The Faculty of Biotechnology and Food Engineering

Seminar

Prof. Matthias Bureik

Human Cytochrome P450 Enzymes: Applications and Perspectives

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Abstract

The majority of drugs used in human patients are substrates of drug metabolizing enzymes, which are classified into the two groups of Phase I and Phase II enzymes depending on the type of reaction they catalyze: Phase I is characterized by functionalization reactions (such as redox reactions), while in Phase II conjugation reactions occur (such as glucuronidation). The most important enzymes in Phase I metabolism are the cytochrome P450 enzymes (CYPs or P450s), which belong to a large superfamily of monooxygenases present in all biological kingdoms. We have recently introduced the use of permeabilized fission yeast cells (enzyme bags) that recombinantly express full-length human CYPs for drug metabolism studies. Moreover, a complete set of recombinant fission yeast strains that coexpress each of the 57 human P450s together with its natural human electron transfer partner(s) was cloned. This strain collection was used to establish a convenient testing scheme that permits a rapid screen of all human CYPs for activity towards any given candidate substrate. Interesting applications of this technology include the study of the metabolism of the active pharmaceutical ingredients of Chinese Medicines and the development of a CYP4Z1-dependent prodrug strategy for the treatment of breast cancer. In addition, we have also extended the scope of our research to include other human drug metabolizing enzymes (such as UDP glucuronosyl transferases) on one hand and P450s from other species (e.g. insect pests) on the other hand.

Monday, 25/5/2020, 14:00 – 15:00, Via zoom

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