

The CLIB²⁰²¹ Technology Cluster

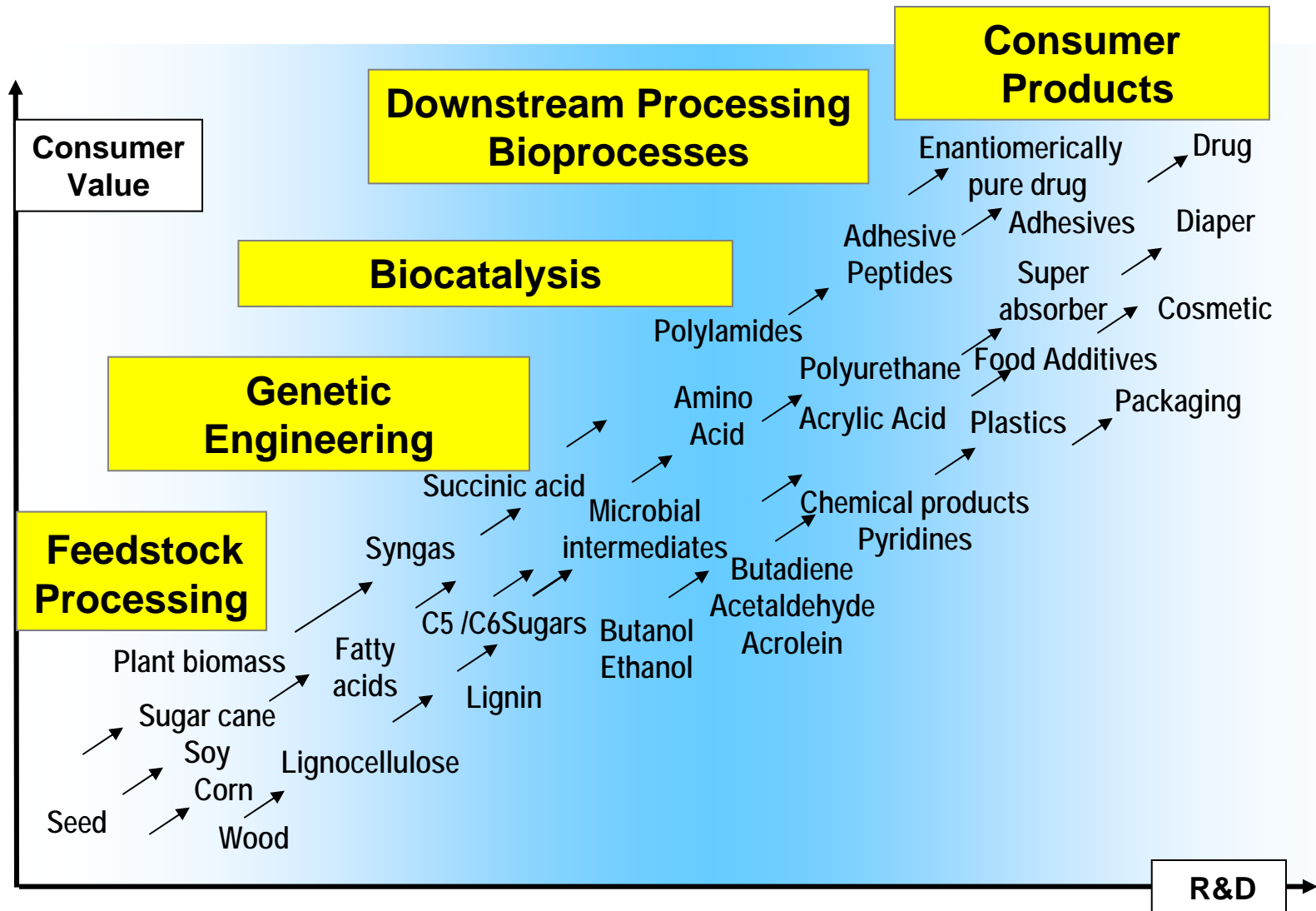
Providing Excellence in Science and Technology

Dr. Jens Klabunde

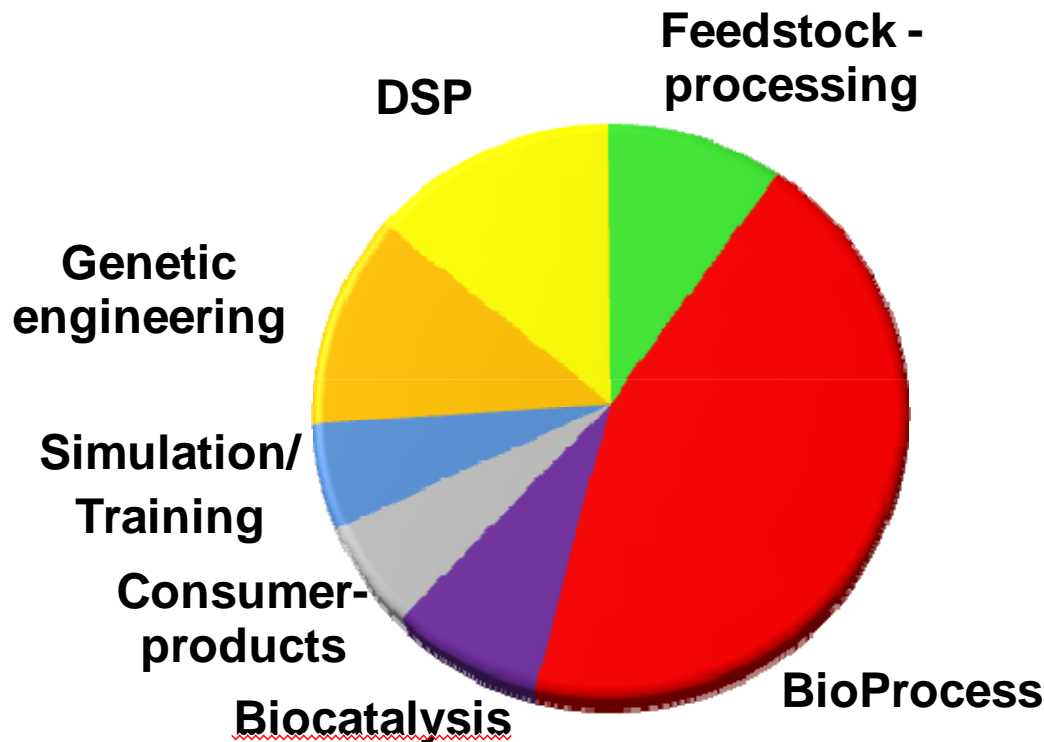
Moscow, November 12th 2009

Russian-German Forum for Biotechnology

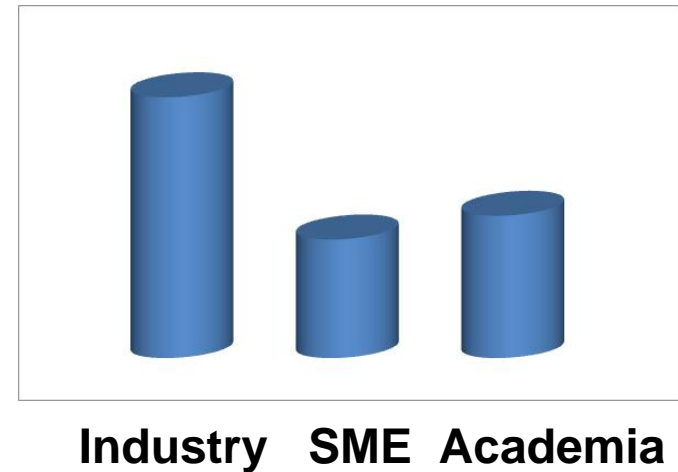
CLIB Accelerates R&D all Over the Value Chain



CLIB²⁰²¹: R&D Projects Combining all Competences of our Members



R&D Projects lead by:



CLIB R&D projects promoted by:



Bundesministerium
für Bildung
und Forschung



Bundesministerium für
Ernährung, Landwirtschaft
und Verbraucherschutz

Ministerium für Wirtschaft,
Mittelstand und Energie
des Landes Nordrhein-Westfalen



CLIB²⁰²¹ Technology Cluster Integrates Basic Research into Applied Sciences

- Overall-budget ~€ 8.5 Mio
- Close collaboration with CLIB industry and SME
- Direkt link to CLIB Graduatecluster
- Instrument for innovation transfer



Forschungszentrum Jülich
in der Helmholtz-Gemeinschaft



Science

Feasability Studies

Technology

PolyOmics
Expression
BioCatalysis
Downstreaming

BioCatalysts

BioProcesses

BioProducts

promoted by:



Bundesministerium
für Bildung
und Forschung

Ministerium für Wirtschaft,
Mittelstand und Energie
des Landes Nordrhein-Westfalen



CLIB²⁰²¹ Technology Cluster

PolyOmics

**Bielefeld University
CeBiTec Institute**



Alfred Pühler Volker Wendisch

PolyOmics

„Omics“:

- Bioinformatics
- Genomics, Transkriptomics, Metabolomics

Product / Flux quantification

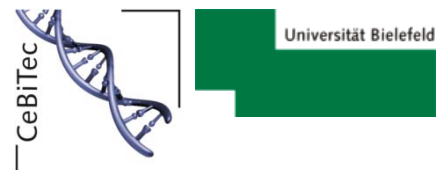
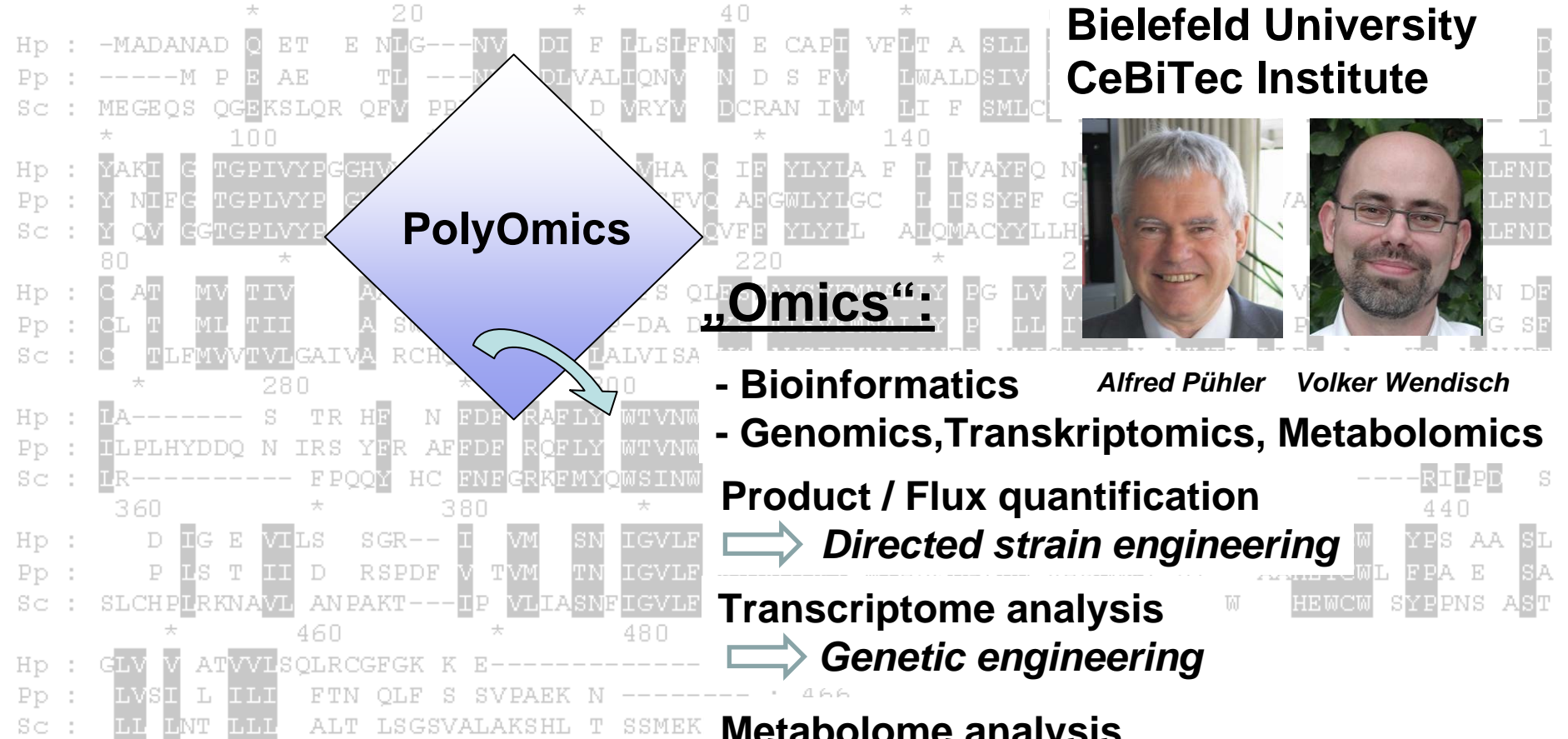
⇒ **Directed strain engineering**

Transcriptome analysis

⇒ **Genetic engineering**

Metabolome analysis

⇒ **Directed metabolic engineering**



CLIB²⁰²¹ Technology Cluster

Expression

H.-H. University Duesseldorf (IBOC)
Research Center Juelich (IBT1/2)

- Novel expression hosts
- Engineered expression strains



Karl-Erich Jaeger

PolyOmics

Expression

To be optimized:

Escherichia coli

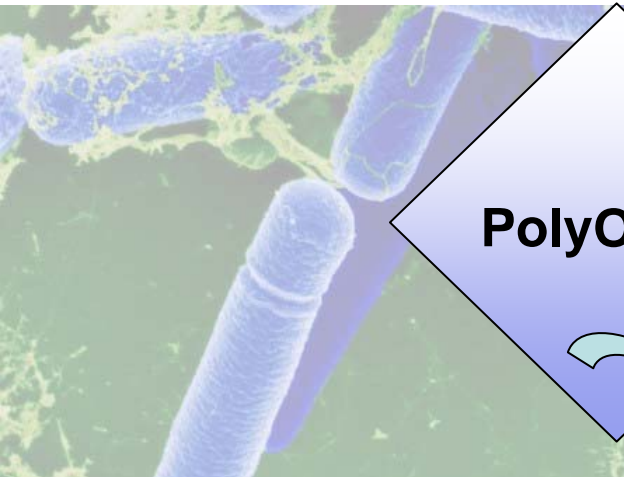
Bacillus subtilis

Corynebacterium glutamicum

To be evaluated:

Pseudomonas putida: stress-tolerant

Rhodobacter capsulatus: membrane proteins



Bacillus subtilis, Source: Waterscan.co.yu

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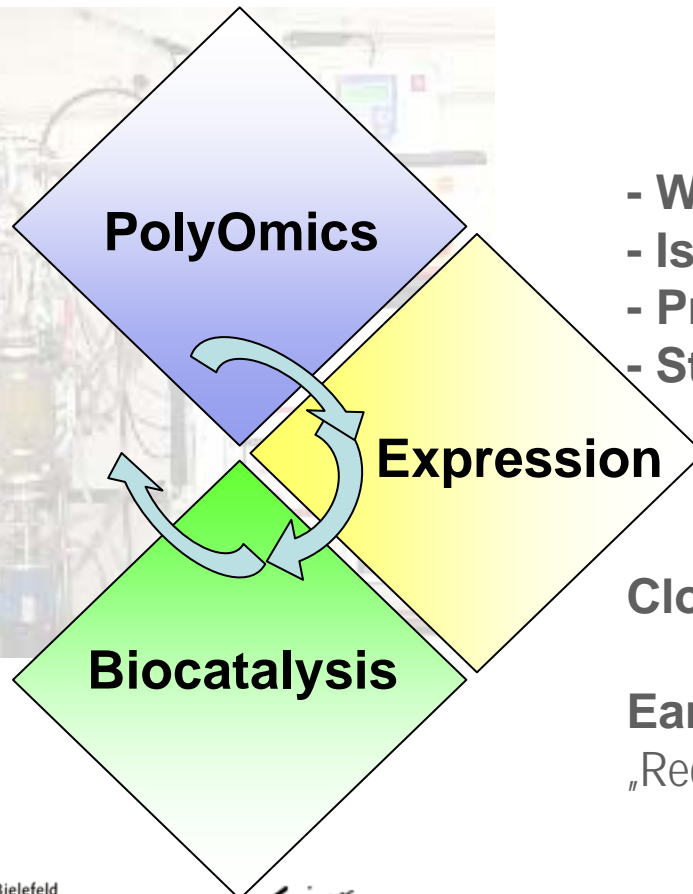
Biocatalysis

University of Technology Dortmund



Andreas
Schmid

- Whole cell biocatalysts
- Isolated enzymes
- Process integration
- Steric and kinetic properties



Close Callaboration with DSP Platform

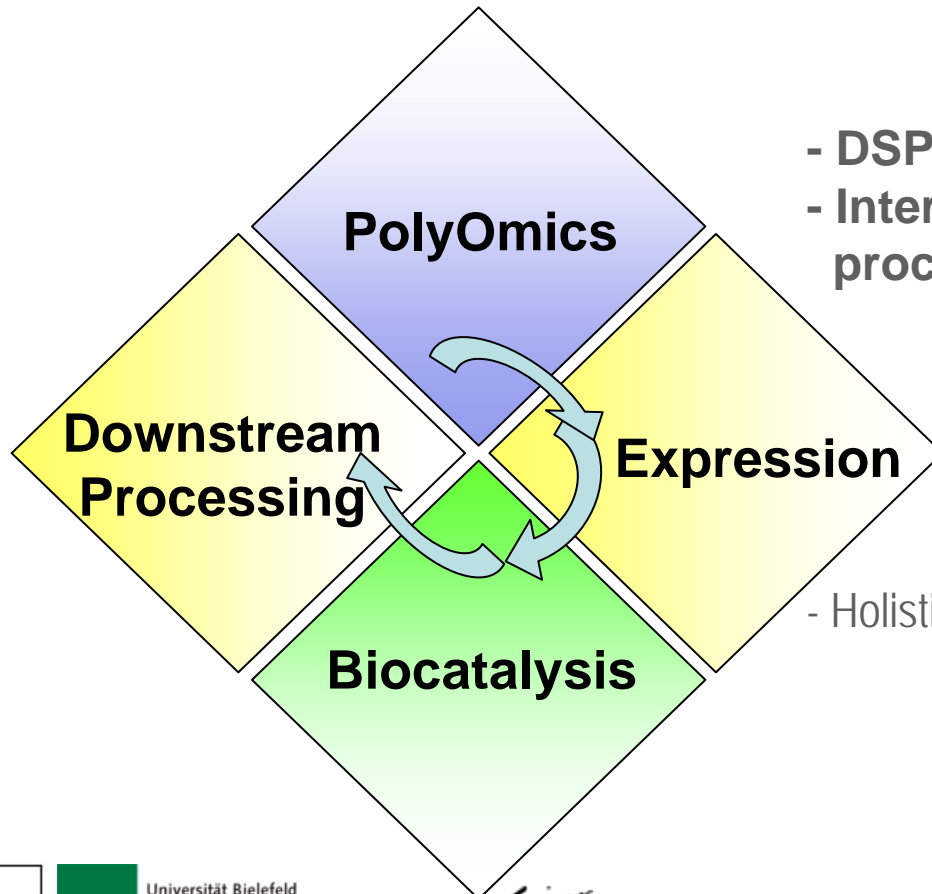
Early target:

„RedoxCells“ with cofactor regeneration

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Downstream Processing

University of Technology Dortmund



- DSP determine profitability
- Interaction with upstream process



Gerhard Schembecker

- Holistic view on the complete process

Technology Transfer to Industry

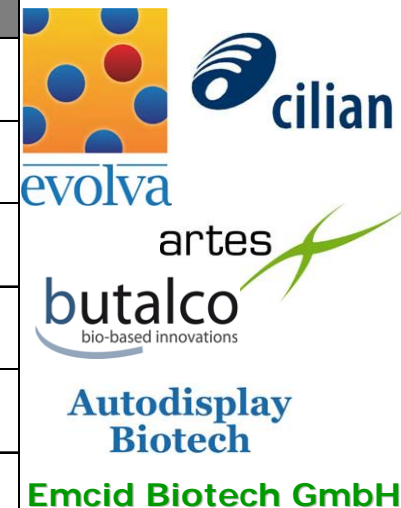
Examples for Established Microbial Production Systems

Company	product	Expression System
Rhein Biotech	Vaccines, bulk enzymes	<i>Hansenula polymorpha</i>
Henkel	Subtilisin (washing agent additive)	<i>Bacillus subtilis</i>
Syral France	α -Amylase	<i>Aspergillus niger</i>
bitop	(Hydroxy-) Ectoines (cosmetic actives)	Extremophiles
Evonik	Sphingiosines	Yeasts



Examples for Novel Expression Systems to be Evaluated

Company	Technology/ product	Expression System
Evolva	Artificial chromosomes, genetic-/ metabolic engineering	<i>Saccharomyces cerevisiae</i>
Cilian	High secretory capacity, multicopy genome, eukaryotic glycosylation	Ciliates (Tetrahymena)
ARTES Biotechnology	High secretory capacity of mycelia, eukaryotic glycosylation	<i>Arxula adenivorans</i>
butalco	Pentoses as sole carbon source for butanol production	<i>Saccharomyces cerevisiae</i>
Autodisplay	Surface display of heterologous protein to produce fine chemicals	<i>Escherichia coli</i>
Emcid Biotech	Axenic cultivation of plant cell cultures, tailor-made plant cell cultures	Plant cell cultures



CLIB²⁰²¹

Partnering Excellence
in Science, Production
and Commercialization
is Key to Success

Partnering Options

Academic and Industrial Excellence

