

Dear NIMBioS team

Herewith I report that I were participating the NIMBioS program for short-term visits from May 22nd till May 25th 2015. During this time I had meetings with NIMBioS members Vitaly Ganusov and Colleen B. Jonsson, as well as the meeting with Mike Simpson, the director of JIBS.

In my communication with Professor Ganusov we focused the most on choosing an appropriate model for kinetics of Simian Immunodeficient infection of monkeys, the most commonly used animal model to study HIV infection. Recent work showed that out of many viral clones present in the donor, only few of these are transferred into a recipient host (either human or monkey) during primary infection. Professor Ganusov stated a question whether difference in expansion between different clones was due to their unequal virulence or due to their unequal ability to proliferate. In order to reveal this we first needed to select a model formalizing the process of infection and virus expansion. After rejecting several deterministic models, we concluded that a top-priority model should be stochastic and should describe proliferation of each HIV clone as an independent continuous time Markov chain.

I hope that this model will lead to better understanding of the very early stages of HIV infection kinetic. I am not aware of plans of Professor Ganusov on publishing these ideas. Nevertheless, if at some point he decides to publish a work on HIV infection kinetics, I will be glad to know that my humble contribution promoted that publication.

In addition, I met Professor Michael Simpson (University of Tennessee, Department of Materials Science and Engineering), with whom I discussed my model of proliferation of two cell populations that compete to each other for limited inflow of nutrients. Comments on my model that I got during this discussion were valuable and useful for further work; I truly appreciate them and I am grateful to Professor Simpson for his attention and for his aspiration for help.

I also truly enjoyed meeting Professor Jonsson and discussing with her viral infections of immune system.

I thank entire NIMBioS team very much for their hospitality and for provided opportunity to share my ideas with experts in mathematical biology.

Yours sincerely

Alex Surnov