

STSM Scientific Report

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STSM Topic: Development of a computer assisted flagella shape analyzer adapted to specificities of fish sperm motility

Purpose of the STSM:

- Provide a negotiating platform to support the collaborative work between the Laboratory Reproductive Physiology, USB RIFCH, Vodnany, Czech Republic and Proiser R+D S.L., Valencia, Spain on the development of a computer assisted automatic analysis of flagella wave shape of fish spermatozoa.

Description of the work done and the main results:

During my stay in Proiser Company together with colleagues we were discussing about possible options for automatic analysis and data extraction of sperm flagella parameters from high-speed video records. Finally, we have defined development stages of an automatic analyzer for evaluation of flagella wave shape in spermatozoa while swimming. For a start, among variety of videos showing sperm flagellar movement the scallop pattern was chosen as a model due to its relatively sine waves and planar propagation. Primarily the movie background was cleaned from noises, which cause harmful interference for the efficient detection of flagella. Thereafter we focused on automatic tracing of the flagella and changes in its beat patterns over the motion. Eventually, we proceeded to our main ideas of extraction of flagella wave parameters and started to examine successive fragments along sperm flagella to determine the bending points for drawing the reference line. Also to evaluate angular characteristics we decided to apply circle fitting on flagella bend curvatures, the algorithm of which is still under development. Apart from it, I had an opportunity to record with high-speed camera several species of mammalian (dog, goat, pig, rabbit etc) sperm.

Future collaboration with host institution:

Due to the present COST action we have actually started our long term cooperative work on the development of a computer assisted automatic analyzer of sperm flagella movement. Consequently as a valuable outcome from our research collaboration we expect to create a fully automatic system for sperm flagella analysis adapted for different animal species.

Confirmation by the host institution:

Prof. Carles Soler hereby confirms that Ms. Galina Prokopchuk visited the company Proiser R+D, S.L. and the Department of Functional Biology and Physical Anthropology of the Valencia University from March 24th to April 4th 2014.



Signed: Prof. Carles Soler



Signed: Galina Prokopchuk, M.Sc.