Biobanking in a Pandemic: Lessons Learned

The central tenets of biobanking – data/sample collection, processing, storage, and providing access for researchers – have proven indispensable throughout the COVID-19 pandemic. Even before the virus was properly characterised and defined as a coronavirus with a similar morphology to MERS and SARS, biobanks were leveraged for the storage of bronchoalveolar lavage fluids from patients with the as-yet unknown strain of viral pneumonia.

Researchers across the globe accelerated their efforts to decode the genome of the novel coronavirus and to make data available to the global scientific community. Thanks to the availability of a limited number of high quality specimens and the tireless work of a small group of researchers, many of them in the UK, the viral genome was quickly sequenced and the virus characterised as SARS-CoV-2. Thereafter, the World Health Organisation (WHO) declared the outbreak a pandemic.

Over a year later we can begin to reflect on lessons learned, including the importance of effective biobanking and sample handling in any future pandemic.

Effective Sample Handling

The rapid sequencing of SARS-CoV-2 was accomplished using a relatively restricted number of samples and therefore only characterized a small subset of the viral strains in circulation.

The quality and traceability of samples was thus of the utmost importance, and though sample quality should already be a hallmark of biobanks, without having that principle ingrained in the sample handling workflow, COVID-19 research would have been hindered significantly with potentially fatal consequences.

Challenges in Biobanking Capabilities

The size of the pandemic presented a unique issue to biobanking in that, after the initial outbreak phase, vast quantities of sample material were anticipated. With as many as 2 million confirmed cases worldwide by mid-April, academic and biopharmaceutical biobanks alike were inundated with samples involved in

the development of new diagnostic test kits and potential vaccines. A hurdle to the success of these initiatives was that few biobanks were experienced in the handling of highly pathogenic viruses, often lacking the necessary containment. In future, the receiving biobanks will be much better positioned to deal with samples emanating from a potential pandemic virus.

International cooperation and transparency were key to overcoming these obstacles, with the Centre for Disease Control (CDC) in Atlanta, USA, the International Atomic Energy Authority in Vienna (on behalf of the United Nations), and Public Health England at Colindale, UK, quickly publishing guidelines for handling and testing COVID-19 samples. Additionally, scientific publications were quick to disseminate articles relating to SARS-CoV-2 and biobanking, putting extremely valuable information in the hands of biobankers.

What Does the Future Hold for Biobanking?

Some biobanks have been forced to reduce existing activities as many clinical efforts have stuttered to a halt while the scientific community rallies to defeat COVID-19. One key question that remains is which biobanks will return to pre-COVID levels of activity once the overwhelming demand for SARS-CoV-2 samples eventually reduces?

Many commentators think that it is now inevitable that another viral pandemic will arise in the next 10 years and in that situation, biobanks will be much better prepared to cope with the bio-sampling necessary to support the development of new vaccines and treatments. Access to the genomes of many individuals from different geographies, races and socio-economic backgrounds will allow us to more fully understand the impact of future viral diseases on closely targeted segments of the population much more quickly than before. By making this data available to epidemiologists more quickly and precisely, we will be able to track the spread of the disease more efficiently and through that, to control it more effectively. In this, the role of biobanks will be key to success.

Read our recent article to learn more about biobanking and the future of sample handling. Or, contact a member of the Ziath team today if you have any queries.