“Measuring resilience during recovery from infections.”

Abstract:

Infections push our physiology out of place, and to recover, we must bring each of these systems back to their original healthy state. We are developing methods to quantitatively measure and then mathematically model this process. We started doing this using a fruit fly model, where we study the dose response curve of health to microbe loads, which the field calls “disease tolerance”. We are now developing an approach to apply this sort of thinking to individual patients, modelling this using a *Plasmodium chabaudi* infections in mice. Here, we study the resilience of the system measuring how the system is displaced and then returns to health. Our approach is to infect mice and then observe them deeply, by following their respiration, eating, drinking and moving rates, their circulating immune cells and cytokines as well as their circulating metabolome. We are particularly excited about changes in the metabolome as we see sweeping changes in circulating metabolites and can link these to changes in behaviour. Several of these metabolites are expected to modulate the health of the animal and we are currently determining which are necessary and sufficient for recovery.