



## Open position for the LSM call of applications

**Department/Institute:** LMU Munich, Faculty of Biology, Department of Cell Biology

**Subject areas/Research fields:** Cell Biology, Biochemistry

**Keywords:** mitochondria, Hsp70 chaperones, protein import, protein folding

**Name of supervisor:** Dr. Dejana Mokranjac

**Funding:** LSM-CSC/DAAD-GSSP (LSM)

**Project title:** Understanding the unique features of the mitochondrial Hsp70 system that mediate translocation and folding of proteins

### **Project description:**

Heat shock protein 70s (Hsp70s) represent a conserved family of molecular chaperones involved in a plethora of cellular processes ranging from folding of newly synthesized proteins and prevention of their aggregation over translocation of proteins across cellular membranes and assembly/disassembly of protein complexes to protein degradation. All these diverse functions of Hsp70s rely on their ability to reversibly bind to substrate proteins via their C-terminal domain in a reaction regulated by the nucleotide bound to their N-terminal domain. Progression through the ATP hydrolysis driven cycles of Hsp70 chaperones is typically regulated by two types of co-chaperones, J-proteins that stimulate the ATPase activity of Hsp70s and thereby enable substrate binding and nucleotide-exchange factors that release ADP molecules and thereby enable binding of a new molecule of ATP and substrate release. In mitochondria, a member of the Hsp70 family, mitochondrial Hsp70, plays an essential role in translocation of proteins across two mitochondrial membranes and in subsequent folding of proteins. In humans, mtHsp70, also

known as mortalin, is implicated in cancer and neurodegeneration. MtHsp70 is a peculiar member of the Hsp70 family as its function requires help of cochaperones not present elsewhere. First, mtHsp70 is recruited to the translocation site by Tim44, a peripheral membrane protein. Second, a J-protein is not sufficient for the stimulation of the ATPase activity of mtHsp70 during translocation of proteins but rather a complex of a J- and a J-like protein is required. Third, mtHsp70 is itself an aggregation-prone protein and its aggregation is prevented by a dedicated chaperone Hep1.

We love proteins and we love yeast so here, we will combine biochemistry with AI structural predictions, yeast genetics and cell biology to obtain molecular understanding of these unique features of the mtHsp70 system that mediate translocation and folding of proteins.

**References:** Mokranjac D. (2020) How to get to the other side of the mitochondrial inner membrane – the protein import motor. Biol. Chem. 401(6-7):723-736

**For further information, please contact:** Dr. Dejana Mokranjac, e-mail: [mokranjac@bio.lmu.de](mailto:mokranjac@bio.lmu.de)

**Research group website:**

[https://www.cellbiology.bio.lmu.de/research\\_groups/mokranjac/index.html](https://www.cellbiology.bio.lmu.de/research_groups/mokranjac/index.html)

**Apply:** Please send your application through the [online portal](#) of the Graduate School Life Science Munich (LSM)

