JANUARY 2025

ABNA EXCHANGE

OFFICIAL NEWSLETTER OF THE AUSTRALASIAN BIOSPECIMEN NETWORK ASSOCIATION

Indigenous Engagement in Biobanking Special Interest Group

Did you know that there are no national guidelines for biobanking with samples from Aboriginal and Torres Strait Islander people or Country?

Have you ever asked yourself;

- How can we engage with Indigenous communities in biobanking?
- What are the ethics and governance concerns?
- What are the cultural considerations associated with biospecimens?

ABNA's newest SIG aims to map areas of concern and uncertainty from a biobanker perspective, and to find answers to the questions raised through collaborative engagement with Indigenous communities.

Our first meeting is being held on Tuesday 25 February, if you'd like to join us please contact SIG chairs Jessica Buck or Cassandra Griffin.

Jessica.Buck@thekids.org.au or
Cassandra.griffin@newcastle.edu.au

We are ready for takeoff!

Welcome to the first edition of the ABNA Exchange for 2025! This year promises to be action-packed with all things biobanking, from seminars to conferences, funding opportunities, and more. We're kicking things off by introducing the successful candidates for the ISBER Board of Directors for 2025, including the President Elect, Treasurer, and Director at Large for the Europe, Middle East, and Africa (EMEA) region. Spoiler alert - one of these candidates is one of our very own! But I won't give too much away just yet - congratulations to all three of them!

ABNA has plenty lined up for 2025 as well, including the 2025 Achievement in Australasian Biobanking Award, our seminar series and of course, our annual conference. Stay tuned for more details in the coming months!

In this edition, you'll find an exciting article on biobanking that's truly out of this world, as well as updates in the world of biobanking, including the latest on the Declaration of Helsinki and the evolving role of Artificial Intelligence in Research Ethics.

Sit back, enjoy, and welcome to what's shaping up to be another thrilling year ahead!

Georget

To Mars and Beyond:
The Pivotal Role of Biobanking in Space Biology

By Dr Louise Ludlow & Dr Carmel Quinn

The prospect of mankind visiting Mars has been the subject of science fiction stories for decades (think 'The Martian' as depicted by Matt Damon in the 2015 movie, and the less successful 'Red Planet' from 2000) but in recent years we have been hearing more and more about the measures being taken toward making this a reality.

Unsurprisingly, 'space biology' has been gaining increasing prominence and public awareness due to the innate fascination in this field, and the stated aim by NASA to send the first humans to Mars as soon as the 2030's. Indeed, preparations for an expedition to Mars will reach a new milestone in 2026 when the Artemis III mission is scheduled to return humans to the moon, where some will stay for several months exploring the lunar surface and preparing for the quest to reach Mars. The scale of research and development behind these endeavours is immense, and the role of data and specimen collections in the field of space biology are pivotal to their success.

Left: The Martian movie poster from 2015. Right: A NASA artist's illustration of Artemis astronauts working on the Moon
Source: https://www.nasa.gov/mission/artemis-iii/

Long-time ABNA members may recall a fascinating article "Extra-Terrestrial Biospecimen Collection and Biobanking" by Cassandra Griffin in the March 2021 newsletter, introducing some of the banking (bio and other) initiatives established, as well as the stringent international guidelines designed to govern these. Unsurprisingly, the organisation leading the way in this area is the National Aeronautics and Space Administration, NASA, who facilitate collection, processing, storage, management and distribution of a range of specimens and data.

Admirably, NASA practice the ethos of 'Open Science', i.e. the belief that broad access to high quality scientific data will contribute to a richer accumulation of knowledge. To this end, they have established the Open Science Data Repository (OSDR) to enable space life-science data be used widely. The OSDR implements the FAIR principles of data access (that data be Findable, Accessible, Interoperable and Reusable) and promotes the concept that "all space-related biological research data are precious national data resources".

NASA banking and repository operations are located at NASA field centres in the United States, including the Lyndon B. Johnson Space Center in Houston, Texas (wherein the Luna Sample Laboratory Facility houses geologic samples returned from the Moon by the Apollo missions between 1969 and 1972), and the Ames Research Center situated in Silicon Valley, California. Many of NASA's space biology Open Science projects are located at the Ames Center; these include the Ames Life Sciences Data Archive (ALSDA), Genelab, and the NASA Biological Institutional Scientific Collection (NBISC). Broadly, ALSDA is a repository for datasets of non-human science data generated by the Space Biology Program and Human Research Program, GeneLab houses omics data from both spaceflight and correlated ground-based studies, whilst NBISC holds non-human biospecimens from such experiments.

A large portion of the NBISC holdings have come through NASA's Space Biology Biospecimen Sharing Program (BSP), which again operates through the Open Science principle. The BSP has its origins in the Russian COSMOS flights of the 1960s and was formally established as BSP in 1985. Essentially, the BSP acquires specimens from animals and plants that have undergone spaceflight. Meticulous planning and organisation is required for the BSP teams to be in situ as soon as their targeted flights return to earth, to dissect, process and record the biospecimens and metadata in a timely fashion, before submitting these to the NBISC.

What's the difference between Astrobiology and Space Biology?

Though they sound analogous, the disciplines of Astrobiology and Space Biology cover distinct, though related fields of research: 'Astrobiology' is concerned with the origins, evolution and limits to life on Earth, in order to facilitate the search for signs of life in space, whereas 'Space Biology' explores how conditions experienced in space affect life *from* Earth; space biology is essential for the development of infrastructure necessary for space exploration.

Left: The representation of the number of biospecimens collected from a single BSP mission
Right: Scientists working at the Russian Institute for Biomedical Problems in Moscow following the landing of the uncrewed Bion M-1 satellite (May 2013). Biospecimens from the 30-day spaceflight mission were collected, preserved, and shipped to US investigators' institutions.
Source:https://science.nasa.gov/biological-physical/data/space-biology-biospecimen-sharing-program/

In addition to the wealth of space biology-related specimens and data managed and distributed by NASA, they also run the Human Research Program, and through the associated Life Sciences Portal they make available all archived data from investigations run through the program, including from the Lifetime Surveillance of Astronaut Health (LSAH) resource. The LSAH screens and monitors astronauts for occupationally related injury or disease. The 2024 ABNA conference featured a presentation by Dr Vienna Tran from South Australia who discussed the risks of space flight for astronauts; these include the loss of bone density and muscle mass due to the lack of gravity, and the risk of cell and DNA damage due to the high radiation environment, leaving astronauts more prone to e.g., developing heart disease and poor vision in later life. These observations are made possible by the LSAH resource among others.

Research outputs from the LSAH

As valuable as the Longitudinal Surveillance of Astronaut Health (LSAH) data is, some studies cannot proceed without a matched control cohort for direct comparison. This is not as straightforward as it sounds as most US government large-scale research data collections are intentionally representative of the general US population, which unsurprisingly does not match up well with typical astronauts. Astronauts are selected on the basis of their health profile, education status and highly specialised skill set – they also need to maintain peak physical fitness, as well as receive excellent health care.

One study using data from the LSAH cohort to look at cardiovascular disease risk in astronauts over their lifetime was presented with exactly this problem; they evaluated 10 different 'control' cohorts before finding that data from the Cooper Centre Longitudinal Study out of Dallas, Texas could fit the bill. This study was the first to directly compare LSAH data to that of an outside cohort and found no substantive difference between the two groups. However, the wider issue of how to find suitable control cohorts for investigations into diseases using LSAH data is important to highlight.

Unsurprisingly, several peer-reviewed publications are produced using the LSAH dataset each year; NASA helpfully include lists of these in their LSAH newsletters which can be accessed via the Life Sciences Portal.

The Australasian Connection

One of several Australian researchers with an interest in space biology is Professor Patrick Humbert, Director of the La Trobe Institute for Molecular Science in Melbourne. In collaboration with a Melbourne aerospace engineering firm and the German Aerospace Centre (DLR), Prof Humbert is investigating how the lack of gravity affects cells in space. The MAPHEUS-15 (Material Physics Experiments Under Microgravity) research rocket was launched from Sweden in November 2024 and included a vial of the human intestinal cell line Caco2. The cells were housed in a special enclosure to keep them alive and allow scientists to watch in real time how they reacted to the environment, to help understand how gravity controls biological processes.

From left: Geoffrey Cooper, Lead Engineer, Enable Aerospace; Samantha Melrose, PhD student, Humbert Group, La Trobe University; Professor Thomas Voigtmann, Project Manager, MAPHEUS-D, DLR Institute of Materials Physics in Space; Dr Jens Hauslage, Group Leader, Aeromedical FabLab, DLR Institute for Aerospace Medicine;Professor Patrick Humbert, Director, La Trobe Institute for Molecular Science (LIMS), La Trobe University; andSebastian Feles, Deputy Group Leader, Aeromedical FabLab, DLR Institute for Aerospace Medicine.
Source: Space mission explores role of gravity in health, News, La Trobe University

Among the other experiments from around the globe that were included on this mission was the MiniWeed experiment, a collaboration between the University of Adelaide, La Trobe University, and the DLR. This experiment tested how altered gravity

affects duckweed - a plant identified as a potential food source for astronauts. 10 tonnes of food would be required to get people to Mars and back which represents a challenge. Professor Mathew Lewsey, who also presented at our ABNA 2024 conference will be involved in analysing the biological and molecular effects on the duckweed, which will help the researchers prepare for future launches to deep space.

https://www.abc.net.au/news/2024-11-23/duckweed-launched-into-space-research-plant-astronaut-food-moon/104624990

The Space Omics and Medical Atlas (SOMA) and International Astronaut Biobank

The Space Omics and Medical Atlas (SOMA) is an integrated repository for clinical, cellular and multi-omic research profiles: this publicly available space omics data has matched samples housed at The Cornell Aerospace Medicine Biobank (CAMbank). The SOMA data has predominantly been acquired through the SpaceX Inspiration4 (I4) mission which took four civilian astronauts on a 3-day orbital mission in 2021; this provided a unique opportunity to collect samples from the crew at different stages of the mission, creating a longitudinal sample set. The samples included blood, capillary dried blood spot cards, saliva, urine, stool, body swabs, capsule swabs, SpaceX Dragon capsule HEPA filter, and skin biopsies, and were processed to obtain specimens including serum, plasma, extracellular vesicles, and peripheral blood mononuclear cells.

The CAMbank is dedicated to the preservation of specimens obtained during spaceflight experiments (SpaceX I4 and others) and currently represents the largest collection yet of detailed medical data and tissue samples from astronauts. As 'space tourism' (carrying civilians into space) inevitably grows, so will the opportunities to learn about the effects of space flight on humans. Importantly, SOMA data and samples are accessible for research directly through SOMA and also via the NASA OSDR initiative.

A Lunar Biorepository?

An article published in BioScience August 2024 proposes "a passive lunar biorepository for long-term storage of prioritised taxa of live cryopreserved samples to safeguard Earth's biodiversity and to support future space exploration and planet terraforming". Utilising already established cryopreservation techniques and the fact that 4.5% of the Moon's southern pole seasonal temperature variation is stable year-round at or below -196°C, means that the proposed lunar biorepository could maintain samples in a cryopreserved state with little human intervention. While this may appear to be a radical suggestion, this is a decades long program that is being suggested. By the authors' own admission, collaboration between a broad array of nations, cultural groups, agencies, and international stakeholders is required to develop acceptable sample holding, governance, and long-term plans. Given the fascination in the subject matter this article has been widely reported and we all watch the project with interest.

The field of space biology along with the studies into astronaut health continues to grow and holds the interest of many a casual observer. With the upcoming Artemis III mission where astronauts are due to live on the moon for an extended period, a new wave of publicity will fascinate a global audience. What seems like science fiction is fast becoming science fact and we will all be glued to each development along the journey of this momentous human endeavour.

22ND ANNUAL CONFERENCE

australasian biospecimen network association

22-24 OCT 2025

REGISTRATION & WEBSITE COMING SOON

#ABNA2025NEWCASTLE

ABNA's 2025 Achievement in Australasian Biobanking Award

ABNA's Achievement in Australasian Biobanking is awarded every two years, and at this years Annual Conference we will be giving out this award for the second time. This award is designed to recognize a past or present individual ABNA-member biobanker, who has contributed and/or continues to contribute to the Australasian biobanking community.

The nominated individual should demonstrate ABNA's aims of;

- Support of Australasian biobanking
- Promote ethically sound high-quality specimens for research
- Promote the benefits of biobanking
- Enhance knowledge amongst the biobanking community

As part of the nomination process, individuals will need to provide:

- Description of your reasons for nominating the individual
- Description of the nominees' contributions in support of the nomination

ABNA members will be notified when nominations are open.

The Fine Print:

Nominations for this award will be sought from active ABNA members and the submissions will be judged by the Prize sub-committee.
Judging will be a merit based comparison of the achievements and alignment with ABNA's aims as listed above.
Current members of the ABNA Management Committee will not be eligible for nomination.
Only nominations received on the official nomination form will be accepted.
No nominations will be accepted once the nomination period has closed.

Lisa Devereux, Manager, Lifepool BROCADE and CASCADE. Coordinator MAGIC study, Honorary Principal Fellow, Sir Peter MacCallum Department of Oncology, University of Melbourne, pictured with her ABNA award, 2023.

ISBER Board 2025 Election Results

ISBER is pleased to announce the results of the 2025 Election!

ABNA congratulates the new ISBER Board members.

PRESIDENT-ELECT

Stella Somiari

View Stella's Position Statement

View Stella's Biosketch

TREASURER

Anusha Hettiaratchi

View Anusha's Position Statement

View Anusha's Biosketch

DIRECTOR-AT-LARGE: EMEA

Engela Helena (Elne) Conradie

View Elne's Position Statement

View Elne's Biosketch

Biobanking in the News

Declaration of Helsinki 2024 Update

The Declaration of Helsinki (DoH) is the World Medical Association's best-known policy statement since the initial release in 1964. Since 2016, the Declaration of Taipei on Ethical Considerations regarding Health Databases and Biobanks has complemented the DoH.

The 2024 revisions emerged from a thorough, transparent, and inclusive 30-month process that began with the appointment of a World Medical Associations workgroup comprising members from 19 countries and invited advisors with expertise in bioethics.

The DoH's updated paragraph 32 also cross-references the World Medical Association's Declaration of Taipei, which includes more detailed guidelines on rights of individuals and principles of governance for health databases and biobanks broadly. Building on existing DoH principles regarding confidentiality of personal information and consent for data collection and storage, this call to apply requirements of the Declaration of Taipei specifically pertains to data collected "from research participants for multiple and indefinite uses" beyond the clinical care of individual patients.

A summary of the revisions published in 2024 by Dr Resneck, the Chair of the World Medical Association workgroup that led the 2024 revisions of the DoH can be found HERE.

WORLD MEDICAL ASSOCIATION

Artificial Intelligence and Research Ethics

Participant consent in biobanking circles is promoted as best practice. The form of this consent and how it is collected is varied, and nuances between ethics committees' requirements is an ongoing conversation.

Recently it was reported that Australia's largest radiology provider has transferred de-identified patient data to an artificial intelligence company without explicit patient consent. Patient X-rays and CT scans are used to train AI models utilising large data sets to model and learn how to identify patterns in diagnoses - thus making these datasets highly valuable.

AI and research ethics including the role that legislation plays is certainly not a new topic but one that is front of mind for many biobankers and discussed in many forums.

This article offers an overview including the (Australian) privacy legislation and includes multiple links to supporting documentation and related articles (including one from Dec 2024 on how communities can benefit from data reuse and AI).

Join in the conversation - is this perhaps a topic our members would be interested in exploring at the 2025 ABNA Annual Conference?