Modeling of T-Cell polarization

Ivan Hornak[1] and Heiko Rieger

[1]*Theoretical Physics, Saarland University, Germany*

The polarization of T-Cell is a key part of many fundamental biological processes. It takes place during the destruction of the target cell by T-Cell, and, therefore, it is one of the primary processes of the immune system. The polarization was experimentally observed, but its inner dynamics and key features remained poorly understood. We developed a physical model of microtubules and their organizing center that is able to realistically simulate the rotation of the microtubule structure and repositioning of the microtubule organizing centre towards the immunological synapse. The output of the model is in compliance with the experimental observations. We use the model to clarify rudimentary aspects of the repositioning, such as biphasic movement of the centrosome. The model is also used for parameter estimation.