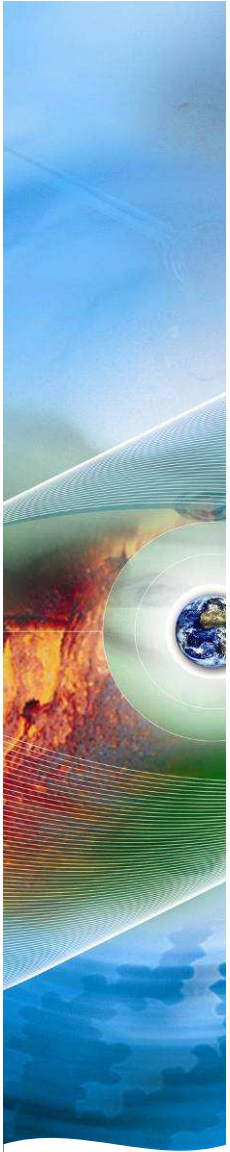


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EuroBio
Sept 23-25, 2009
Lille

www.proteus.fr

Nature
has more imagination
than our dreams



In- and out-sourcing management for successful business development

1998 . 2008



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Protéus - corporate overview



- Founded in 1998
- Based in Nîmes, France
- Highly skilled multidisciplinary team
- In-house IP team
- Over 2000 m² research premises (including clean rooms and a bio-process development facility)

1998 . 2008



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Protéus, world expert in proteins

Proteins

Biological properties

Catalytic properties

protéus

Discovers, optimizes, produces
and formulates proteins

Products and bioprocesses for industry

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Proteins for industrial innovation

Healthcare



Chemistry



Energy



Environment



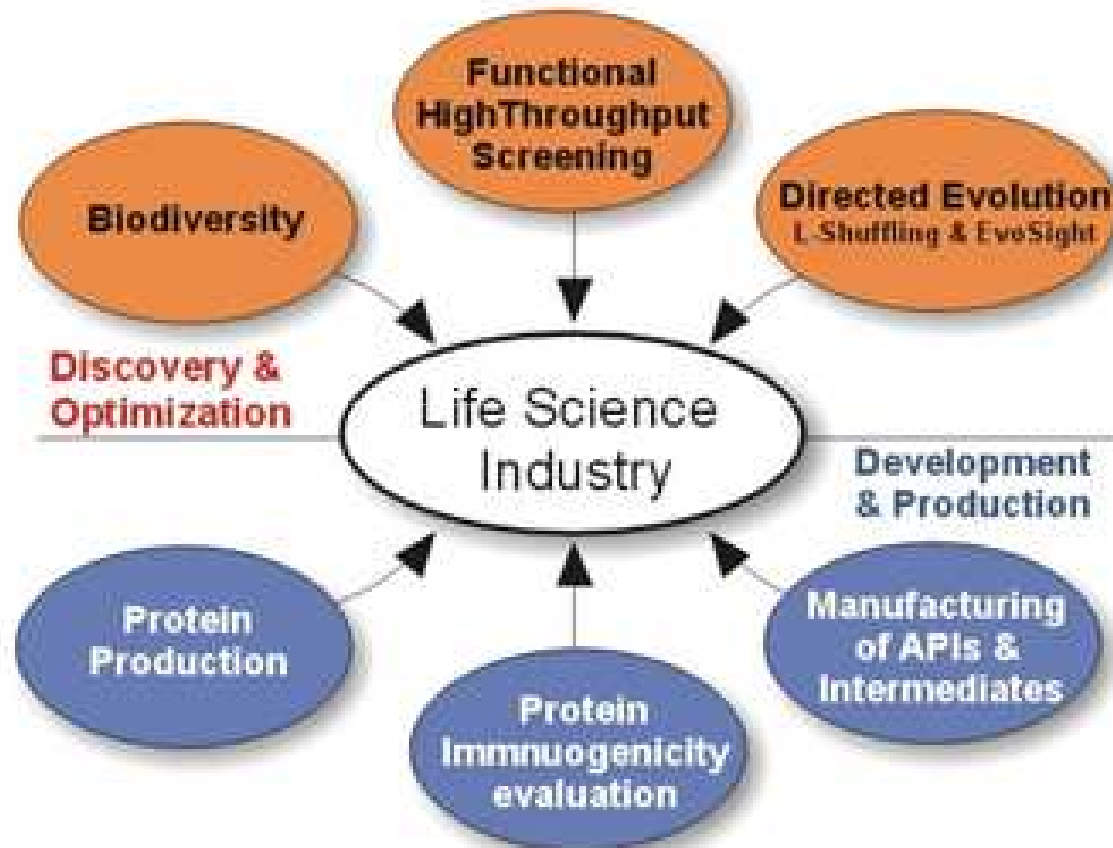
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Integrated Platform



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Multidisciplinary platform

Microbiology
Molecular biology
Bioinformatics
Protein expression
Intellectual Property
Protein engineering
Process development
Chemistry
High throughput screening

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Industrial partnerships

Healthcare

ORION
BIOMÉRIEUX
SERVIER
BioAlliance Pharma
The Drug Resistance Company
ROTTAPHARM

Chemistry

Henkel
Firmenich
EVONIK INDUSTRIES
metabolic explorer
pcas
more than chemistry
A·R·D

Energy

PNRB
ifp
Innovation
Energie
Environnement
syngenta

Environment

ADISSEO
A Bluestar Company
Adding Difference
NBC sys
THALES
VEOLIA ENVIRONNEMENT
Bayer CropScience

Proteins for industrial innovation

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In- and out-sourcing management for successful business development

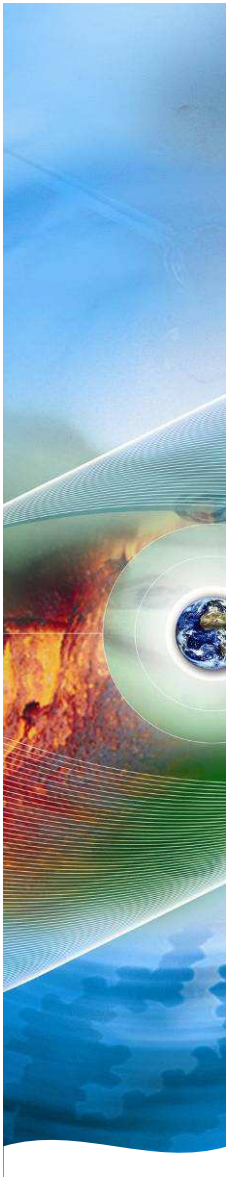
By entrusting projects to biotech companies, the industrial companies are looking for a set of:

powerful technologies,
know-how
industrial property.



From concept to industrial products...

How to obtain a protein fulfilling the needs of its target application?



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From the idea to the product



Strategic studies for industrial and pharmaceutical proteins

Protein discovery and development

Protein engineering and optimisation

Protein- or cell-based process development

Biocatalysts formulation

Protein immunogenicity assessment

Protein production and biomanufacturing

Marketing

Sales

Proteus Business Chain

Bibliographic, Strategic
and Feasibility Studies

Biodiversity screening

Protein engineering

Protein expression

Bioprocess Scale up

Manufacturing

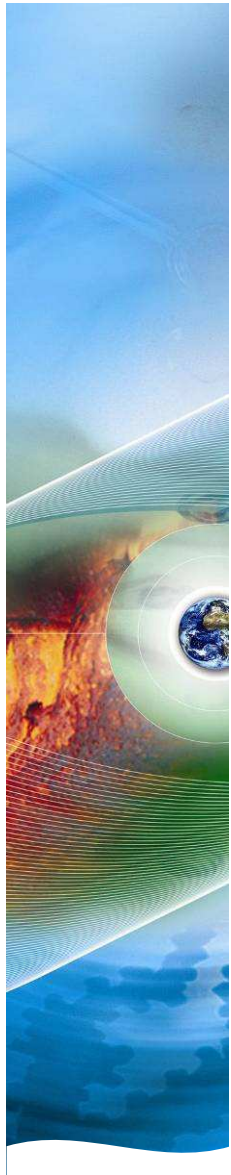
Marketing & Sales

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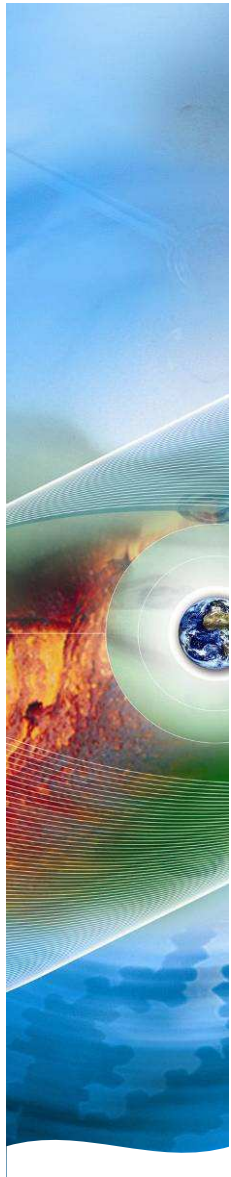


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A vast collection of biodiversity for sourcing new genes and proteins



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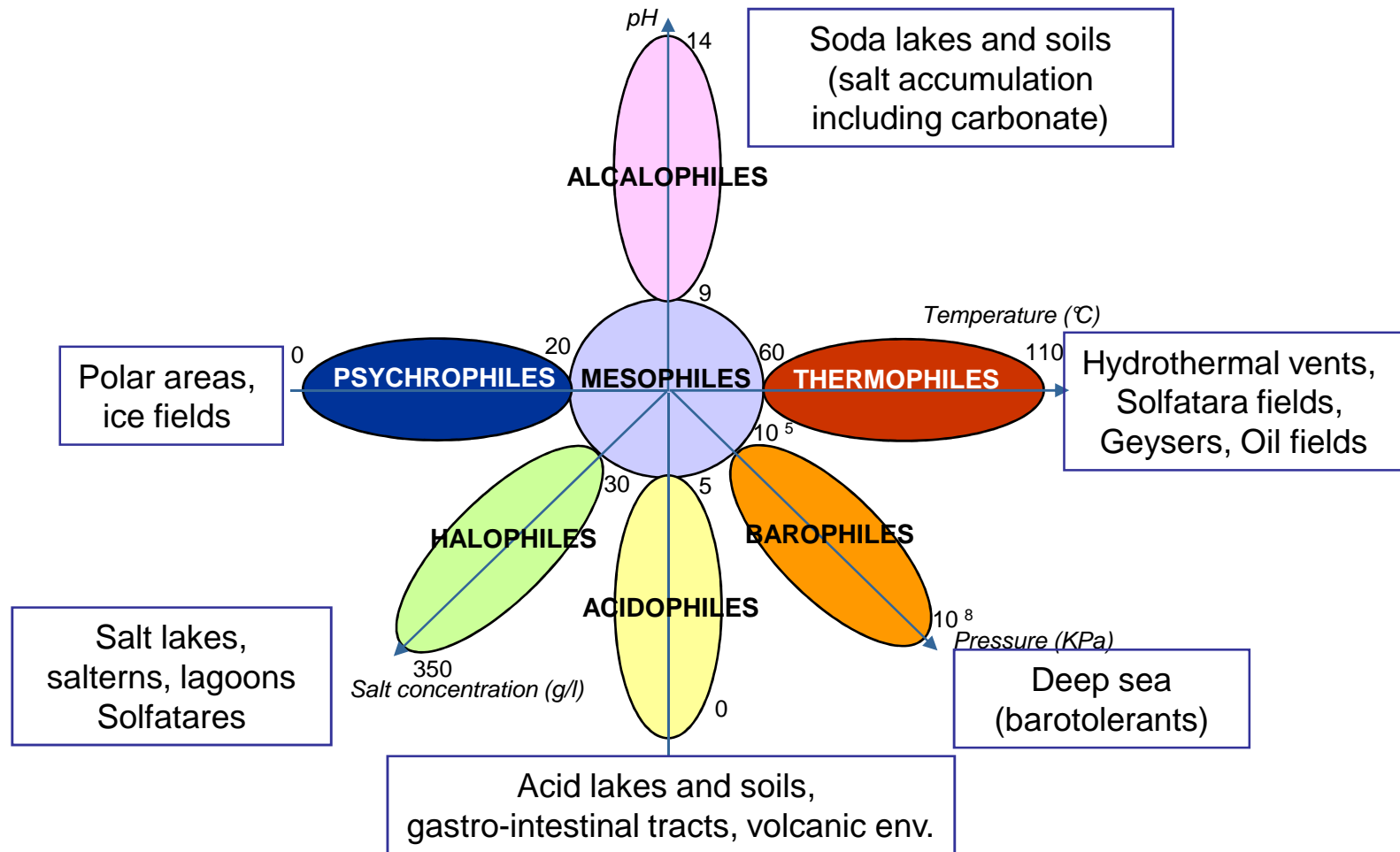


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Protéus biodiversity

Very large diversity collection including extremophile



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Protéus biodiversity - a unique international network

Prominent members of the network

Biodiversity from:

IFREMER

IRD (former ORSTOM)

Hebrew University of Jerusalem

Griffith University, Australia

Total-Fina-Elf

Degussa Ferm. Aromatisation

BIODEEP (EC-funded program)

University of Buenos Aires

University of Moscow

HERMES (EC-funded program)

Deep sea hydrothermal vents

Anaerobic environments
and tropical fermentation

(hyper)saline environments
(e.g. Dead Sea)

Hot non volcanic environments
(Great Artesian Basin)

Oil fields

Food ingredients

Hypersaline deep sea basins
(Mediterranean Sea)

Cold environments
(Antartica)

(Hyper)-Thermophiles

Europe's deep-ocean margin

Access to strains, samples and knowledge

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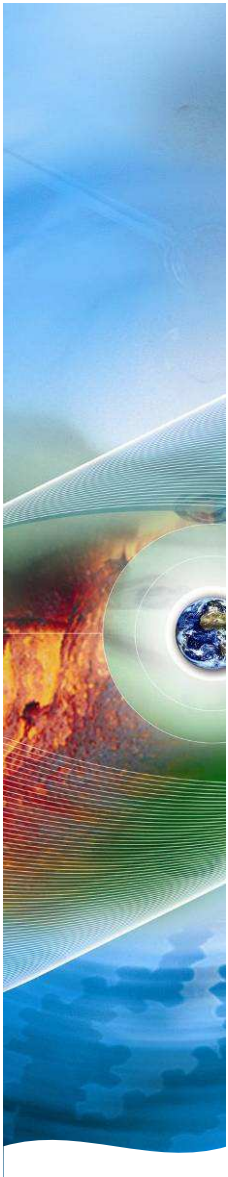
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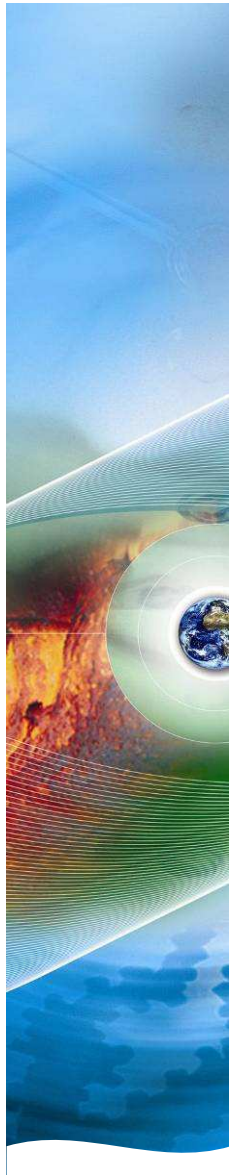
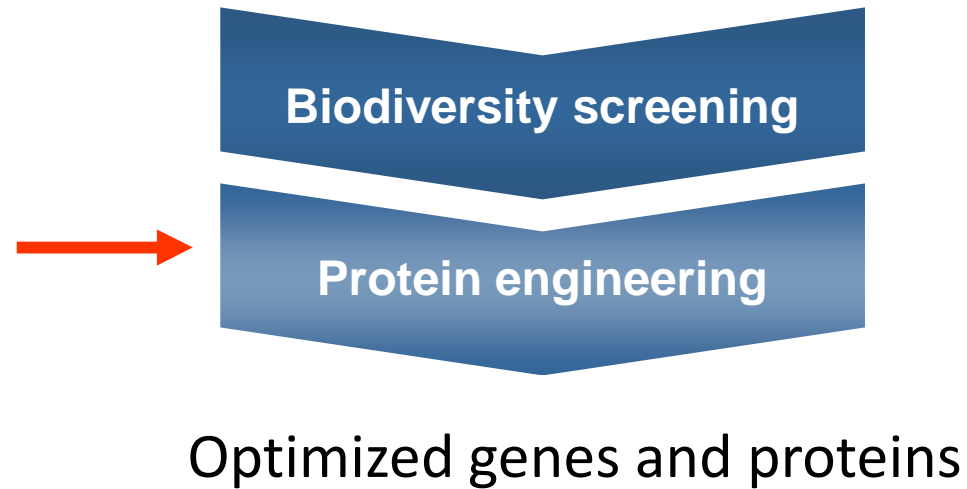
What does screening result into ?



Selection of strains and/or gene libraries

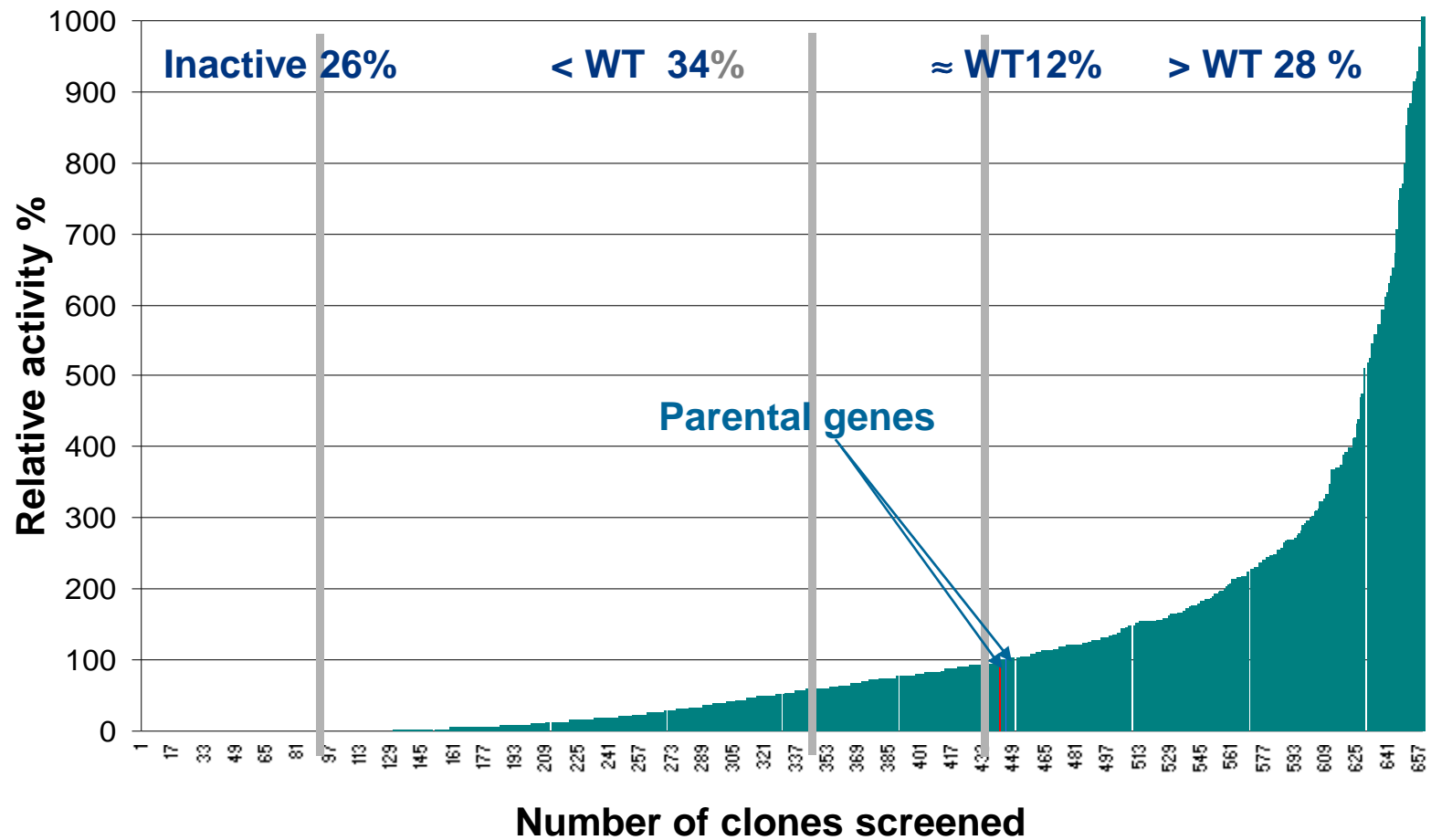


What does protein engineering result into ?



Case study: improving industrial enzyme

Results after L-Shuffling™ and HTS



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Other case study

Improve specific activity

- 2 L-Shuffling rounds using three homologous genes (70%)
- Set up of the HTS assay (colorimetric assay)
- Screening of 25 000 clones per round

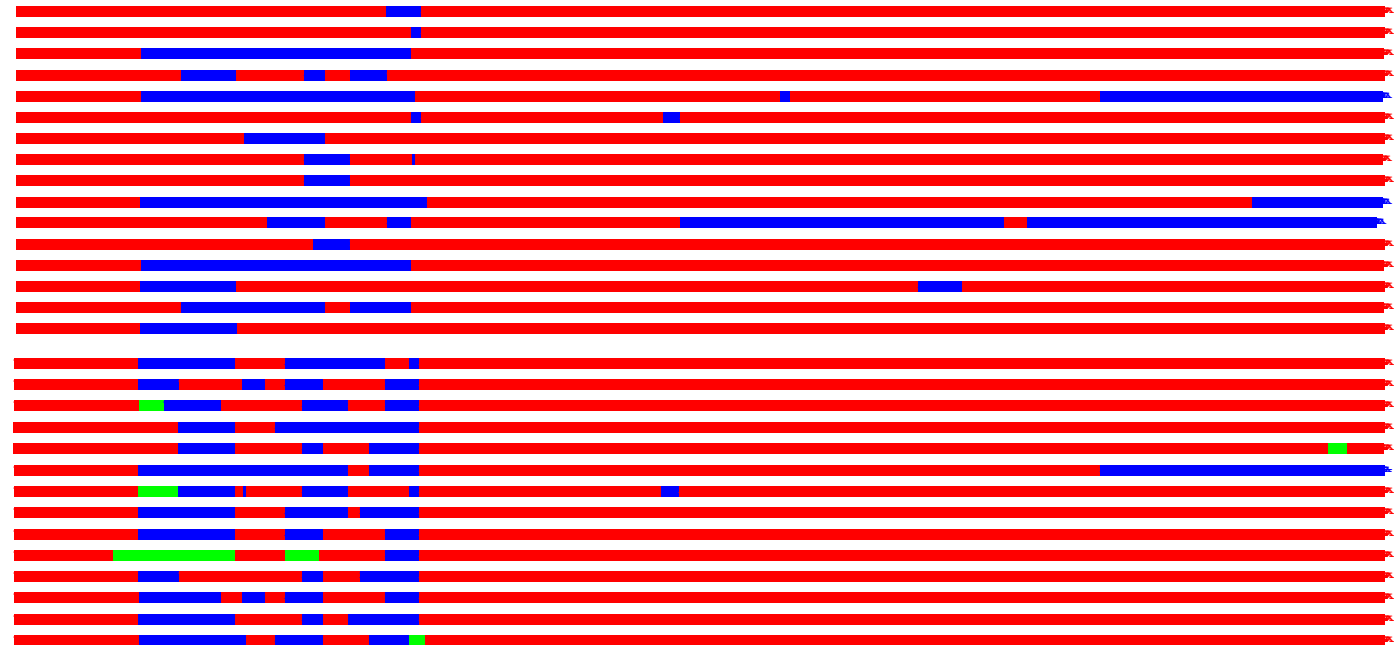


Results

Genetic diversity

SH1:
Reference
protein X
parental
protein A

SH2:
Best
SH1 X
parental
protein C



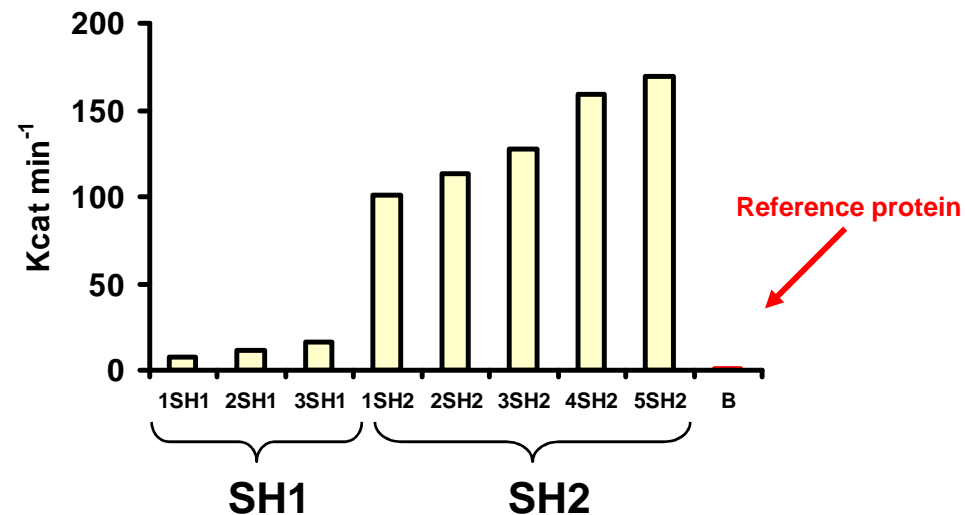
Reference protein; parental protein A; parental protein C

- Large sequence diversity
- Among the best performers, up to 11 recombination events per gene were observed

Result

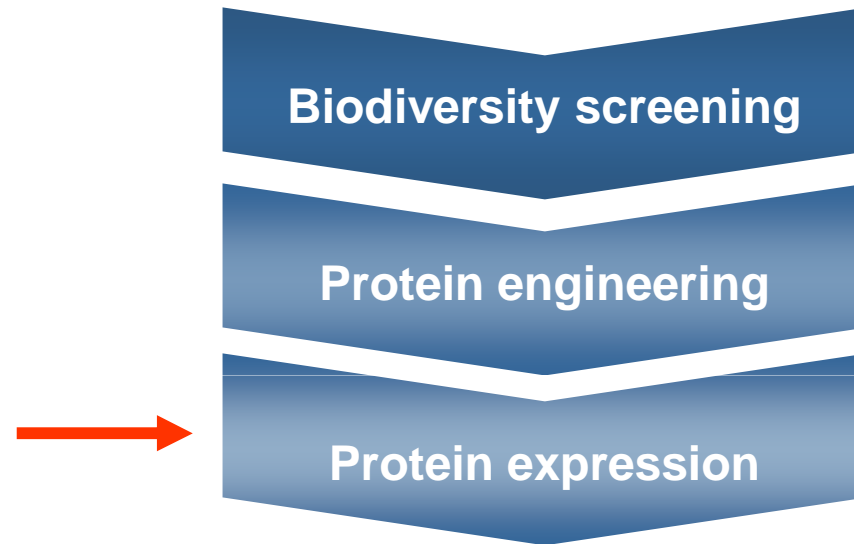
Specific activity measurement

Towards synthetic substrate (used for HTS)



➔ Strong improvement in term of specific activity (X230 compared to the reference protein) towards both synthetic and natural substrates

What does protein expression result into ?



Milligrams or grams of optimized protein, formulated as appropriate for the application

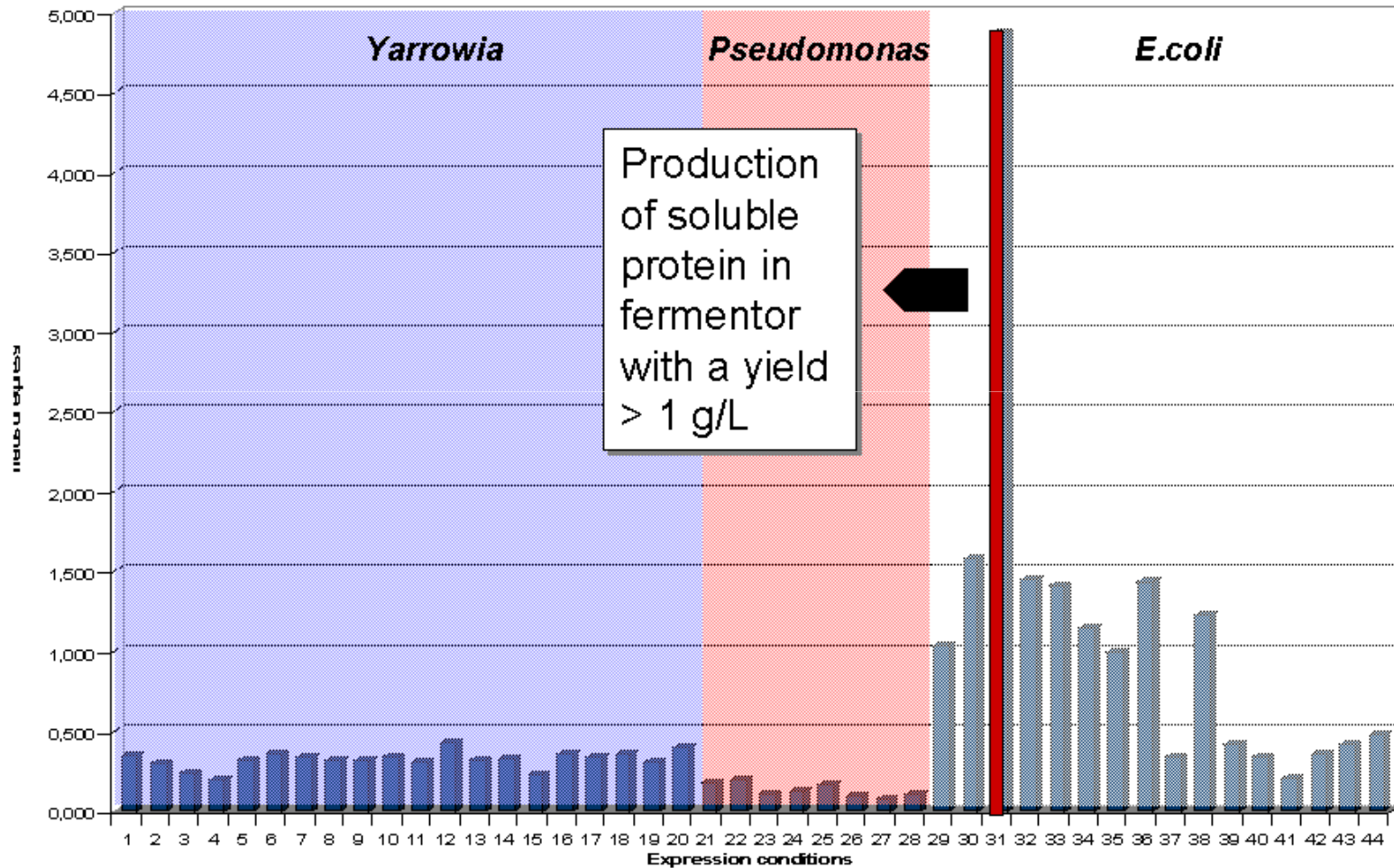
Host library - Prokaryotes

- **Multiparallel expression profiling** strategy to enhance success
- An unmet panel of expression systems and conditions, allowing for expression of most proteins
- Hosts:
 - Bacteria (*E. coli*, *Bacillus*, *Pseudomonas*)
 - Yeast (*Yarrowia*)
 - Baculovirus / insect cells



Example of expression profiling

protein (55 kDa)



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Key deliverable from Protéus



Biodiversity screening

Protein engineering

Protein expression

Protein ready to be industrialized

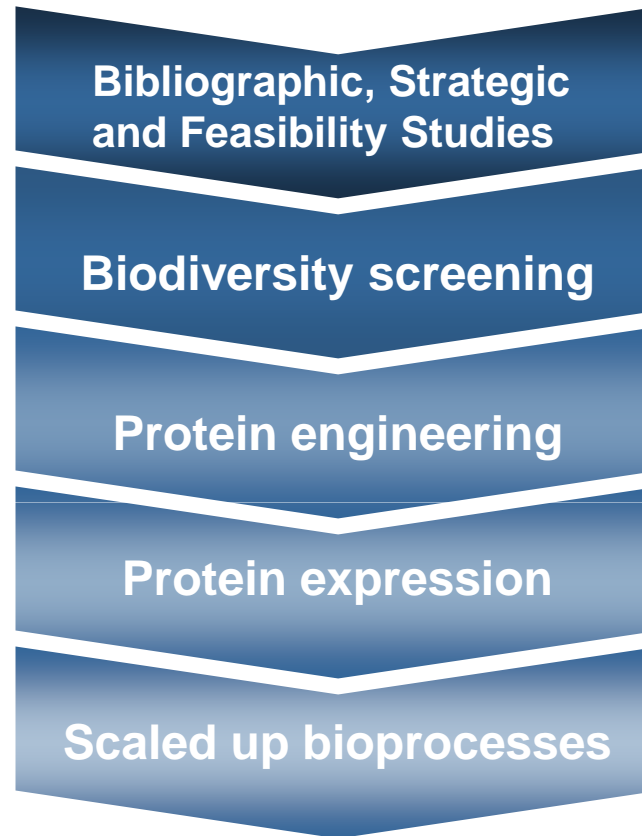
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In- and out-sourcing management for successful business development



Product and process resulting from a combination of in house and outsourced R&D

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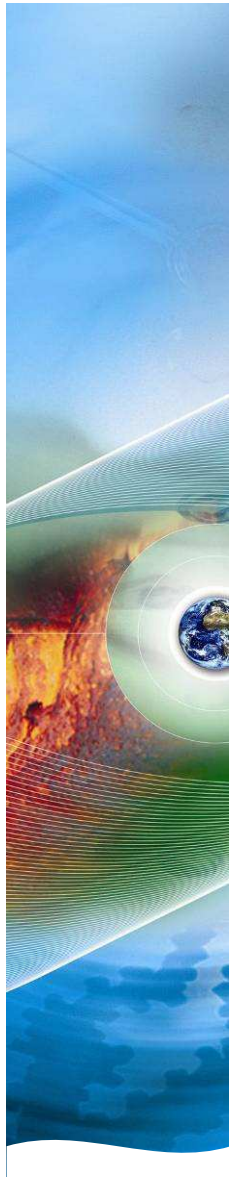


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Next step



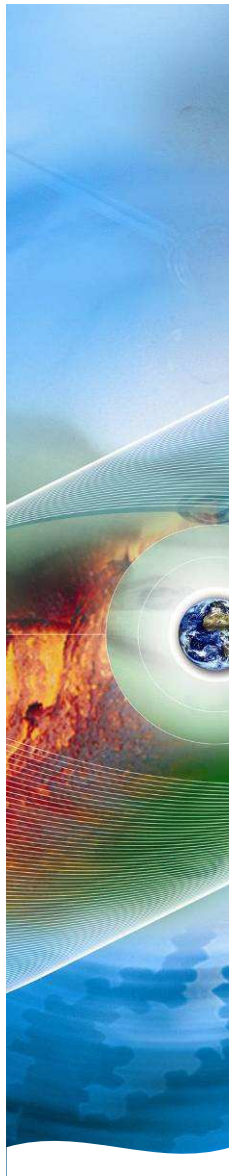
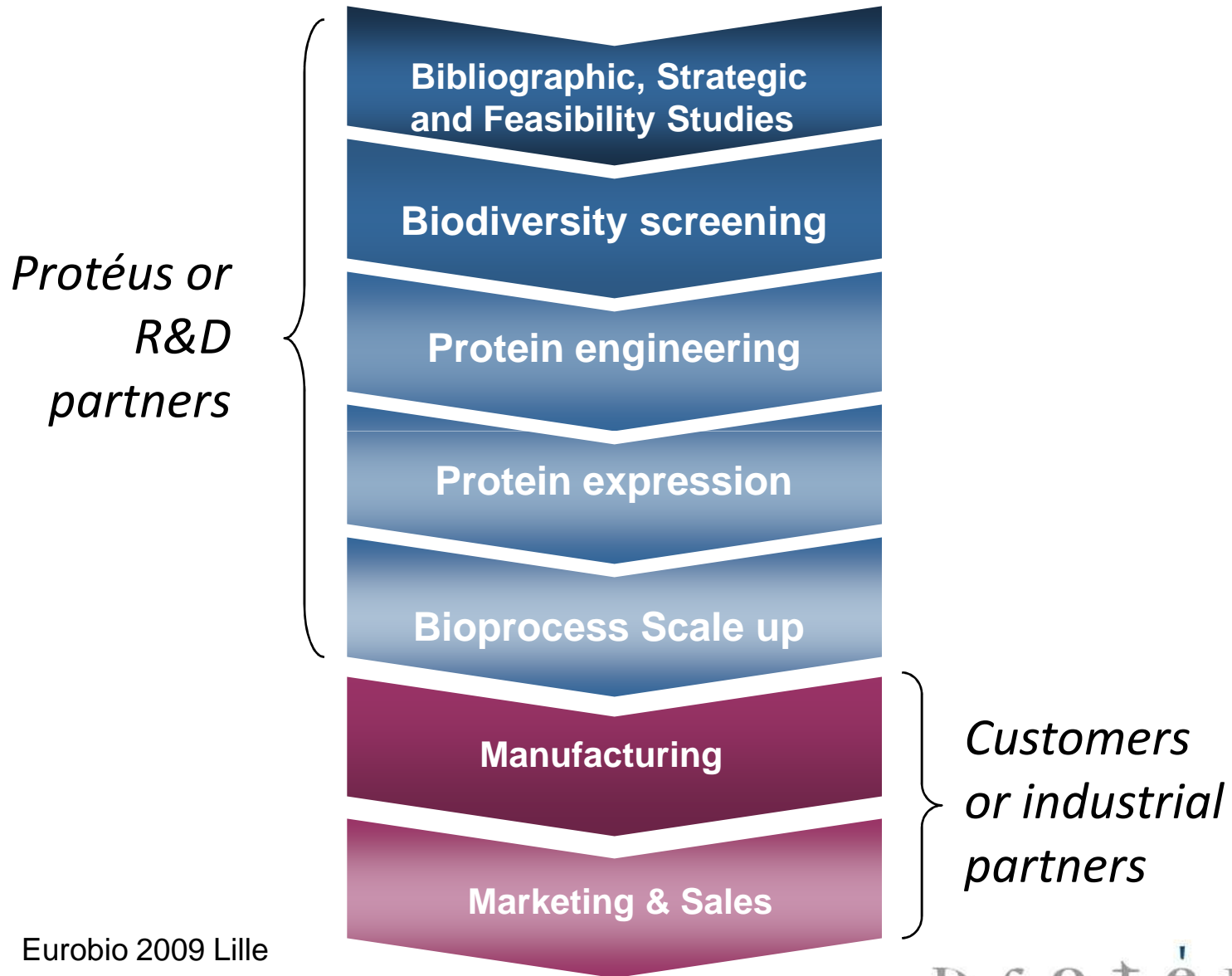
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Relationship Between Owners of Technologies, Protéus & Industrial Partners

The Deal :

Owner of technologies, Know How, IPRs

creates value from its technologies, Know How and Industrial Property Rights

Protéus

combines complementary outsourced technologies, know-how and IP with in house R&D to develop new products and processes for industrial applications

Industrial Partners

make money by implementing processes and selling products.

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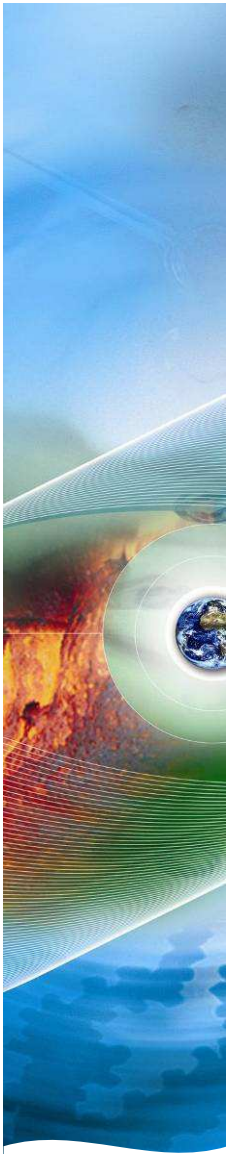
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In- and out-sourcing management for successful business development

Clauses to be discussed

- Definitions
- Research Funding
- Intellectual Property Rights
- Scope
- Confidentiality.
- Term and Termination
- Applicable Law
-

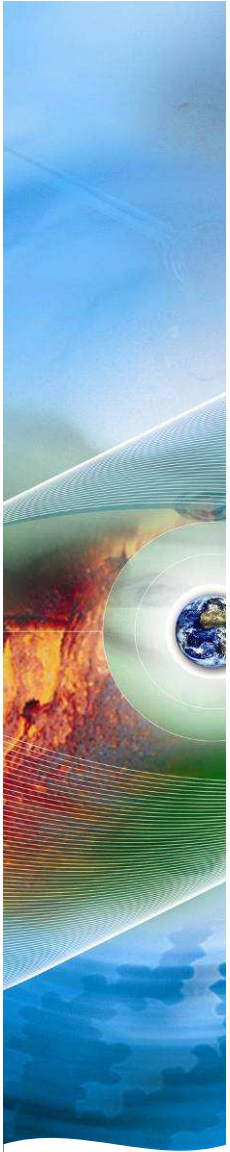




The Take Away Message

No single biotech is able to build such a comprehensive offering unless it teams up with a network of academic and industrial third parties to acquire complementary expertise and industrial property.





Thank you for your attention

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