

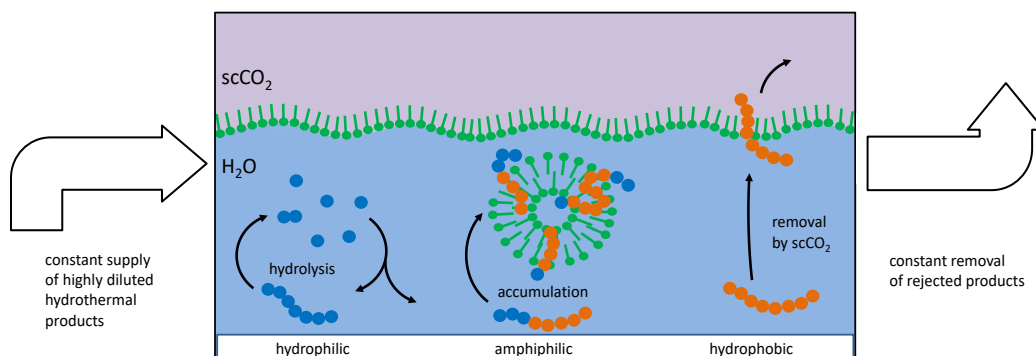
## Evolution of Prebiotic Peptides in Amphiphilic Environments

C. Mayer<sup>1\*</sup>, U. Schreiber<sup>2</sup>, M. J. Dávila<sup>2</sup>, A. Bronja<sup>3</sup>, O.J. Schmitz<sup>3</sup>

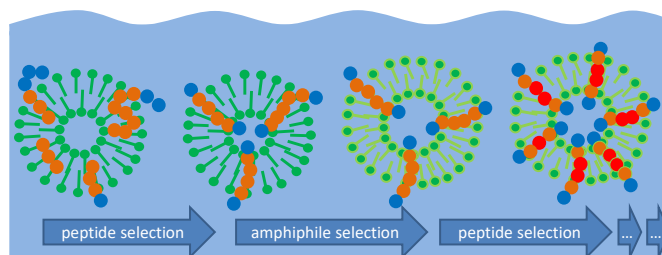
<sup>1</sup>Physical Chemistry, <sup>2</sup>Geology, <sup>3</sup>Applied Analytical Chemistry, University of Duisburg-Essen, Germany

\* [christian.mayer@uni-due.de](mailto:christian.mayer@uni-due.de)

A fundamental problem in many postulated pathways of prebiotic chemistry is the low concentration which is generally expected for interesting reactants in fluid environments. Therefore, a mechanism of selection and accumulation of relevant prebiotic compounds seems to be a crucial condition for further molecular evolution. A very efficient environment for selection and accumulation can be found in the fluid H<sub>2</sub>O/scCO<sub>2</sub> continuum circulating in tectonic fault zones. Vesicles which form periodically at a depth of approximately 1 km present a selective trap for amphiphilic molecules, especially for peptides composed of hydrophilic and hydrophobic amino acids in a suitable sequence:



Recent experiments which artificially reproduce these conditions have shown that this mechanism leads to an efficient selection and accumulation of amphiphilic peptides, the latter being formed in-situ in the same environment out of a random mixture of amino acids. The experiments are presently continued in order to follow an evolution process of the incorporated peptides as well as of the vesicles as a whole:



Altogether, the described processes lead to peptide-enriched, stabilized, and potentially functionalized vesicles which form a very potent basis for further developments such as a subsequent RNA-based evolution.

**References:** [1] Schreiber U, Locker-Grütjen O, Mayer C (2012) *Origins of Life and Evolution of Biospheres* 42: 47-54. [2] Mayer C, Schreiber U, Dávila MJ (2015) *Origins of Life and Evolution of Biospheres* 45:139-148. [3] Mayer C, Schreiber U, Dávila MJ (2017) *Life* 7:3.