African Trypanosomes as model system for functional analyses of microbial motility

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The locomotion of microorganisms in a microscopic world, where cells move through a fluid environment without using inertial forces, is a fascinating phenomenon in life science. Nature offers clever and inspiring strategies for self-propelling in an environment of no inertia. The flagellate African trypanosome, which causes African sleeping sickness, moves with help of a flagellum, which is firmly attached to its cell body. The beating flagellum leads to a strong distortion of the cell body and therefore to a swimming agitation of trypanosomes. We have found that trypanosomes use a hydrodynamic mechanism to defend against host's immune attacks. Owing to continuous and directional swimming, host-derived antibodies attached to surface glycoproteins of the cell are dragged to the posterior cell pole, where they are rapidly internalized and destroyed. In the following we present new methodology and techniques to quantify the movements of proteins and the motility of cells. Moreover trypanosome motility schemes and their influence on cellular lifestyle and survival strategies are characterized.

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