

Cellular Factories

Recombinant DNA technology as enabler – some general remarks

Lecture 1

Recombinant DNA (rDNA) technology

- Ability to transfer specific units of genetic information from one organism to another
- Objective of rDNA technology is to create useful products or processes
- First commercial product produced using rDNA technology was human insulin (in 1978 by Genentech)
- rDNA technology is one of the pillars for "Molecular Biotechnology"

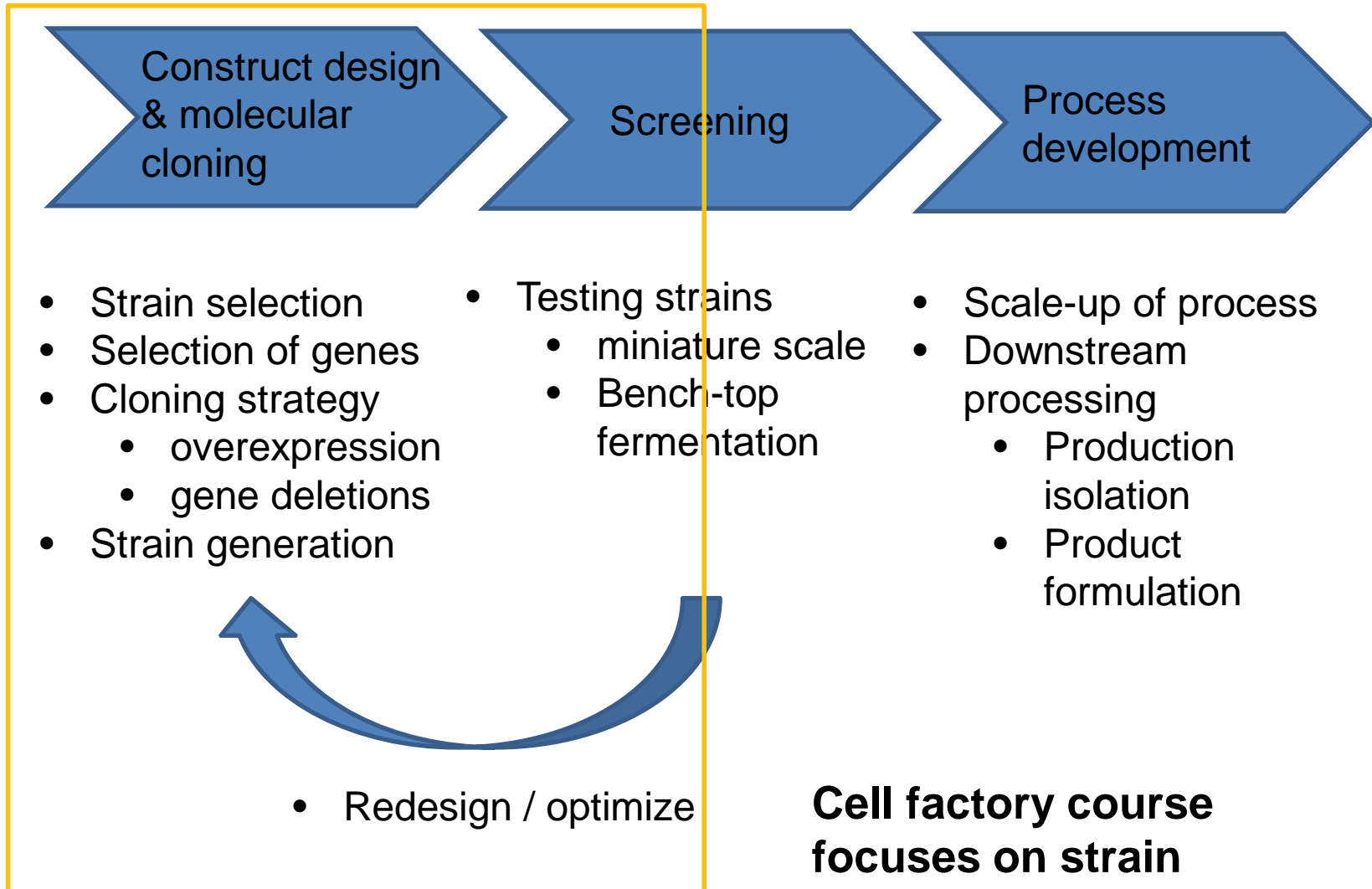
Molecular biotechnology

- Besides rDNA technology, molecular biotechnology is founded on various other disciplines:
 - Molecular biology
 - Microbiology
 - Biochemistry
 - Genetics
 - Cell biology
 - Chemical engineering

What are the general advantages of rDNA technology?

- Selection of host and vector
- Can regulate expression by choice of vector
- Genetic modification of host and cloned gene
- Choice of location of product
- Modification of protein produced
- Ease of production and scale
- Can facilitate purification

A generic workflow for production of a recombinant DNA product

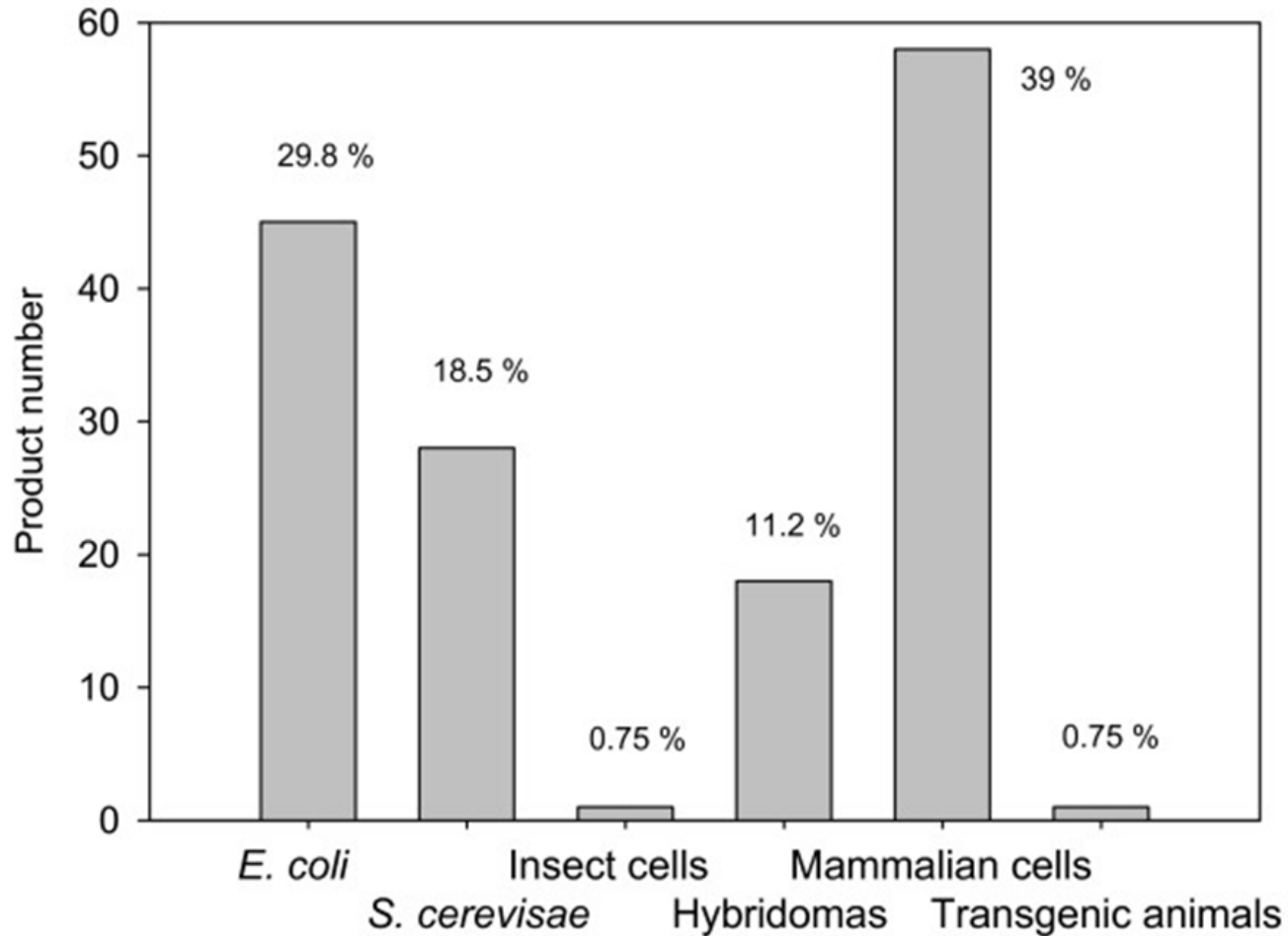


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Recombinant DNA market – some numbers

- Global recombinant DNA (rDNA) technology market estimated at 497.7 billion USD in 2016
 - products include therapeutic agents, vaccines, diagnostics, GMO crops and animals, specialty chemicals

Number of recombinant proteins approved as biopharmaceuticals in different production systems



Biotechnologically produced products – what are they?

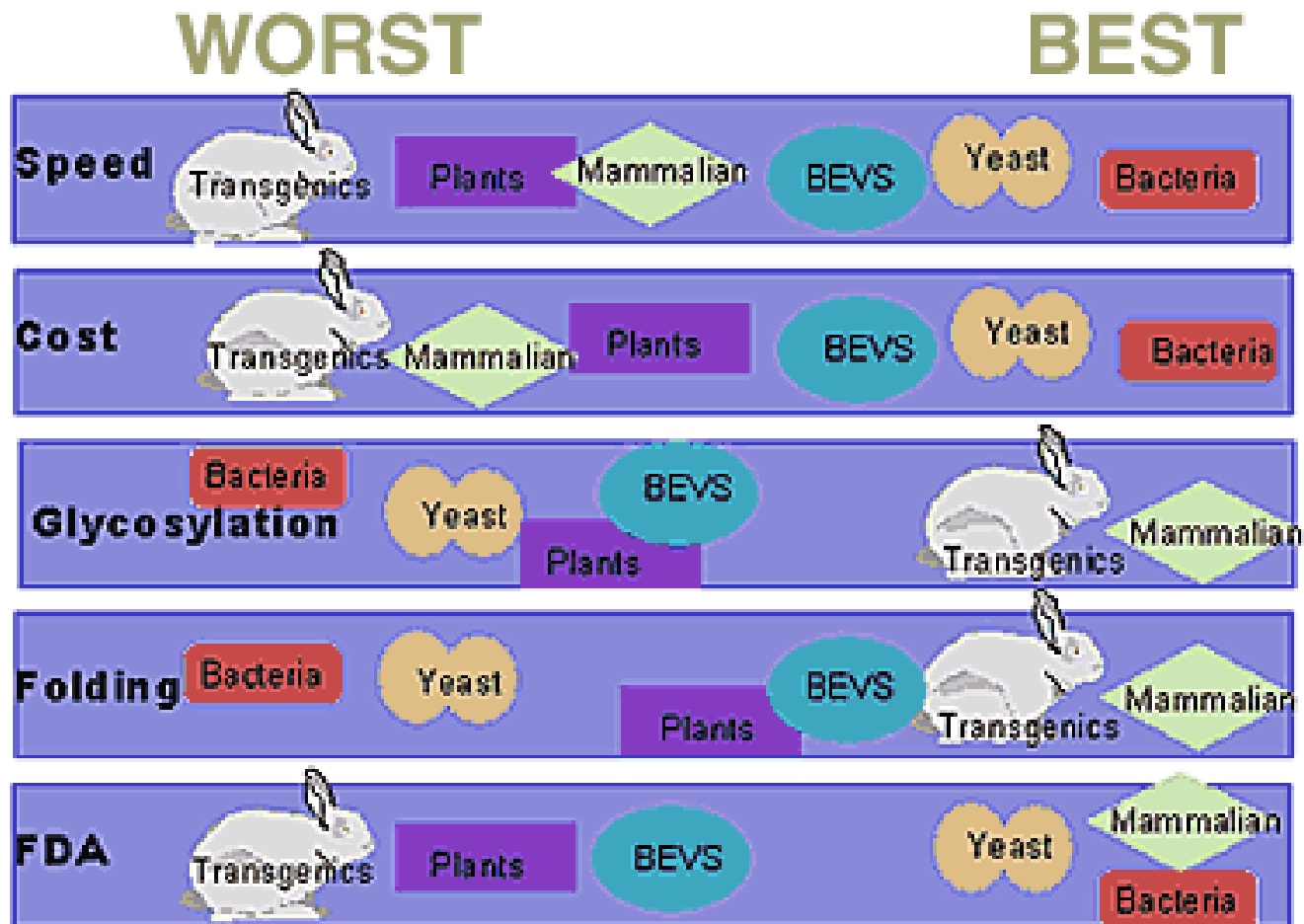
Biotechnological production system – what are they?

“We are still far from the "one-host-for-all-recombinant-gene-expression" era, and the most suitable system for a particular target protein should be determined empirically among qualified candidates.”

Sørensen, Microbial Cell Factories 2010, 9:27

What cellular system are used in the production of biotechnologically produced products?

Considerations for the selection of the expression hosts?



Discuss advantages and disadvantages!