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**Simplifying sperm motility analysis in fishes: comparing commercial and free CASA approaches**

Computer-Assisted Sperm Analysis (CASA) is a method intensively used in medicine and reproductive biology studies. It is obvious that to be reliable for sperm biology studies, this method should provide objective and precise information on the kinetics of sperm cells. Numerous commercial systems were developed to achieve this requirement, and nowadays, they are widely used in studies. These systems incorporate appropriate quality videomicroscopy sets with specifically designed software, which in combination makes the expensive commercial product. These kinds of systems usually mask video analysis algorithms, complicating their adaptation to specific research requests. That is important for fish spermatology study because of the taxa-specific properties of sperm motility in fishes. At the same time, there is open-access software that allows the evaluation of sperm kinetic parameters, providing fool spectrum of possibilities for detailed analysis of individual spermatozoon movement. The latter type of system also allows the automated analysis of significant numbers of video records simultaneously. Moreover, it enormously reduces the price of analysis.

The present study will compare outputs from commercial CASA systems and smartphone-based videomicroscopy followed by sperm motility analysis by open-source software. The study will be performed using a microscope that is part of a commercial product called ISAS from Proiser, Spain, and a more commonly used microscope with several different adapters which allow connection to a smartphone or simple digital camera. A commercial semi-medical adapter to a smartphone, which makes it possible to make a video record of sperm suspension, will be tested.

We will use fresh and cryopreserved sperm from common carp (*Cyprinus carpio*) as the object for video records and analysis. Samples will be video-recorded using a digital camera coupled with a negative phase-contrast microscope or by a specific adapter by smartphone. Video records will be analyzed using the two different CASA systems, Proiser ISAS and open-source CASA plugins for ImageJ. The data will be statistically analyzed to compare these two video analysis approaches.

This summer school project is oriented toward students interested in the first steps of sperm motility analysis, especially by not expensive but scientifically robust approach.