Das **Institut für Biochemie** lädt gemeinsam mit dem Ortsverband der **Gesellschaft Deutscher Chemiker** zu einem

K o l l o q u i u m der GDCh

Großer Hörsaal des Instituts für Biochemie

Felix-Hausdorff-Str. 4, Greifswald

Montag, d. 22. Oktober 2018, 16:15 Uhr

Prof. Dr. Miriam Agler-Rosenbaum

Leibniz-Institut für Naturstoff-Forschung und Infektionsbiologie e. V. – Hans-Knöll-Institut (HKI) Jena

spricht zum Thema:

Engineering of mediated electron transfer for microbial electrocatalysis

Abstract:
Microbial extracellular electron transfer via self-produced diffusible redox-mediators has some significant advantages over direct electron transfer pathways. Most importantly, it can enable also other microbial community partners besides the producer to engage in extracellular electron transfer and it mediates electron transfer for the entire planktonic biomass not only for a two-dimensional electrode biofilm. The latter will be an important efficiency factor when electroactive biocatalysts are employed in modified stirred tank bioreactors for biotechnological productions.
One of the most dominant and best known producers of natural redox-mediators for electron discharge to an anode is Pseudomonas aeruginosa. It was found and isolated from several wastewater treating microbial fuel cells and defined co-culture experiments showed synergistic relationships between P. aeruginosa and the fermenter Enterobacter aerogenes. Thereby, Enterobacter stimulates phenazine synthesis in P. aeruginosa and in turn uses these mediators for anaerobic respiration with the anode.
Over the past years, we investigated the phenazine-based electroactivity in P. aeruginosa and the co-culture relationship in detail. Interestingly, the electroactivity is strongly dependent on the strain of P. aeruginosa, while the co-culture stimulation is also found for other 2,3-butanediol fermenting microorganisms. However, we now know that the synergism is only partly determined by the fermentation product 2,3-butanediol and also other molecular factors are involved. We also show that environmental factors, especially oxygen, can be used to steer co-culture interaction and performance and drastically influence the phenazine production and utilization at an anode. On a molecular basis, the phenazine production is highly controlled and regulated and we deciphered strong antagonistic cross regulation of the different phenazine synthesis genes.
Our final goal is the molecular understanding of phenazine synthesis, regulation, and molecular physiological reaction under oxygen limited conditions to then apply this knowledge in a heterologous utilization of phenazines for mediator-based microbial electrocatalysis.

Einladender:
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Vorsitzende des Ortsverbandes der GDCh