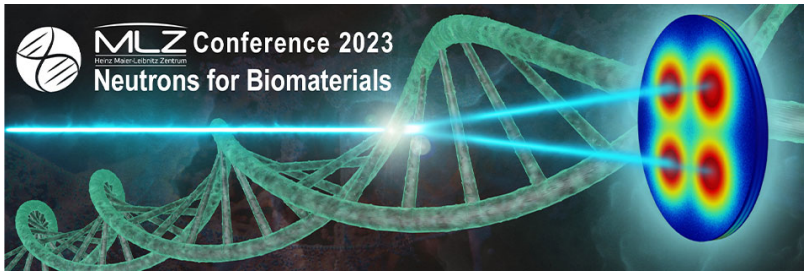

Contribution ID: **34** Type: **Poster**

Enzymes in Microemulsions or Where does an enzyme reside in a sponge?

Tuesday, 23 May 2023 17:20 (1h 10m)

The substrates of enzymes are often insoluble in water. Protein molecules, however, are usually hydrophilic. Nature overcomes this problem by compartmentalization of the cytoplasm and by generating huge interfaces between polar and apolar regions inside the different relevant organelles. For biotechnological applications an approach mimicking this compartment formation has already been successfully employed . This is the use of microemulsions being thermodynamically stable mixtures of water and oil forming nanoscale compartments stabilized by surfactants and sometimes co-surfactants.
Enzymes within a microemulsion can on the one hand be affected in their structure and function by the complex environment of the microemulsion and on the other hand, with their presence, alter the phase structure of the microemulsion and the properties of the amphiphilic interface.
We were curious how a combination of laboratory and scattering techniques makes it possible to shed light on this complex situation. We discuss the cases of two enzymes inside bicontinuous microemusions as examples: the lipase from Candida antarctica B (CalB) and the diisopropyl fluorophosphatase (DFPase) from the squid Loligo vulgaris. The time-averaged structure was determined from SANS measurements and on the nanosecond time scales the fluctuations of the amphiphilic film were probed with NSE. The results show, that adsorption/desorption mechanisms of CalB at the surfactant monolayer lead to a stiffening of the interface while in the case of DFPase the interface remains unaffected.
The approach we suggest makes it possible to comprehensively investigate the biotechnological usability of enzymes in microemulsions.

Primary authors: HOLDERER, Olaf; ENGELSKIRCHEN, Sandra (Patentanwaltskanzlei Hinkelmann); WELLERT, Stefan (TU Berlin)

Presenter: HOLDERER, Olaf

Session Classification: Poster session

Track Classification: Lipids and membranes