Intitulé du Sujet de Thèse : Supramolecular Protein Frameworks for Spatially Organized Enzymatic Cascades

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Descriptif du projet

General Context. Enzymatic cascade reactions offer highly selective and sustainable routes for chemical synthesis, but their efficiency is often limited by poor control over enzyme proximity, intermediate diffusion, and catalyst stability. Current strategies either improve stability (immobilization) or spatial precision (molecular scaffolds), but rarely combine both strategies.

Description of the work This project aims to develop adaptive supramolecular protein assemblies that enable precise control over enzyme proximity, orientation, and stoichiometry. The approach combines protein-protein interactions[1] and metal coordination[2] to construct modular catalytic frameworks. The strategy will be evaluated using a redox enzymatic cascade involving an alcohol dehydrogenase (ADH) and a Baeyer-Villiger monooxygenase (BVMO), a demanding system involving cofactor recycling and intermediate transfer.[3,4] This multidisciplinary project will integrate various approaches to study the design of enzyme fusion proteins, supramolecular assembly of multienzyme complexes, structural and biochemical characterization, evaluation of cascade efficiency and structure-function relationships.

Free Key words

Protein-protein interaction; Biocatalysis; Protein Framework; Enzymatic cascade; Metal Coordination.

Références Bibliographiques

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