

PRESS RELEASE

New research collaboration network develops biocatalytic processes for the activation of hydrocarbons.

Zwingenberg, February 2006 – Biotechnology company **BRAIN AG** discloses the conclusion of a collaboration agreement with the University of Dortmund (Prof. Dr. Andreas Schmid), the University of Stuttgart (PD Dr. Jürgen Pleiss), the International University Bremen (Prof. Dr. Ulrich Schwaneberg), EMC microcollections GmbH and BASF AG. Together the team works on the development of new biocatalytical processes for the enzymatic hydroxylation of hydrocarbons and fine chemicals using novel oxido-reductases. Research within the network is financially supported by the „Deutsche Bundesstiftung Umwelt“ (DBU).

For the production of intermediates as starting material for clinical trials of the phases I and II within the pharmaceutical industry an immense time pressure for the development of synthesis routes is characteristic. A further attribute of the synthesis routes of these fine chemicals are the high selectivity and specificity requirements which shall exclude the occurrence of side products. There is a need for broadly applicable and modular basic technologies for drug synthesis. Therefore the expertises in the areas of enzymatic biooxidation and bioreduction reactions were bundled within the working group of Prof. Dr. Andreas Schmid, chair of Chemical Biotechnology of the University Dortmund and chief-coordinator of the cooperation network, PD Dr. Jürgen Pleiss, of the Institute for Technical Biochemistry of the University Stuttgart and Prof. Dr. Ulrich Schwaneberg, chair for Biochemical Engineering at the International University Bremen

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and the three industry partners BRAIN AG in Zwingenberg, EMC GmbH in Tübingen and BASF AG in Ludwigshafen. With this research cooperation a substantial contribution to the development of basic technologies for highly selective biooxidations and hydrations with isolated oxidoreductases will be achieved, which then will be used for the activation of low molecular starting substances of pharmaceuticals.

The research team will work on the current key problems of redox-biocatalysts as e.g. the identification of adequate biocatalysators and starting substances as well as the development of environmentally compatible processes for the production of biocatalysts and starting substances.

The evolutionary diversity of enzymes and metabolic pathways offers a biotechnological access to new and valueable biocatalysts and chemicals and is a prime example of the so called white or industrial biotechnology. In the current biocatalytic example oxygen atoms are introduced selectively into hydrocarbons using highly specific enzymes. Within the cooperation BRAIN AG identifies and develops from their proprietary BioArchives strains and oxygenase enzymes which can be used in biocatalytic processes for the production of refined pharma starting substances.

“By identifying and utilizing novel biocatalysts on the basis of oxygenases we want to improve industrial processes for the production of specialty chemicals as pharma starting substances”. says Dr. Jürgen Eck, member of the board and head of research at BRAIN AG. “The intensive cooperation within the network complements and accelerates our own activities in this sector and allows the faster transformation of an idea to synthesis processes”.

„The identification of designer bugs and optimized biocatalysts hallmarks the growing importance of white biotechnology for efficient production processes“. says Dr. Patrick Lorenz head of the Unit Enzymes & Bioconversion Technology at BRAIN AG. „Our BioArchives harbour thousands of valuable synthetic routes. Through our EvoSolution® Technology platform we can identify developmental candi-

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dates, design production strains and improve enzymes and processes. We are confident to be able to identify novel sustainable pathways for the production of specialty chemicals using our proprietary tools”.

The engagement of BRAIN AG in this high ranking research network is a further example of the potentials within white biotechnology and emphasises the sustainable and dynamic development of the biotechnology sector.

As published by Festel Capital in 2004 white biotechnology already contributed 40 billion € of the total revenues in the chemical industry of 1.320 billion €. Since 2001, when biotechnological processes contributed some 30 billion €, this equates to an annual growth rate (CAGR) of 10%. Following a prognosis of the Dechema and the VCI in 2005 the sum will reach 50 billion €. For 2015 Festel Capital forecasts an increase of white biotech revenues to 305 billion € corresponding to a CAGR of 20% and some 16% of the total revenues of the chemical industry of 1.930 billion €.

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About BRAIN AG:

BRAIN Biotechnology Research and Information Network AG is an innovative company focusing on the discovery and development of novel enzymes and bioactives. Its novel EvoSolution® technology platform combines the untapped biodiversity of microorganisms and plants with modern methods of molecular biology. The company located in Zwingenberg within the research and industrial region Rhine-Main-Neckar has at its disposal a comprehensive BioArchive with over 100 million genes of unique and non-cultivable microorganisms. Based on these resources BRAIN identifies novel technical enzymes for biotechnological production and synthesis processes (biotransformation) in the chemical and life science industries as well as new bioactive substances and lead candidates for the pharmaceutical and cosmetics market, and develops the basis for their large-scale industrial production. The company, which was founded in Darmstadt in 1993, currently employs a staff of 43.

Pictures

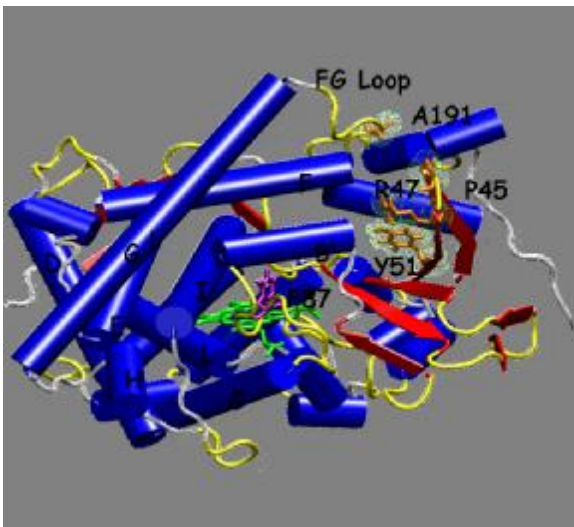
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BRAIN AG: Listed Bauhaus building in
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Structure model of the Heme-Domain
of the universal catalyst monooxy-
genase P450 BM-3 from *Bacillus me-
gaterium* for the selective oxygenation
of alkanes and aromatics.

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BRAIN AG: Searching for optimal biocatalysts: active oxygenase cloned and expressed in *E. coli*.

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