

# Development of Electrochemical Reactors Using Dehydrogenases for Enantiopure Synthons Preparations

## Fact Sheet

### Project Information

ERUDESP

Grant agreement ID: 213487

[Project website](#) 

Status  
Closed project


Start date  
1 July 2008

End date  
30 June 2011

Funded under  
FP7-NMP

Overall budget  
€ 3 723 963

EU contribution  
€ 2 749 909

Coordinated by  
**UNIVERSITÄT DES  
SAARLANDES**  
 Germany

## Objective

The aim of the project is the development of electrochemical reactors for the manufacture of fine chemicals with dehydrogenases as a process with almost zero waste emission. The production of enantiopure compounds with high EE's can be achieved by using dehydrogenases as biocatalysts, because they express high enantioselectivity in ketone reduction, combined with broad substrate spectra by some of these enzymes. These proteins will be engineered for improved catalytic performance using the tools of molecular evolution, modelling, structure prediction, and crystallography. As these dehydrogenases typically require cosubstrate regeneration by aid of a second enzymatic reaction, we are looking for the alternative solution of an electrochemical approach for the regeneration of reduced cofactors. If all active compounds can be functionally immobilized on the electrode surface the constructed reactor would convert the educt in the input flow to the product in the output flow avoiding any contaminations. All necessary components like the

output now avoiding any contaminations. All necessary components like the mediator, the cofactor and the dehydrogenase will be bound to nano or meso structured electrodes (for increased active surface area) resulting in biofunctionalised surfaces with tailored properties at the nanoscale. Optimization of the electrode materials and surfaces, of the mediators and the required spacers as well as the surface bound dehydrogenase activities will result in electrochemical reactor moduls which can deliver enantio pure synthons for desired compounds in pharmaceutical or agrochemical applications. The obtained data will increase our knowledge on nanostructured catalysts and inorganic-organic hybrid systems. Cheap cofactor regeneration, easy product purification, high selectivity and avoidance of organic solvents will be the advantages of such processes to satisfy the demands of green chemistry in respect of environmentally friendly, flexible and energy efficient productions.

## Field of science

/natural sciences/earth and related environmental sciences/geology/mineralogy/crystallography

/natural sciences/biological sciences/biochemistry/biomolecules/proteins

/natural sciences/biological sciences/molecular biology/molecular evolution

/natural sciences/biological sciences/biochemistry/biomolecules/proteins/enzymes

## Programme(s)

## Topic(s)

## Call for proposal

FP7-NMP-2007-SMALL-1

## Funding Scheme

CP-FP - Small or medium-scale focused research project

## Coordinator



**UNIVERSITAT DES SAARLANDES**

Address

**Campus**

**66123 Saarbrücken**

 **Germany**

[Website](#) 

Activity type

**Higher or Secondary**

**Education Establishments**

[Contact the organisation](#) 

EU contribution

**€ 890 880**

Administrative Contact

**Mareike Schmitt (Ms.)**

## Participants (5)

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### **ECOLE NATIONALE SUPERIEURE DE CHIMIE ET DE PHYSIQUE DE BORDEAUX**

 France

EU contribution

**€ 344 120**

Address

Activity type

**16 Avenue Pey Berland  
33607 Pessac**

**Higher or Secondary  
Education Establishments**

[Website](#) 

[Contact the organisation](#) 

Administrative Contact

**Bernard Berdeu (Prof.)**

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### **CENTRE NATIONAL DE LA RECHERCHE SCIENTIFIQUE CNRS**

 France

EU contribution

**€ 385 604**

Address

Activity type

**Rue Michel Ange 3  
75794 Paris**

**Research Organisations**

[Website](#) 

[Contact the organisation](#) 

Administrative Contact

**Michel Mauvais (Mr.)**

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### **KOBENHAVNS UNIVERSITET**

 Denmark

EU contribution

**€ 593 245**

Address

Activity type

**Norregade 10  
1165 Kobenhavn**

**Higher or Secondary  
Education Establishments**

[Website](#) 

[Contact the organisation](#) 

Administrative Contact

**Ivan Kirstoffersen (Mr.)**

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## MIDDLE EAST TECHNICAL UNIVERSITY

 Turkey

EU contribution

**€ 332 500**

Address

**Dumlupinar Bulvari 1  
06800 Ankara**

Activity type

**Higher or Secondary  
Education Establishments**

[Website](#) 

[Contact the organisation](#) 

Administrative Contact

**Ayhan Sitki Demir (Prof.)**

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## IEP GmbH

 Germany

EU contribution

**€ 203 560**

Address

**Rheingastrasse, 190-196  
65203 Wiesbaden**

Activity type

**Private for-profit entities  
(excluding Higher or**

**Secondary Education  
Establishments)**

[Website](#) 

[Contact the organisation](#) 

Administrative Contact

**Antje Gupta (Dr.)**

**Last update:** 16 July 2019

**Record number:** 87775

**Permalink:** <https://cordis.europa.eu/project/id/213487/>

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