

Biomolecules in vivo – from the test tube into the cell

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For more info: <https://www.biopc.ruhr-uni-bochum.de/bpc/index.html.en>

Most biopolymers like proteins, DNA, and RNA molecules function inside the cell. However, biochemical assays and analytical tools are mainly applied *in vitro*, in aqueous buffer solutions or crystals. We are interested in studying biomolecular structure, function and aggregation directly in cellular environments to yield new insight on their function in health and disease. To analyze biomolecular reactions *in vivo* with high spatio-temporal resolution, we developed novel in-cell spectroscopic and microscopic techniques that range from temperature-induced relaxation to single molecule spectroscopy. We apply the methods in environments of increasing complexity ranging from cytomimetic media and bacteria to (neuronal) cells and multicellular organisms (**Figure 1**). Our current research interest lies in the field of neurodegenerative diseases as well as bona/cartilage malformations and disordered hormone metabolisms based on impaired sulfation pathways. In this hands-on module, you will be introduced to the problem of protein misfolding and aggregation in human health as well as to the microscopy tools used by our lab to investigate such problem inside living cells and model organisms.

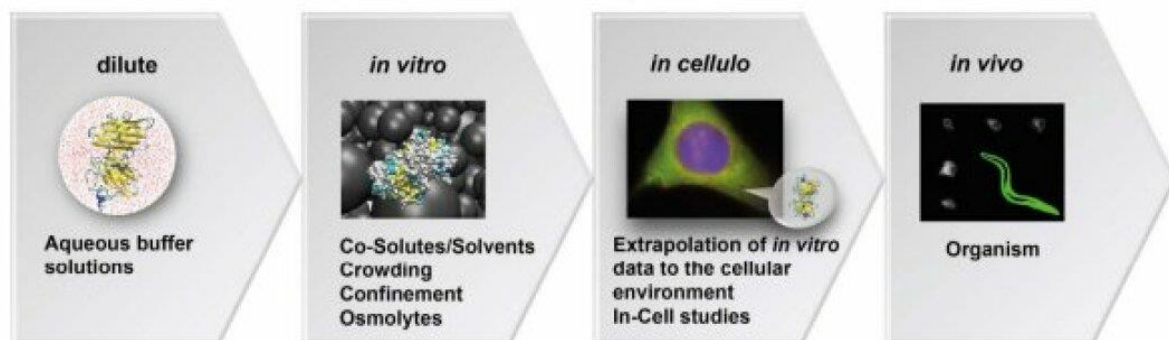


Figure 1: Investigating biomolecular reactions in environments of increased complexity.