

# Pharmaceutical Biotechnology

Dr. Aws Alshamsan  
Department of Pharmaceutics  
Office: AA87  
Tel: 4677363  
[aalshamsan@ksu.edu.sa](mailto:aalshamsan@ksu.edu.sa)

# Objectives of this lecture

**By the end of this lecture you will be able to:**

1. Develop a general understanding of biotechnology
2. Recognize the different areas in biotechnology
3. Realize the significance of biotechnology in pharmaceutical production and applications

# Biotechnology



# Biotechnology

- **Any technological application that uses biological systems, living organisms, or derivatives thereof, to make or modify products or processes for specific use**

"The Convention on Biological Diversity (Article 2. Use of Terms)." United Nations. 1992. Retrieved on February 6, 2008

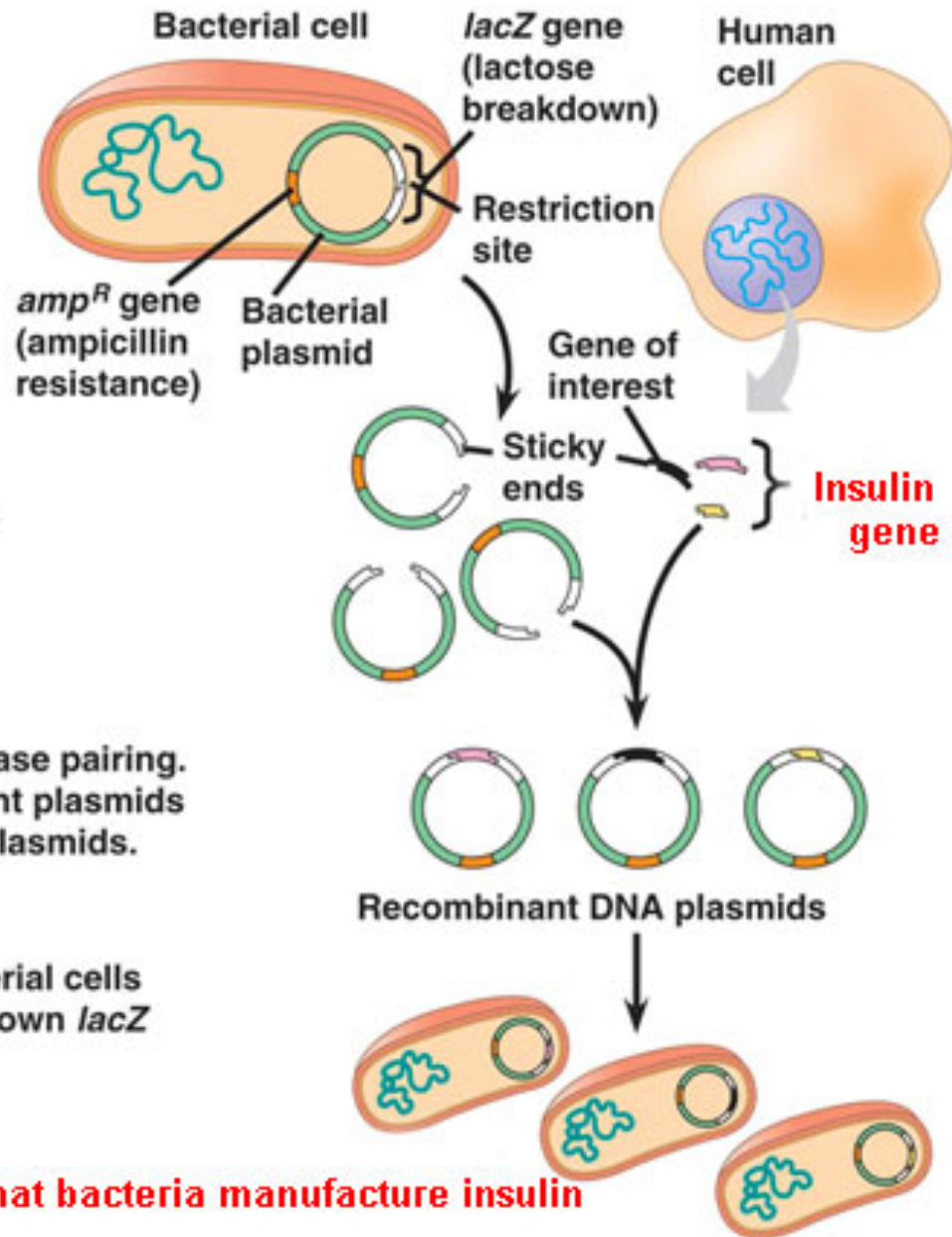
**Recombinant Human Insulin**

1 Isolate plasmid DNA and human DNA.

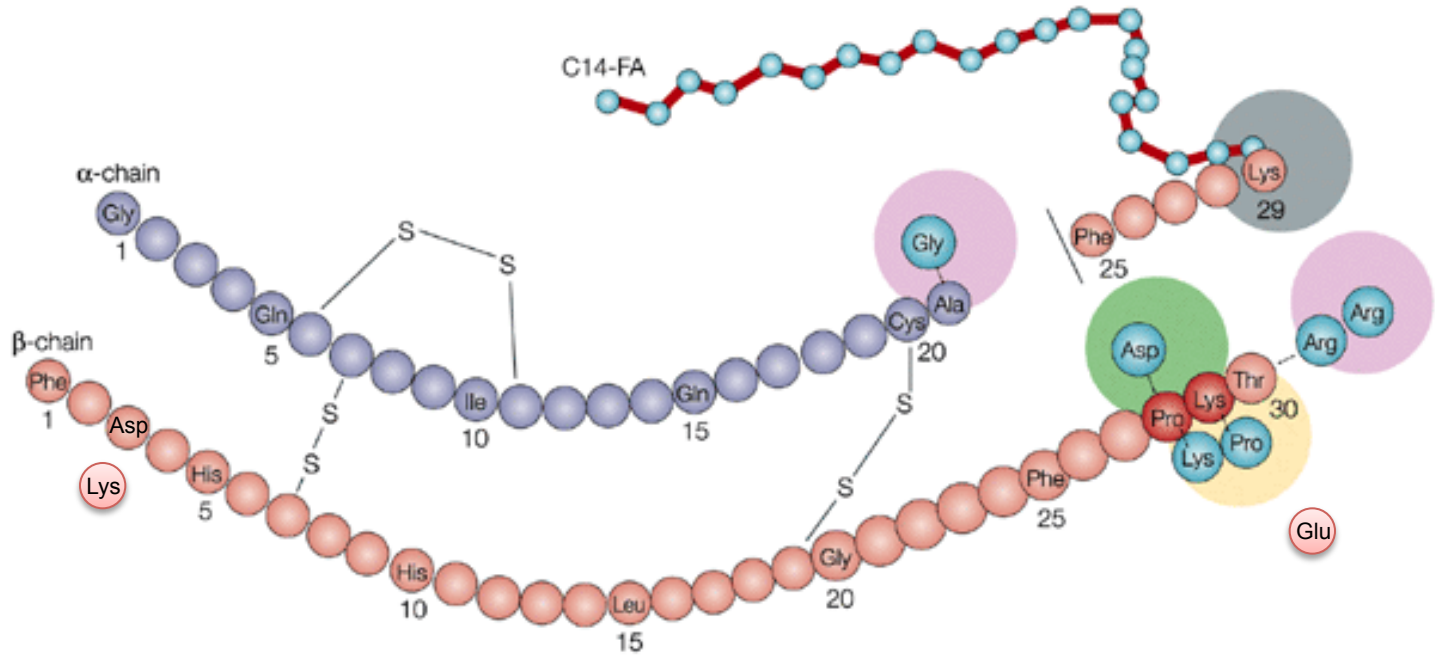
2 Cut both DNA samples with the same restriction enzyme.

3 Mix the DNAs; they join by base pairing. The products are recombinant plasmids and many nonrecombinant plasmids.


4 Introduce the DNA into bacterial cells that have a mutation in their own *lacZ* gene.

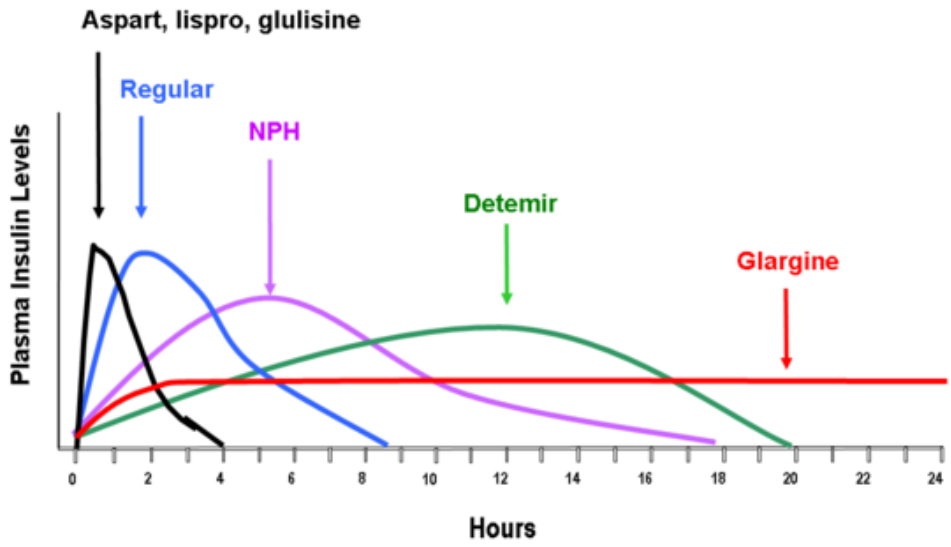


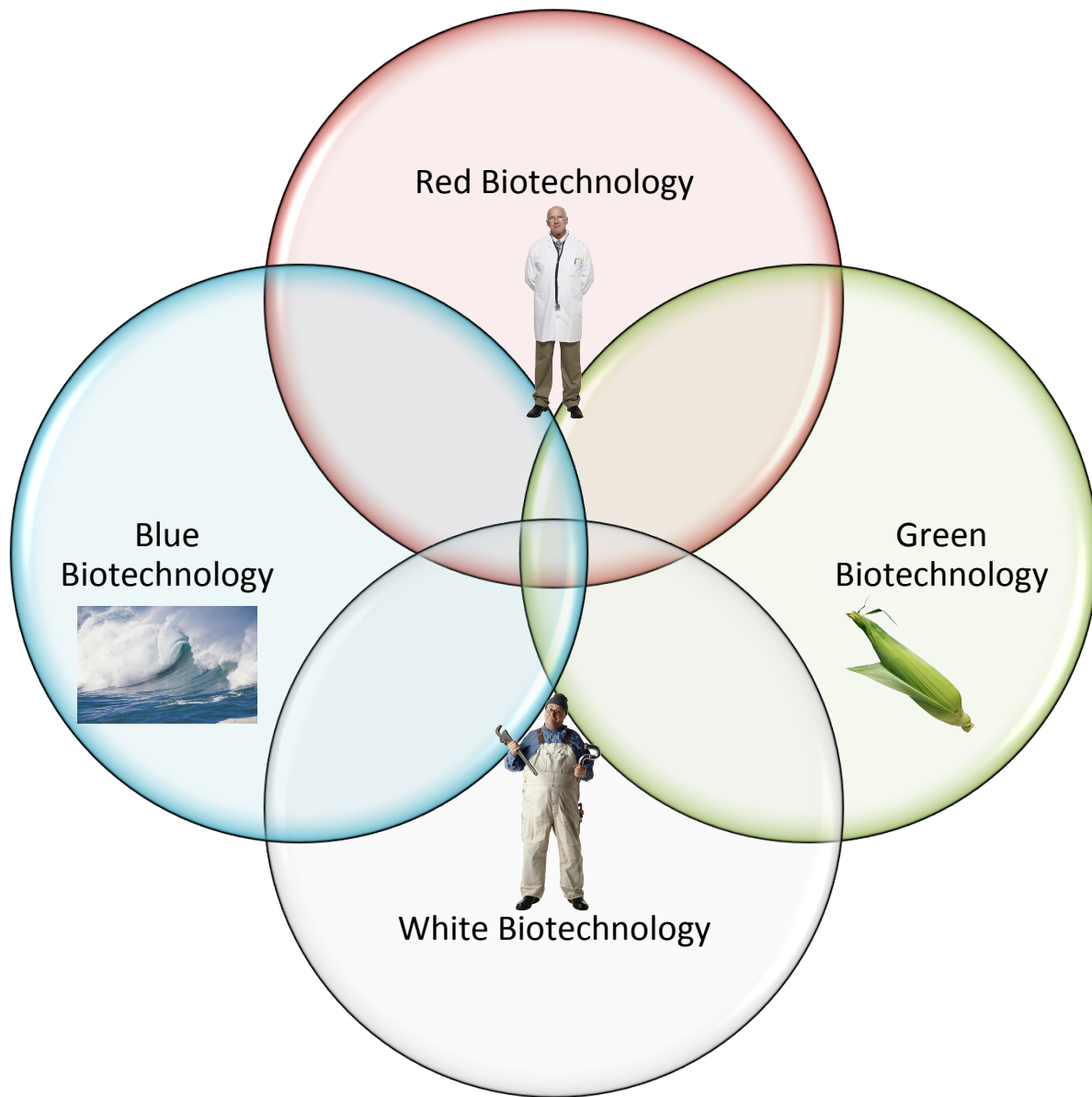
**Recombinant bacteria manufacture insulin**



Fast-acting analogues		Long-acting analogues	
	Insulin lispro		Insulin aspart
	Insulin glargine		Detemir insulin

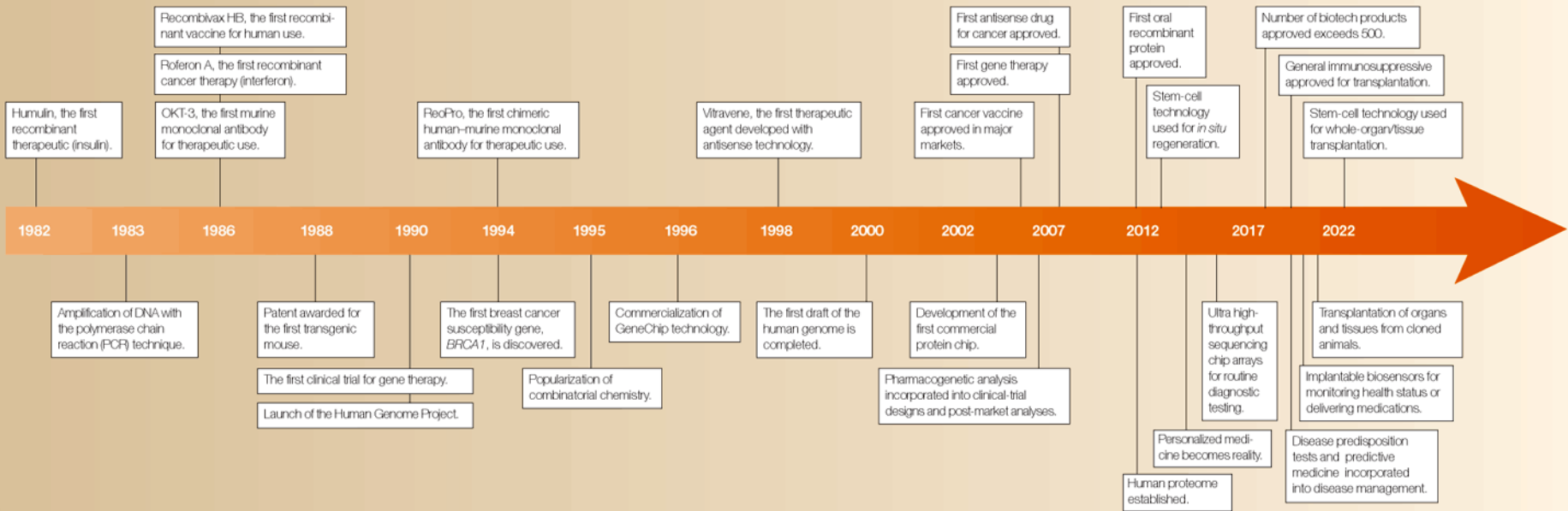
 Insulin glulisine





# Branches of Biotechnology

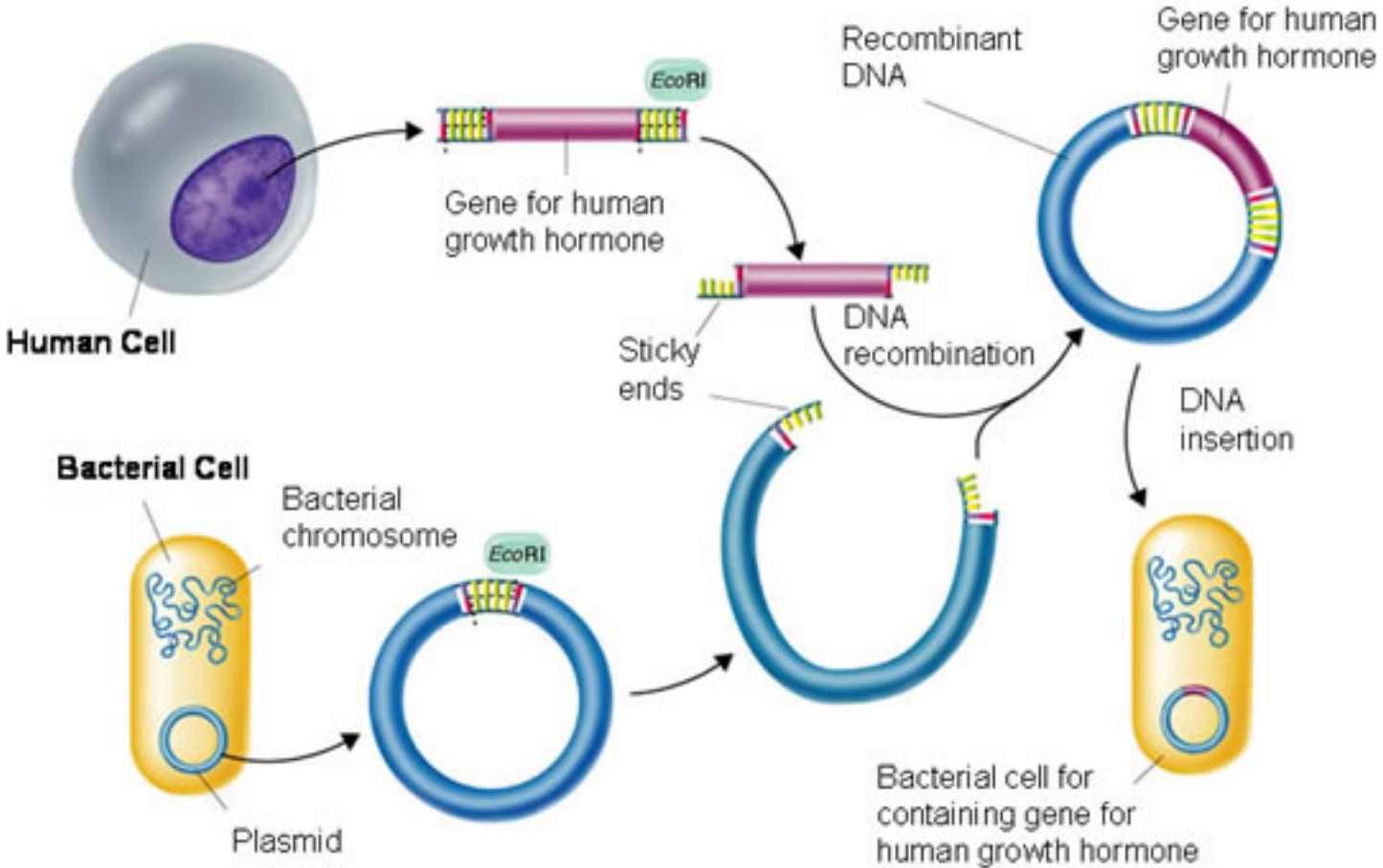
Timeline | **Biotech turns 20... and just keeps growing**



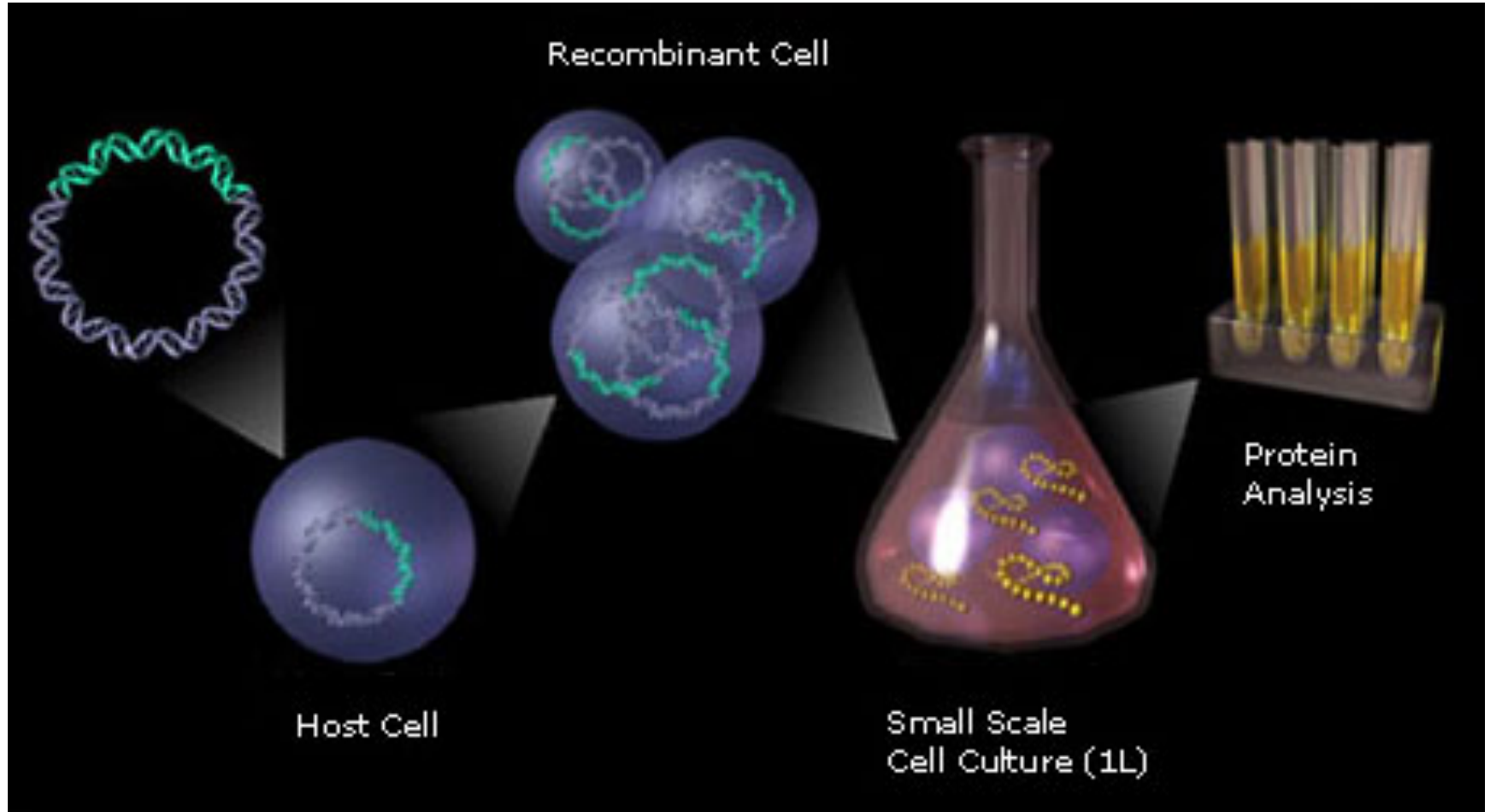
# Biotechnology Timeline



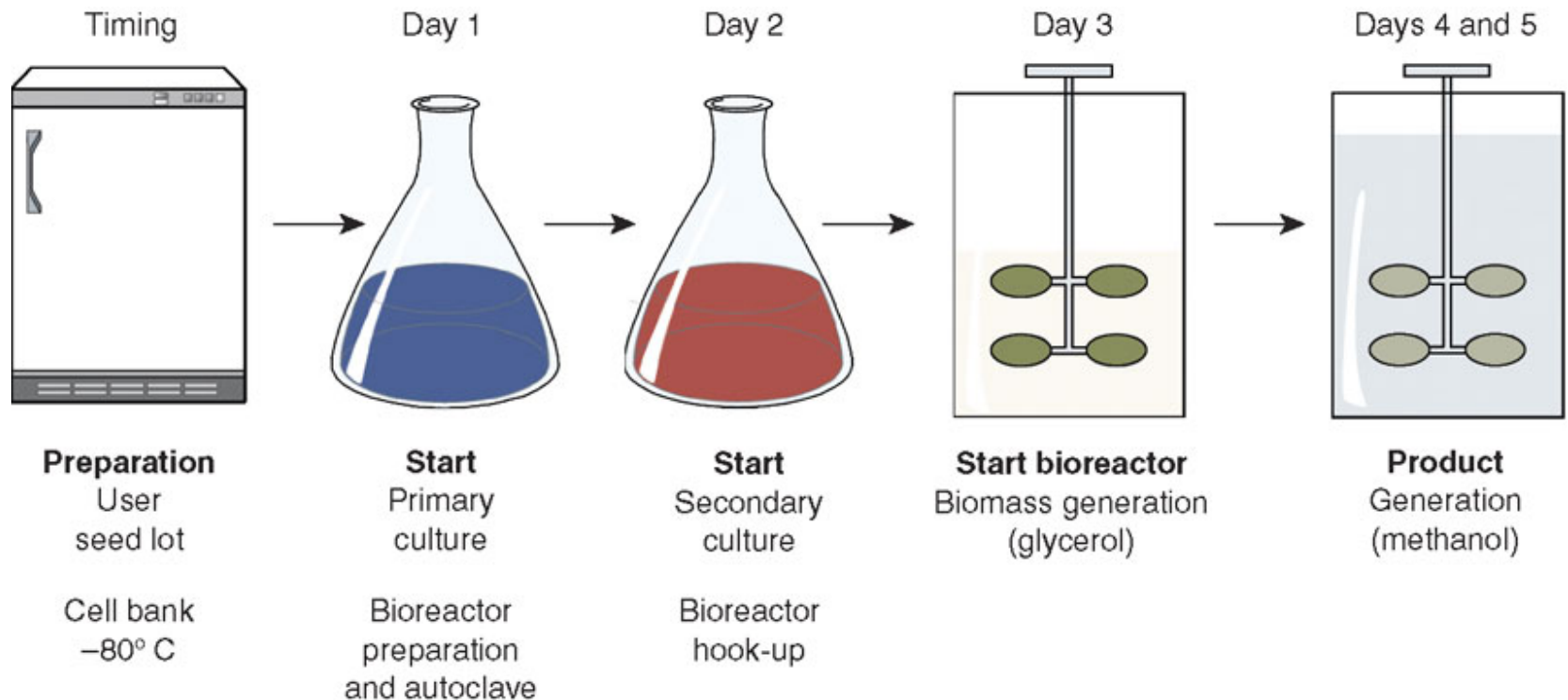
# In this course



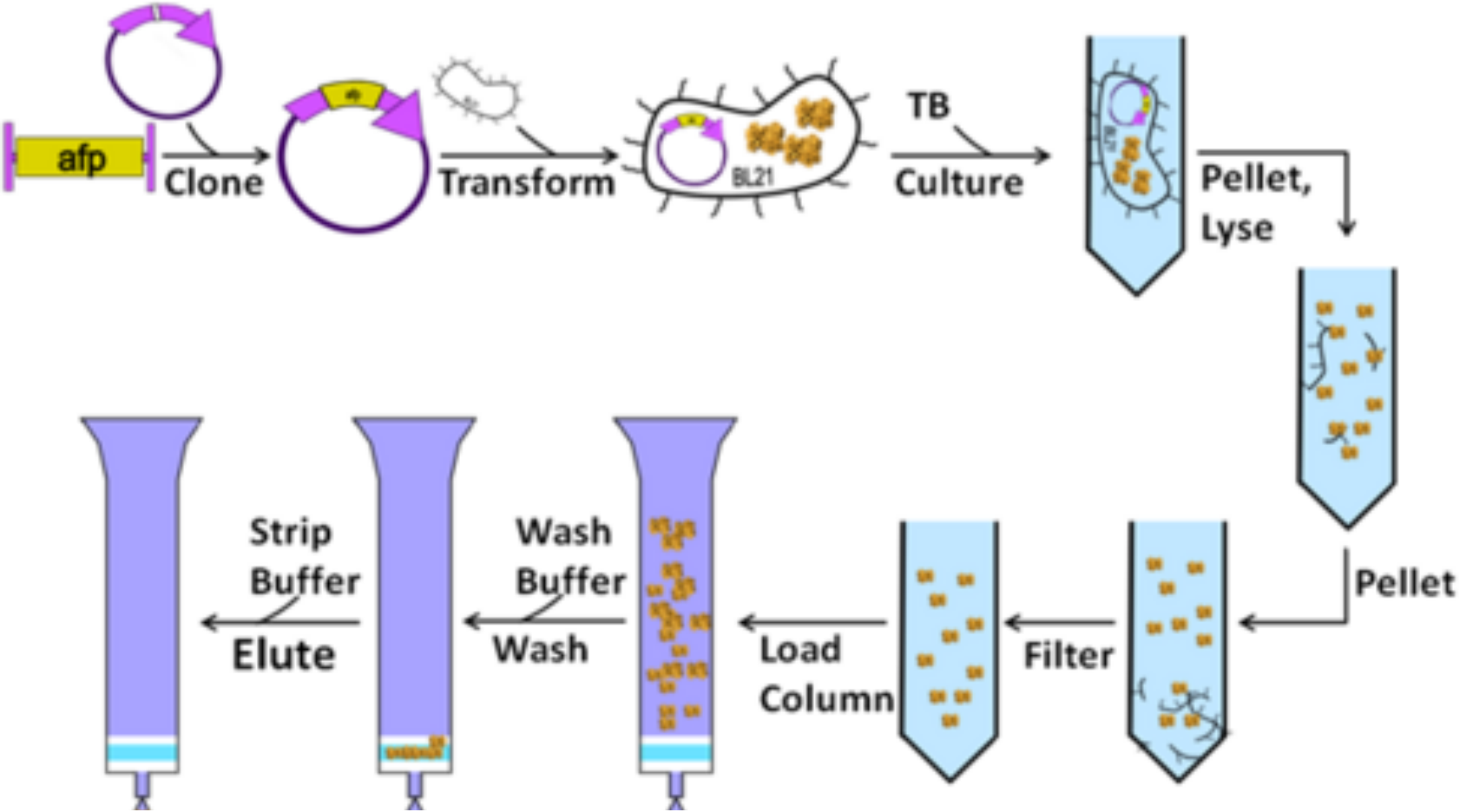
# In this course



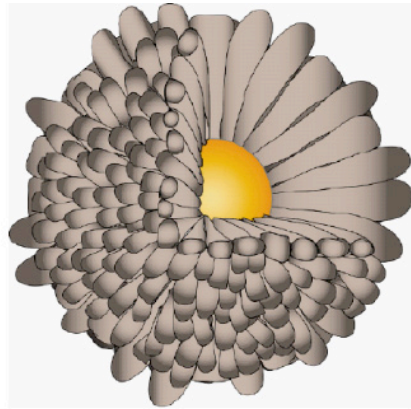
# In this course



# In this course

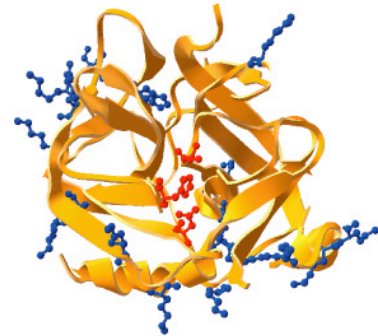


# In this course

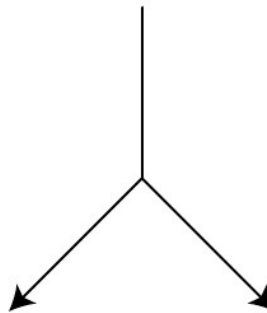


**Nanoparticle**

+



**Protein**



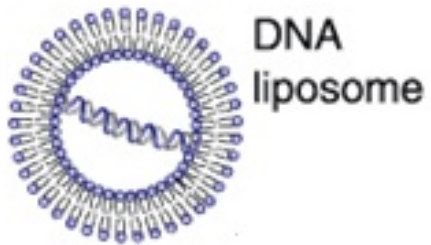
**Modular Control of Protein  
Structure and Function**

**Directed Protein-Nanoparticle  
Self-Assembly**

# In this course



# In this course



DNA liposome



Recombinant virus

Biolistic gene gun



plasmid DNA

# In this course





## **You are now able to:**

- ✓ Develop a general understanding of biotechnology
- ✓ Recognize the different areas in biotechnology
- ✓ Realize the significance of biotechnology in pharmaceutical production and applications