SNS COLLEGE OF TECHNOLOGY

(An Autonomous Institution)
COIMBATORE-35
Accredited by NBA-AICTE and Accredited by NAAC – UGC with A++ Grade
Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai

19GET277 / Biology For Engineers
IV YEAR / VII SEMESTER
UNIT-II: BIODIVERSITY

MICROBIAL SYSTEM HISTORY-TYPES OF MICROBES

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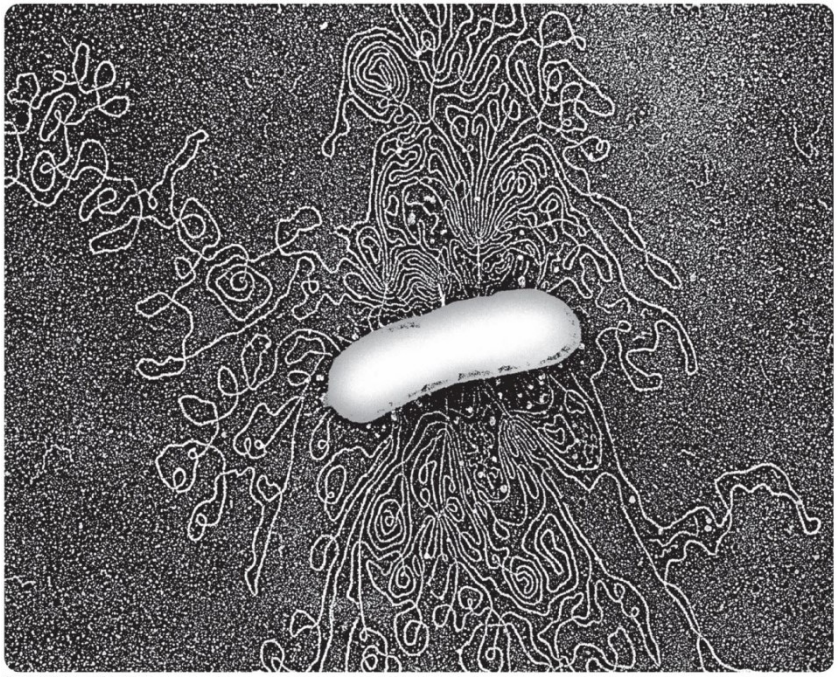
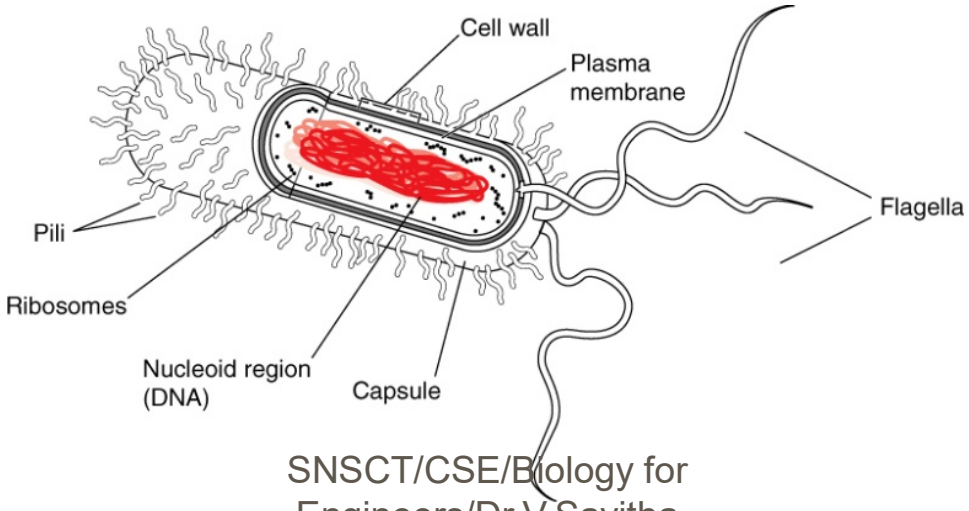
Microbial Biotechnology



The Structure of Microbes

- Prokaryotes
  - Archaebacteria
    - Includes halophiles, thermophiles, "extremophiles"
  - Eubacteria
    - On skin, soil, water, can be pathogenic



The Structure of Microbes

- Characteristics of Prokaryotes
  - Generally smaller than Eukaryotes
  - No nucleus
  - Cell wall composed of peptidoglycan
  - Conjugation (transfer of DNA by cytoplasmic bridge)
  - Transduction (DNA is packaged in a virus and infects recipient bacterial cells)
  - 20 minute growth rate (binary fission)

Yeast are Important Too!

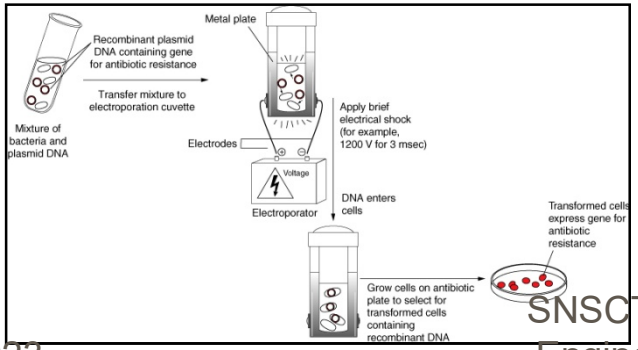
- Single celled eukaryote
- Kingdom: Fungi
- Over 1.5 million species
- Source of antibiotics, blood cholesterol lowering drugs
- Able to do post translational modifications
- Grow anaerobic or aerobic
- Examples: *Pichia pastoris* (grows to a higher density than most laboratory strains), has a no. of strong promoters, can be used in batch processes

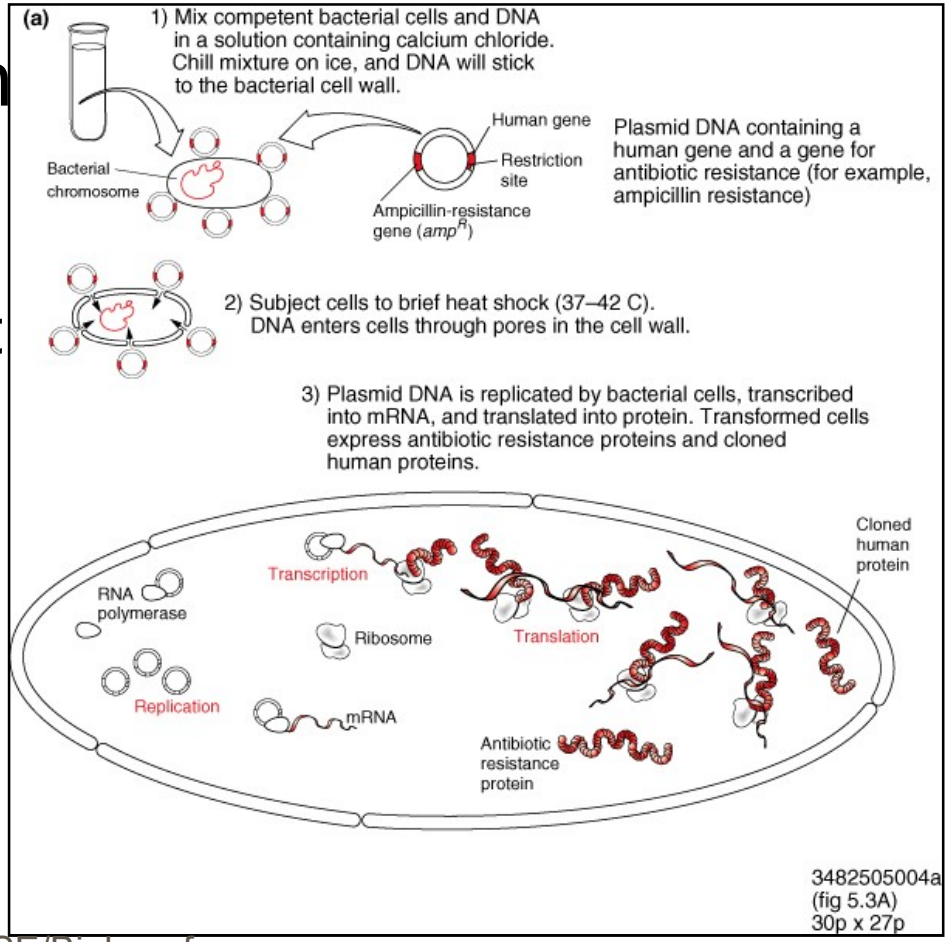
Microorganisms as Tools

- Microbial Enzymes
  - Taq (DNA polymerase), cellulases, proteases, amylases

Microorganisms as Tools

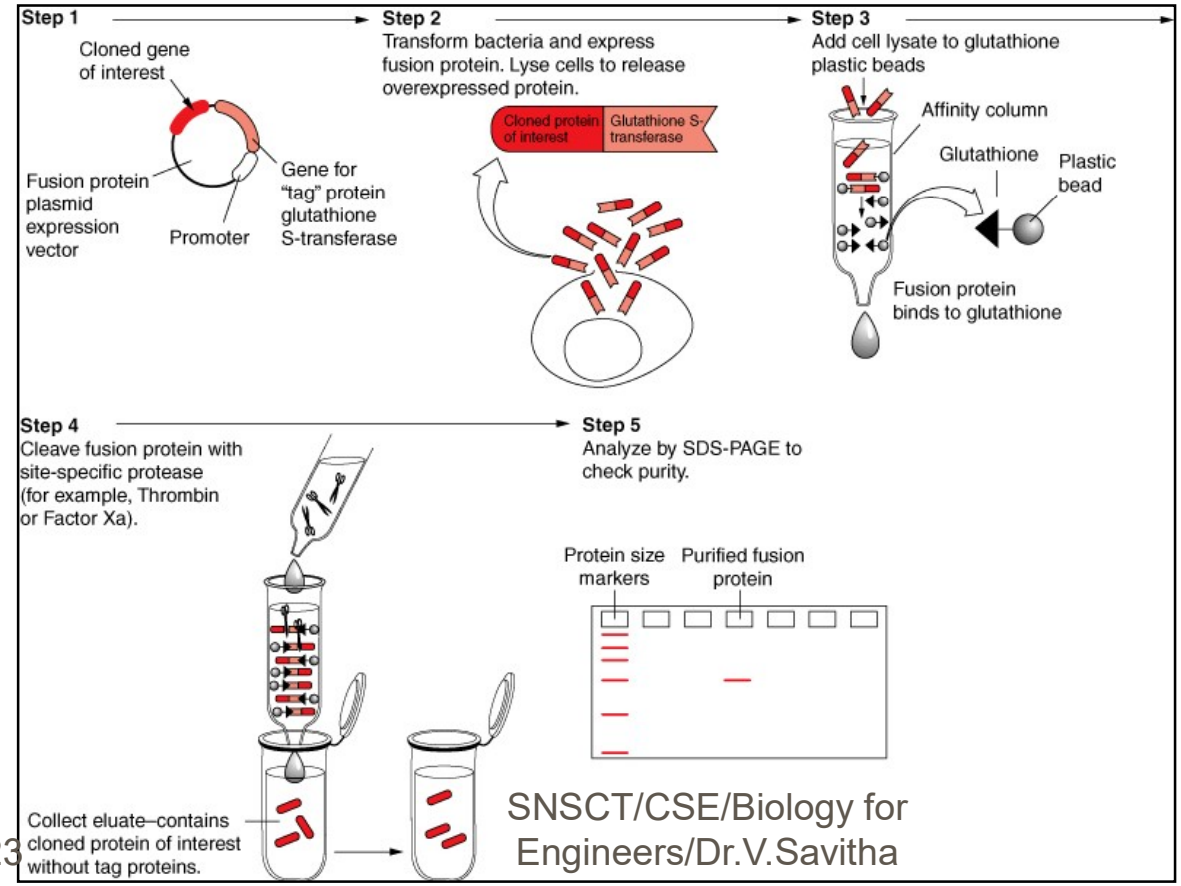
- Bacterial Transformation
  - The ability of bacteria to take in DNA from their surrounding environment
  - Bacteria must be made competent to take up DNA





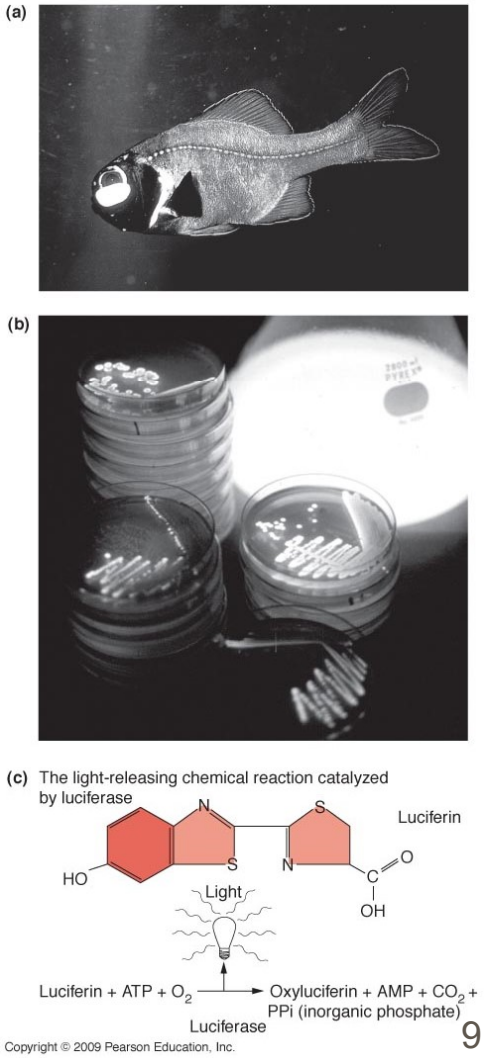
Microorganisms as Tools

- Cloning and Expression Techniques
  - Fusion Proteins



Microorganisms as Tools

- Microbial Proteins as Reporters
  - Examples: the lux gene which produces luciferase
  - Used to develop a fluorescent bioassay to test for TB



Microorganisms as Tools

- Yeast Two-Hybrid System
  - Used to study protein interactions