**Agent based modeling of the germinal center**

Mathematical modeling plays an increasing role in biological sciences.

Partly because computers make it possible to tackle computational problems

that are impossible to solve 'by hand', partly because computational

techniques are relatively cheap compared to 'wet' experiments and usually

do not face the practical and ethical issues sometimes involved with research

on real subjects. In this project you will venture into a less well known

branch of mathematical modeling, agent based modeling. You will use the

program NetLogo to extend an existing agent based model of the germinal

center. This structure plays a major role in the adaptive immune system

as it is the place were B cells increase their affinity for antigen. The

existing program models the maturation of B cells against an HIV antigen.

In this model we made a number of assumptions. The project involves

examining the consequences of these assumptions for the maturation of

the B cells.

**Technical skills / methods**

To do this project, it helps if you have some programming experience.

During the project the student will learn to:

- translate a biological problem into a mathematical model

- Learn to apply agent based modeling

- interpret and present the results from the mathematical model

Timespan: 8 weeks project and 4 weeks reporting

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