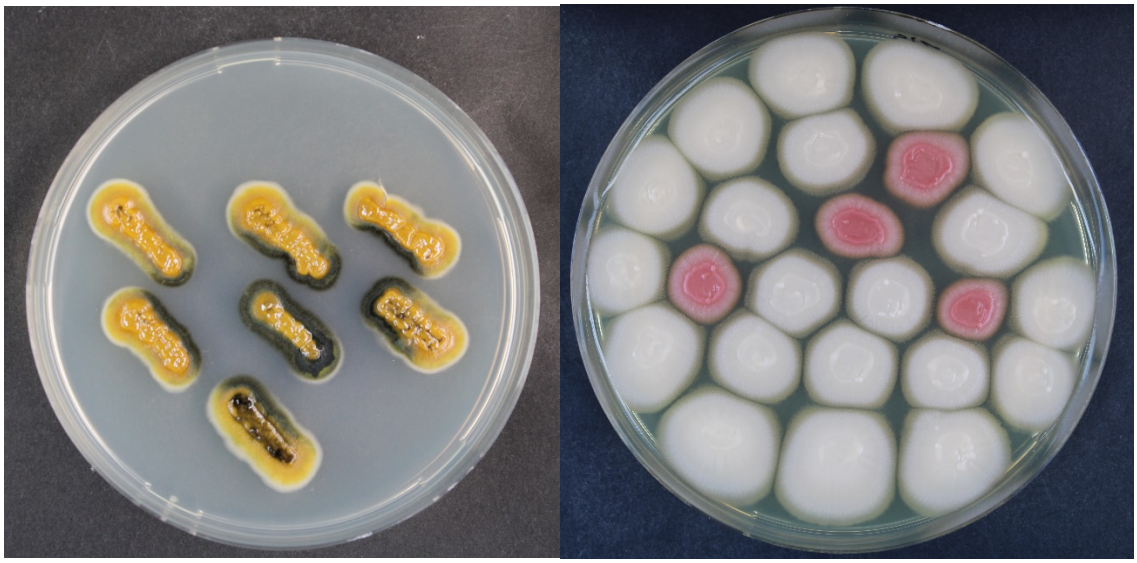
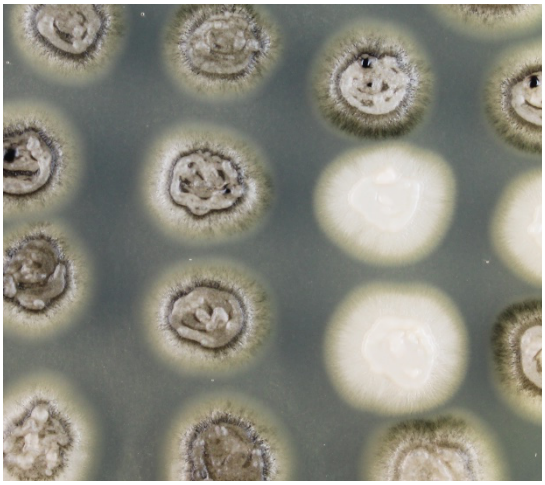
AN ALBINO *AUREOBASIDIUM PULLULANS* FOR BIOTECHNOLOGICAL APPLICATION (ALABAMA)

Project related Figures (e.g. photo, schematic, results). For example:





SUPERVISORY TEAM[1]

Primary Supervisor: *Robert L. Mach, Institute of Chemical, Environmental and Bioscience Engineering ICEBE, Faculty of Technical Chemistry, TU Wien*

TU Wien project partners: *Ruth Birner-Grünberger, Institute of Chemical Technologies and Analytics, Faculty of Technical Chemistry, TU Wien*
Peter Ertl, Institute of Applied Synthetic Chemistry, Faculty of Technical Chemistry, TU Wien
Bernhard Lendl: Institute of Chemical Technologies and Analytics, Faculty of Technical Chemistry, TU Wien
Aleksandr Ovsianikov Institute of Materials Science and Technology, Faculty of Mechanical and Industrial Engineering, TU Wien

External academic partners: *Florian Freimoser, agroscope, Switzerland*

External industry partners: *haben wir (noch) nicht*

PROJECT DESCRIPTION

Aureobasidium pullulans is a ubiquitous, extremotolerant yeast-like fungus, that is used as biocontrol agent and for the industrial production of pullulan and other extracellular polymers. This fungus has a unique cell cycle with different unicellular and even filamentous cell morphologies. Notably, only certain cell types are secreting pullulan. This can be controlled in bioprocesses to a certain point. Unfortunately, melanin is produced as a side product, which can spoil a production batch. Deletion of the melanin biosynthetic genes leads to a substantial loss of pullulans production rate, as the two anabolic pathways seem to be interlinked. Within this project a deeper understanding of the regulatory mechanisms behind cell type switching and the interlinked biosynthetic pathways for pullulan and melanin biosynthesis shell be achieved. The regulatory mechanisms will be investigated using epigenetic approaches, comparative genomics and transcriptomics, and CRISPR-mediated genome editing. Random mutagenesis and micro fluidic-assisted cell sorting can be used as a work around for the strain generation.

KEY GOALS AND TASKS

The primary aim of this PhD thesis is to understand which regulatory pathways and mechanisms (cAMP signaling, MAP kinase pathway, epigenetic mechanisms, yet unknowns, etc.) are responsible for the cell type switching and how this is connected to the production of pullulan and melanin in *A. pullulans*. Ultimately, this knowledge shall contribute to the design of strain that produce melanin-free pullulan.

[1] The Early Stage Researchers (ESRs) will be accompanied during their thesis by an individual "Thesis Advisory Committee" (TAC), which will guide the ESR through the graduate studies. The TAC will consist of the thesis primary supervisor, and two additional members of the Supervisory Team selected by the ESR.

PROJECT-SPECIFIC REQUIREMENTS

- Completed master studies in Biochemistry or Molecular Biology or Biotechnology or closely related field
- Knowledge on the regulation of gene expression in eukaryotes
- Experience and skills in molecular biology and/or bioinformatics
- Interest in working with a unique fungus and state-of-the art genome and transcriptome analysis methods
- Enthusiasm for learning new methods and techniques
- Affinity for solving complex riddles
- Willingness to travel to project meetings and scientific conferences
- Excellent English language skills in scientific field
- Personal skills: independence but also being able to work in a team, solution-oriented thinking, detail-oriented working style