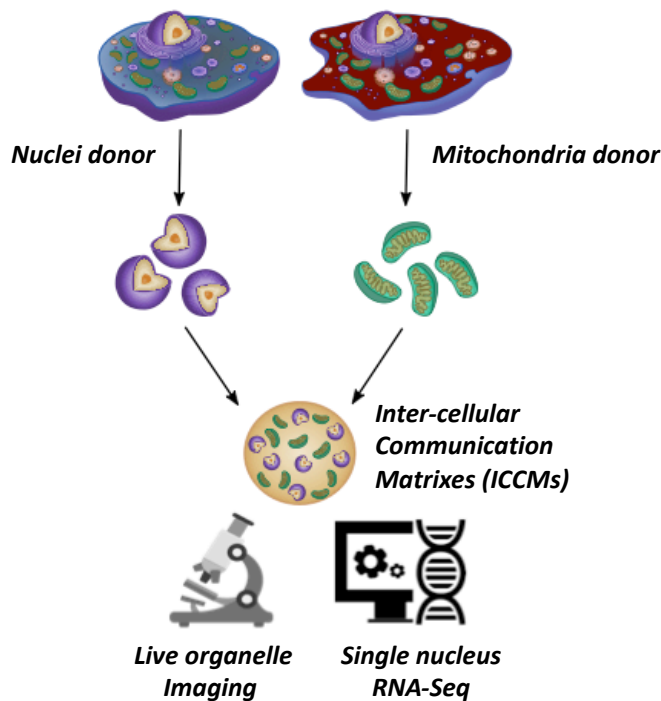


Title of the research project: Unravelling the code of mitochondrial-nuclear communication

PI: Prof. Konstantinos Lefkimiatis

Background:

Communication between mitochondria and nucleus is crucial for the functional integration of these organelles to the host cells' needs. However, our understanding of the pathways involved in this process, and their downstream effects remains limited. A major obstacle in the study of mitochondria-nuclear communication is represented by the high complexity of the signalling environment where these events take place. To overcome this obstacle and eliminate the interference of unrelated signals this project aims to develop an in vitro model for the study of nuclear-mitochondria communication and its functional effects.



The PhD candidate will be engaged in the studies of mitochondrial and nuclear signaling and function. He/She develop synthetic matrixes for optimal mitochondria-nuclear communication and will verify the signalling status of isolated organelles enclosed in different matrixes. Mitochondria and nuclei, expressing FRET-based sensors for the measurement of several signalling parameters, will be seeded in different synthetic matrixes and their viability and signalling integrity tested using “live organelle” measurements (ATP production, Ca^{2+} uptake, kinase activity) and compared to the signalling of intracellular organelles. In addition, the PhD candidate will study the mitochondria-triggered signalling cascades responsible for the

transcriptional signatures identified by single nucleus RNAseq experiments.

Techniques: Real-time live cell and organelle imaging, cell culture, Nucleic acid isolation, confocal microscopy, transcriptome analysis, gene silencing, western blotting.