



LABORATORY OF

CELL MOTILITY

Cytoskeleton, trypanosome flagellum, mammalian cilium, processes of flagellum formation

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Our research focuses on the eukaryotic flagellum and cilium, fascinating organelles with motility, sensory and signalling functions. Malfunctions of these organelles in humans cause pleiotropic diseases collectively called ciliopathies. There is little understanding of how these complex organelles with a highly organized cytoskeleton are formed. We leverage the unique experimental tractability of parasitic flagellate *Trypanosoma brucei* to identify proteins involved in the processes of flagellum formation and length regulation.

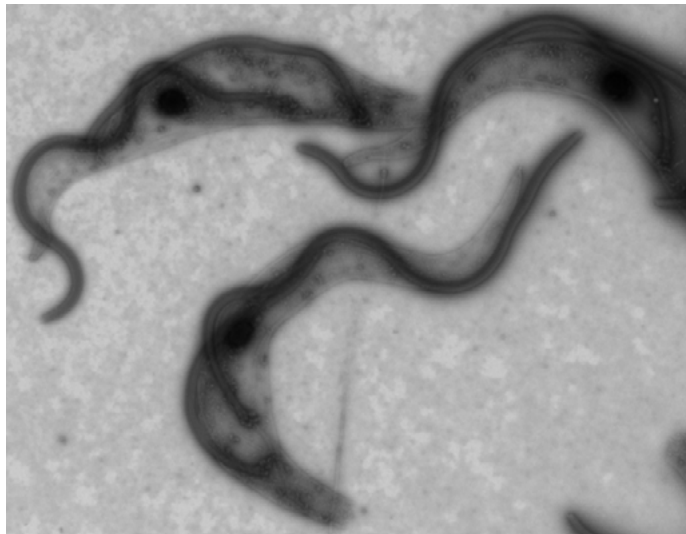


Figure 1. A transmission electron microscopy image of detergent-extracted whole-mount negatively stained cells of *Trypanosoma brucei*. [Image taken by Miroslava Šedinová]

To gain an insight into the activities of the identified proteins, we employ a broad range of molecular biology, biochemistry, and advanced light and electron microscopy approaches. Taking advantage of the high degree of evolutionary conservation of the cilia, we search for mammalian orthologues of the *T. brucei* proteins and study those in mammalian models. We believe that understanding the processes of the flagellum formation will be informative as to the causes of individual ciliopathies.

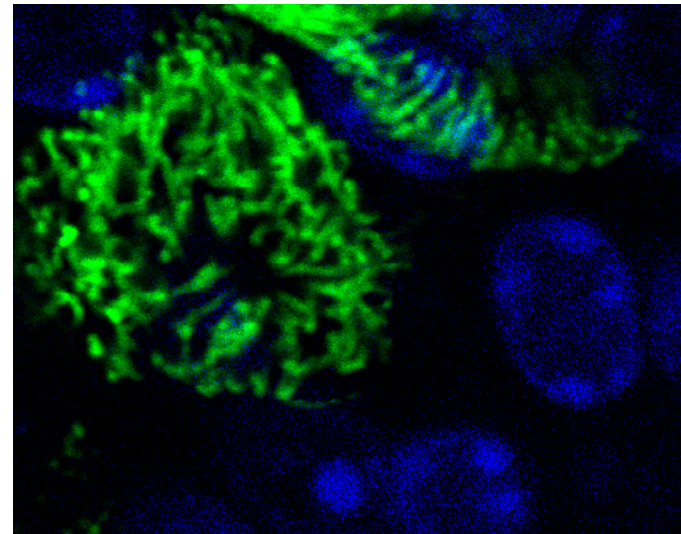


Figure 2. A fluorescence microscopy image of multiciliated tracheal epithelial cells. Cilia in green, cell nuclei in blue. [Image taken by Peter Gorilák]

Selected publications:

1. [Varga V*](#), Moreira-Leite F, Portman N, Gull K* [2017] Protein diversity in discrete structures at the distal tip of the trypanosome flagellum. *Proc Natl Acad Sci USA* **114**:E6546-E6555.
2. Abeywickrema M, [Vachova H](#), Farr H, Mohr T, Wheeler R, Lai D, Vaughan S, Gull K, Sunter J*, [Varga V*](#) [2019]. Non-equivalence in old- and new-flagellum daughter cells of a proliferative division in *Trypanosoma brucei*. *Mol Microbiol* **112**:1024-1040.



In the picture: 1. Pružincová Martina | 2. Varga Vladimír | 3. Váchová Hana | 4. Štěpánek Luděk | 5. Alquicer Barrera Glenda Paola