LMU KLINIKUM
Klinik und Poliklinik für
Frauenheilkunde und Geburtshilfe

BIOspire

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Call for research project/thesis for post-graduate students (Master level)

Validation of 3D images of single human spermatozoa through fluorescent staining

Approximately 1 in 6 couples nowadays faces infertility issues. In these cases, 40% of them are classified as male-factor infertility patients. Current diagnostic and treatment options are quite limited for men. The conventional sperm analysis evaluates external characteristics such as sperm morphology and motility patterns. By the time of assisted reproduction intervention (intracytoplasmic injection of a single sperm to an oocyte), sperm are selected only based on external characteristics. Despite the newest methods, the success rates of achieving a live birth still remains relatively low (~35%).

The aim of this project is to utilize state-of-the-art technology to visualize single human spermatozoa at the sub-cellular level. For this, the patented 3D imaging lens-free microscope BIOspire will be used to take 3D images of sperm. The sperm will be then stained with fluorescent dyes for assessing the fragmentation status of the nucleus. The 3D images will be then compared with the staining images for each sperm to examine the correlation between the two imaging methods. The long-term aim of this project is to be able to predict the fragmentation status of the sperm using only the 3D microscope. The 3D microscope could be then used by embryologists to select in real-time the best sperm for oocyte injection.

The experiment will include a minimum of 100 sperm samples and the student will carry it out in the facilities of LMU Andrology Lab (Campus GH and INN). The student will conduct innovative research, be trained in laboratory techniques for staining and fluorescence microscopy with the possibility of short-term training in sperm preparation techniques and introduction into the clinical environment of assisted reproduction laboratories. Additionally, the student will be trained into using imaging software and to perform basic statistics. Any future use of this projects' results in oral presentations or publications will be properly acknowledged either as authorship or under the acknowledgements section depending on the amount of useful data.

The completion of the thesis (practical and drafting part) will be under the shared supervision and responsibility of the BIOspire team members Rahmetullah Varol (MSc, Co-Founder at BIOspire) and Tülay Aydın (MSc, Co-Founder at BIOspire) and Dr. Dimitra Makri (PhD, Embryologist and Deputy Head of Andrology Lab, LMU IVF clinic) as well as the collaborating department. The duration is estimated to be approximately 3-6 months.

For further clarifications and applications please use the following contact information:

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We look forward to a successful collaboration for the completion of this project.