

Group : Biocatalysis

Project : **Synthetic nicotinamide cofactors in biocatalytic reactions**

Supervisors : Alice Guarneri, Caroline E. Paul, Maurice C.R. Franssen, Willem J. van Berkel

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Introduction

A remarkable proportion of synthetically useful enzyme-catalyzed reactions requires cofactors (inorganic ions or organic molecules: coenzymes and prosthetic groups), e.g. pyridine nucleotide coenzymes and flavin coenzymes, used in enzyme-catalysed redox reactions.

Some of these cofactors are rather sensitive molecules and are gradually destroyed due to undesired side-reactions occurring in the aqueous medium, in particular NAD(P)H. This cofactor is too expensive to be used in the stoichiometric amounts formally required for a biocatalytic reaction. This leads to the challenge of creating nicotinamide cofactors biomimetics (also called mimics), which are synthetic analogues that can be accepted by redox enzymes, replacing the natural cofactor in its role.

Goal

The overall goal of the project is the development of robust synthetic nicotinamide cofactor analogues for different cofactor-dependent redox enzymes, e.g. hydroxylases and alcohol dehydrogenases (ADHs). A variety of enantiopure products of chemical and pharmaceutical interest can be thus obtained.

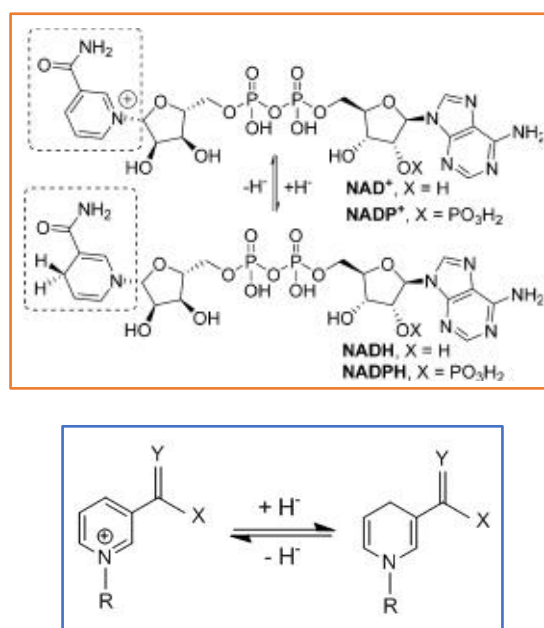


Figure 1. Natural nicotinamide coenzymes (orange) and mimics general structure (blue) in their oxidized and reduced forms.

Techniques to be used

General organic synthesis techniques for the synthesis of the mimics (including analysis by TLC and NMR). Biocatalytic reactions monitored by HPLC/GC. Enzyme kinetics (UV).

Information

Alice Guarneri: Helix, room 8056, alice.guarneri@wur.nl

Caroline E. Paul: (TUDelft) c.e.paul@tudelft.nl

Maurice C.R. Franssen: Helix, room 7032, maurice.franssen@wur.nl

Willem J. van Berkel: Axis, room X0118, willem.vanberkel@wur.nl