Infectious Diseases Labs

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# A/Prof Cornelia Landersdorfer

Drug Delivery, Disposition and Dynamics,
Monash Institute of Pharmaceutical Sciences,
Monash University, Melbourne, Australia

**Wednesday 24th Sep 2025**
3:00 PM to 4:00 PM (SGT)

**Venue:** Cistron A & B, Matrix Level 5

## Understanding interactions between bacteria, antibiotic and patient: towards model-informed personalised therapy

Antimicrobial resistance can emerge rapidly, even against recently approved antibiotic compounds, when they are administered to patients in non-optimised dosing regimens. Therefore, it is important to develop novel approaches that inform the rational selection of antibiotic dosing regimens, in monotherapy and combinations, and account for patient factors and bacterial characteristics, to maximise bacterial killing, minimise resistance emergence and translate optimised regimens to the clinic.

Well-designed dynamic in vitro infection models combined with latest data analysis and pharmacokinetic/pharmacodynamic modelling approaches enable us to evaluate a range of antibiotic dosing regimens and inform the selection of those most likely to be successful in patients, for clinical trials during pre-registration development and routine use of the antibiotic after registration. The dynamic in vitro studies expose bacterial pathogens to the concentration-time profiles of one or multiple antibiotics that are observed in patients following administration of relevant dosing regimens. They allow us to frequently quantify the total and resistant bacterial counts, as well as genomic, transcriptomic and metabolomic changes in response to treatment.

Mechanism-based and quantitative and systems pharmacology models that are developed based on the data generated in dynamic in vitro infection models contribute to a better understanding of the interplay of interactions between the pathogen, antibiotic and patient. They can be used to quantify the effect of certain bacterial and patient factors on the bacterial response to treatment. When combined with population pharmacokinetic models for the patient population of interest, they can be used to predict likely treatment outcomes and support the clinical translation of optimised dosing regimens.

**A/Prof Cornelia Landersdorfer**, PhD, is an Associate Professor at the Monash Institute of Pharmaceutical Sciences, Monash University in Melbourne. She trained in clinical PK studies, bioanalysis, PK/PD modelling and microbiological studies in Germany, Australia and the USA. She leads a research group that integrates dynamic in vitro infection experiments with 'omics studies and quantitative and systems pharmacology modelling to understand the interactions between bacteria and antibacterial compounds, and optimise dosing of antibiotics and other drugs. Her group performs the design and analysis of clinical and preclinical population PK studies for small and large molecules and novel dosage forms.

She is the Scientific Director of the Monash-Moderna Quantitative Pharmacology Accelerator (MMQPA), a 5-year initiative which is focused on driving advancements in mRNA medicines and includes a postdoctoral training program. She has 150 peer-reviewed publications and received the Georgina Sweet Award for Women in Quantitative Biomedical Sciences (2018), the Future Leader Award (2016) and Research Impact Award (2020) in the Faculty of Pharmacy and Pharmaceutical Sciences (#2 worldwide, QS world ranking), a 2022 Australian Award for University Teaching, and the 2023 Monash Graduate Supervisor of the Year award.

Her research is supported by the Australian National Health and Medical Research Council, the National Institutes of Health (NIH) and pharmaceutical industry, and has impacted on dosing guidelines and patient therapy internationally.

**Hosted by: Dr Matthew Tay**

**Seminar is open to all. No registration required.**

Questions? Contact us at **seminars@idlabs.a-star.edu.sg**

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