results

Analysis of daily activities revealed that 6% were categorized as level I, indicating the highest severity. The most pressing need for intervention was identified at level III, encompassing 50% of the activities, followed by level II at 44%. While these situations may not be deemed severe, there is a discernible requirement for overall improvement in conditions. The proposed Plan recommends primary preventive measures, allocating percentages as follows: biological risk prevention (25%), educational measures (23%), ergonomic enhancements (20%), administrative changes (18%), and addressing chemical risks (14%).

Discussion/Conclusion

The challenge encountered in preparing this Plan was enhancing existing preventive measures to eliminate risks, when certain tasks necessitated adherence to specific requirements. This study underscores the imperative nature of OHS and endeavors to contribute substantively to the refinement of working conditions and risk prevention in the domain of biobanking activities.

References

(1)OHSAS 18001:2007 (2)DOI: 10.31252/RPSO.18.02.2019

Keywords

Risk Assessment Plan; Biobanking Activities; Risks; Preventive Measures; Occupational Health and Safety; Simplified Method

P135: Versatile 96-SNP Genotyping Panel Enables DNA Fingerprint and Sample Integrity Assessments

Lopez, Honrado (1), Qin, Jian (1), Kabu, Christopher (1), Sun, Gang (1)
(1) Standard BioTools

Description

Biorepositories provide access to high-quality, curated samples for basic and clinical research purposes. Sample degradation, misidentification and contamination are significant risks to the integrity of banked samples. Distribution of such samples can waste time and laboratory resources and negatively impact the integrity of research studies.

Standard procedures for sample traceability and quality assessment have been employed by biorepositories for many years, including but not limited to barcode labeling, LIMS tracking and DNA quantification. Implementing a DNA fingerprinting method in the biorepository workflow provides more informative quality assessment tools and a direct assessment of sample molecular identity.

The Advanta™ Sample ID Genotyping Panel is a 96-SNP (single-nucleotide polymorphism) assay that generates a sample-specific genetic fingerprint and supports multiple quality assessments of research specimens throughout the sample journey. Developed for use with the Biomark™ X9 system and based on Standard BioTools microfluidics technology, the workflow uses integrated fluidic circuits (IFCs) to precisely combine multiple reactions at nanoliter volumes. In this poster, we demonstrate the utility of the Advanta Sample ID Genotyping Panel as a sample identity and quality assessment tool.

Keywords

sample id, genotyping, microfluidics, DNA

P137: Development of the new component “Dataset types” for the Minimum Information About Biobank Data Sharing (MIABIS) standard

N. Eklund (1), A. Strug (2), C. Engels (ORC ID: 0000-0003-1448-7190) (3, 4), H. Müller (1), K. Silander (5), M. Neumann (6), G. Anton (7)
(1) BBMRI-ERIC HQ, Graz, Austria, (2) Gdański Uniwersytet Medyczny, Gdańsk, Poland, (3) German Biobank Node (GBN), Charité – Universitätsmedizin Berlin, Berlin, Germany, (4) Charité University Hospital Berlin, Berlin, Germany; German Cancer Consortium (DKTK), partner site Berlin, and German Cancer Research Center (DKFZ), Heidelberg, Germany, (5) THL Biobank, Finnish Institute for Health and Welfare, Finland, (6) Universitätsklinikum Würzburg, Würzburg, Germany , (7) Bielefeld University, Medical School OWL, Bielefeld, Germany

Description

MIABIS (Minimum Information About Biobank Data Sharing) is a biobank-specific terminology to facilitate data sharing between biobanks, which consists of components. MIABIS Core v3 includes entities for Biobank, Collection, Research resource and Network, and is meant to provide aggregated administrative descriptions of these entities.

Although with the recent update to MIABIS Core V3 (Eklund et al. 2024, in press) the MIABIS Core now comprehensively includes data-driven biobanks, information hosted by or linked to such biobanks has only been described in a very general manner.
Therefore, the need for a new MIABIS component “Dataset types” has been raised by the MIABIS coordination group and was

positively evaluated by the BBMRI-ERIC MC (Management Committee).

The aim of the proposed work in this dataset type component is to develop three distinctive aggregate level entities for dataset types. These entities consist of a basic model to describe any dataset, as well as entities specifically designed for Omics data and Imaging data stored in biobanks or obtainable through them. Omics and Imaging have been selected as proof-of-concept components because they constitute vital elements of the big data provided to researchers through biobanks (Kinkorová J, et al. 2020).

A working group of biobank and thematic experts has been initiated who will develop the new components in a structured consensus process in the next one to one and a half years. Alignment with related EU projects will be secured by the embedding of the working group within the BBMRI-ERIC Common Service IT.

Interested experts are welcomed to join the working group.

Keywords

MIABIS; data standard, OMICs, Imaging

P139: Sample Index: A tool for searching in biobank data taking into account privacy restrictions

Shekhovtsov, V.A. (1), Eisenkeil, P. (2), Dehari, B. (2), Göbel, G. (1), Eder, J. (2)

(1) Medical University of Innsbruck, Austria, (2) University of Klagenfurt, Austria

Introduction

To provide material and data to researchers efficiently, biobanks have to implement means of searching for collections that contain the data needed for research. The problem with such a search is that direct access to the sample data may be subject to privacy restrictions. One solution is to search in a central repository of quality annotated metadata augmented with indexes.

Methods

As part of BBMRI.at research, in addition to metadata-based search, we propose to design and implement a sample index tool supporting the search for suitable collections within preprocessed non-sensitive data. It consists of the data anonymization component converting the biobank data into a non-sensitive form, the repository storage component holding metadata, quality data, and index data, and the search component running queries against the repository and returning requested collections.

Results

The concept of a sample index was implemented as a software tool that supports a search within the repository storing biobank data after its K-anonymization, aggregation, and annotation with OMOP CDM concepts. It was validated with data from the BBMRI Colorectal Cancer Cohort.

Discussion

We address compliance with the accessibility principle for biobank data by offering the possibility to search within non-sensitive data when the original data is not accessible. The novelty of the tool lies in its support for semantic data annotation together with its aggregation and anonymization such that the central repository can offer rather fine grain information about collections and their associated data sets without any potential compromise of the privacy of the donors.

Keywords

biobank search, repository, data quality, anonymization, data aggregation

P141: ISBER Best Practices and Interrelated Tools

Annemieke De Wilde (1), Samantha Higgins (1), Monique Albert (1), Clare Allocca (1), Cory Arrant (1), Karolin Bergenstråhle (1), Marta Castelhano (1), Bongikosi Duma (1), Helena Ellis (1), Koh Furuta (1), Shannon McCall (1), Karine Sargsyan (1), Brent Schacter (1), Emma Snapes(1), Peter Watson (1)

(1) ISBER Standards Community of Practice

Background and statement of problem

The international standard ISO20387 provides general requirements to ensure biobanking processes, products and services are fit for the intended purpose. A set of interrelated tools, developed by ISBER helps biobanks when implementing this standard.

Proposed solution

The ISBER Best Practices is a set of guidelines describing consensus and evidence based recommendations for the management of biological and environmental repositories. The document harvests the collective experience of ISBER members to provide comprehensive guidance for biorepository professionals, and was used as an input in the development of norms such as ISO20387. After extensive stakeholder feedback and gap analysis, the fifth edition was published in December 2023, and is currently being translated in multiple languages.

The Best Practices are central to a set of interrelated tools.

- The Standard PReanalytical Code (SPREC) is a coding system that offers a general framework for the documentation and reporting of preanalytical variables.
- The ISBER-endorsed IBBL Proficiency Testing program is an external quality control program that allows biobanks to verify the efficiency of processing methods and the precision and accuracy of testing methods.
- The Biobank Assessment Tool (BAT) is a web-based tool that can be used to evaluate how well a biobank follows the Best Practices.
- The ISBER/ASCP-BOC Qualification in BioRepository Science (QBRS) exam allows biobanking technicians to gain recognition for their skills and competencies.

Conclusion

The Best Practices and interrelated tools continue to be broadly used by biobanks, supporting them in achieving their quality goals such as ISO20387 compliance.

Keywords

ISO20387, accreditation, harmonization

P143: Modelling standardized workflows integrating SBP datasets, a new comprehensive service developed in collaboration with and for biobanks.

Flavien, Delhaes (1)
(1) Swiss Biobanking Platform

Introduction

High-quality preanalytical data are key for reliable and reproducible research. The harmonized usage of standards to document sample-related data is a major challenge at national level. To overcome this problem, Swiss Biobanking platform (SBP) published datasets encompassing diverse biobanking practices and has developed an innovative tool integrating SBP datasets into a visual workflow to support the standardized documentation of sample data during their biobanking operations.

Material & methods

To understand biobank specific workflows and determine user requirements, SBP conducted a business analysis, transforming real case studies into specific, standardized workflows for biobanks. Eight biobanks coming from various domains (liquid, veterinary and bacteria) were used as pilots to test the SBP developed tool based on an event-based method, called the SMPL.

Results

SBP SMPL is a plugin module that can easily be integrated into a Biobank Information Management System, for instance DiData LIMS, to facilitate the configuration and management of workflows. By normalizing the description of biobank workflows, the pilot phase helped SBP design and tailor this configuration module. With different event-based building blocks integrating SBP harmonized datasets, SBP SMPL facilitates customization of biobank operations, and enables efficient management and standardized documentation of daily activities and sample-related data.

Discussion

With this flexible and easy to use solution, biobanks can rapidly become autonomous to use the module on their own, reducing SBP or any LIMS provider support and configuration at a minimum. Biobanks will thus benefit from an interoperable tool including regular datasets updates and automatic exchange of sample data into specific catalogues.

Keywords

interoperable, standard datasets, facilitates configuration, BIMS, LIMS, quality

Poster Session Two

PS3. Training and education for quality improvement and knowledge generation

P2: German Biobanking Alliance tissue proficiency test – a sustainable way to assure high quality standards in biobanking

Tilman Pfeffer (1), Carolin Kaufhold-Wedel (2), Sabrina Schmitt (3), Florian Hinterberger (4), Dörthe Kieslich de Hol (2), Nhutuyen Nguyen (5), Peter Schirmacher(1,4,6), Alexander Brobeil (2,6)
(1) German Center for Infection Research (DZIF), Tissue Biobank at the partner site Heidelberg, Germany, (2) Tissue Bank of the National Center for Tumor Diseases (NCT) Heidelberg, Germany, (3) NAKO e.V. Gesundheitsstudie, Germany, (4) BioMaterialBank Heidelberg at the Institute of Pathology, University Hospital Heidelberg, (5) German Biobank Node, Charité – Universitätsmedizin Berlin, Germany, (6) Institute of Pathology, University Hospital Heidelberg, Germany

Description

For tissue-biobanking and its associated services, e.g. histotechnological processing and tissue analyses, quality testing of the whole processing chain are crucial to control sample identity and characteristics prior to any research use. Proficiency tests are a useful tool to ensure high quality of tissue-biosamples after processing. This is necessary to avoid alterations in histopathological morphology or on molecular level caused by pre-analytical processes, such as transportation, processing and storage.

For this purpose, the BioMaterialBank Heidelberg, in close cooperation with the German Biobank Node, organizes annually tissue proficiency tests since 2017. In 2023, the 5th round was performed with 17 participating biobanks across Germany. The aim of this successfully established national-wide quality assurance program for tissue-biobanks is to offer an opportunity to objectively review and evaluate sample processing procedures. Those include the sampling and macroscopic assessment of centrally distributed fresh tissue-samples, its fresh freezing, preparation of cryosections, hematoxylin-eosin staining, and DNA/RNA-extraction from cryogenic tissue including the respective concentration and integrity measurements. In addition, the assessment of a histopathological evaluation is offered. The results are jointly evaluated in personal feedback sessions and considered for the design of the following proficiency test.

Here, we present the structured performing and results of the 5th round of the GBA tissue proficiency test. The derived conclusions are valuable resources allowing a refinement and harmonization of tissue-related processes. This is important to ensure consistently high and comparable sample quality across many different biobanks, especially in context of a sustainable use of biomaterial by and with the help of biobanking.

Keywords

proficiency test, quality assurance, GBA, tissue-biobanking

P4: Biobanking education: the project “SCIence outreach: The example of BIObanks in Europe” and its progression so far

Tzortzatou, Olga (1), Zogopoulos, Vasileios L. (1), Mascalzoni, Deborah (2), Biasiotto , Roberta (3), Southerington, Tom (4), Salmi-Tolonen, Tarja (5), Stumptner, Cornelia (6), Abuja, Peter M. (6), Papadopoulos, Homer (7), Pappa, Dimitra (7), Katsamagkou, Areti (7), Georgiou, Stasthis (7), Vavouraki, Helen N. (8) Ninios, Yiannis P. (8), Charalampos, Voudommatis S. (8), Charalambidou, Georgia (9), Christodoulou, Ioanna (9), Spyropoulos, Fotios (10), Troussas, Christos (10), Lempesi, Martha (10), Pierrakos, George (10)
(1) Biomedical Research Foundation of the Academy of Athens, (2) Institute for Biomedicine, Eurac Research, Bolzano, Italy, (3) University of Modena and Reggio Emilia, Modena, Italy, (4) University of Turku, Hospital District of Southwest Finland, Finnish Biobank, (5) University of Turku, Turku, Finland, (6) Medical University of Graz, Graz, Austria, (7) National Center for Scientific Research “Demokritos”, Athens, Greece, (8) Human Tissue Bank, National Center for Scientific Research “Demokritos”, Athens, Greece, (9) Center of Excellence in Biobanking and

Biomedical Research, University of Cyprus, (10) University of West Attica, Athens, Greece

Introduction

Public involvement is essential in biobanking for medical research, as these endeavors greatly rely on public trust and citizen participation. To achieve these, raising public awareness and keeping the interest alive, biobanks with the aid of researchers and students need better community engagement strategies. The "SCIence outreach: The example of BIObanks in Europe" (SCIBIOEU) project, conducted by seven BBMRI-ERIC node partners in five European countries (Austria, Cyprus, Finland, Greece, Italy), addresses this need.

Materials & methods

To map existing educational resources, online courses and serious games for students, young researchers and citizens on biobanking were searched and summarized in an inventory. In addition, focus groups involving the public and selected stakeholders (including students, professors, researchers, developers and designers, biobanking professionals), were conducted. An online course is engineered using Moodle, while the serious game is developed in Unity, with WebGL enabling online browser accessibility.

Results

The focus groups provided insights into target group's needs and important elements for the development of the course and serious game. An online multimedia course, incorporating texts, videos, and user self-evaluation mechanisms, is developed. Additionally, a 3-D online serious game that navigates users through a virtual biobank, is designed. This interactive experience is enhanced with the assistance of an AI service, providing multiple stages and customization options.

Discussion

SCIBIOEU, an ERASMUS+ funded initiative, seeks to bridge the communicative divide between scientists and the public about biobanking. It equips scientists with effective strategies for scientific outreach and boosts public knowledge of biobanking, through an online course and a serious game.

Keywords

biobanking, serious game, e-learning, gamification, public engagement, science outreach

PS4. Organisational profiles

P6: Collaborative approaches for a sustainable future: BBDCARDIO, the widespread biobank of the Italian Cardiology Network

De Curtis, Amalia (1); Magnacca, Sara (2); Renna, Laura Valentina (3); Colazzo, Francesca (4); Amato, Mauro (4); Masina, Giorgia (5); Stoppini, Andrea (6); Donati, Maria Benedetta (1); Cardani, Rosanna (3)
(1) Neuromed Biobanking Center, Department of Epidemiology and Prevention, IRCCS Neuromed, Pozzilli, Italy, (2) Mediterranea Cardiocentro, Naples, Italy, (3) Biobank BioCor, IRCCS Policlinico San Donato, San Donato Milanese, Milan, Italy, (4) Centro Cardiologico Monzino, IRCCS, Milan, Italy, (5) DPO Rete Cardiologica, Milan, Italy, (6) Consorzio di Bioingegneria e Informatica Medica (CBIM) Pavia, Italy

Introduction

The Italian Cardiology Network (ICN) includes 20 Italian Research Hospitals with the aim to promote collaboration in the field of cardiovascular diseases (CVD). Within this network, the widespread cardiovascular biobank (BBDCARDIO) is working to harmonize for ICN projects access to high-quality samples and related data from CVD patients and healthy volunteers. BBDCARDIO is organized as a Hub&Spoke model with two Coordinating Hubs (North and South of Italy) managing all activities and maintaining contacts among biobanks (Spokes).

Materials and Methods

The building of BBDCARDIO has implied several harmonization and standardization steps: 1) creation of a group of experts working together for research projects and organization of working group meetings; 2) surveys to explore the activities of each biobank and careful checkpoints to verify the standardization of the processes; 3) establishment of a Quality Management System for the standardization of all the policies (governance, ethical/legal

documents) and biobanking standard operating procedures; 4) centralized database containing a minimum data set; 5) website with a reserved area (https://bbdcardio.retecardiologica.it/) accessible only to BBDCARDIO members with updated versions of official documents, the forum area with suggestions/questions and the catalogue of all samples stored in BBDCARDIO; 6) co-ownership agreement signed by all the members for samples and data sharing.

Results and Conclusions

To date BBDCARDIO has already collected samples and related data for research within 2 ICN collaborative studies and is now starting a new collection for a national ICN project on primary CVD prevention. No biobank, by itself could have achieved similar goals.

Keywords

biobank network

P8: The Dutch BBMRI-node as part of the national health and life science data infrastructure Health-RI

Hamann, Jörg (1, 2); Kulhánková, Lucie (3); Verjans, Robin (3); Vos, Janet (3); Oostergo, René (4); Meijer, Gerrit (3); Manders, Peggy (5)
(1) Neuroimmunology Research Group, Netherlands Institute for Neuroscience, Amsterdam, The Netherlands, (2) Department of Experimental Immunology, Amsterdam Institute for Infection and Immunity, Amsterdam University Medical Center, Amsterdam, The Netherlands, (3) Health-RI / BBMRI.nl, Utrecht, The Netherlands, (4) University Medical Center Groningen, Groningen, The Netherlands, (5) Radboud University Medical Center, Nijmegen, The Netherlands

Introduction

The Netherlands have been a member of BBMRI-ERIC since its foundation. Since 2021, BBMRI.nl has been integrated in Health-RI, the national health & life sciences data infrastructure. Here we describe the organization and activities of BBMRI.nl.

Results

Health-RI aims to build an integrated infrastructure for reuse of health & life sciences data for research, policy, and innovation. The Health-RI theme Biobanks & Collections, representing BBMRI.nl, facilitates that health data, biomaterials, and images from a wide range of collections, are collected, managed, stored, and made available in a harmonized manner. Key activities are the standardization of sample and data processing based on evidence and (inter)national alignment, the provision of support via services that enable their finding and sharing, and the distribution of knowledge towards the biobank community. A first national Biobanks & Collections Day was organized in 2023.

These goals are realized through collaboration between European Strategy Forum on Research Infrastructures (ESFRIs). Health-RI envisions to establish and manage an ESFRI-overarching service portfolio (a so-called “house of services”) to support health & life sciences researchers in the Netherlands, which is based on the developed infrastructural solutions from these individual ESFRIs, including BBMRI, ELIXIR, EATRIS, and EuroBioImaging.

Conclusions

The current organization of BBMRI.nl facilitates improved functioning as a national node of BBMRI-ERIC, increased alignment and collaboration between ESFRIs, and more added value for the Dutch community of researchers. We believe that the description of our organisation of the Dutch BBMRI node may be informative for other member states to explore possibilities.

Keywords

BBMRI node, ESFRI, infrastructure

P10: Review of the Biobank Landscape in Ireland

Khan, Sonja (1); Miller, Nicola (2)
(1) University of Galway, Institute for Clinical Trials, (2) Cancer Biobank, Lambe Institute, School of Medicine, University of Galway

Background

Ireland has seen an expansion of biobanking practice in recent years due to an increasing need for specimens and associated data for use in translational and clinical research. The aim of this study was to perform a review of biobanking practice in Ireland, collect information relating to biobanking activities (informed consent

forms, patient information leaflets, funding, quality management systems and governance structures).

Methods

This review involved collation of biobanking activity and assessment of organisational structures in Ireland. Information for this review was obtained through internet searches, database reviews maintained by relevant organisations involved in biobanking or biomedical research communities within the country.

Results

27 biobanks were included in this review, with the majority located in Dublin (22), followed by Galway (2) and the rest spread across the country. A subset of 22 biobanks were identified to be disease specific centres of which 10 were dedicated to Cancer research. 25 biobanks were dedicated to collection and storage of adult biospecimens, and two specifically for paediatric specimens. Most biobanks are established and run by hospitals/academic research institutions, supporting clinical and scientific research development.

Conclusion

This review provides relevant context on Irish biobank structure, governance, challenges, opportunities and areas for improvement/growth. Obtaining a clearer understanding of this area will improve greater access to biospecimen samples and data, facilitate collaboration, support sustainability and ultimately promote research to the highest standard possible.

Keywords

biobank, Ireland, research landscape

P12: The role of Lithuanian Biobanks in accelerating progress towards personalised medicine

Dabkeviciene, Daiva (1); Jarmalaite, Sonata (1)

(1) National Cancer Institute, Vilniaus, Lithuania

Introduction

The Human Biological Resource Centre (HBRC) project was implemented between 2019 and 2023 to address the critical need to modernise Lithuania's biobanking infrastructure for advancement in biomedical research and personalised medicine. A key objective of the project was the Lithuanian active membership in BBMRI-ERIC - the international network of biobanks.

Materials and Methods

The Lithuanian National Cancer Institute (LNCI) has been appointed as the project leader and the National node of the Lithuanian biobanks in BBMRI-ERIC network. LNCI and its partners are implementing HBRC standardised procedures and quality measures in collaboration with key stakeholders. Biobanking activities include the collecting, storing, and sharing of biological samples and related health data in an ethical and legal framework. The governmental strategic analysis centre STRATA performed personalised medicine feasibility study to map out the priority areas for action in the medical and scientific domains.

Results

The HBRC has managed to integrate Lithuanian biobanks into a comprehensive national network, enabling the effective use of biological resources for the research process. Lithuania identifies the biobank network as a fundamental tool for accelerating progress in personalised medicine.

Discussion and Conclusion

Lithuanian membership in the BBMRI-ERIC reinforces international research collaboration and visibility in the global landscape. The results of the project stimulate not only biomedical research but also investments into healthcare innovations. Through standardised procedures and international partnerships the HBRC opens the road to improving healthcare services and biomedical research quality in Lithuania and in Europe.

Keywords

Lithuanian biobanks, Human Biological Resource Centre, personalised medicine, STRATA feasibility study

PS6. The road towards ISO 20387 accreditation

P16: Quality management in Biobank at Masaryk Memorial Cancer Institute

Kristina Greplova (1), Jana Gottwaldova (1), Roman Hrstka (1)
(1) Bank of Biological Material of Masaryk Memorial Cancer Institute, Žlutý kopec 7, Brno

Description

Bank of Biological Material of Masaryk Memorial Cancer Institute (BBM MMCI) is the coordinator of the Czech national network of biobanks - BBMRI.cz, which has been part of the European Research Infrastructure Biobanking and Biomolecular resources Research Infrastructure (BBMRI-ERIC) since 2013.

BBM MMCI is focused on long-term storage of frozen tissue and other human biological material of cancer patients and clients of the Prevention Center of MMCI. This biological material, including related data, is provided primarily for research purposes.
The goal of biobanks Quality management is to provide biological material and related data for research and development in a minimum standardized quality in order to strengthen mutual interoperability across several EU countries. The introduction of a Quality management system (QMS) is an important way how to prove a flawless operation of the given biobank. Accreditation of biobanks in the Czech Republic is carried out according to the ISO 20387:2021 Biotechnology-Biobanks standard.

In 2022, BBM MMCI participated in the pilot project of Czech Accreditation Institute to assess the implementation of the QMS according to the standard ISO 20387:2021, and based on the assessment of the established QMS and the activities carried out in BBM MMCI, the compliance with the requirements of this standard has been met. In March 2023, BBM MMCI became the 1st biobank in the Czech Republic that will be accredited according to this standard. Currently, other biobanks in the Czech Republic cannot be accredited due to the requirement to harmonize this standard.

This work was supported by the project BBMRI.cz no. LM2023033.

Keywords

accreditation, ISO 20387

P18: Analysis of the quality of biological material stored in the Bank of Biological Material at MMCI since 2001

Ema Jochmanova (1), Eva Ruckova (1) and Roman Hrstka (1)
(1) Bank of Biological Material of Masaryk Memorial Cancer Institute, Zluty kopec 7, Brno, Czech Republic

Description

Our goal is to analyse and compare the quality of 120 samples of fresh frozen tissue from tumour resections stored in liquid nitrogen vapour in biobank at Masaryk Memorial Cancer Institute (MMCI) since 2001, 2006, 2011, 2016 and 2022. Twenty four samples from two different diagnosis from each of the selected years were analysed and RNA integrity number determined, to provide an instant and objective evaluation of total RNA degradation. Western blotting method was used to determine the total level of chosen proteins and their posttranslational modifications prone to degradation. Current results of the RIN values of the first group of 24 samples stored since 2001 show a RIN higher than 7 (high enough even for sequencing) for 62.5% of the samples. In the group of 12 samples stored only shortly, since 2022, it is 83.4%. More than 87% of all 36 analysed samples from both groups show RIN higher than 6 (good quality). In conclusion, we confirmed a high quality of long-term stored samples in our biobank, which should provide scientific support for their use in a wide range of research applications.

The work was supported by the project BBMRI.cz no. LM2023033.

Keywords

quality control, long-term storage, fresh frozen tissue, RIN

P20: A Train-the-Trainers program to support the ISO 20387 accreditation process of Italian biobanks

Monica Forni (1), Massimiliano Borsani (2), Sara Casati (2), Matteo Pallocca (2), Claudia Miele (2), Marialuisa Lavitrano (3)

(1) University of Bologna, (2) CNR-IEOS, (3) University of Milano Bicocca

Description

As part of the Strengthening BBMRI.it project 4 Quality Managers (QMs) were recruited to support biobanks in the implementation of 20387 ISO standard. To achieve this objective, the project involves a train-the-trainer approach.

In the first phase, QMs are trained by professionals on the fundamental knowledge to deal with the implementation of ISO 20387, including the accreditation application, the required documentation, the internal audits, the quality report and the instrumentation and measurement management system. In addition, some cross-cutting aspects (e.g. privacy and IT) and the alignment of ISO 9001 with ISO 20387 are covered. This first training is also open to QMs of advanced BBMRI.it biobanks.

In the second phase, each QM is assigned part-time to 5 selected biobanks to support their accreditation and transfer the knowledge to the staff. QMs work as a team and assist the biobanks in performing a gap analysis, identifying the collections for which accreditation is required and preparing the application for accreditation. A second round of training allows the QMs to work on the results of the gap analysis and a third one to review the applications.

Finally (third phase), each biobank will submit its application to the National Accreditation Body ACCREDIA.

The expected result of this process is the accreditation of the selected biobanks and the availability of a large number of professionals with specific skills in ISO 20387, which will facilitate, in the coming years, the accreditation of most Italian biobanks.

Keywords

Train-the-Trainers, Quality, Accreditation

P22: Adapting to pandemics and the climate crisis: The transition to virtual cross-audits at BBMRI.at

Muchar, Patrick (1), Gruber, Franz (2), Hofer, Philipp (3) , Kedenko, Ludmilla (4), Neff, Patrick (5), Plattner, Katharina (6), Riegler, Skaiste (6), Stargardt, Melanie (7), Strahlhofer-Augsten, Manuela (6), Stumptner, Cornelia (8), Tauscher, Petra (6), Wieser, Monika (7), Brcic, Luka (8), Goebel, Georg (9), Haslacher, Helmuth (10)
(1) Department of Laboratory Medicine, Medical University of Vienna, Vienna, Austria, (2) Center for Medical Research, Johannes Kepler University, Linz, Austria, (3) Department of Pathology, Medical University of Vienna, Vienna, Austria, (4) Department of Internal Medicine I, Paracelsus Medical University, Salzburg, Austria, (5) Vice-Rectorship for Research and International Affairs, Medical University of Innsbruck, Innsbruck, Austria, (6) Biobank Graz, Medical University of Graz, Graz, Austria, (7) VetCore Facility for Research, University of Veterinary Medicine Vienna, Vienna, Austria, (8) Diagnostic and Research Institute of Pathology, Medical University of Graz, Graz, Austria, (9) Department of Medical Statistics Informatics and Health Economics, Medical University of Innsbruck, Innsbruck, Austria, (10) Department of Laboratory Medicine, Medical University of Vienna, Vienna, Austria

Introduction

For the past decade, BBMRI.at has operated a cross-audit program among its participating biobanks. Amidst global challenges like pandemics and climate change, the adoption of innovative research and collaboration methods has become increasingly crucial.

Methods

Faced with the challenges of the pandemic, BBMRI.at revised its cross-audit approach, moving from traditional in-person methods to virtual formats. The effectiveness of this new virtual approach was assessed through questionnaires answered by auditors and auditees, which were developed with the assistance of ChatGPT.

Findings

The original BBMRI.at cross-audits comprised the generation of an audit plan, followed by a one-day one-site visit of auditors nominated by the BBMRI.at partner biobanks at the auditee's site. After this, the auditors compiled a detailed audit report provided not only to the auditee but also to other consortium partners. The virtual cross-audits, in contrast, commence with a four-week document review phase, culminating in an auditor meeting where open questions are

compiled, followed by a virtual interview with the auditee. Techniques such as desktop sharing and camera tours enable random checks. The audit again concludes with the generation of a comprehensive report. The change to this format has been well received by both auditors and auditees.

Conclusions

In summary, the shift to a virtual cross-audit format at BBMRI.at has been met with widespread approval, showcasing a consortium‘s adaptability and the effectiveness of digital solutions in modern research collaborations. This successfull transition establishes a valuable model for similar audit programs seeking to adapt.

Keywords

cross-audits, virtual, BBMRI.at, pandemic, climate crisis

P24: High Quality BioBanking in Belgium: the Road towards ISO20387 Accreditation (B3-ISO)

De Wilde Annemieke (1), Annelies Debucquoy (1), Johan Guns (2), Ahmad Merhi (3), Loes Linsen (4), Pieter Moons (5), Elke Van Rossen (6), Manon Huizing (5), Katia Emmerechts (1), Elke Smits (5)
BBMRI.be - Belgian Cancer Registry (1), Central Biobank, UZBrussel (2), IPG BioBank and Laboratory of Translational Oncology, Institut de Pathologie et de Génétique (3), AC Biobanking, University Hospitals Leuven (4), Biobank Antwerp, Antwerp University Hospital (5), BELAC, Federal Public Service Economy, SME, Self-employed and Energy (6)

Background

BBMRI.be, the Belgian node of BBMRI-ERIC, connects 20 Belgian biobanks. The inclusion of ISO20387 ‘General Requirements for Biobanking’ in the portfolio of the Belgian accreditation organization BELAC, will allow biobanks to formalize their competences.

Methods

To harmonize and enhance the quality management activities of the BBMRI.be biobanks, a stepwise quality improvement program is being implemented at the individual biobanks. In cooperation with the participating biobanks, BBMRI.be coordinates the development of guidelines, templates and policies, the organization of webinars, and the development of an interactive FAQ tool. Templates are being harmonized and integrated in the domains of IT, ELSI and sustainability. At the same time, an accreditation program is being established together with BELAC, ultimately leading to ISO20387 accreditation. One year after a kick-off survey, the biobanks provided feedback in one-on-one focus discussions that were organized from October-December 2023.

Findings

The initial project deliverables, including guidance documents, webinars, and harmonized templates, received positive feedback from participating biobanks and will be presented during the conference. In contrast to the kick-off survey findings, fewer biobanks now express an interest in achieving ISO20387 accreditation within the initial 2 years of the project (mid-2024). However, all participating biobanks wish to receive at least a BBMRI-ERIC peer to peer audit by the end of the project in mid-2026)

Discussion

The setup of this program and the implementation of ISO20387 will substantially contribute to (inter)national translational research and foster collaborations between industry and academia in the biomedical sector.

Acknowledgements

The B3-ISO project is financed by BELSPO in the framework of the ESFRI-FED call.

Keywords

ISO20387, accreditation, harmonization

P26: The successful accreditiation of the Tissue Bank of the NCT Heidelberg according to DIN EN ISO 20387

Carolin KAUFHOLD-WEDEL (1), Marc SCHNEIDER (2,3), Thomas MULEY(2,3), Tilman PFEFFER (4), Peter SCHIRMACHER (1,4,5), Alexander BROBEIL (1,5)
(1) Tissue Bank of the National Center for Tumor Diseases (NCT) Heidelberg, Germany, (2) Translational Research Unit, Thoraxklinik at Heidelberg University Hospital, Germany, (3) Translational Research Center Heidelberg

(TLRC), Member of The German Center for Lung Research (DZL), (4) Tissue Bank of the German Center for Infection Research (DZIF), Institute of Pathology, Heidelberg University Hospital, Germany, (5) Institute of Pathology, Heidelberg University Hospital, Germany

Abstract (Englische Version)

An accreditation according to DIN EN ISO 20387 is the final proof of a biobank to demonstrate its competence and consistency in the high-quality handling of biological material and associated data. Thus, the biobank can guarantee both, its academic and industrial customers, that the entire life cycle of the biosamples and the associated data meet the highest quality and safety standards. The tissue bank of the NCT received this proof in April 2023 as the first German and fifth biobank in Europe.

Here, we present a report about the strategy of preparation and the timeline to the receipt of the certificate. The tissue bank of the NCT has been accredited according to DIN EN ISO/IEC 17020 for 14 years together with its branch in the Lung Biobank Heidelberg. The main challenge was the adaptation of the QM system in accordance with DIN EN ISO 20387 and the integration of an additional partner biobank, the DZIF tissue bank. The entire QM system and the existing processes were self-assessed with regard to their fulfillment of the requirements of DIN EN ISO 20387 and adapted and complemented accordingly. Services not yet included in the scope of the previous accreditation were extensively tested by means of verification or validation and integrated into the QM system. In a dyadic assessment by the German Accreditation Body (DAkkS), all biosample-related processes were examined. The remediation of the identified deviations was presented in a corrective action plan to the DAkkS, which accepted the measures and issued the accreditation.

Keywords

accreditation, DIN EN ISO 20387, German Accreditation Body

P28: BBMRI-ERIC's Quality Management service portfolio

Maike Tauchert (1), Niina Eklund (1), Nadja Palko (1), Andrea Wutte (1)

(1) BBMRI-ERIC, Graz, Austria

Description

Over the past 10 years, BBMRI-ERIC's Quality Management (QM) Department has built up a comprehensive service portfolio to support the biobanking community in providing high quality biosamples and associated data for basic and applied biomedical research. Implementing standardised processes is crucial, therefore international and European standards served as the basis for the development of QM services right from
the start.

So far, the service portfolio consists of three pillars. Our **Knowledge Hub** provides the biobanking community with fundamental knowledge and expertise. This ranges from information on biobank-relevant standards to events on quality-relevant topics, working groups, access to QM templates and our expert community.

This is being expanded through **training & support** by topic experts which is offered in various formats, mainly virtual and therefore easily available to the community. As part of the BBMRI-ERIC Academy, it is possible to receive Continuing Medical Education credits for participating in some of the live webinars.

Following the publication of the biobanking standard ISO 20387, biobanks are endeavouring to implement its requirements and, ideally, to have their defined biobanking processes accredited. Our services are designed to support biobanks on their way to accreditation, for example by using our **audit** programme. Compliance with the principles of the biobanking standard is reviewed and, if the outcome is positive, the biobank is awarded with a BBMRI-ERIC Quality Label in the BBMRI-ERIC Directory.

To meet the increasing interest in data and AI tools, we are currently expanding our portfolio to include a comprehensive range of data quality services.

Keywords

Quality management, services, ISO 20387, biobank

P30: Data quality services in BBMRI-ERIC

Niina Eklund (1), Maike Tauchert (1), Nadja Palko (1), Andrea Wutte (1)
(1) BBMRI-ERIC, Graz, Austria

Description

BBMRI-ERIC's Quality Management (QM) Department offers many quality-related services to the biobanking community to help increase the overall quality of biobanking activities. Existing services cover operational aspects of biobanking as well as the quality of biobanked samples, and they have been widely constructive when bettering biobanking quality.

In recent years biobanks have started to shift from samples also to data domain, when samples have been used in research and distinct types of analytical data are returned to biobanks. Consequently, data quality becomes vital when biobanks offer sample and donor related data to health research. The relevancy of biobank data quality also stems from the biobanking standard ISO 20387, which presents prerequisites on biobank data management and data quality, and which must be considered if accreditation is pursued.

Therefore, BBMRI-ERIC QM is initiating new services in data quality to complement the existing QM services and to support biobanking community in data quality activities. The upcoming services will initially focus on documentation and interoperability but will eventually cover more topics, i.e., best practices for biobank data quality, overview of different standards and guidelines, requirements for data management processes, and data quality control protocol and report templates. Additionally, the services will touch AI-related tools and standards. To reflect the data quality services for biobanks, experts are welcome to join the data quality community.

With this initiative, we intend to raise awareness of the importance of data quality. Showcasing quality- controlled datasets that can be complemented with high-quality samples, new avenues for biobank research can be explored.

Keywords

data quality, data management, services, quality management

P32: GBN quality programme: audit findings and their impact

Nguyen, Nhutuyen (1), Sprecht, Cornelia (1)
(1) German Biobank Node

Introduction

The German Biobank Node (GBN) developed its comprehensive quality programme (QP) to guide biobanks towards accreditation. The QP comprises various components, such as friendly audits, proficiency tests for interlaboratory comparison and the GBN QM manual which provides templates for implementing a QMS according to ISO 20387. Furthermore, the GBN has an eLearning platform with over 20 webinars on various biobanking topics. Here, we would like to highlight the ‘friendly audits’ conducted within the German Biobank Alliance (GBA) as a central component of the QP and their crucial impact on the continuous improvement of GBNs services.

Material & methods

Since 2018, GBN has been training auditors and conducting friendly audits according to applicable guidelines and the GBN QM manual. The use of templates and checklists enables standardised documentation. Each audit is evaluated based on defined criteria by the parties involved and the audit reports are regularly analysed.

Results

From 2021-2023 a total number of 25 friendly audits were conducted for 21 biobanks. The auditors identified 891 conformities, 245 recommendations and 242 non-conformities. Most non-conformities were identified for quality control, validation and verification and report.

Discussion/conclusion

The audit programme is continuously improved based on the analysis of evaluations and reports. Furthermore, the results can be used to identify best practices and training needs for specific biobanking topics. As a result, 75% of GBA partners aim to be accredited by 2027 and the GBN is actively supporting that goal. Additionally, membership of the GBA is now associated with high-quality biobanking and is a prerequisite for some project applications.

References

Schmitt, S., Meinung, B., Becker, K.-F., Slotta-Huspenina, J., Kiehntopf, M., Schirmacher, P., Hartfeldt, C., Herpel, E., & Hummel, M. (2021). German Biobank Node: Manual for Quality Management in Biobanking - English Version. Zenodo. https://doi.org/10.5281/zenodo.4697594

Keywords

German Biobank Node, German Biobank Alliance, Friendly Audit, ISO 20387:2018, Biobanking, Quality Management, Accreditation

PS7. Information security and data privacy

P34: Restrictive access to data and samples in Italy: will the EHDS address the problems?

Staunton, Ciara (1), Mascalzoni, Drborah (1)
(1) Eurac Research

Description

In June 2022, the Italian Garante issued an Opinion that stated while broad consent to specific research areas is sufficient to create a databank, such consent is not sufficient for the use of the data for research. To use such data, specific consent for each research project is required. This decision is impacting the operation of biobanks in Italy. Meeting the specificity of consent as required by the Garante will likely require re-contact and re-consent that was not envisaged at the time of establishment of a biobank and in the drafting of their governance framework. This decision is also at odds with the proposed European Health Data Space (EHDS) which is seeking to create an obligation to share electronic health data for secondary purposes.

This paper will discuss the impact of the Garante opinion and outline how the lack of regulatory coherence between the proposed EHDS and the current situation in Italy will have on biobanks and its participants in Italy.

Keywords

GDPR; EHDS; Italy; consent; privacy

P36: Implementing consent for a hospital-based biobank with data and residual biosamples: evaluation of the procedure including a patient interview study

Miriam Beusink (1), Annegien Broeks (1), Irith Kist (1), Henri van Luenen (1), Aaike van Oord (1), Sonja van Scheijen (1), Susanne Rebers (1), Marjanka K Schmidt (1)
(1) The Netherlands Cancer Institute – Antoni van Leeuwenhoek hospital (NL)

Background

A consent procedure for biobanking and use of data and residual biosamples in future health research aims to provide patients with sufficient information. Simultaneously, it is unknown whether such a consent procedure leads to sufficient data and biosamples for research. Our study investigated these questions during the implementation of a new consent procedure in a cancer hospital where people were asked consent during their first visit.

Methods

We analyzed consent decisions of 59.813 patients recorded between May 2018 and December 2020. We interviewed 64 patients (stratified sampling: 25 consent, 16 no consent and 23 no response) to investigate whether they felt sufficiently informed, whether the patients' remembered and desired consent choice was correctly registered, and reasons for giving (no) consent or not responding.

Results

Consent rates were 92.4% consent, 2.3 % no consent and 5.3% no response. The majority of the interviewees who remembered consent was asked, felt sufficiently informed. Those that needed more information, mostly had not yet read the information given to them, due to the hectic and emotional period. Most desired consent choices matched with the registered choice. Reasons for giving consent were mostly motivational, e.g., based on altruism and solidarity. Reasons for not giving consent or not responding yet were mostly contextual, e.g., insufficient headspace, or privacy concerns.

Conclusions

We conclude that patients feel sufficiently informed using a broad consent procedure. Moreover, the procedure resulted in a relatively high response rate of 92%, assuring sufficient

availability of data and biosamples for health research.

Keywords

broad consent; implementation; real-world data; response; information; secondary data use; electronic health records; routine health data; transparency

P38: Privacy-Preserving Record Linkage between the SIOPEN BIOPORTAL and the RD-Connect Genome Phenome Analysis Platform via the EUPID Services

Hayn, Dieter (1), Sander, Emanuel (1), Jammerbund, Bernhard (1), Zalatnai, Luca (2), Papakonstantinou, Anastasios (2), Beltran, Sergei (2), Piscia, Davide (2), Devi-Marulkar, Priyanka (3), Schleiermacher, Gudrun (3), Kreiner, Karl (3), Schreier, Günter (1)
(1) AIT Austrian Institute of Technology GmbH, Graz, Austria, (2) Centro Nacional de Análisis Genómico (CNAG), Barcelona, Spain, (3) Institut Curie, Paris, France

Introduction

Since rare disease data are often distributed among various pseudonymised contexts (registries, biobanks...), privacy-preserving record linkage (PPRL) is crucial [1]. The EUPID Services [2] support not only the linkage of pseudonyms derived from identical identities ("full matches"), but also in case of typing errors ("partial matches"), without disclosing the patients' identities. The RD-Connect Genome-Phenome Analysis Platform (RD-Connect GPAP) [3] is an online tool for diagnosis and gene discovery, which can identify mutations, confirm diagnoses, and find matching cases. The SIOPEN BIOPORTAL [4] is an international neuroblastoma registry linked to a virtual biobank, holding core clinical and sample data. Up to now, despite its huge potential, RD-Connect GPAP and SIOPEN BIOPORTAL data were not linkable due to different pseudonyms.

Materials and methods

We linked test installations of SIOPEN BIOPORTAL and RD-Connect GPAP to the EUPID Services. ChatGPT was used to generate 12 synthetic sets of typical European identity data, representing 4 no-, full-, and partial-matches, respectively. Users of each system logged into the respective service and registered their fake patients using the EUPID Services.

Results

All corresponding datasets were correctly linked via the EUPID Services. No identifying data were leaked from one to the other system. An overview of all synthetic patient data is provided in table 1.

Discussion and conclusion

We have demonstrated that genome-phenome data can be linked with clinical and biobanking data via the EUPID Services. As a next step, we plan to deploy the linkage on real-world data.

References

https://pubmed.ncbi.nlm.nih.gov/35901818/
https://pubmed.ncbi.nlm.nih.gov/24825705/
https://pubmed.ncbi.nlm.nih.gov/35178824/
https://clinicaltrials.gov/study/NCT05192980

Keywords

Privacy-Preserving Record Linkage, GDPR, Pseudonymisation, Biobanking, Data Analysis, Bioinformatics

P40: Digital Use Conditions (DUC) and Common Conditions of Use Elements (CCE)

van Enckevort, Esther (1), Gibson, Spencer (2), del Carmen Sanchez Gonzalez, Maria (10), Kamerling, Pim (9), Alper, Pinar (3), Bernier, Alexander (4), Woolley, Patrick (5), Mietchen, Daniel (6), Strug, Andrzej (7), Becker, Regina (8), Lynne-Mah, Nancy (11), Novakowski, Ann (12), Wilkinson, Mark (13), Benhamed, Oussama (13), Landi, Annalisa (14), Krog, Georg Philip (15), Müller, Heimo (16), Riaz, Umar (2), Veal, Colin (2), Holub, Petr (16), Iermito, Mariapia (18), Casati, Sara (19), Maini, Monika (2), Mimouni, Yanis (20), Le Cornec, Clèmence (21), Coviello, Domenico D. (22), Franchin, Tiziana (23), Fusco, Francesca (24), Ramírez García, Jose Antonio (21), van der Zanden, Loes (25), Jeanson, Francis (17), Brookes, Anthony J. (2)
(1) University Medical Centre Groningen & University of Groningen, (2) University of Leicester, (3) Luxembourg National Data Service, (4) McGill University, (5) University of Oxford, (6) Ronin Institute for Independent Scholarship, (7) Medical University of Gdańsk, (8) University of Luxembourg, (9) VASCERN ERN, Radboud University Medical Center, (10) Instituto de Salud Carlos III, (11) Fraunhofer

Institute for Biomedical Engineering, (12) Sage Bionetworks, (13) Universidad Politécnica de Madrid, (14) Fondazione Gianni Benzi Onlus, (15) Signatu AS, (16) BBMRI-ERIC, (17) Ontario Brain Institute, Datadex Inc, (18) Istituto Neurologico Carlo Besta & Fondazione IRCCS, (19) ELSI Services & Research Unit, BBMRI-ERIC, (20) European Joint Programme on Rare Diseases, (21) Center for Pediatrics and Adolescent Medicine, Heidelberg University Hospital, (22) Istituto Giannina Gaslini, (23) Research Biobank, IRCCS Bambino Gesù Children's Hospital, (24) Institute of Genetics and Biophysics "Adriano Buzzati- Traverso", (25) ERN eUROGEN, Radboud University Medical Center

Introduction

In recent years efforts have been undertaken to develop infrastructures for discovery and sharing of health and biomedical data and samples. To make discovery of usable assets possible it is important that information about use conditions is made available in a consistent format. However, the current systems either focus on a limited set of common conditions and are not easily extendable or are considered too complex and have found limited adoption.

Materials & Methods

We evaluated existing ontologies and systems for recording use conditions and consent clauses such as Consent Codes (CC), the Data Use Ontology (DUO), Informed Consent Ontology (ICO) and Automatable Discovery and Access Matrix (A-DAM) as well as examples of use conditions and consent information from registries and biobanks for rare diseases.

Results

We developed a new system (the DUC data structure) to record use conditions in a simple and flexible manner with a simple sentence-like structure that defines conditions based on a condition term, rule, and scope optionally extended with condition parameters. In addition, we defined a set of atomic terms that have no directionality (the CCE terms) and can be used together with this structure.
The structure has been adopted as part of the EJP-RD Virtual Platform and is being piloted within BBMRI-ERIC.

Discussion

The system we developed was tested at the level of entire resources (biobanks/registries). We are currently working towards adapting it to the individual record level and defining extensions to the DUC model and CCEs where necessary.

Publications

Jeanson, Francis, et. al. “Getting Your DUCs in a Row - Standardising the Representation of Digital Use Conditions”, pre-print: 10.5281/zenodo.8200044
del Carmen Sanchez Gonzalez, Maria, et. al. “Common Conditions of Use Elements. Atomic Concepts for Consistent and Effective Information Governance.” Pre-print: 10.5281/zenodo.8200079

Funding

This work was supported by the European Joint Programme on Rare Diseases (EJP RD) and the International Rare Diseases Research Consortium (IRDiRC). The European Joint Programme on Rare Diseases, including the IRDiRC Scientific Secretariat is funded by the European Union under the European Union’s Horizon 2020 research and innovation programme Grant Agreement N°825575.

Keywords

Consent, use conditions, ontology, data standard, DUC, CCE

PS8. Public Health Emergencies – Growing importance in the One Health concept

P42: Autopsy-based COVID-19 tissue biobanking – structure, performance and research relevance

Tilman PFEFFER (1), Isabel M. KLEIN (1), Katharina Hofmanna, Constantin SCHWAB (2), Lisa M. DOMKE (1), Laura HARTMANN (1), Alexander MARX (3), Martin WERNER (4), Oliver SCHILLING (4), Falko FEND (5), Hans BÖSMÜLLER (5), Peter MÖLLER (6), Albrecht STENZINGER (2), Thomas LONGERICH (2), Peter SCHIRMACHER (1,2)
(1) German Center for Infection Research (DZIF), Tissue Biobank at the partner site Heidelberg, Germany, (2) Institute of Pathology, University Hospital Heidelberg, Germany, (3) Institute of

Pathology, University Medical Center Mannheim, Germany, (4) Institute of Pathology, Medical Center, University of Freiburg, Germany, (5) Institute of Pathology, University Hospital Tübingen, Germany, (6) Institute of Pathology, University Hospital Ulm, Germany

Introduction

Since the beginning of the SARS-CoV-2 pandemic, structured and quality assured autopsy-based biobanking has been performed in the context of the COVID-19 Autopsy and Biosample Registry Baden-Württemberg (BW), encompassing the five university pathologies (Heidelberg, Freiburg, Mannheim, Tübingen, Ulm). The consortium, coordinated by Heidelberg site, closely cooperates with the German Center for Infectious Diseases (DZIF) and is funded by the Ministry of Science, Research and Arts of Baden-Württemberg, Germany, since 2020.

Structure

The main part is a structured biobanking and registry function to support latest research and to facilitate and increase autopsy frequency. Tissue samples (FFPE, cryopreserved) of all relevant organs are standardized collected from SARS-CoV-2 infected and/or anti-SARS-CoV-2 vaccinated deceased patients. Samples are stored in a harmonized decentral manner. Sample data including relevant patient datasets, autopsy data, histopathological/radiological characteristics, immunization status, clinical and virological data are recorded in a web-based platform.

Results

Since 2020 around 12,500 tissue samples were collected resulting in over 40 peer-reviewed publications. Among others, the latest publications aimed on severe adverse vaccination complications and on a longitudinal pathogenicity comparison of virus variants throughout the SARS-CoV-2 pandemic. Further projects also focus on severe long-COVID cases with histopathological evaluated lung injury.

Conclusion

The five university pathologies in Baden-Württemberg, Germany, established a worldwide unique autopsy-based SARS-CoV-2 autopsy registry with tissue biobanking, leading to numerous research publications with major contribution to relevant medical issues (e.g. pathology of severe COVID and over time changes, post-vaccination myocarditis). This demonstrates the major importance of qualified biobanking in relevant infectious diseases and public health topics.

Keywords

COVID-19, tissue biobanking, autopsy-based, anti-SARS-CoV-2 vaccination, myocarditis, DZIF Tissue Bank

P44: Integration, Cataloguing and FAIRification of Biobank and Clinical Data

Kacová, Radoslava (1), Houfek, Tomáš (1), Dudová, Zdenka (1), Tomášik, Radovan (1)
(1) Masaryk Memorial Cancer Institute

Description

Sequencing of somatic DNA generates a vast amount of data with the potential for secondary usage in research, however, sharing this data for research purposes is challenging. This is often due to inadequate description, management, and the absence of a platform for presenting its existence. Associated issues include high capacity demands for storing large volumes of data and ensuring their security and long-term sustainability. Data is not only exposed to the risk of complete loss due to the degradation of storage media, but its retrospective retrieval and linking to other data of the same patient are complicated due to inconsistently used identifiers and labels.

The study addresses these challenges by proposing a method for managing sensitive hospital data and establishing the foundation of an integration centre aligned with the FAIR principles, ensuring data is Findable, Accessible, Interoperable, and Reusable. The output of the study is a data management proposal, within which a metadata catalogue was created as a unified platform for exposing metadata, and a cloud environment was designed for storing sensitive data using the SensitiveCloud service.

The poster highlights the newly established data pipeline, providing inspiration for biobanks seeking to offer requestors diverse data types (e.g., sequencing, radiological) alongside biological samples. This approach has the

potential to enrich research and offer valuable insights into the medical field.

This work was supported by the project BBMRI.cz no. LM2023033 and by Ministry of Health, Czech Republic - conceptual development of research organization (MMCI, 00209805).

Keywords

FAIR principles, sensitive data sharing

P46: COVID-19 Biobank in the first wave, biological witnesses of the first encounter between SARS CoV-2 and our species.

Cerny, Andreas (1,2), Barda, Beatrice (3) Forlenza, Rossella (1), Garzoni, Christian (2), Uhr, Mario (2, 4), Bissig-Canevascini, Maurizia (1), Di Bartolomeo, Claudia (1)
(1) Fondazione Epatocentro Ticino, Lugano, Switzerland (2) Clinica Luganese Moncucco, Lugano, Switzerland, (3) Ente Ospedaliero Cantonale, Lugano, Switzerland, Lugano, Switzerland, (4) Medisyn, Bioggio, Switzerland

Introduction

When COVID-19 pandemic arose, samples from SARS-CoV-2 infected patients were needed to study the new virus. Therefore, we decided to establish a new "Biobank COVID-19 Ticino" of patients hospitalized for COVID-19 infection in Ticino. The Biobank gathered biological specimen and high-quality data on the first pandemic wave to elucidate clinical presentation, natural history, response to treatment, immune response and cytokines activation, and outcomes of the disease.

Material & Methods

We collected clinical and biological data from the patients at baseline and at scheduled follow ups until one year after the infection.

Results

144 patients were included from 25th April 2020 until 13th December 2021 hospitalized in Ticino.The mean age of patients was 65 years old. Most participants in the COVID-19 Biobank were male (70.8%), whites (98.6%). Six patients were hospitalized in the ICU directly during the enrollment visit, while 138/144 patients were hospitalized in internal medicine ward. Of the latter, fourteen patients had a worsening of their clinical condition that led them to the ICU and three of them died. Two nested projects used our Biobank data.

Discussion and Conclusion

The project of Covid-19 Biobank Ticino was created with the primary objective to collect data and samples of COVID-19 hospitalized patients; during the project we collected a total of 9'363 specimens. The Biobank will allow investigators to carry out genetic, serological, microbiologic and immunological studies as nested projects.

Keywords

Covid-19, Biobank

P48: Opportunities and Challenges in Setting-Up a Malian-German Biobank Collaboration

Lina Winter (1), Saidou Balam (2,3), Annalena Artinger (1), Haby Konaté (3), Fousseyni Diarra (3), Mamoudou Maiga (3), Bakrou Kamaté (3), Cheick B. Traoré (3), Christoph Brochhausen(1)
(1) Institute of Pathology, Medical Faculty Mannheim, Heidelberg University, Mannheim, Germany, (2) Department of Surgery, University Hospital Regensburg, Regensburg, Germany, (3) University of Science Technical and Technologies of Bamako (USTTB), Bamako, Mali

Introduction

Despite the ongoing globalization, a profound North-South gap persists across various scientific disciplines, including medical research and biobanking. Therefore, we share insights from the creation of a Malian-German biobank network.

Methods

Our partnership involves the University of Science, Techniques and Technologies of Bamako, Mali and the Institute of Pathology in Mannheim, Germany with its integrated biobank. After comparing the different settings, we systematically formulated research objectives and collaboration milestones. Additionally, we analyzed challenges that arose during the initial implementation steps.

Results

The implementation of a harmonized protocol has established the groundwork for a robust

biobank in Bamako. Ongoing efforts include advancing collaborative cancer-related research initiatives, expanding the platform for enhanced cancer care, and providing high-quality resources through precision medicine training programs. However, acknowledging substantial differences between European and Malian contexts, the collaboration addresses unique prerequisites by adapting equipment to regional needs and different research priorities since Mali's research focuses on rural populations and tropical diseases.

Discussion

There is scepticism surrounding collaborations between high- and low-income countries since they often neglect specific local needs, and their outcome is hard to predict. Thus, continuous communication, transparency, and adherence to ethical standards remain crucial elements for success. Tailoring projects to the distinct characteristics of both populations might foster mutual learning. We are convinced that Mali benefits from Germany's biobanking expertise, while Germany gains insights from Mali's genetic diversity, particularly relevant amid immigration and refugee movements. This approach ensures strategic collaboration and positive outcomes, leading to reducing north-south gaps.

Keywords

Biobanking, precision medicine, research collaboration, global cancer research, health disparity, Mali, Germany

PS9. Modelling and regenerative medicine

P50: Organoid biobanks: Walking towards the future for a high-standing precision medicine

Díaz, Tatiana (1,2,3); Jiménez, Álvaro (1,2,3); Toledo, Ana (1,2,3); Valiente, Isabel (1,2,3); Cañadas, Carmen (1,2,3); Céspedes, Alicia (1,2,3); Ferro, Pedro (1,2,3)
(1) ECAI de Biobanco, Instituto de Investigación Biomédica de Málaga-IBIMA- Plataforma BIONAND, Málaga, Spain, (2) Biobanco en Red del Sistema Sanitario Público de Andalucía, (3) Instituto de Investigación Biomédica de Málaga-IBIMA-Plataforma BIONAND, Málaga, Spain

Description

Currently, human 3D cultures represent a revolution in translational research, reducing the use of animal models. For this reason, it is a tool with great future perspective in personalized medicine and drug testing for a wide variety of pathologies. They also make it possible to carry out functional studies and molecular mechanisms which allow us to understand the pathophysiology of many diseases. In this way we could discover new diagnostic biomarkers and detect possible therapeutic targets. The importance of biobanks in the management and creation of these 3D cultures is fundamental to guarantee optimal quality, traceability and conservation of these collections.
The objective of this study was the creation of an organoid library in the Biobank of the Public Health System of Andalusia (BBSSPA) – Malaga node.
Results showed that was necessary to create two models of organoid libraries: management of organoids created by researchers and generation of organoids in the biobank at the service of the research community. In the last 3 years, a management of 35 intestine organoids from patients with Chron´s disease has been created and a circuit to implement the creation of our own organoids was developed. In 2021, only the digestive unit was interested in this service, but currently there is demand from 5 medical areas, including neurology and oncology.
In conclusion, an organoid library has been launched in the BBSSPA which offers researchers both management of their organoids and the use of organoid created in the biobank with high quality standards and optimal conservation.

Keywords

organoids, 3D cultures, spheroids, biobank, preccision medicine

S10. ELSI Topics in Biobanking – friend or foe?

P52: Development of a framework to ethically assess the governance and operations of a national, multisite biobanking infrastructure

Costello, Anne (1); Vereker, Emily (1); National Irish COVID-19 Biobank - Research Ethics Committee (NICB-REC) (1)

(1) National Office for Research Ethics Committees

Description

In response to the COVID-19 pandemic, the Department of Health in Ireland invested funding to establish Ireland's first National, multi-site, multi legal entity biobanking infrastructure: the National Irish COVID-19 Biobank (NICB). It is crucial that the collection, storage and use of bio-samples, and associated data is underpinned by the highest standards in ethics, governance and codes of practices.

The National Office for RECs in Ireland performed a scoping review of best practices in ethical biobanking and human rights to inform the development of the national ethical review process.

The National Office:

- Established a 15-member strong REC incorporating expertise in biobanking, bioethics, data protection, law, epidemiology, genetics and genomics, pathology, virology, immunology, gerontology, respiratory medicine, pharmaceutical bioethics as well as patient and public perspective.
- Identified the information requirements to facilitate a robust ethical review and developed a bespoke ethics application form.
- In consultation with the NICB-REC, developed and implemented a bespoke phased and partitioned ethical opinion model to facilitate biobank operations in line with the NICB's establishment milestones, delivering separate opinions for 1) governance, 2) participant recruitment and informed consent, 3) data and bio-sample management and 4) researcher access.
- Published an operational framework for the NICB-REC.

The establishment of a REC which oversees the ethical robustness of a national, multisite biobanking infrastructure ensures the safety, autonomy and wellbeing of biobank participants in relation to the use, transfer and interpretation of their biosamples and data for research. The operational framework produced by the National Office may serve as a reference for ethical assessments of biobanks in Ireland and beyond.

Keywords

Ethical framework, National, multisite, harmonised, biobanking

P54: Managing incidental findings at research biobanks

Geiger, Joerg (1); Baber, Ronny (2); Fuchs, Jörg (1); Hummel, Michael (3); Illig, Thomas (4); Kiehntopf, Michael (5); Neumann, Michael (1); Nussbeck, Sara Y. (6) Specht, Cornelia (3); Jahns, Roland (1)
(1) Interdisciplinary Bank of Biomaterials and Data Wuerzburg (ibdw), University and University Hospital Wuerzburg, Wuerzburg, DE, (2) Institute for Laboratory Medicine Clinical Chemistry and Molecular Diagnostics, University Hospital Leipzig, Leipzig, DE, (3) German Biobank Node, Charité - Universitätsmedizin Berlin, Berlin, DE, (4) Hanover Unified Biobank (HUB), Hannover Medical School, Hanover, DE, (5) Institute of Clinical Chemistry and Laboratory Diagnostics and Integrated Biobank Jena (IBBJ), Jena University Hospital, Jena, DE, (6) University Medical Center Goettingen, Central Biobank, UMG, Goettingen, DE

Introduction

With the advances in genetic diagnostics and predictive biomarkers, the management of incidental findings has become an issue of great importance. In recent years, biobanks have become increasingly relevant as brokers of samples and data, especially for large research projects or multicenter trials. Scenarios where a biobank acts as an intermediary between clinician and researcher involve additional responsibilities and requirements that do not apply to intra-hospital settings. Key requirements to consider are privacy, self-determination, ethics, and medical responsibility and accountability.

Methods

The German Biobank Alliance, coordinated by the German Biobank Node has endeavored to set up a procedure for research biobanks which complies with the legal and regulatory framework, professional regulations, and ethical standards. In a joint action the centralized

biobank ibdw together with local authorities drafted a coherent concept to manage incidental research findings in full compliance with relevant ethical and data privacy regulations.

Results

Traceability of the process is ensured by comprehensive documentation of all steps. Unnecessary action is avoided by requiring that the results be evaluated prior to re-identifying the individual. The individual's "right not to know" is respected as required by informed consent. As a rule, all communication with the individual will be through the hospital and by competent physicians with appropriate knowledge and communication skills.

Conclusions

The procedure presented is designed to be adaptable to most settings of academic human biobanks and may therefore serve as blueprint for other biobanks facing the requirement to implement appropriate measures for handling incidental research findings.

Keywords

Biobanking, Incidental findings, Broad consent, Workflow, Medical ethics, Return of research results

P56: To retain or to terminate? A national guideline for the assessment of biobank collections based on 'FIT' and 'PURPOSE'

Schutten, Joëlle (1); Broekstra, Reinder (1); Manders, Peggy (2), on behalf of the Health-RI theme Biobanks & Collections
(1) University of Groningen, University Medical Center Groningen, Groningen, The Netherlands, (2) Radboud Biobank, Radboud University Medical Center, Nijmegen, The Netherlands

Introduction

Human biological materials, such as blood, urine, or tissue, are extensively collected for scientific research purposes. Decisions to terminate a biobank collection (e.g. due to retirement of the principal investigator or limited use) are based on ethical, legal, societal and/or technical considerations, requiring careful assessment to determine the suitability (FIT) and scientific value/potential (PURPOSE) of the collection. Among the research institutions in The Netherlands, different protocols are currently exhibited for collection termination, and some institutions even lack specific procedures. Therefore, a national guideline is being developed to stimulate and support research institutions to implement termination policy.

Materials & methods

The guideline will present various considerations, criteria, and implementation directions regarding the decision whether or not to terminate biobank collections. The guideline, including criteria for the assessment based on FIT (e.g. availability of (meta)data and potential to link it the related biological samples) and PURPOSE (e.g. uniqueness of the collection and clear objectives of the collection that align with the spearheads of the research institute) will be developed by the Health-RI theme Biobank & Collections, together with scientific experts (ethical/legal/societal/technological) within the field of biobanking.

Discussion and conclusion

The guideline will provide practical support and food for thought for individual researchers and research institutions in the implementation of biobank collection termination policy in scientific research. The guideline is part of Health-RI and stakeholders' larger mission to transform these guidelines into an improved infrastructure for collections of human biological samples and associated data for scientific research. The preliminary guideline will be discussed at the European Biobank Week 2024.

Keywords

biobank, collection, termination, Health-RI, guideline, policy, support, fit, purpose, criteria

P60: RENACER: Updating cancer research with patient-focused networks

Artiga Gonzalez, Maria-Jesus (1); Sobrino Solorzano, Cecilia (1); Alba Olano, Daniel (1); Almenara Gonzalez, Inmaculada (1); Baena Galán, Patricia (2); Vela Gual, Catalina (2); Caro Chinchilla, Pilar (1); Ajenjo Diez, Nuria (1); Escolano Moyano, Jose Miguel (1); Perez-García, Victor M. (3); Al-Shahrour Nuñez, Fatima (4); Perez Nuñez, Angel (5); Martinez Saez, Elena (6); Sepulveda Sanchez, Juan Manuel (7); Nicolas

Jimenez, Pilar (8); Valiente Cortes, Manuel (2); Paino Ortega, Eva (1)
(1) CNIO-Biobank. Spanish National Cancer Center, (2) Brain Metastasis Group. Spanish National Cancer Center, (3) Mathematical Oncology Laboratory. Castilla La Mancha University, (4) Bioinformatics Unit. Spanish National Cancer Center, (5) Neurosurgery Unit. Hospital Universitario 12 de Octubre, (6) Pathology Department. Hospital Universitario Vall d'Hebron, (7) Medical Oncology. Hospital Universitario 12 de Octubre, (8) Research Group Chair in Law and the Human Genome. Basque University

Description

RENACER (Spanish National Network of Brain Metastasis) is multidisciplinary nationwide network integrated by 18 hospitals, with a backbone of a biobank and a basic/translational laboratory. Brain metastasis is currently an unmet clinical need, and the main aim of this network is to benefit the translation of discoveries from the laboratory to patients, as well as to initiate research projects with patient-derived observations.

Beyond the collection of high-quality common samples, managed under strict control of preanalytical variables by CNIO-Biobank, RENACER cohort has allowed the building of a "living" biobank to perform functional experiments in patients ex vivo. In addition, a comprehensive clinical information database is being generated to support research on brain metastasis.

RENACER samples have generated FFPEs and 'living' specimens, and more than 150 brain metastases have been profiled using omic approaches, including RNAseq (bulk and single cell) and whole exome sequencing. All this data will be translated into a RENACER Precision Medicine Data Portal for (meta)data storage, accession, and consultation of patients' genomics and associated clinical data, under development. Since RENACER is associated with a network of hospitals, these research findings can be translated into further clinical studies faster, and a prospective multi-institutional study has been initiated. In addition, RENACER has also partnered with pharmaceutical companies to launch clinical trials based on results from the consortium (NCT05635734, NCT05689619).

In only 2 years, RENACER has provided invaluable resources to the scientific community, significantly contributing to increase the knowledge of the biology of brain metastasis and to improve patient clinical management.

Keywords

living biobank, brain metastasis, patient-oriented

P62: Management of consent by children. Recommendations for biobankers when (?) children reach the age

Langella, Alessandra (1)
(1) Researcher of National Research Council (Italy), PhD, Lawyer Institute CNR-IFAC Via Madonna del Piano, 10 50019 Sesto Fiorentino (FI)

Background

Among the numerous difficulties that operators of biobanks may encounter is that of managing the consent and assent of the minors involved. The difficulty stems from a gap at the European level: there is no reference to children in the context of biobanking. Even the legal sources of the Member States may not be conclusive, since there is often no law at all on biobanking in the national framework, or, if there is, it does not cover the involvement of children. If reference is made to laws regulating cases close to biobanking for an analogical application, different age thresholds are often set.
The analysis and comparison of the legislation of all member states shows the divergences between countries with respect to the unresolved issue of how and when minors should be involved in biobanking consent procedures. the result is a confusing legal framework.

Conclusions

The conclusion is that a shared solution can be traced to identify the age threshold at which consent should be obtained. The ambition is to provide practical guidance to practitioners to be compliant with the legal requirements and the ethical imperative to involve minors in decisions regarding participation in biobanking.

Keywords

Consent of minors, EU divergences, age thresholds

P64: Biobanking in legally heterogeneous research environments

Feeken, Corinna (1); Lüthke, Stephanie (2); Adam, Heike (2); Wilken, Marc (1); Kempa, Felix (3); Thiemann, Volker (1); Wilken, Christoph (3); Fischer, Hauke (3); Petersmann, Astrid (2,4,5)
(1) Carl von Ossietzky University, Oldenburg, Germany, (2) Institute of Clinical Chemistry and Laboratory Medicine, University Medicine Oldenburg, Oldenburg, Germany, (3) Carl von Ossietzky University, Unit for Data Protection and Information Security Management, Oldenburg, Germany, (4) Core Facility Biobankstructure, Faculty VI, University Medicine Oldenburg, Oldenburg, Germany, (5) Institute of Clinical Chemistry and Laboratory Medicine, University Medicine Greifswald, Greifswald, Germany

Description

The University Medicine Oldenburg includes four hospitals under different ownership, including one municipal, one private and two distinct church-affiliated hospitals, each with its own ecclesiastical law, together with the Medical Faculty Oldenburg. This legally and organizationally complex structure complicates the establishment of crucial research infrastructures including a participative biobank structure.
The Biobank Structure Oldenburg (BSO) as a Core Facility is designed to be accessible to all participating hospitals, the faculty and cooperating institutions. The BSO employs digitalized workflows to facilitate standardized and quality-assured biosample collection, processing, storage and distribution for research purposes.

The BSO provides various utilization opportunities, including consultation on sample management, support for collection and processing and the legal transfer of well-characterized biosamples to the faculty after project completion. It allows targeted sample collection under a Broad Informed Consent. The reuse of biosamples from completed projects, adherence to research data management and compatibility with national and international research infrastructures underscore its comprehensive approach.

The infrastructure of the biobank relies on a central IT system (CentraXX, Kairos) for sample management and workflow provision, with decentralized web-based access. Centralized and decentralized storage capacities, process-oriented sample management, quality assurance and documentation of clinical data further enhance the facility's efficiency.

The governance structure, embedded in the faculty's concept for central research infrastructures, comprises a user council, a Core Facility leadership and staff. The user council, inclusive of representatives from all four participating hospitals, research data management and the Coordination Center for Clinical Studies, plays a vital role in ensuring effective service provision.

Keywords

Biobank Structure Oldenburg, Core Facility, different legal partners

P66: Auditing participant consent in an Irish Biobank

Annuk, Heidi (1); Khan, Sonja (2)
(1) University of Galway, Cancer Biobank, (2) University of Galway, Institute for Clinical Trials

Description

The Cancer Biobank evolved from cohorts of patient samples collected from consenting participants (primarily) with breast cancer, obtained by clinical researchers for specific translational projects. The earliest consent forms stored in participant files date from 1998. Over the years and in line with practice guidance, the processes of obtaining informed participant consent have evolved in line with developments in specimen processing and storage. The aim of this work was to clarify precisely which participants were recruited during the period that this study documentation was in use (April 1998 – January 2006).

Participant files (electronic data and paper documentation) were accessed, examined and cross-checked to verify which version(s) of the Cancer Biobank informed consent form (ICF) were used at the time of participant recruitment.

In addition, participant signature status (presence, legibility) was recorded for each participant.

Manual verification of participant consent revealed that in 69.2% (872/1260), consent had been appropriately documented. This is a positive outcome given the study timeframe (1998-2006). The process of obtaining, documenting, and recording participant consent in the Cancer Biobank has evolved in line with best practice guidance. From 1998-2006, it was not common practice to record participant consent in triplicate. It is possible that when single/duplicate copies of ICFs were in use, they could have been misfiled in patient medical charts. Access to archived medical charts is beyond the scope of this study, however future work could involve checking medical charts to identify the presence of any misfiled Cancer Biobank ICFs.

Keywords

Participant consent

P68: Ethical issues in biobank-based preclinical and translational research

Mežinska, Signe (1); Poplavska, Elita (1,2)
(1) University of Latvia, (2) Riga Stradins University

Background

To enhance translational research, new partnerships and collaboration among patients, clinicians, researchers, and commercial partners are needed. Biobanks, with their potential for various types of research purposes, may play a central role in these relationships. In this process reflection on ethical issues plays an important role.

Materials and methods

This study undertook a state-of-the-art comprehensive review and expert focus groups to examine ethical issues in translational research.

Results

The central ethical issues in translational research are related to quality and reliability of non-clinical evidence, risk/benefit assessment for starting human studies, risk perception of various stakeholders, transparency and communication of uncertainties and risks to clinical trial participants. Various authors highlighted the challenge of identifying minimal preclinical evidence and risk acceptance to move to human research for innovative treatment approaches. By some, risk aversion is seen as a potentially hindering factor to medical progress. Only marginally discussed but an important issue was raised that decision makers who are weighing risk/benefit ratio and approving early human studies are also prone to biases that essentially undermines rights of participants. Additional issue for discussion is publication of negative results of preclinical and translational research.

Conclusion

Currently, there is a lack of in-depth ethical reflection on ethical issues in biobank-based translational research from the point of view of different stakeholders. To address this problem, identification of new ethical problems, development of guidelines and support tools for decision-making is necessary.

Keywords

research ethics, translational research, risk/benefit analysis

PS11. Rare Diseases

P70: Advancing SCI Research: Insights from the Swiss Spinal Cord Injury Cohort Biobank

Schaniel, Ramona Maria (1), Glisic, Marija (1), Capossela, Simona (1), Bertolo, Alessandro (1), Valido, Ezra (1), Jordan, Xavier (2), Hund-Georgiadis, Margret (3), Eriks-Hoogland, Inge (1), Pannek, Jürgen (1), Stucki, Gerold (1), Stoyanov, Jivko (1)
(1) Swiss Paraplegic Research, Nottwil, Switzerland, (2) Clinique romande de réadaptation, Sion, (3) REHAB Basel, Basel, Switzerland

Description

Spinal cord injury (SCI) represents a low-incidence condition, with Switzerland reporting a traumatic SCI rate of approximately 21.7 cases per million individuals annually. The Swiss SCI (SwiSCI) cohort study, a longitudinal, multicentre initiative, focuses on enhancing the understanding and support of SCI individuals in terms of their functioning, health, and life

quality. Initiated in 2016, the SwiSCI Biobank gathers biospecimens from SCI patients receiving treatment across three Swiss rehabilitation centers.

These biosamples, collected at the commencement and conclusion of the initial rehabilitation program, offer researchers longitudinal insights. Utilizing standardized, meticulous processing and cryopreservation methods, these samples form a robust foundation for future research necessitating biological specimens. Additionally, the biobank facilitates various project and clinical trial support within the SwiSCI study and other SCI-related research.

As of October 2023, the SwiSCI Biobank has accumulated biosamples from 312 individuals. Over 52,000 aliquots—including plasma, serum, total blood DNA, blood RNA, PBMCs, urine, and urine sediment—have been cryopreserved. Participant demographics show an average age of 51 (± 17) years, with a male majority of 80% and predominantly traumatic injury cases. Paired sample availability varied, with 64% for RNA and 69% for urine and urine sediment.

The SwiSCI Biobank stands as a distinctive resource, offering a comprehensive platform for collaborative SCI research. It enables advanced multi-omics studies and enriches our understanding of SCI as a rare medical condition.

Keywords

spinal cord injury, longitudinal sampling, first rehabilitation, SwiSCI study

P72: ISTisNA Platform: A Comprehensive Biobank Network for Rare and Undiagnosed Diseases

Fatma Merve Antmen (1,2), Bahadır Kasap (3), Ceren Erdogan (1), Melisa Kilic (3), Sümeyye Kocaaga (3), Gizem Onder (4), İlayda Sahin (5), Ozden Hatirnaz Ng (6), Sibel Aylin Ugur Iseri (7), Muge Sayitoglu (7), Yasemin Alanay (8), Ozlem Akgun Dogan (8), Kaya Bilguvar (9), Çigdem Erol (10), Ilhan Satman (11), Nese Atabey (12,13), Ugur Ozbek (14, 15), Sanem Tercan Avcı (15), Özkan Özdemir (6), Yücel Erbilgin (7)

(1) Biobank Unit, Acibadem Mehmet Ali Aydinlar University, Istanbul, Türkiye, (2) Department of Physiology, Institute of Health Sciences, Acibadem Mehmet Ali Aydinlar University, Istanbul, Türkiye, (3) Department of Genetics, Istanbul University Aziz Sancar Institute of Experimental Medicine, Istanbul, Türkiye, (4) Department of Biochemistry and Molecular Biology, Institute of Health Sciences, Acibadem Mehmet Ali Aydinlar University, Istanbul, Türkiye, (5) Department of Medical Biotechnology, Institute of Health Sciences, Acibadem Mehmet Ali Aydinlar University, Istanbul, Türkiye, (6) Department of Medical Biology, Department of Basic Medical Sciences, School of Medicine, Acibadem Mehmet Ali Aydinlar University, Istanbul, Türkiye, (7) Department of Genetics, Istanbul University Aziz Sancar Institute of Experimental Medicine, Istanbul, Türkiye, (8) Pediatric Health and Diseases, Department of Medical Sciences, School of Medicine, Acibadem Mehmet Ali Aydinlar University, Istanbul, Türkiye, (9) Medical Genetics, Department of Medical Sciences, School of Medicine, Acibadem Mehmet Ali Aydinlar University, Istanbul, Türkiye, (10) Department of Informatics, Istanbul University, Istanbul, Türkiye, (11) Department of Internal Medicine, Division Of Medical Sciences, Istanbul Medical Faculty 12Department of Medical Biology, Department of Basic Medical Sciences, Dokuz Eylul University, Izmir, Türkiye, (13) Department of Medical Biology, School of Medicine, Izmir Tinaztepe University, Izmir, Türkiye (14), Chair, Rare and Undiagnosed Diseases Research Unit, Izmir Biomedicine and Genome Center, Dokuz Eylul University, Izmir, Türkiye, (15) Izmır Biomedicine and Genome Center, Dokuz Eylul University, Izmir, Türkiye

Introduction

Rare diseases (RD) affect more than 6 million individuals in Türkiye and present a significant health challenge. Accordingly, Acıbadem University (ACU) and Istanbul University (IU) coordinates a project namely “Istanbul Undiagnosed and Rare Disease Solution Platform (İSTisNA)” which has been granted by Istanbul Development Agency (www.istisna.org). ISTisNA brings together all the main players of the RD and undiagnosed disease field to boost biomedical research. The ultimate goal of ISTisNA is to guide coordinated biobank activities, translational research, education and dissemination.

Materials and Methods

The ISTisNA Platform and its partners employ a collaborative approach to enhance RD research, including regular coordination among three BBMRI-TR affiliated biobanks; ACU

Biobank Unit, IU. Aziz Sancar Institute of Experimental Medicine Rare Disease Biobank, and İzmir "Biomedicine and Genome Center (IBG) Biobank. ISTisNA conducted education programs on quality managements of biobanks adhering to ISO20387:2018 standards, increased specialist exchanges, and efforts to establish a broader network with other biobanks.

Results

In accordance with project activities, ISTisNA facilitates the coordination between biobanks. ISTisNA emphasis on GDPR-compliant storage of genomic data is vital. This data based biobanking effort supports research towards improved diagnostics and treatments, especially for undiagnosed cases.
Discussion and Conclusion: Istanbul's dense and diverse population offers a unique opportunity for RD research. By strengthening research infrastructures and encouraging collaboration, ISTisNA platform will significantly contribute to pioneering work in the field of RD in Türkiye.

Grants

This work was supported by Ministry of Industry and Technology, Istanbul Development Agency (ISTKA), Project No:TR10/22/TNH/0001.

Keywords

Biobank, rare diseases

P74: The establishment of a Lymphatic Malformations (LM) Biobank of to enhance personalized medicine for LM

Barba M. (1), Cozzolino A.M. (1), Trevisan V. (2), Appicciafuoco B. (1), Scambia G. (2), Leoni C. (2), Parolini O. (2)
(1) Biobanca di Ricerca per la Medicina Personalizzata, Fondazione Policlinico Universitario A. Gemelli, IRCCS, (2) Scienze della salute della donna, del bambino e di sanità pubblica, Fondazione Policlinico Universitario A. Gemlli IRCCS

Introduction

Lymphatic malformations (LMs) are benign lesions resulting from abnormal embryological development of the lymphatic system. They pose challenges in treatment due to their diverse phenotypic expression and limited genotype/phenotype correlation studies. The crucial role of biological material and associated data in advancing diagnostic and therapeutic strategies is evident. The establishment of the LM-Biobank aims to provide high-quality biological samples for research while adhering to ethical and legal standards. Interoperability is ensured through standardized procedures to enhance the understanding of LM.

Materials & methods

The LM-Biobank will collect DNA from various sources and LM-endothelial cells, governed by Standard Operating Procedures (SOPs) and Operative Instructions (OIs) to ensure precise sample management. Patient consent and data protection adhere strictly to both national and international regulations. Operations will be overseen by a Technical Scientific Committee (TSC) comprised of LM clinical experts and representatives from the “Associazione Malformazioni Linfatiche” patient association.

Results or findings

The LM-Biobank will be established within the Biobank for Research in Personalized Medicine (Biobank-FPG), located at the A. Gemelli IRCCS University Hospital Foundation. This strategic placement ensures access to a well-organized infrastructure facilitating the collection of high-quality samples and data dissemination.

Discussion

The absence of a dedicated Italian LM biobank impedes our understanding of the disease. The s establishment of the LM-Biobank lays the groundwork for future molecular, pathophysiological, and therapeutic research by providing well-maintained biological samples over time.
In conclusion, the LM-Biobank addresses a critical need for LM research infrastructure in Italy, facilitating comprehensive investigation into this complex condition's underlying mechanisms and therapeutic options.

References

- Adams DM, Ricci KW. Vascular Anomalies: Diagnosis of Complicated Anomalies and New Medical Treatment Options. Hematol Oncol Clin North Am. 2019;33(3):455-470. doi:10.1016/j.hoc.2019.01.011
- https://www.ifc.cnr.it/images/BancaBiologica/linee_guida_Comitato_Nazionale_per_la_Biosicurezza_e_le_Biotecnologie__2008.pdf

Keywords

Lymphatic malformations; Rare disease; Biobank; Personalized Medicine; Therapeutic research; Disease understanding; patient association

PS13. Microbiome – the known unknown

P76: molecular network analysis for host-microbiome multi-omics data integration in Autism Spectrum Disorder

Chiodi, Alice (1) Sula, Ada (1), Manconi, Andrea (1), Mezzelani, Alessandra (1), Mosca, Ettore (1)
(1) Institute of biomedical technologies, CNR

Introduction

Complex traits like Autism Spectrum Disorders (ASD) involve the interplay of various factors, including human microbiota. This complexity demands the extraction of multi-omics data by means of various technologies starting from samples isolated from different biological sources. We present a bioinformatic approach to investigate the cross-talk between multiple biological contexts (e.g., brain, gut) to identify relevant and reproducible molecular players to be used as biomarkers. We present a proof-of-concept on ASD data.

Methods

Multi-layer network diffusion was performed through the R package mND (10.1093/bioinformatics/btz652); ASD data were collected from the literature (https://gene.sfari.org and 10.1038/s41593-023-01361-0). Molecular interactions sources: STRING (https://string-db.org); host-gut gene-gene interactions (10.1186/s13059-022-02643-9). Pathways: KEGG (https://www.genome.jp/kegg/pathway.html). Random Forest: R package "caret" (10.18637/jss.v028.i05).

Results

We created an interactome that involves both host-host and host-gut microbiota molecular interactions. We map the gene-level results of intra-dataset analyses on such "scaffold". We use multi-layer network diffusion to obtain a summary gene ranking which contains both human and microbial genes that display significant molecular interactions and are associated with ASD. Then, we assess the ability of these genes to distinguish between ASD and normal subjects. The analysis of ASD datasets revealed an interesting network of genes with promising predictive potential.

Discussion and conclusions

Molecular networks and pathways enable the integration of various types of molecular data from multiple biological contexts, highlighting potential cross-talks between such domains. The complexity of molecular interactions constitutes one of the main challenges for knowledge-based multi-omics data analysis approaches. Funding: EU GEMMA-(825033); BBMRI.it-(Italian national node of BBMRI-ERIC); Strengthening BBMRI.it-(EU-NextGenerationEU-IT-NRRP-IR000003 CUP-B53C22001820006); MUR "CNRBIOMICS"-(PIR01_00017).

Keywords

molecular network, multi-omics, data integration, Autism spectrum disorders

P113: The MICROBE project: MICRObiome Biobanking (RI) Enabler

Cornelia Stumptner (1), Katrin Panzitt (1), Kurt Zatloukal (1), Tanja Kostic (2), Matthew Ryan (3), Michael Schloter (4), Tony Burdett (5), Amber H. Scholz (6), and further members of the MICROBE consortium
(1) Medical University of Graz, Austria; (2) AIT Austrian Institute of Technology GmbH, Austria; (3) CAB International, UK; (4) Helmholtz Zentrum München - Deutsches Forschungszentrum für Gesundheit und Umwelt (GmbH), Germany; (5) European Molecular Biology Laboratory - European Bioinformatics Institute (EMBL-EBI), UK; (6) Leibniz Institute DSMZ-German Collection of Microorganisms and Cell Cultures GmbH, Germany

Introduction

Microbiomes are complex communities of microorganisms (bacteria, archaea, protists, fungi, microalgae) and their “theatre-of-activity” characteristic of a specific habitat. They are everywhere in, on and around us i.e. in/on humans, animals, plants, in soil and aquatic habitats. They play a key role in maintaining life on Earth by providing essential ecosystem services and are indispensable for One Heath - the health of humans, animals, and environment.

By harnessing microbiomes and their functions, society would be better placed to tackle global challenges like health, food waste management, and climate change mitigation. To facilitate science necessary to achieve key advances in microbiome research, methodologies and technologies are required to capture, and ensure long-term maintenance of microbiomes. Research infrastructures (RIs) currently lack optimized methodologies and technologies to preserve and provide access to microbiome samples and associated data.

Material & methods

The MICROBE project (funded by EU Horizon programme Grant-No. 101094353; 2023-2027) brings together key research actors, biological resource centres and European infrastructures to address these issues.

Results/findings

MICROBE is developing (1) technical solutions for microbiome preservation, propagation and functionality assessment, (2) novel ecological concepts (i.e., “core microbiome”, “microbial keystone taxa”), and (3) data infrastructures. (4) MICROBE also addresses essential biobanking framework issues like standardization, pre-analytical microbiome sample quality and quality control, ethical and legal requirements, and new business opportunities.

Discussion/conclusion

Long-term ambition is to ensure widespread uptake of developed methods and guidelines in microbiome research communities and to enable RIs to support this field, ultimately enabling the development of novel microbiome-based applications.

Keywords

microbiome, biobanking, quality, pre-analytics, one health

P121: Pre-Analytical Quality Standard for Microbiome Samples

Cornelia Stumptner (1), Peter M Abuja (1), Kurt Zatloukal (1) & members of SPIDIA4P Consortium (2)
(1) Medical University of Graz, Austria, (2) EU-project SPIDIA4P number 733112

Introduction

It is widely accepted that the pre-analytical phase is a very vulnerable part of the laboratory testing process. An important way to improve the pre-analytic phase, reduce errors and generate samples of high and defined quality is working according to ISO/CEN standards, particularly those for pre-analytical sample processing.
The need for standardization is also increasingly recognized in the microbiome field.

Material & methods

During the EU-project SPIDIA4P, the standard CEN/TS 17626:2021, Molecular in-vitro diagnostic examinations—Specifications-for-pre-examination-processes-for-human-specimens—Isolated microbiome-DNA’ was published. Although this standard relates to diagnostic procedures, it also has implications for microbiome research and development and for biobanks.

Results/Findings

This standard defines requirements along the pre-analytical workflow of microbiome samples, to generate samples that are fit for microbiome DNA analysis. The workflow includes all steps from documentation of patient-related information, to sample collection, transport, processing, storage and DNA isolation.

Among the most critical pre-analytical factors that can impair sample quality are undesired growth and/or instability of individual microorganisms, contamination of specimens/samples with microbial cells or DNA from other sources than the sampling site. Methods for isolation of microbiome DNA need to be appropriately selected, due to different

lysis requirements of microorganisms, inhibitory compounds, and human host DNA.

Discussion/conclusion

Compliance with pre-analytical standards is important in the light of the IVDR. They serve as a basis for laboratories' standard-operation-procedures and are important for quality-management-audits of ISO-accredited/certified laboratories. Moreover, they can also serve as a template for samples of other than human origin, e.g., environmental samples.

Keywords

microbiome, standardization, quality, pre-analytics, DNA

PS14. "Be aware of biobanking" – outreach and communication in and for biobanks

P78: Empathy Interview: how to use this tool to meet the stakeholder's needs in biobanks and beyond

Juozapaite, Dovile (1), Minkauskas, Mantas (1), Gumbis, Gediminas (1), Naumovas, Daniel (1)
(1) Vilnius Santaros Klinikos Biobank, Vilnius University Hospital Santaros Klinikos, Vilnius, Lithuania

Introduction

During the development of biobanking, meeting the needs of stakeholders was established as a priority. Given that, methods that could evaluate the needs while minimizing biases are needed. Empathy interview is one such method. It emphasizes participants' experiences by using a one-on-one open-question interview format.

Material and methods

Ten empathy interviews were performed between December 2022 and November 2023. Participants were selected to represent different groups of biobank stakeholders. Deductive and inductive coding of the interview transcripts was based on the three stages in the buying decision process - the ability to "Find", "Decide" to engage, and "Return" when a service is needed again. Additional codes were used to highlight potential improvements or issues, as well as communication. Besides this, keyword analysis was conducted for the most abundant keywords.

Results

During thematic analysis, we identified that most "Pain" snippets were related to the "Return" part of the buying decision process. Those snippets suggest the importance of clear communication, sample labeling, data transfer standardization, quality issues evident after receiving the samples, as well as timely processes. Word count analysis showed that communication was highly important to the participants.

Conclusions

This study shows that empathy interviews are a viable tool that can be used by biobanks to understand the needs of their stakeholders. For participants of this study, they face most issues deciding to return to biobanks again after using their services. Communication seems to be imperative to biobank stakeholders.

Keywords

Biobank, biobanking, empathy interview, interview, stakeholders, customers

P80: How to uncover weaknesses and strengths of biobanks?

K. Nováková (1), R. Hrstka (1)
(1) Bank of Biological Material, Masaryk Memorial Cancer Institute, Žlutý kopec 7, 656 53 Brno, Czech Republic

Introduction

For any large research infrastructure (LRI), it is important to identify weaknesses and strengths in order to accelerate improvements in all areas of need. During 2023, the Czech National Node has developed a new reporting system that includes both national and European KPIs (Key Performance Indicators). This system allowed us to collect various outcomes in detail in a uniform format for all members.

Results

This work, critically describes the actual usefulness of various ways of sample/data communication by requesters, what kind of requests are received and afterwards provided, what kind of material is the most requested,

what is the workflow of the samples from historical point of view. Some highlights:

- Negotiator communication covers up to 30% of total requests, but the majority of communication goes via email (39%), and other ways are chosen in 30% of cases in 2023.
- The ratio of external to internal requests is almost 1:1 in 2023, in contrast to previous years when the ratio shifted significantly towards internal requests.

Conclusion

The continual mapping and improvement of the LRI is essential for sustainable development. The unified system can help to adapt to real needs and changes over time. A major shift is more feasible when it is implemented step by step is. This contribution was supported by LM2023033.

Keywords

communication, report system, evaluation of requests

P82: BBMRI.at #3 – Austrian Biobanking and BioMolecular resources Research Infrastructure & partner for research using biological samples

C. Stumptner* (1), N. Forgo (2), G. Goebel (3), F. Gruber (4), H. Haslacher (5), M. Henrich (4), H. Henzinger (1), S. Kaltenbrunner (2), S. Kral (1), P. Mucher (5), P. Neff (3), V. Perz (1), E. Propadalo (4), V. Shekhovtsov (3), M. Valjan (1), I. Walter (6), M. Wieser (6), L. Brcic (1),
(1) Diagnostic & Research Institute of Pathology, Medical University of Graz, Austria, (2) University of Vienna, Austria, (3)Medical University of Innsbruck, Austria, (4) Johannes Kepler University, Austria, (5) Medical University of Vienna, Austria, (6) University of Veterinary Medicine, Austria

Introduction

BBMRI.at – the Austrian Node of BBMRI-ERIC - comprises all public medical universities of Austria and the University of Veterinary Medicine with their biobanks, and the University of Vienna bringing in legal expertise. Since its foundation in 2013 BBMRI.at has established a highly collaborative biobanking community in Austria stimulating and supporting biobanks to advance. In BBMRI-ERIC, BBMRI.at has become a visible, essential and driving, part in many fields e.g. quality management, data management, and stakeholder engagement. However, the environment in which BBMRI.at and biobanks are operating is constantly changing and this demands to address emerging needs and further developments relevant for biobanking.

Material & methods

The BBMRI.at management committee developed a new program for the next 5 years which is funded by the Austrian Ministry of Education, Science and Research (2023-0.752.780).

Results/findings

BBMRI.at continues where it has core competences, e.g., in quality management with cross-audits and development of standards at ISO/CEN, or in data quality and digital whole slide imaging, but also addresses new topics, e.g., environmental sustainability and comparative medicine (human-animals) & one health. Stronger focus will also be put on data integration/harmonization/access, and (data-related) legal issues, two very current, dynamic and relevant topics.

Discussion/conclusion

The activities of BBMRI.at shall ensure Austrian biobanks are well prepared to address upcoming user needs, and that both the biobanks and BBMRI.at are positioned as valuable, competent and responsible collaboration partners within the research community. With Its work BBMRI.at will also serve the European BBMRI-ERIC biobanking community.

Keywords

quality, standards, one health, sustainability, data, legal, digital imaging

P84: LABORATORY EMERGENCY: Unlocking Knowledge in the Educational Biobank Escape Room

Judith Sabaté-del Río (1), Ada Soler-Ventura (1), Noemi González-Abuín (1), HCB-IDIBAPS Biobank Group (1), Aina Rodríguez-Vilarrupla (1), Teresa Botta-Orfila (1).
(1) Biobank from Hospital Clínic Barcelona (HCB) - Institut d'Investigacions Biomèdiques August Pi i Sunyer (IDIBAPS) (HCB-IDIBAPS

Biobank), Fundació Recerca Clínic Barcelona-Institut d'Investigacions Biomèdiques August Pi i Sunyer (FRCB-IDIBAPS), Barcelona, Spain.

Introduction

To raise awareness of Biobanks' crucial role in the procurement of quality samples and associated data, we adopted a unique and inclusive community engagement approach, surpassing traditional outreach strategies. Given the heightened public sensitivity to COVID-19, we developed an immersive 'escape room' based on research on this disease.

Materials and methods

We transformed a tent into a Biobank setting, where participants took on roles as lab specialists and documentalists. They worked in teams and followed a laboratory protocol to process samples, they decoded viral cycle phases, unlocked items, translated genetic codes for patient consents, and analyzed PCR images within a 30-minute timeframe. Feedback on the activity was collected via a four-option scale survey.

Results

In the first edition, 170 students from 8 institutions participated and rated it "Very well" in 63.5% of the surveys, "Quite well" in 28.2%, "Low" in 7.1%, and "None" in 1.2%. 81% of the educators rated it "Very well" and 19% "Quite well." The second edition involved 203 students from 10 institutions, rating it "Very well" in 69.4% of the surveys, "Quite well" in 25%, "Low" in 5%, and "None" In 0.6%. As for the educators', 82.6% rated it "Very well" and 17.4% "Quite well".

Conclusions

Participatory research actively involves community members in shaping study design, implementation, and outcomes, fostering inclusivity and empowering communities for impactful research. Similar community engagement initiatives are being considered by research collaborators at the Biobank.

Keywords

escape room, engagement, outreach, survey

P86: Developing Biobank Donor Portal Prototype Based on User Evaluation

Eder, J. (1), Shekhovtsov, V. (2)
(1) University of Klagenfurt, Austria, (2) Medical University of Innsbruck, Austria

Introduction

As part of the BBMRI.at project we develop a prototype for the donor portal solution. The goal of such a prototype was elicit requirements and collect user feedback.

Methods

For collecting user feedback, we continued with an iterative approach using horizontal prototyping. We made the version of the portal mock-up available to biobank administrators and distributed an educational video that presented a step-by-step guide to the interaction with the prototype. The participants were asked to leave feedback on the quality of both the mockup itself and the educational video.

Results

We collected feedback from the participants based on their experience with the biobank portal prototype and the educational video. In general, they graded the available portal mockup in a positive light, emphasizing its importance and clarity in representing information. Still, there were open issues that were addressed in the final versions of both the prototype and video. In addition, the final version of the prototype supports collecting lifecycle data from wearables such as smartwatches or blood pressure measurement devices. It includes support for collecting data from Google Fit and Fitbit.

Discussion

The final version of the prototype developed as a result of the presented activities can serve as a generic blueprint for biobanks considering developing such a portal. A particular novel feature of the portal is the support of data donation, in particular health records and various forms of lifestyle data collected by fitness gadgets or measurement journals.

Keywords

biobank, portal, data donation, lifecycle data

P88: The establishment of the Sant'Orsola Research Biobank as a community engagement action

Luigi Ricciardiello (1), Pier Paolo Piccaluga (2), Giulia Calafato (3), Floriana Jessica Di Paola (3), Sabrina Seidenari (1), Claudia innoceni (1), Chiara gibertoni (1), Marco Seri(1),
(1) IRCCS AOU Bologna, (2) CNR – BBMRI, (3) UNIBO

Description

In 2023, St. Orsola Research Hospital (IRCCS AUO Bologna) recognized the need of establishing its health-care integrated biobank as an excellent opportunity for a community engagement process.
An institutional participatory action based on transparency, inclusion, participation, and open science involved:

- The Scientific Technical Committee.
- Patient and citizen associations.
- Clinical leaders of major research lines.
- Biobank staff in the co-creation and validation of ELSI tools and biobank policies.

While all Clinical Units were engaged in the census of Old Collections aimed at assessing whether and which collections could be institutionally biobanked, an information and scientific citizenship pathway was structured in parallel to recognize translational biobanking as a familiar and central process in health choices and the St. Orsola biobank as the citizens' biobank.
In preparation for the ethical review, a community engagement process was promoted in which:

- Patient, volunteer, citizen representatives, clinical staff, biobank team, the DPO, the Research and Innovation Operational Unit, and the secretariat of the territorial ethics committee discussed and validated ""Information Pathway and Informed Consent to Institutional Biobanking"".
- -he Institutional Scientific Technical Committee, the PIs of the institutional research strands, the biobank team, and the directions coproduced the access and return results policy and process.

Last Jan. 17, 2024, the ethics committee gave a positive opinion on establishing the biobank. Importantly, the access committee will include 3 patient-citizen representatives alongside clinicians and expert. The next challenge will be a living lab with mature minors on the assent path.

Keywords

institution of a biobank, translational medicine, community engagement, coproduction of ELSI tools, access, informed consent

P90: The Legal Regulation of Biobanking in Ukraine.

Svetlana Gramatiuk (1,2), Alyeksyeyenko Mykola (1,3), Olena Renna (3), Alla Yushko (1,4), Sergei Antonov (3).
(1) Institute of Bio-Stem Cell Rehabilitation, Ukraine Association of Biobank, 61022, Puskinska str., Kharkiv, Ukraine, (2) International Biobanking and Education, Medical University of Graz, Elisabethstraße 8010, Graz, Austria, (3) Ukraine Association of Biobank in Austria, Graz, Austria, (4) Yaroslav Mudryi National Law University, 61022, Puskinska str., Kharkiv, Ukraine

Introduction

In many jurisdictions, including Ukraine, the operation of biobanks is likely to combine general legal principles and specific health, privacy, and data protection regulations.

Materials and methods

Analysis of documents regulating the work of biobanks in Ukraine and the procedure for treating biological material with the subsequent use of it for scientific purposes.

Results

In Ukraine, the main document that regulates and ruins the activities of biobanks is the production of the Cabinet of Ministers of Ukraine dated March 2, 2016, No. 286 to approve the terms of licensing for the economic activity of Cord blood, stem cells, and other human tissues and cells . The Law of Ukraine on licensing types of economic activity is Article 7, a list of activities subject to licensing; paragraph 16 includes licensing of Cord blood, stem cells, and other human tissues and cells. Data protection in Ukraine is regulated by the Law on the Protection of Personal Data No. 2297-VI of 01.06.2010. Biobanks in Ukraine collection and use of biological samples and associated data

are generally subject to ethical considerations. Order of the Ministry of Health of Ukraine No. 110 of 14.02.2012 in the version of the Order of the Ministry of Health No. 2837 of 09.12.2020 defines the procedure of documentation "Informed consent form."

Conclusion

In this connection, we recommend when working with Ukrainian biobanks along with IRB, consent forms and SOPs to request a license to the Cord blood, stem cells, and other human tissues and cells.

Keywords

Biobank, legal regulation, ethical

P92: Strengthening and improving communication between biobanks and researchers

Rejón, Juan David (1), Concepción Romero-Sánchez, Maria, (1), Franco, Fernando (1), Badillo, Irati (1), Cano, Enrique (2), Gómez, Manuel (2), Belén Estrada, Ana (1), Cabo, Manuel (3), Manuel Puerta, Jose (1), Sánchez-López, Ana M. (1,4)
(1) Biobanco del Sistema Sanitario Público de Andalucía, (2) Biosoft Innovation S.L, (3) Fundación Pública Andaluza Progreso y Salud, (4) Instituto de Investigación Sanitaria Ibs.Granada

Introduction

Biobanks have a key role in promoting biomedical research, offering researchers high quality services related with the management of biological samples and associated data. Nowadays biobanks are not sufficiently recognized by the researchers, so their communications strategies and procedures to access their services should be improved. Virtualization and digitalization of biobanks is an opportunity to provide tools to enhance access of researchers to biobank services.

Material & Methods

Andalusian Public Health System Biobank (SSPA Biobank) has a client portal (image 1) through new enhancements in the process of request and offer of samples have been implemented. Both developments arise from the information registered in the biobank information management system, nSIBAI

Results

Two tools haven been developed based on real time data from nSIBAI. One of them allows researchers to send requests to the SSPA Biobank in a digitalized way as well as the monitoring of their progression. Requests for the sample provision and other services have been implemented.

On the other hand, a catalogue of samples has been performed. It permits researchers to consult available samples, and through the advanced search, to reserve these samples and the interaction between the catalogue and the sample provision.

Conclusions

The improvements carried out allow a closer approach and connection between the SSPA Biobank and researchers. They will be able to consult available samples and to request services in an agile way, establishing the bases for new interactions such as the return of research results.

Keywords

researchers, catalogue, client portal, sample provision, request

P94: Designing a Public Awareness Campaign on Biobanks with Participatory Research Techniques

Miqueu, Patrick, (1), Debucquoy, Annelies (2,3), Smits, Elke (4)
(1) Institut Jules Bordet, Université Libre de Bruxelles, (2) BBMRI.be, (3) Belgian Cancer Registry, (4) Biobank Antwerp, Antwerp University Hospital, University of Antwerp

Description

Despite being strong assets for Belgian university hospitals and academic research centers, biobanks do not gather much interest in the media or in general health communications in Belgium. BBMRI.be, the not-for-profit initiative that connects 20 Belgian public biobanks, is concerned by this lack of awareness in the public sphere. To tackle this issue, the BBMRI.be Stakeholder Involvement Group (BBMRI-SIG) which gathers together scientists, patients, members of patient organisations, professionals from pharmaceutical and biotechnology companies, biobankers and hospital

representatives, has engaged patients and patients' organisations in public and semi-public participatory activities like workshops, visits in anatomopathological laboratory and focus groups. The results of these encounters allowed to grasp patients' understanding and perspective on biobanking, to seek their local knowledge (i.e. experience of patients with biobanking in their own care pathway), to give more transparency on hospital's activities and to explicit the integration of research into care. With this knowledge, a public awareness campaign has been launched to enhance the visibility on biobanks and to raise more awareness and engagement. In conclusion, BBMRI.be has the opportunity with its partners to develop a unique engagement methodology and to experience that participatory research techniques have the potential to build strong communities. Hopefully, with the aim of making biobanks more visible, the actions of this community shall result in significantly increasing research literacy of both the public and the patients and in paving the way towards a better engagement of citizens in research.

Keywords

Public Awareness, Literacy

P96: Utilizing Strategic Communications and Social Media to Drive Qatar Precision Health Institute Public Recruitment

Mohammed Al Dosari (1)
(1) Qatar Biobank

Background

Qatar Precision Health Institute aims to recruit 60,000 Qatari nationals and long-term residents, 18 or older. More than 42,000 participants have already been recruited through its cohesive recruitment strategy Oof which 40,000 participants had their genome sequenced. Qatar Precision Health Institute has recently started the follow-up visits for those who have completed five years since their first registration and launched MRI to its portfolio of check-ups to generate more insights about the participants' health.

Qatar Precision Health Institute has been using a multi-pronged participant outreach strategy, powered with proactive public relations activities, to disseminate the underlying messages to the right target audience. The core pillars of the participants outreach strategy includes: participation in industry events, awareness programs, and national events, sustained media outreach, and continued social media activities.

Methods

In addition to monthly social media campaigns, Qatar Precision Health Institute participates in monthly media interviews with both broadcast media and print media. Qatar Precision Health Institute regularly attends relevant industry events and global awareness campaigns to raise awareness about Precision Health. It has been providing opportunity for media and social media influencers to take tours of the facility and personalize their stories. A series of campaigns around the main national events such as Qatar's national day, the national sports day and the country's landmark national sports day were launched to humanize the Qatar Precision Health Institute story, allowing the population to understand the concept better encouraging people to register.

Results and Discussion

Qatar Precision Health Institute public participant recruitment strategy and methods successfully achieved to enrol more than 50% of the targeted population in 10 years (with almost 2 years of COVID 19 pandemic interceptions). Qatar Precision Health Institute has over 7500 potential participant waiting list. Basing the core messages of the communications activities on the benefits Precision health brings to the people of Qatar has been of utmost help to the success of the campaign.

Keywords

Qatar Precision Health Institute

P98: vNIB: developing a novel virtual reality tool for public engagement in biobanking.

Lewis, Claire (1), Craig, Stephanie (2), Collins, Matthew (2), Gault, Richard (2), Pan, Jingting (2), Routley, Stephen (2), Morgan, James (2), Chang, Zhenghao (2), Mongomery, Josh (2), James, Jacqueline (2)
(1) Northern Ireland Biobank, (2) Queen's University Belfast

Background

Public outreach activities are an important practice for biobanks. They can help raise awareness of biobanking and inform the public about of the important contribution biobanks make to science and society. Outreach activities typically involve open days or science festivals using interactive activities and educational materials to engage with the public (BBMRI.nl). With the increasing application of serious games as educational tools in healthcare (Wang et al, 2022), we sought to develop a novel virtual reality (VR) serious game to use as an interactive outreach activity in biobanking.

Methods

The VR software Virtual Northern Ireland Biobank (vNIB) was developed by a team of undergraduate software engineering students for use with a VR headset. The VR software and headset enabled the user to be immersed in a virtual lab to experience activities such as pipetting and use of a centrifuge. The game was used in an outreach activity in February 2023 as part of a local science festival, with feedback requested from those who used the vNIB activity.

Results

Of those who provided feedback (n=28), 70% had never used a VR headset before, 80% learnt something new, and 100% of respondents rated their VR experience of the vNIB game as 4 out of 5 or greater. vNIB was also mentioned as one of the key takeaways from the general feedback collated from visitors at the event.

Conclusions

vNIB is the first software of its kind and was well received as an innovative public outreach activity. Further development and testing of this approach is warranted.

Keywords

Public Awareness; Public Outreach; Serious Games

PS17. Getting more from less – liquid biopsies, biopsies and fine needle aspirates for molecular technique

P100: Making the most of lung fine needle aspirates for molecular testing: value of cell blocks and corresponding supernatants

Coetsee, Liezel (1); Louw, Meagan (2); Sanderson, Micheline (2); Schneider, Johann W. (2)
(1) National Health Laboratory Service, Tygerberg Hospital, Cape Town, South Africa, (2) Division of Anatomical Pathology, Faculty of Medicine and Health Sciences, Stellenbosch University, South Africa

Description

Formalin-fixed paraffin-embedded cell blocks (FFPE) are produced from fine needle aspirates (FNAs) and represent enriched tumour samples. However, limited cellularity can curtail ancillary molecular testing. Adequate quantities of nucleic acids, suitable for mutational analysis, can be recovered from otherwise discarded FNA supernatants. We investigated whether DNA and RNA co-extracted from cell blocks and the associated FNA supernatants, respectively, suffice for molecular testing.

Forty non-small cell lung carcinoma FFPE cell blocks and their corresponding supernatants were used. Cell block cellularity was assessed and graded A through D. The AllPrep® DNA/RNA FFPE kit, QIAamp Circulating Nucleic Acid Kit, DNA IQ system and the PicoPure RNA Isolation kit were used for extractions. Nucleic acid quantities and quality were assessed using spectrophotometry, fluorimetry and microcapillary electrophoresis. Utility of isolated nucleic acids was tested through qPCR of human β-Globin and GAPDH plus EGFR and ALK variant analysis in 16 adencarcinomas. A260nm/A280nm ratios above 1.5 for DNA ranged from 33% to 80% and for RNA from 53% to 68%. DNA and RNA yields varied from 0.020 ng to 1000 ng, irrespective of origin. DV200 scores above 30% were obtained for 78% of cell blocks-derived RNA, and 90% of RNA originating from the supernatants. β-Globin was detected in all DNA samples, whilst GAPDH mRNA transcripts were detected in 80% of cell blocks and 28% of supernatants tested. Preliminary

results confirmed EGFR variants but no ALK fusion variants.

Overall, DNA and RNA co-extracted from cell blocks with reduced cellularity and residual supernatants, respectively, were suitable for molecular testing.

Keywords

fine needle aspirates, cell blocks, supernatants, nucleic acids, molecular testing

PS18.Partnerships towards real world data

P102: Attitude towards consent-free research use of personal medical data in the general German population

Richter, Gesine (1,2); Trigui, Nourane (3); Caliebe, Amke (3); Krawczak, Michael (3)
(1) Institute of Experimental Medicine, Division of Biomedical Ethics, Kiel University, University Hospital Schleswig-Holstein, Kiel, Germany, (2) German Center for Lung Research (DZL), Airway Research Center North (ARCN), Borstel, Germany, (3) Institute of Medical Informatics und Statistics, Kiel University, University Hospital Schleswig-Holstein, Kiel, Germany

Background

The design of appropriate consent procedures for the secondary use of personal health data is a key concern of medical research by both, academia and industry. Recently, the concept of ‘data donation’ has come into focus in Germany, defined as a legal entitlement to the research use of routine medical data without explicit prior consent of patients (opt-out).

Methods

Standardized telephone interviews of 3013 individuals, representative of the German online population, were conducted in August 2022 to determine their attitude towards data donation to medical research.

Results

Approval of data donation was high, both for publicly funded (85.1%) and privately funded medical research (66.4%). Major predictors of a willingness to donate data included (i) sufficient appreciation of the respective kind of research, (ii) a reciprocity attitude that patients have a duty to support research, and (iii) sufficient trust in data protection and control.

Conclusion

There is a positive attitude towards data donation in the German population which based on factors that can be curbed through laws and internal procedures. However, implementing data donation would require alternative means of information provision to compensate for the lack of direct communication during medical care. To this end, we propose the creation of general ‘health data literacy’ which refers to the comprehensive ability to find, understand and evaluate information about the risks and benefits of data-rich medical research. Specifically, health data literacy would include knowledge about the goals and methods of such research as well as the possibilities and limits of data protection.

Keywords

data donation, informed consent, medical research, secondary data use, health data literacy, precision medicine, European Health Data Space

P104: Establishment of a Medical Biorepositories of South Africa (MBiRSA) Network

Conradie, E. (1); Anderson, D. (2); Staunton, C. (3,4); February, F. (5); Sanderson, M. (6); Duma, B. (7); Maseme, M. (7,8); Singh, S. (9,10); Swanepoel, C. (11)
(1) Centre for Human Metabolomics, North-West University, Potchefstroom, South Africa, (2) South African National Bioinformatics Institute, University of the Western Cape, Cape Town, South Africa, (3) Institute for Biomedicine, Eurac Research, Bolzano, Italy, (4) School of Law, Howard College, University of KwaZulu-Natal (UKZN), Durban, South Africa, (5) Division of Human Genetics, Institute of Infectious Disease and Molecular Medicine, Faculty of Health Sciences, University of Cape Town, Observatory, South Africa, (6) Division of Anatomical Pathology, Department of Pathology, Faculty of Medicine and Health Sciences, Stellenbosch University, (7) National Health Laboratory Service, National Biobank, Johannesburg, South Africa, (8) University of Pretoria, School of Health Systems and Public Health, Faculty of Health Sciences, Pretoria,

South Africa, (9) Centre for Medical Ethics and Law, WHO Collaborating Centre in Bioethics, Department of Medicine, Faculty of Medicine and Health Sciences, Stellenbosch University, Cape Town, South Africa, (10) Discipline of Dentistry, Westville Campus, University of KwaZulu-Natal (UKZN), Durban, South Africa, (11) Division of Haematology, Department of Pathology, Faculty of Medicine and Health Sciences, Stellenbosch University and National Health Laboratory Services, Tygerberg Academic Hospital, Cape Town South Africa Cape Town South Africa

Description

The MBiRSA was established by the South African Department of Science and Innovation (DSI) to ensure long-term security and access to biomedical sample collections and associated data through the development and implementation of common policies, standards and collection strategies; catalyse ground-breaking interdisciplinary research that relies on access to scientific collections that addresses questions of relevance to South African society; and explore opportunities for enhancing economic potential of knowledge and products generated through collections-based research.
Objectives for the next 3 years:

1. Establish the network of medical biorepositories in SA
2. Ensure a standardised approach to the collection, storage, processing and sharing of biomedical samples and associated data, whilst ensuring compliance to national and international ethical, legal and quality assurance regulations and standards
3. Increase awareness of benefits to network of medical biorepositories, to increase accessibility and collaborative use of biomedical samples
4. Ensure that medical biobanking services and resources provided are professional and according to global best practices, by developing and facilitating training opportunities for individuals within the field of biomedical research collections
5. Ensure that a network of proper physical infrastructure is available across SA for the storage of biomedical materials, to ensure that the quality and integrity of the resource provided to researchers is maintained.

This paper will discuss MBiRSA, its purpose, mission, and proposed plan for integration in the South African scientific community and leveraging current international developments to strengthen local capacity through facilitating opportunities for education and collaboration.

Keywords

Biorepository, Networks, stakeholders, partnerships

P106: Development of a Hungarian Biobank Data Management System

Felső, Regina (1,2,3,4); Béres, Petra (1); Bokor, Szilvia (2,3,4); Gyenesei, Attila (1,2); Molnár, Dénes (2,3,4)
(1) Hungarian Centre for Genomics and Bioinformatics, Szentágothai Research Centre of the University of Pécs, Hungary, (2) National Laboratory on Human Reproduction, University of Pécs, Hungary, (3) Molecular Medicine Research Group, Szentágothai Research Centre of the University of Pécs, Hungary, (4) Department of Paediatrics, Medical School, University of Pécs, Hungary,

Description

ASTRAGEN is a collaboration study between obstetricians and pediatricians. The study aims to investigate the possible epigenetic changes caused by in vitro fertilization. To investigate the effect of different epigenetic patterns on the developmental, metabolic, and hormonal status of the mother and newborn after birth and during a 2-year follow-up period. Additionally, we aimed to develop a biobank, for which proper data management is essential with an appropriate information technology background. The planned total number of involved mother-child pairs in the study is 360. The planned sample size is 7900 samples from blood, saliva, urine, and breast milk altogether, We aimed to develop a data management system that is not only designed to store the meta-data of the biobank established by the ASTRAGEN working group but also to design the program so that it could store all relevant data needed for the day-to-day running of a well-functioning biobank.
The Hungarian Centre for Genomics and Bioinformatics developed a Biobank Information

Management System in collaboration with the ASTRAGEN working group, that could be used also by other biobanks of the University of Pécs. The development was carried out in a flexible framework. During the establishment of the data directory not only the needs of the ASTRAGEN working group were taken into account, but also the international biobanking guidelines were followed.
The system can also meet the needs of future users by its flexibility. The system's complexity and high flexibility make it a solution for managing and operating the workflows of any biobank with modern technology.

Keywords

data management system, ASTRAGEN biobank

P108: Implementation of a Digital Maturity Framework for Biobanking

Pallocca, Matteo (1); Rossi, Federica (1); Palombo, Ramona (1); Cruoglio, Antonella (1); Fragnito, Davide (1); Casati, Sara (1); Mirabile, Antonella (1); Manconi, Andrea (2); Milanesi, Luciano (2); Frexia, Francesca (3); Pireddu, Luca (3); Sulis, Alessandro (3); Delussu, Giovanni (3); Meloni, Vittorio (3); Forni, Monica (4,5); Adami, Valentina (6); Borsani, Massimiliano Vittorio (1); Miele, Claudia (1); Lavitrano, Marialuisa (7)
(1) Institute of Experimental Endocrinology and Oncology \\\"G. Salvatore\\\", National Research Council (CNR), Via Pansini, 5, 80131 Naples, Italy, (2) Institute of Biochemical Technologies, National Research Council (CNR), Via Cervi 93, 20054 Segrate (Milan), Italy, (3) CRS4, Center for Advanced Studies, Research and Development in Sardinia, 09050 PULA (CA), Italy, (4) Department of Veterinary Medical Sciences, University of Bologna, Via Tolara di Sopra 43, 40064 Ozzano dell'Emilia, Bologna, Italy, (5) Health Sciences and Technologies - Interdepartmental Center for Industrial Research (CIRI-SDV), Alma Mater Studiorum, University of Bologna, 40126 Bologna, Italy, (6) CIBIO - Department of Cellular, Computational and Integrative Biology, University of Trento, via Sommarive 9, 38123 Trento, Italy, (7) School of Medicine and Surgery, University of Milano-Bicocca, 20900 Monza, Italy

Introduction

Biobanks must ensure a fully engineered and digitalized process towards data FAIRification. To this aim, the first step is to assess the current digitalization status with quantitative metrics, which is particularly challenging given the multi-faceted regulatory and logistics aspects of biobanking.

Materials and Methods

We hereby present a Biobanking digital assessment maturity framework, BB4FAIR, implemented in the #NextGenerationEu "Strengthening BBMRI.it" project. It comprises: 1) a survey with 38 questions divided in three macro areas, namely IT infrastructure, personnel, and data annotation richness; 2) an automated R system to analyze and produce data visualization based on the survey results.

Results

We piloted the tool via 45 Italian biobanks associated with BBMRI.it. A score table was designed to distribute tiering scores to specific features, such as already having a Biobank Information Management System (BIMS) in place, declared by ~15% of biobanks. Three maturity tiers were defined dividing the score distribution into tertiles. Know-how on Common Data Models is present in 20% of biobanks. The Informed Consent/ELSI process lacks digitalization in 95% of cases.

Discussion

Maturity models are required to assess the required actions to improve infrastructure networks. For example, tiering results were exploited to have the first list of Biobanks to join the Federated Search Network, having already in place the proper annotations and IT infrastructure. Furthermore, they highlight the strong need for IT training and data annotation resources in the BBMRI.it landscape.

Keywords

maturity model, biobank quality assessment, biobank facilities, clinical data warehouses, data FAIRification

P110: A Catalogue for Discovering the BBMRI-it Infrastructure Services

Gnocchi, Matteo (1); Moscatelli, Marco (1); Milanesi, Maria (2); Bobbo, Tania (2); Chiodi, Alice (2); Manconi, Andrea (2)
(1) National Research Council of Italy - AtdRMI4, Italy, (2) National Research Council - Institute of Biomedical Technologies, Italy

Introduction

The BBMRI-it Biobanks offer on-demand services through access to methodologies, tools and platforms for sample processing and data analysis. The availability of a federated catalogue describing the ecosystem of infrastructure services would represent a showcase for biobanks and an attractive tool for project collaborations.

Materials and methods

We present an online service catalogue collecting the information related to the available common service ecosystem to effectively and consistently engage biobanks and industry who need to access the infrastructure. The catalogue is implemented in the NextGenerationEu “Strengthening BBMRI.it” project. The data model underlying the catalogue is designed with the aim to provide as much as possible comprehensive description of both service providers and the related services. Searching for services is supported through a dedicated engine built on the data model.

Results

Though a web interface the biobank responsible can submit and modify the information describing the offered services using controlled forms. The information is published on the catalogue. The catalogue allows to search for services according to different features such as the type of collaboration supported (i.e., commercial or not-for-profit). Results also report contact information of the biobanks offering the identified services.

Discussion and conclusion

The catalogue addresses the implementation of Open Science while increase the visibility of the service ecosystem of BBMRI-it. It will contribute to the sustainability of all biobanks. This activity has been supported by the funding of the European Union (NextGenerationEU), Italian NRRP project code IR0000031 - Strengthening BBMRI.it - CUP B53C22001820006.

Keywords

On-demand services, federated catalogue of services

P112: International Collaborative Biobanking: Shaping the Future Together

Botta-Orfila, Teresa (1); Bjelogrlic, Snezana (2); Tanic, Miljana (2); Krivokuca, Ana (2); Soler-Ventura, Ada (1); González-Abuin, Noemi (1); Aragonès, Gemma (1); Djuric, Ana (2); Rodríguez-Vilarrupla, Aina (1); HCB-IDIBAPS Biobank group (1); Zoidakis, Jerome (3,4); Fijneman, Remond (5); Castellví-Bel, Sergi (6); Cavic, Milena (2)
(1) Biobank from Hospital Clínic Barcelona (HCB) - Institut d’Investigacions Biomèdiques August Pi i Sunyer (IDIBAPS) (HCB-IDIBAPS Biobank), Fundació Recerca Clínic Barcelona-Institut d’Investigacions Biomèdiques August Pi i Sunyer (FRCB-IDIBAPS), Barcelona, Spain, (2) Department of Experimental Oncology, Institute for Oncology and Radiology of Serbia, Belgrade, Serbia, (3) Department of Biotechnology, Biomedical Research Foundation, Academy of Athens, Athens, Greece, (4) Department of Biology, National and Kapodistrian University of Athens, Athens, Greece, (5) Department of Pathology, The Netherlands Cancer Institute, Amsterdam, Netherlands, (6) Gastroenterology Department, Fundació de Recerca Clínic Barcelona-Institut d'Investigacions Biomèdiques August Pi i Sunyer (FRCB-IDIBAPS), Centro de Investigación Biomédica en Red de Enfermedades Hepáticas y Digestivas, Hospital Clínic de Barcelona, University of Barcelona, Barcelona, Spain

Introduction

Recognizing the role of cross-country collaboration in biobanking, STEPUPIORS project (101079217) has driven biobanking initiatives through strategic partnerships, culminating in the establishment of Serbia's rectal cancer biobank at the Institute for Oncology and Radiology of Serbia (IORS). This pioneering effort highlights the importance of international collaboration in biobanking innovation, with efforts extending to valuable trainings enriching the global biobanking community's knowledge base.

Material and methods

In the realm of biobanking, we established a procedural framework aligned with international guidelines and regulations, comparing Spanish and Serbian contexts and prioritizing ethical-legal compliance, while enhancing human

capacities at IORS through an educational program designed ad-hoc at IDIBAPS.

Results

Since 2012, the HCB-IDIBAPS biobank includes rectal cancer samples within its cohorts, through collaborations with clinical groups. With extensive experience in processing and procuring such samples to research projects, it facilitated the establishment of a Serbian rectal cancer biobank at IORS in 2023. Following rigorous one-year training, fourteen IORS researchers assumed management roles, contributing to the advancement of rectal cancer research through standardized procedures and collaborative efforts.

Conclusions

This initiative demonstrates the significant influence of the HCB-IDIBAPS Biobank in designing and implementing biobanks at partner institutions. It fosters collaboration among international centers and underscores Biobanks' pivotal role in specialized project workflows. Through meticulous collaboration, addressing scientific, legal-ethical, procedural, and human resource challenges with expert guidance from seasoned partner institutions, the first IORS cancer biobank was successfully established. This ensures optimal resources sharing and utilization for impactful research outcomes.

Keywords

cross-country collaboration; partnership; educational program

P114: A unified data portal to integrate and represent gene bank data in BBMRI.it

Cozzi, P. (1); Bobbo, T. (2); Manconi, A.(2); Stella, A. (1)
(1) CNR-IBBA, Milan, Italy, (2) CNR-ITB, Rome, Italy

Introduction

Animal gene bank collections are a backup of genetic resources poorly used. Integration of the large amount of heterogeneous data generated is a challenging task. Addressing this challenge requires to unify access to gene bank data and create standards and protocols to exchange it.

Methods

The EU Innovative Management of Animal Genetic Resources (IMAGE) project was established to deal with this task. The solution implemented to manage the huge amount of heterogeneous data distributed across gene-banks in different locations/formats comprises: 1)a well-defined metadata rule-set ensuring high-quality and comparable data across the collections; 2)a single Inject tool helping gene-bank managers to enhance, standardise, tag and submit their gene-bank data to a Common Data Pool that integrates all gene-bank records from across Europe; 3)the sustainability offered by archiving data within EBI-BioSamples; 4)a bespoke data-portal that integrates gene-bank metadata with generated ‘omic-datasets from within IMAGE.

Results

We are working to a pilot study aimed at providing an instance of the IMAGE solution in BBMRI.it. Within a data portal, a GIS tool will assist the user in identifying/storing the geographical origin of the samples as well as displaying individual/population genetic parameters and biological attributes through interactive maps. Querying across all types of data is also expected to facilitate targeted search to identify genetic material of interest residing somewhere in the partner gene-banks and collections.

Discussion and Conclusions

The data portal is means to help the integration and transparent use of the information stored animal gene-banks/genetic collections.

Funding: BBMRI.it-(Italian national node of BBMRI-ERIC-CUP B95E23016940005); Strengthening BBMRI.it-(EU-NextGenerationEU-IT-NRRP-IR000003 CUP-B53C22001820006).

Keywords

gene banks, data integration, data portal

P116: canSERV – providing cutting edge cancer research services across Europe

Balogh, Judit (1); Pausan, Manuela (1); Eriksson, John (2); Scollen, Serena (3); Martins dos Santos, Vitor (4); Medico, Enzo (5); Stechmann, Bahne (6); Hagn, Michael (7); Brockhaus, Corinna (8); Lejeune, Stéphane (9); Kozlakidis, Zisis (10); Raess, Michael (11); Pade, Nicolas (12); del Alamo, Marta (13); Garralda, Elena (14);

Oldoni, Emanuela (15); Lima, Nelson (16); Gilbert, Martha (17); Kirkby, Karen (18); Habermann, Jens K. (1) – on behalf of the canSERV Consortium
(1) BBMRI-ERIC, Graz, Austria, (2) EURO-Bioimaging, Turku, Finland, (3) ELIXIR/EMBL, Heidelberg, Germany, (4) Wageningen University representing IBISBA, Wageningen, Netherlands, (5) Universita degli Studi di Torino representing EuroPDX, Turin, Italy, (6) EU-OPENSCREEN, Berlin, Germany, (7) Artrtic, Munich, Germany, (8) Instruct ERIC, Oxford, UK, (9) EORTC, Brussels, Belgium, (10) IARC/WHO, Lyon, France, (11) INFRAFRONTIER, Neuherberg, Germany, (12) EMBRC, Paris, France, (13) ECRIN, Paris, France, (14) Fundacio Privada Institut D'Investigacio Oncologica De Vallhebron representing Cancer Core Europe, Barcelona, Spain, (15) EATRIS, Amsterdam, Netherlands, (16) Universidade do Minho representing MIRRI, Braga, Portugal, (17) ttopstart, Rijswijk, The Netherlands, (18) University of Manchester representing ARIE, Manchester, UK

Background

canSERV is a € 15 Mio. project offering cutting-edge research services, enabling innovative R&D projects and fostering precision medicine for patients benefit. canSERV involves 18 leading organizations across Europe including Research Infrastructures, key organisations and oncology experts.

Objectives

canSERV's main objectives are: (i) offer at least 200 different unique Personalised Oncology relevant and valuable cutting-edge services; (ii) establish a single, unified, transnational access platform to request services and trainings; (iii) ensure oncology-related data provided will be fully compliant with FAIR principles and complement and synergise with other EU initiatives and (iv) ensure long-term sustainability beyond project duration. Furthermore, canSERV establishes the European Molecular Tumor Board Network (EMTBN) that is open for anyone to join. The EMTBN develops Molecular Tumor Board (MTB) consensus guidelines, an MTB outcome registry, and provides advice to scientists, clinicians, and MTBs.

Results

canSERV offers a series of open and challenge calls for access to services in the amount of ~ € 9 Mio. The calls are designed to support researchers to develop innovative research projects that explore cutting-edge methodologies and target critical gaps in cancer research and care by providing funding to resources/services. By encouraging the submission of collaborative proposals, canSERV aims to foster transnational cooperation, support a vibrant scientific community, and help to accelerate knowledge gain and transfer through defragmenting the European Research Area.

Conclusions

canSERV presents an unparalleled opportunity to accelerate cancer research, drive innovation, and improve patient outcomes. canSERV is granted by the EU Horizon programme under #101058620.

Keywords

cancer, cutting-edge research services, precision medicine, research infrastructures, transnational access to services, European Molecular Tumor Board Network, innovative research projects

P118: CancerModels.Org - an open global research platform for patient-derived cancer models

Perova, Zinaida (1); Martinez, Mauricio (1); Mandloi, Tushar (1); Almanza, Marcelo Rios (1); Neuhauser, Steven (2); Begley, Dale (2); Krupke, Debra (2); Bult, Carol (2); Parkinson, Helen (1)
1) EMBL-EBI, Hinxton, UK, (2) The Jackson Laboratory, Bar Harbor, ME, USA

Description

Patient-derived cancer models (PDCMs) are an essential tool in cancer research and precision oncology. The heterogeneity of the underlying metadata and the lack of robust standards to describe PDCMs makes it difficult for researchers to find models of interest and compare associated data across multiple academic and commercial sources.

CancerModels.Org is an open-source and community-driven platform that aggregates, standardizes, and integrates the complex and diverse data associated with PDCMs using FAIR principles. It provides a unified point for PDCM stakeholders, from researchers to

bioinformaticians and tool developers, to search and compare over 8300 PDCMs and associated data, including frequently mutated genes, diagnoses, drug treatments and sequence data from patient-derived xenografts, organoids, and cell lines.
Users can search for models of interest via a web interface or the REST API and explore molecular data summaries for models of specific cancer types. The underpinning data model was augmented with additional dimensions and covers gene expression, gene mutation, biomarkers, imaging, patient treatment, and drug dosing studies. Moreover, the knowledge is enriched with links to external resources - publication platforms, cancer-specific annotation tools (COSMIC, CIViC, OncoMX, OpenCRAVAT, ClinGen), and raw data archives (EGA, dbGAP, GEO).

In conclusion, CancerModels.Org aggregates PDCMs from 38 academic and commercial providers, enabling users to search and compare over 8300 models and associated molecular data. It increases the visibility and reusability of the models and facilitates collaboration across disciplines and geographies.

Keywords

patient-derived cancer models, research platform, standards, FAIR data, data integration

PS22. Green biobanking and sustainability

P120: Design of data-warehouse solution and future interregional biobank system

Klein, Aviaja (1); Sørensen, Erik (1); Fjelster, Sofie (1)
(1) Copenhagen Hospital Biobank Unit, Copenhagen University Hospital, Copenhagen, Denmark

Introduction

Denmark is divided into five regions responsible for certain administrative and healthcare tasks. Biobank units of the Capital Region (RH) and Zealand Region (SJ) each collect residuals after blood-type testing. Each Biobank uses essential resources when processing a sample. If multiple biobanks collaborate on same-patient samples, resources can be deployed on a greater width of patients. In a new data-warehouse solution we engage the idea of resource pooling by sharing data (patients) and ensuring a collective standard of data quality.

Methods and Material:

In designing the data-warehouse we have:

- Mapped data content and quality between the biobanks
- Defined a shared standard for data quality.
- Built the system with future web access ensuring future relevance.

Results

Each region is responsible for their physical storage and data infrastructure. As both Biobanks used the same interface, the solution is built on the platform Labware. Each local system sends nightly sample data to the data-warehouse. Thereafter the warehouse sends a list of patients with samples from both biobanks to either Prosang – a requisition system or the local system depending on the Prosang set-up. Every 5 minutes Prosang sends new sample data to the local system wherein laboratories can process samples for research.

Discussion

As daily exchange of patients prevents processing additional samples, resources are utilized more efficiently. In this presentation we highlight considerations and difficulties in sharing resources between biobanks and regions in Denmark.

Keywords

Data quality, system building, resource pooling, resources

P122: Getting a Biobank “Fit for Blackout” – A Required Investment of Resources?

Tauscher, Petra (1); Strahlhofer-Augsten, Manuela (1); Plattner, Katharina (1); Perz, Veronika (1); Kral, Sabrina (1); Valjan, Monika (1)
(1) Biobank Graz of the Medical University of Graz, Austria

Introduction

In 2022 Biobank Graz - a partner of BBMRI.at - initiated an evaluation of its infrastructure‘s durability during a multi-day power blackout.

The evaluation aimed to determine critical infrastructure, assess emergency power supply and possible infrastructure upgrades.

Material and Methods

During the evaluation process, several steps were taken.

- Definition of the critical infrastructure required to maintain sample storage within our specifications. This included refrigerated storage systems and safety related systems such as gas leak detectors. Additional technical facilities needed to operate -80°C storage systems during blackout were also considered.
- Evaluating the effectiveness of our emergency power supply in securing critical infrastructure.
- Assessment of options to upgrade our infrastructure in order to ensure the functionality of essential devices in case of a multi-day power blackout.

Results and findings

In the course of getting prepared for a long-term blackout, it became clear that simply connecting our storage systems to an emergency power generator is insufficient. In fact, additional technical facilities “in the background” are needed to operate our cooling systems within specifications.

Discussion and conclusion

The evaluation concluded that making our Biobank “fit for blackout” would require a substantial investment of resources. Biobankers are responsible for sample quality assurance. However, developing a concept for a blackout-scenario prompted us to critically examine following questions: Where does our responsibility for sample quality end and our responsibility for our environment begin, and do we have environmentally more sustainable storage options?

Keywords

long-term blackout, resources, quality assurance

P124: Important steps in the decision-making process towards greener biobanking

Madsena, Corrie Lynne (1); Mikkelsena, Nicolai Sode (1); Høgdalla, Estrid V. (1)
(1) Department of Pathology, Bio- and GenomeBank Denmark, Herlev Hospital, Herlev, Denmark

Introduction

Ultra-Low Freezers (ULTs) are essential for safe and secure storage of biological material, but cold storage can be extremely energy intensive. The Bio- and GenomeBank Denmark (RBGB) examined the temperature stability of the Haier ULT Freezer DW-86L959 at -80°C, -70°C and -60°C as the first step towards greener biobanking and increased sustainability.

Material & Methods

Temperature was measured in three ULTs filled with empty racks set at -80°C, -70°C and -60°C. Temperature stability was measured using data loggers for 2x20 hours at 10 min intervals placed in outer and middle positions of each shelf at the front and back of racks. Finally, each freezer was turned off to simulate power failure and temperatures were logged every 10 minutes.

Results

We identified temperature zones with maximum mean temperatures reaching respectively -71.1°C, -64.2°C and -57.8°C and maximum SD reaching 0.7°C, 1.1°C and 1.7°C in the -80°C, -70°C and -60°C ULTs. There was less than 1 hour difference in warm up time between the operating temperatures with all ULTs reaching -20°C after 15-16 hours.

Discussion and conclusion

Preliminary results show a decrease in temperature stability at higher operating temperatures, while only slight differences in warm up times were measured. With studies1,2 showing an up to 29% decrease in energy consumption at operating temperatures of -70°C and 48% decrease at -60°C, the identification of temperatures zones and stability in this study forms the basis for future decision-making towards greener biobanking and increased sustainability at the Bio- and GenomeBank Denmark.

References

[1] M. Farley, "Efficient ULT freezer storage - An Investigation of ULT freezer energy and temperature dynamics," The University of Edinburgh, Jul. 2015. [Online]. Available from: https://www.ed.ac.uk/files/atoms/files/efficient ultf reezerstorage.pdf
[2] Faugeroux D. Ultra-low temperature freezer performance and energy use tests; 2016. Available from: https://sustainability.ucsc.edu/engage/green-certified/green-labs/resources/Green%20Procurement/ucr2016_tempfreezertest [Accessed 31 Jan 2024]

Keywords

Ultra-Low Freezer, temperature stability, energy consumption, sustainability

P126: New Approach for Room Temperature Stabilization and Storage of High Quality Plasma Samples

Martín-Ayuso, Marta (1); Hernández, Ana (1); García-Álvarez, Miguel (1); Morgado, Mario (1)
(1) 300K Solutions SL, Salamanca, SPAIN

Description

Determination of relevant biomarkers in human plasma and serum has recently gained a high relevance, essentially for being a rich source of biomarkers while being minimally invasive. Proper specimen collection and biobanking are critical success factors in the identification of these biomarkers.

Gold-standard method for plasma/serum preservation is -80ºC which implies high maintenance costs, large spaces, constant energy supply and safety measures. This study aims to investigate the feasibility of dry preservation of human plasma using lyophilization technology and to evaluate the stability of plasma components during the lyophilization process and subsequent storage.

We performed a proof of concept with 5 plasma samples collected and processed with less than 2 hours. Each sample was divided in parallel to be stored at -80ºC or lyophilized with 300K Solutions technology. After 1 week of storage both replicates (frozen vs lyophilized) were characterized and compared with an untargeted analysis for proteomic, lipidomic and metabolomic with Liquid chromatography–mass spectrometry (LC–MS).

Among hundreds of metabolites studied, we could observe that lyophilized samples showed a good preservation of metabolites and for some families, lyophilized preservation was even better than that of frozen samples.

While it is widely accepted that pre-analytical factors like sample collection, processing, and shipping can have a negative impact in the sample quality influencing analytic reliability and reproducibility of clinical results, the data here observed indicate that preservation of blood plasma in the dried state minimize this impact and would facilitate long-term sustainable storage and transport while keeping the sample quality.

Keywords

plasma, room temperature storage, lyophilization, sustainable

P128: Biobanking and Sustainability: Piedmont Region Biobanks Network

Bonvicini, Paolo (1); Valentino, Paola (2); Oliveri, Giulia (1); Amore, Valentina (1); Di Sapio, Alessia (3); Martire, Serena (3); Bava, Cecilia (3); Deaglio, Silvia (4); Genzano Besso, Federico (4); Togliatto, Gabriele (4); Sorbini, Monica (4); Capello, Daniela (5); Bettio, Valentina (5); Libener, Roberta (1); Maconi, Antonio (6)
(1) Alessandria Biobank - Department of Integrated Activities for Research and Innovation, Santi Antonio e Biagio e Cesare Arrigo Public University Hospital, Alessandria, Italy, (2) Department of Clinical and Biological Sciences, Università degli Studi di Torino, Torino, Italy, (3) CRESM Biobank – San Luigi Gonzaga Public University Hospital, Orbassano, Italy, (4) TESEO Biobank, Department of Medical Sciences, University degli Studi di Torino – Città della Salute e della Scienza Public Hospital, Torino, Italy, (5) UPO Biobank – Università del Piemonte Orientale, Novara, Italy, (6) Director - Department of Integrated Activities for Research and Innovation, Santi Antonio e Biagio e Cesare Arrigo Public University Hospital, Alessandria, Italy

Introduction

The growing demand for large numbers of high quality standardized biological samples and associated data increased biobanks importance. This implies attention to sustainability: shared models of cost-recovery policies need to be addressed, in an inclusive network perspective between biobanks.
Major public research biobanks in the Piedmont Region, Italy, created a working group coordinated by DAIRI (Department Integrated Research Innovation activities), to address common biobanking sustainability issues. Here we introduce the ongoing work about a shared recovery-cost model.

Material and Methods

The working group carried out an intensive literature review focusing on available recovery-cost models, to identify different variables/aspects, related to collection, processing, preservation, and distribution of biological material/associated data, that should be included in costs assessment.
Then, each biobank categorized variables according to its own entity and based on the specific nature of the biological material and associated data.

Results

The recovery-cost computational rationale is based on several parameters: "cost of consumables" necessary to collect, process, store and distribute samples, "cost of staff work " based on working time and personnel expertise, assessment of different "preciousness" and "rarity" levels related to specific biospecimens and clinical conditions, differentiation of the “complexity level of associated data” by establishing “basic”, “intermediate” and “advanced” data packages.

Conclusions

The proposal of a shared recovery-costs model by Piedmont Region Biobanks Network represents a useful and applicable tool to implement a transparent financial sustainability policy for high quality collection, processing, storage, and distribution of biological material and associated data.

Keywords

biobanking, financial sustainability, recovery-cost, biobanks network

P130: Justifying an Automated Biobank in Your Business Plan

Tiller, Cory (1)*
*Presented by Kraeusche, Falko (1)
(1) SPT Labtech Ltd.

Description

Barriers to automation of biobanks include the costs associated with equipment purchase, the significant changes to infrastructure and process that are required. The cost and benefits analysis within this poster explore these in more detail to help ascertain whether automation, or manual operation best supports of varying sized biobanks.

Automation systems offer high density storage capacity, sample registration and tracking, random access and rapid cherry picking, all of which improve the speed and organization of biobanking workflows. Automating these steps can significantly minimize the costs associated with wasted employee time manually searching for samples.

Initial investment, service costs and infrastructure changes attributed to automated systems is difficult to justify, however, other factors to consider when weighing the advantages and disadvantages of automation. Labor costs, energy costs and space considerations are easily assessed by quantitatively evaluating current usage and predicting future needs. Other “softer” factors such as sample security and integrity are more difficult to quantitate. Advances in automated sample storage and processing have focused on improving these needs to ensure that biobanks are able to contribute the highest quality samples to research.

Conclusions

The manual processes versus automation cost analysis outlined within this poster can be customized to represent any biobank. Building an operational cost model for the working life of a system that considers library size, throughput requirements and the value placed on the intangible benefits of automation can help to determine whether full or partial automation is the right approach.

Keywords

biobank, cost-saving, sample-quality and integrity, modularity

P132: Liquid biobanking: increase of efficiency and performance accompanied by reduced costs and environmental burden

Petersmann, Astrid (1,2); Doms, Lutz (3); Janzen, Waldemar (4); von Lueder, Martin (4); Kindle, Ralf (5); Malin, Cosmas (5); Spiegel, Dennis (6); Stephan, Christian (6); Zünkeler, Martin (6); Nauck, Matthias (1,7)
(1) Institute of Clinical Chemistry and Laboratory Medicine, University Medicine Greifswald, Greifswald, Germany, (2) Institute of Clinical Chemistry and Laboratory Medicine, University Medicine Oldenburg, Oldenburg, Germany, (3) ASKION GmbH, Gera, Germany, (4) LVL technologies GmbH & Co. KG, Crailsheim, Germany, (5) LiCONiC AG, Mauren, Liechtenstein, (6) KAIROS GmbH an IQVIA business, Bochum, Germany, (7) DZHK (German Centre for Cardiovascular Research), Partner Site Greifswald, University Medicine Greifswald, Greifswald, Germany

Description

Since 1997 about two million aliquots were collected and stored in the Integrated Research Biobank (IRB), organized by the Institute of Clinical Chemistry and Laboratory Medicine (IKCL) in Greifswald. As the number of stored aliquots is increasing over the time, the storage capacity has to be optimized to save running costs, to avoid additional investments in storage capacity and to improve the picking rate. Against this background, a brainstorm meeting was initiated by the IRB to look for optimizing steps to improve the efficiency and sustainability of the IRB in Greifswald and beyond.
The scientific exchange focussed on the following topics: application of high density (HD) racks, material specific sorting of cryotubes and application of an automated workbench for these picking procedures at -80°C or below. All these steps need to be steered by our LIMS (CentraXX, Kairos).

First tests with the automated workbench showed, that a reliable picking of small cryotubes needs precise HD racks, which clearly fit with the specific cryotubes. Therefore, a specific HD rack for 250µl jackets cryotubes were designed by LVL. Successful tests were performed by the IKCL, Askion and LiCONiC using their fully automated storage systems and the automated workbench.

The implementation of these HD racks increased the storage capacity by more than 40%, leading to significantly reduced running costs and investment per sample. The investment in an automated workbench is covered by saving other costs and will lead to a significant increase in efficiency and a reduced environmental burden in Greifswald and beyond.

Keywords

Integrated Research Biobank Greifswald, storage capacity, high density racks, automated workbench

P134: Sustainability and biobanking: scrapping of biorepositories or continuing use

Nauck, Matthias (1); Hein, Volker (1); Levin, Katja (1); Friedrich, Nele (1); Winter, Theresa (1); Zellweger, Marco (2); Savelsberg, Joachim (2); Malin, Cosmas (2); Plattner, Katharina (3); Strahlhofer-Augsten, Manuela Herta (3); Perz, Veronika (3); Kral, Sabrina (3); Gülly, Christian (4); Valjan, Monika (3)
(1) Institute of Clinical Chemistry and Laboratory Medicine, University Medicine Greifswald, Greifswald, Germany, (2) LiCONiC AG, Mauren, Liechtenstein, (3) Biobank Graz, Medical University of Graz, Graz, Austria, (4) Center for Medical Research, Medical University of Graz, Graz, Austria

Enhancing the Sustainability of Biobanking: Deciding Between Scrapping Biorepositories and Prolonged Utilization

Fully automated biorepositories capable of storing cryotubes at -80°C became commercially available approximately 15 years ago. Over this period, biobanking units have evolved in response to changing medical needs. Consequently, some of the initially constructed biorepositories no longer align with the current concept of a biobank unit and are deemed unnecessary. This raises the question: should they be scrapped or continue to be utilized?

In 2016, the Integrated Research Biobank (IRB) in Greifswald acquired a second Kiwi store from

LiCONiC. Although the purchase included all trolleys, it came with a limited number of cassettes to cut costs at the time. Subsequently, the Biobank Graz – a partner of BBMRI.at – decided to dismantle their LiCONiC store, which was originally established in 2012. Through communication between the parties, a decision was made to repurpose the Biobank Graz cassettes in Greifswald.

LiCONiC actively participated in the communication process to assess the compatibility of the cassettes. Following a positive initial check based on engineering drawings, two cassettes were sent to the LiCONiC headquarters, where a hands-on examination also yielded positive results. For safety reasons, all cassettes will undergo a thorough check by LiCONiC before being sent to Greifswald. In addition to technical considerations, financial aspects were negotiated between Biobank Graz and Greifswald, resulting in a mutually beneficial win-win situation.

Scientific infrastructures, such as biobanking units, should enhance their sustainability by promoting the continuous use of components, such as stainless-steel cassettes. This can be achieved locally or through collaborations with other biobanking units.

Keywords

fully automated biorepositories, Integrated Research Biobank Greifswald, LiCONiC AG, cassettes, sustainability

PS23. Non human biobanking

P136: Inverse molecular docking as a powerful new approach in discerning promiscuous mode of action of natural compounds

Bren, Urban (1)
(1) Faculty of Chemistry and Chemical Technology, University of Maribor, Smetanova 17, SI-2000 Maribor, Slovenia

Description

Research efforts are placing an ever-increasing emphasis on identifying signal transduction pathways related to the chemopreventive activity of natural compounds such as curcumin and resveratrol. Using a novel inverse molecular docking approach, we sought to find new potential targets of these two polyphenols. Docking of curcumin and resveratrol into each ProBiS predicted binding site of >38 000 nonredundant protein structures from the Protein Data Bank was performed, and a number of their new potential targets was successfully identified. These explain known actions or predict new effects of both curcumin and resveratrol. We firmly believe that our computational results will complement and direct future experimental studies on their anticancer activity as well as on their therapeutic effects against neurodegenerative disorders.

References

[1] V. Furlan, J. Konc and U. Bren, Molecules 23 (2018) 3351
[2] K. Kores, S. Lešnik, U. Bren, D. Janežič and J. Konc, J. Chem. Inf. Model. (2019)

Keywords

polyphenols, cheminformatics

P138: Challenges for biobanking to support Genotype-to-Phenotype (G2P) research on domestic animals

Tixier-Boichard, Michèle (1); Clark, Emily (2); Hartwig, Tina (3); Wimmers, Klaus (3); Harrison, Peter (4); Groenen, Martien (5); Robertson, Joseph (6); Granados, Ana (7); Ige, Temitope-Oluwafisayo (1); Giuffra, Elisabetta (1)
(1) INRAE, France, (2) Univ. Edinburgh, UK, (3) FBN, Germany, (4) EMBL, Germany, (5) WUR, The Netherlands, (6) NMBU, Norway, (7) EFFAB, Belgium

Introduction

Whereas biomedical biobanks are organised in the frame of BBMRI Research Infrastructure, animal biobanks are yet to be visible at the same scale. The current landscape includes national initiatives, such as CRB-Anim in France (https://crb-anim.fr), and European initiatives, such as the EUGENA network for animal genetic resources (https://www.animalgeneticresources.net/index.php/animal-genetic-resources/eugena-portal/). One major challenge is to develop a European gold standard for biobanks for application-oriented domestic animal research.

Methods

EuroFAANG RI (https://eurofaang.eu) is an INFRA-DEV project funded by the Horizon Europe research framework (Figure 1), which develops the concept of a new infrastructure to support G2P research for domestic animals. An online survey was conducted in 2023 to update the European landscape of animal biobanks and to investigate their willingness to integrate in vitro cellular models in their collections.

Results

The survey collected 31 answers from 14 countries: 9 biobanks can offer a storage service for cellular models whereas 15 would need additional training or equipment. The number of biobanks ready to amplify or generate stem cells or organoids, respectively, was much smaller (6 and 4 respectively) but a great majority would consider doing it if training and/or equipment can be provided. Whereas 15 biobanks were involved in a national network, very few were connected with the EUGENA network.

Discussion

The results demonstrated that there was considerable interest in setting up biobanking services for cellular models to support G2P research in domestic animals. The survey results provides a basis for a SWOT analysis in order to prepare the new infrastructure.

Keywords

domestic animals, genotype, phenotype, cellular models, genetic resources

P140: The VetBiobank: Leading the way in incorporating veterinary samples into the BBMRI consortium

Wieser, Monika (1); Burger, Stefanie (1); Kummer, Stefan (1); Schär, Joana (1); Stargardt, Melanie (1); Walter, Ingrid (1)
(1) University of Veterinary Medicine, Vienna, Austria

Description

The Austrian national node (BBMRI.at) of the European Biobanking and BioMolecular Resources Research Infrastructure (BBMRI-ERIC) unites the Austrian medical universities and their biobanks but also includes the University of Veterinary Medicine Vienna and its VetBiobank as a fully accepted consortium partner. The VetBiobank collects biospecimens, primarily tumor tissue from dogs and cats, after clinical interventions. Like its human counterparts, the VetBiobank is committed to establishing a pre-analytical sample management system that complies with relevant ISO standards. These standards include, for example, documentation of ischemia times, transportation conditions, processing details, type of fixation, fixation time, and more.
The sample processing and data collection on animal patients, diagnosis, treatment, and sample management are harmonized with clinical samples from human biobanks, providing the foundation for comparative research in the One Health field. Cats and in particular, dogs have already been recognized as valuable models for human medicine, as they are affected by similar diseases.
There is no doubt that cooperation between human and animal biobanking will be mutually beneficial. BBMRI-ERIC acknowledge the great potential in collaborating with the University of Veterinary Medicine, the sole entity within the network focused on veterinary samples. Considering this, BBMRI-ERIC aims to inspire and encourage other nodes to support their veterinary partners within the network. BBMRI-ERIC will offer support in utilizing the established infrastructure. Additionally, VetBiobank, with its expertise in sample processing and data collection, is prepared to share valuable insights with the community.

Keywords

Veterinary biospecimens, Comparative Medicine, One-Health, preanalytics, BBMRI-ERIC