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Dynamics of a CD4$^+$ T cell immune response model and calibration to LCMV infection data

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Abstract

In this talk, I will present an ordinary differential equation (ODE) model of immune response dynamics describing the behaviour of CD4$^+$ T cells, regulatory T cells (Tregs) and interleukine-2 cytokine (IL-2) density where regulatory T cells inhibit interleukine-2 secretion. I will succinctly describe some qualitative features of the model such as time evolution, equilibria and bifurcations. I will then fit the model to data reporting the CD4$^+$ T cell numbers from the 28 days following the infection of mice with *lymphocytic choriomeningitis virus* (LCMV). The data consist of two time series of the T

cell responses to the gp61 and NP309 epitopes of the disease. We observed the proliferation of T cells and, to a lower extent, Tregs during the immune activation phase following infection and subsequently, during the contraction phase, a smooth transition from faster to slower death rates. In this way we have that the ODE model was able to be calibrated thus providing a quantitative description of the data.

Keywords: ODE, Immune response, T-cells.

References

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