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Modeling the repulsion effect by infected cells on virius spread

In this talk, we present a mathematical model to describe the repulsion effect by infected cells on spread of virions. The model turns out to be a reaction diffusion system where the diffusion of virions depends not only on its concentration gradient but also on the concentration of infected cells. The basic reproductive ratio, linear stability of steady states, existence of traveling wave solutions for the model are discussed. We show that virus particles spread more rapidly with the repulsion effect by infected cells than with random diffusion only. We observe that for this model, the spreading speed of free virus is not consistent with the minimal traveling wave speed.

This is a joint work with Professor Xingfu Zou.