



Biotechnology



modify a gene on purpose, then grow it at a scale worth harvesting



Biotechnology: Old and New *

- OECD's definition: applying scientific and engineering principles to process materials by biological agents for human welfare
- the term itself was coined by Karl Ereky (1919) for large-scale pig production
- traditional biotechnology (up to 1970): fermentation-based, curd, cheese, wine, vinegar
- an art passed down before anyone knew which organism did the work
- modern biotechnology : began with recombinant DNA technology, Stanley Cohen and Herbert Boyer, 1973
- lets scientists change genetic material directly for a specific product
- two features separate modern from classical biotechnology
- the technical ability to change genetic material: rDNA technology, PCR, cell culture, bioprocessing
- and the new question of who owns that technology

Genetic engineering vs Chemical (bioprocess) engineering

Genetic engineering

- alters the genetic material itself, DNA and RNA, in a directed, predetermined way, in vitro
- covers repairing or replacing a defective gene, synthesizing a new one
- moving a gene to a new organism, gene cloning; alternatively called rDNA technology

Chemical engineering

- keeps a sterile environment for manufacturing the product at scale
- e.g. vaccines, antibodies, enzymes, organic acids, vitamins, therapeutics
- this is the bioprocessing half
- the two together, engineer plus scale up, are what biotechnology actually means

