Research project/Master Thesis:

Development of a stable selection platform for artificial metalloenzymes

Bioprocess Laboratory (Prof. Dr. Sven Panke)
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Starting date: flexible
Duration: at least 4 months (full time)

The field of biocatalysis is currently advancing from exploiting of natural enzyme activities to the development of artificial biocatalysts with tailor-made functions. An important stream in these recent endeavors is the development of tools that allow to expand the natural catalytic repertoire by entirely non-natural reaction mechanisms. Our group has recently developed a screening platform for artificial metalloenzymes in the periplasm of the bacterium *Escherichia coli*\(^1\,\^2\) in collaboration with the group of Prof. Thomas R. Ward (University of Basel). This system allowed for the successful implementation and directed evolution of an artificial metathase with versatile properties in the context of a whole-cell setup\(^1\). In order to improve this system it would be highly desirable to further increase the throughput of the periplasmic screening system and make it accessible for *in vivo* selection schemes. Important milestones in this endeavor include the improvement of periplasmic streptavidin production by application of the recently developed computational tool *RedLibs*\(^3\), the design, implementation and testing of preferably selectable metabolic routes for artificial biocatalyst reactions as well as the establishment of continuous cultivation formats, which allow stable long-term experiments under selective conditions.

We are looking for a highly motivated student from the field of biotechnology or related fields for a research project or thesis work. Different projects are available depending on the duration of stay and the planned starting date. The exact project outline may be adapted according to the student’s preferences in coordination with the direct supervisor.

Potential experimental techniques to be applied by the student include but are not limited to state-of-the-art cloning and genome engineering methods, library generation, next-generation sequencing, fluorescence measurements, flow cytometry and cell sorting as well as bioreactor cultivations with the model bacterium *Escherichia coli*.

If you are interested in working in a collaborative, international environment, please send a concise application (motivation letter, CV) to markus.jeschek@bsse.ethz.ch.

References