australasian biospecimen network association

BIO-BABBLE

AUSTRALASIAN BIOSPECIMEN NETWORK ASSOCIATION
NEWSLETTER
APRIL 2020

Severe Acute Respiratory Syndrome Coronavirus 2

by Georget Reaiche

The current coronavirus pandemic has highlighted the essential role Biobanks play in studies on emerging pathogenic human viruses and other infectious diseases. The COVID-19 pandemic is caused by a human coronavirus taxonomically known as SARS-CoV-2; Severe Acute Respiratory Syndrome Coronavirus 2.

The virus received this name due to its phylogenetic similarity to the coronavirus strain that caused the 2003 Severe Acute Respiratory Syndrome (SARS) outbreak. The first strain of coronaviruses found to infect humans was identified using electron microscopy in 1964 by Scottish virologist, Dr. June Almeida. Since then, 7 coronavirus strains that infect humans have been identified, the strains most people would be aware of are SARS-CoV-1, responsible for the SARS outbreak in 2003 and MERS-CoV, responsible for the Middle Eastern Respiratory Syndrome (MERS) outbreak in 2012. However, other coronaviruses such as Human coronavirus NL63 have been detected in the lungs of diseased patients with pneumonia.

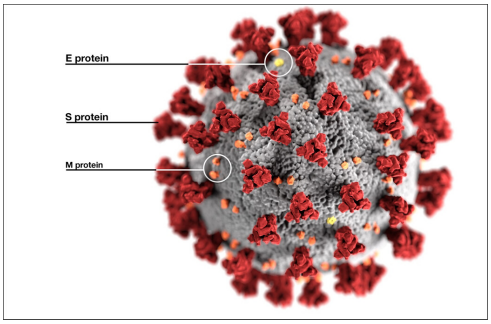

Illustration created at the Centers for Disease Control and Prevention (CDC), reveals ultrastructural morphology exhibited by coronaviruses. Note the spikes that adorn the outer surface of the virus, which impart the look of a corona surrounding the virion, when viewed electron microscopically.

Image courtesy of CDC Public Health Image Library.
Content provider: CDC/Alissa Eckert, MS; Dan Higgins, MAMS.

Although SARS-CoV-2 is a member of the coronavirus family, it is still a newly emerging pathogenic virus that the population has not previously encountered and therefore humans do not appear to have protective immunity. Coronaviruses are enveloped, positive single-stranded RNA viruses which have higher mutation rates than DNA viruses, making vaccine development more challenging. One of the unique attributes of this virus compared to other coronaviruses is the introduction of a cleavage site known to increase transmissibility and potentially pathogenicity. The virus is transmissible by air droplets from an infected person and can remain infectious up to 3 days on certain surfaces. Dissolving the lipid (fatty) envelope by washing hands with soap and water or using high percentage alcohol hand sanitisers leaves it no longer infectious.

Whilst the true origin of the SARS-CoV-2 is controversial, a paper published in Nature Medicine in 2015 demonstrates the work conducted on engineering a virus with proteins from a coronavirus found in horseshoe bats in China, with the backbone of a coronavirus that causes human-like SARS in mice. This would mean that coronaviruses found in bat species would be able to jump into humans without the need of an intermediate host. This kind of research is known as “gain of function”, and has led to debate on whether “gain of function” research should be allowed given the associated potential biosafety and biosecurity risks in the event of an accidental release from the laboratory to the general community.

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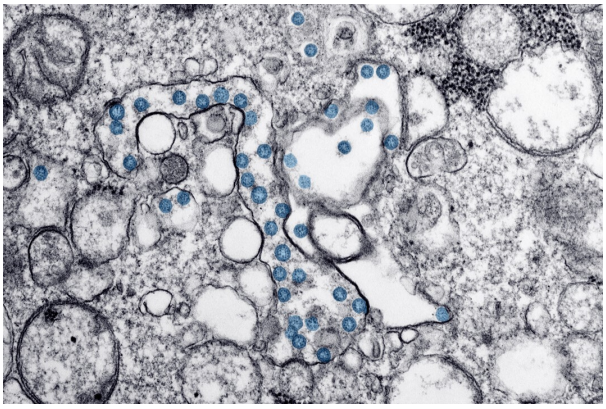
(continued from front page)

The first reported cases of SARS-CoV-2 occurred in Wuhan, China and were subsequently reported by the Chinese centre for disease control (CCDC) in November 2019 with the first human-to-human transmission reported in January 2020. Since then, the virus has spread throughout the world, being declared a pandemic in March 2020 by the World Health Organisation (WHO). To date there have been 2,655,358 confirmed cases worldwide and from the reported cases that have had an outcome, 80% of SARS-CoV-2-positive patients have recovered and 20% of these cases have resulted in death. The true numbers of infection remain unknown with the speculation that for every individual testing positive, ten others are positive but not tested (either asymptomatic or with less severe symptoms).

The mortality rate differs between countries for various reasons, the most common ones being the age of the population infected, cultural traditions, lifestyle and weather. The northern hemisphere has been more severely affected as this pandemic began during their winter months when most respiratory viruses in the community are prevalent. There are currently several active clinical trials on SARS-CoV-2 world-wide investigating the immune response to the infection, as well as therapies and vaccine development. With these clinical trials come a number of important considerations that must be addressed when biobanking samples collected during a pandemic both for current and future use after the pandemic has ceased. Biobanked samples are invaluable for further SARS-CoV-2 research, however biobanking these samples come with significant risks.

The interim recommendation of the Centres for Disease Control and Prevention (CDC) is that work being performed on SARS-CoV-2-positive samples must be done in a PC2 laboratory (minimum). Viral isolation and viral culture must be carried out in a PC3 (minimum). Some of the current considerations are that not all biobanks are set up in a PC2 laboratory and even those that are setup as PC2 may not always have staff experienced or trained in handling infectious material given many biobanks are cancer based or specific disease based. The lack of suitable equipment, such as Class II biological safety cabinets or staff who require training in handling infectious material may lead to accidental exposure resulting in SARS-CoV-2 infection. Similarly, and more concerning, is the accidental release of SARS-CoV-2 back into the community after the pandemic is over. Critical steps, detailed guidelines and standard operating procedures must be put in place for the processing and storage of all human samples collected during a pandemic. Not only SARS-CoV-2- positive samples but any human samples collected during this time or after the first reported SARS-CoV-2- positive cases, have the potential to be infectious. It is therefore important to always adhere to universal guidelines and precautions. Not following the correct guidelines and best practices can be very detrimental.

While it is essential that biobankers are vigilant during pandemics, it also provides a timely reminder that all human samples must always be treated as potentially infectious; treat samples as if they are as lethal as Ebola, have the endurance of Hepatitis B and spread like Influenza.



Transmission electron microscopic image of an isolate from the first U.S. case of COVID-19, formerly known as 2019-nCoV. The spherical viral particles, colorized blue, contain cross-section through the viral genome, seen as black dots.

Image courtesy of CDC Public Health Image Library. Content provider: CDC/Hannah A Bullock; Azaibi Tamin.

Biobanking and COVID-19 webinars

by Wayne Ng, ISBER Indo-Pacific Rim Regional Ambassador

Understanding COVID-19 by ISBER

Presented by Dr. Tristan Knight, The Hospital for Sick Children, Canada April 7, 2020

Synopsis: Beginning in December 2019, a novel coronavirus, designated SARS-COV-2, has caused what rapidly became a global pandemic. The disease caused by SARS-COV-2, which has been designated COVID-19, appears to range from asymptomatic or mild, self-limited respiratory tract illness to progressive pneumonia, acute respiratory distress syndrome (ARDS), multiorgan failure, and death. Optimal management of this condition has not yet been established, but in addition to supportive care, various combinations of glucocorticoids, tocilizumab, anti-virals, and anti-malarial agents have been utilized with varying degrees of efficacy. Importantly, there is growing evidence of heightened vulnerability in immunocompromised patients. The impact of SARS-COV-2 and COVID-19 on the biobanking world is evolving, but likely to be profound. The purpose of this presentation will therefore be to provide a rapid, comprehensive, and relevant update on the current state of COVID-19, with attention to the epidemiology, clinical presentation, and emerging therapeutic options.

Brief Speaker Biography:
Dr. Tristan Knight is originally from Calgary, and completed medical school at the Royal College of Surgeons in Ireland (RCSI). After completing his pediatrics residency at the University of Hawaii and pediatric hematology/oncology fellowship at the Children's Hospital of Michigan, he returned to Canada to undergo additional training in pediatric bone marrow transplant and cellular therapy at The Hospital for Sick Children (SickKids) in Toronto, where he is currently a sub-speciality fellow.

Link to webinar: https://www.isber.org/page/COVID-19Webinar

Biobanking in Times of COVID-19_1: Risks and Opportunities for Biobanks by BBMRI-ERIC
April 1 2020

This web conference was aimed at biobanking experts and researchers. Together, we tried to outline what our biobanking community needs during the corona crisis, what information is missing, which processes are defined and which are still yet to be defined. We are stronger together and can serve the healthcare system more efficiently if we are all moving in the same direction.

Biobanking in Times of COVID-19_2: Pre-Analytical Procedures by BBMRI-ERIC
April 7 2020

This web conference is aimed at biobanking experts and researchers. We will follow up on the open questions raised in the first web conference and, in addition, we will focus on pre-analytical procedures in the hospital and biobanking setting. "Routine processing of COVID-19 samples from the bedside to the laboratory and to the biobank" will be addressed, and we will discuss whether researchers have any "additional requirements for the sample quality", when thinking of any scientifically driven downstream analysis. Together with Lukasz Kozera, colleagues and partners from the biobanking community address your questions and we will try to give answers while incorporating your expertise.

Link for both webinars: https://www.bbmri-eric.eu/services/bbmriqm-covid

IBBL Proficiency Testing

IBBL (Integrated BioBank of Luxembourg) is an institute organised within the Luxembourg Institute of Health (LIH) and dedicated to supporting biomedical research for the benefit of patients. IBBL provide biospecimen-related services and a biobanking infrastructure for applied medical research, including the ISBER endorsed Proficiency Testing (PT) program to laboratories working with biospecimens, including biorepositories and biobanks.

Recently a group of pediatric tumour banks became the first Australian group of biobanks to take part in the IBBL PT programme. The biobanks involved were the Children's Hospital at Westmead Tumour Bank, Children's Cancer Institute Tumour Bank, Monash Children's Cancer Biobank, and the Queensland Children's Tumour Bank. The opportunity to take part in this program was made possible through an ANZ-CHOG Tour-De-Cure mini grant. The aim of participating in a PT program was to improve the consistency of biospecimens within these pediatric tumour banks and thus improve the support of childrens oncology clinical trials across Australia as provided by these biobanks.

Quality assurance (QA) forms an essential part of biobanking practice as it is only high quality human samples that can provide accurate and reproducible research results thus maximising the productivity of translational research. Multiple biobanks within a network participating in a QA programme together is deemed beneficial, especially in the paediatric field due to the rarity of childhood diseases and small specimen volumes involved.

A detailed report of the outcomes from this group experience of participation in the IBBL PT program will be presented in the May 2020 Bio-Babble.

ANZCHOG Biobanking Network

Coming Soon - ISBER 2020 Online

WHY?
Global leaders were set to converge in April, 2020 at the largest international biobank conference, the ISBER 2020 Annual Meeting & Exhibits, to address the impact of biobanks on science and how the related discoveries are establishing a roadmap to extend our knowledge network. Unfortunately, due SARS-Cov-2 (COVID-19) this meeting was cancelled.

ISBER is proud to announce that we will be hosting the sessions planned to take place in Anaheim as a series of webinars. All sessions will be held as live, interactive sessions.

The schedule has been built with flexibility in mind:

- Webinars dispersed over several months
- Each session is limited to 60 - 90 minutes in length
- Live sessions recorded and available for on-demand viewing post event
- Register for the series or single events!

WHEN?
The sessions will be held from May to December, 2020.
The preliminary program and registration will be available soon!
Check www.isber.org for updates.

ANAHEIM, CA, USA
isber2020

If you have any suggestions for a short article for Bio-Babble, please contact : abna.biobabble@gmail.com

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