BP 14: Chemotaxis

Time: Tuesday 14:30–15:15 Location: H44

BP 14.1 Tue 14:30 H44

Chemotaxis of Sperm Cells — •Benjamin Friedrich and Frank Jülicher — Max-Planck-Institute for the Physics of Complex Systems, Nöthnitzer Straße 38, Dresden

Sperm cells swim towards the egg propelled by a flagellum which beats regularly. In many species sperm show chemotaxis, i.e. they move upwards a gradient of chemoattractant molecules released by the egg. Based on recent experiments on sea urchin sperm which indicate that the geometry of swimming trajectories is controlled by a signaling system in the sperm flagellum [1], we present a theoretical description of sperm chemotaxis. We discuss swimming trajectories in two and three dimensions in the presence of a chemoattractant source. From this discussion, we derive the necessary properties of the signaling system which ensure reliable motion towards the source.

[1] B. Kaupp *et al.*: NCB **5**,109 (2003)

BP 14.2 Tue 14:45 H44

Cytoskeletal dynamics in response to complex temporal signals — •Carsten Beta[1], Hellen Ishikawa[2], Till Bretschneider[2], Günther Gerisch[2], and Eberhard Bodenschatz[1] — [1]MPI for Dynamics and Self-Organization, Göttingen, Germany — [2]MPI of Biochemistry, Martinsried, Germany

Understanding of cytoskeletal dynamics has seen a rapid advance through the use of fluorescent fusion proteins. Further progress in this field relies on experimental techniques to stimulate single cells with high temporal resolution. We combine microfluidic techniques with the photo-chemical release of caged signaling agents to expose cells to well-defined stimuli with changing temporal patterns. We apply this approach to quantify intracellular translocation of various fluorescently labeled cytoskeletal proteins in chemotactic *Dictyostelium* cells responding to complex temporal stimuli with cAMP.

BP 14.3 Tue 15:00 H44

Intracellular dynamics during directional sensing of chemotactic cells — •Gabriel Amselem, Eberhard Bodenschatz, and Carsten Beta — MPI for Dynamics and Self-Organization, Göttingen, Germany

We use an experimental approach based on the photo-chemical release of signaling molecules in microfluidic environments to expose chemotactic cells to well controlled chemoattractant stimuli. We apply this technique to study intracellular translocation of fluorescently labeled PH-domain proteins in the social ameba *Dictyostelium discoideum*. Single chemotactic *Dictyostelium* cells are exposed to localized, well defined gradients in the chemoattractant cAMP and their translocation response is quantified as a function of the external gradient.