

Pathogens of pandemic potential: virology and bacteriology

There is now widespread agreement on the most likely cause of future pandemics, but the list of pathogens of pandemic potential is long. Expertise in each of these pathogens is needed to ensure rapid development of therapeutics.

Pathogens of highest concern include influenza, coronaviruses and paramyxoviruses, while many other viral families and a limited number of bacteria could potentially cause a pandemic. Amongst bacteria, antimicrobial resistance is a major concern, especially for some bacteria with very limited therapeutic options.

The Doherty Institute and University of Melbourne are at the forefront of the response to infectious diseases particular expertise and critical mass for the study of respiratory viruses (including, but not limited to influenza and coronaviruses), human retroviruses (HIV and HTLV-1), viral hepatitis, paramyxoviruses, arboviruses (including flaviviruses such as West Nile virus, Zika virus, Dengue, Japanese Encephalitis virus), DNA viruses (including pox and herpesviruses), and avian influenza. In addition there is a large multi-disciplinary program focused on AMR. The research is supported by state-of-the-art capabilities and facilities including PC3 and PC4 high containment laboratories, an animal facility in PC3 high containment, access to extensive biobanking of pathogens and well characterised human cohorts, advanced imaging including electron microscopy (EM) and cryoEM, as well as recent investment in organoid platforms and humanised mouse models. Our critical mass of virologists work closely with immunologists, structural biologists, engineers, clinicians and microbiologists.

Access to relevant clinical samples is enabled through close clinical collaborators at the Royal Melbourne and Austin Hospitals, as well as national programs such as the Australian Partnership for Preparedness Research on Infectious Disease Emergencies (APPRISE) and the National Centre for Antimicrobial Stewardship (NCAS).

University of Melbourne is seeking new researchers at academic Level C-D who can join in and benefit from the developing critical mass of research talent and facilities for infectious disease and pathogens of pandemic potential. We are seeking researchers with demonstrated expertise to build an internationally competitive research program in:

- Basic and translational virology in emerging viral infections
- Basic and translational virology in influenza, coronaviruses, paramyxoviruses and pathogens of high consequence to Australia and the region, specifically Japanese Encephalitis and Murray Valley Encephalitis and other vector borne diseases.
- Basic and translational bacteriology, as relevant for AMR
- Antimicrobial drug discovery and development
- Genomics, bioinformatics and metagenomics
- Mechanisms and pathogenesis of antimicrobial resistance

