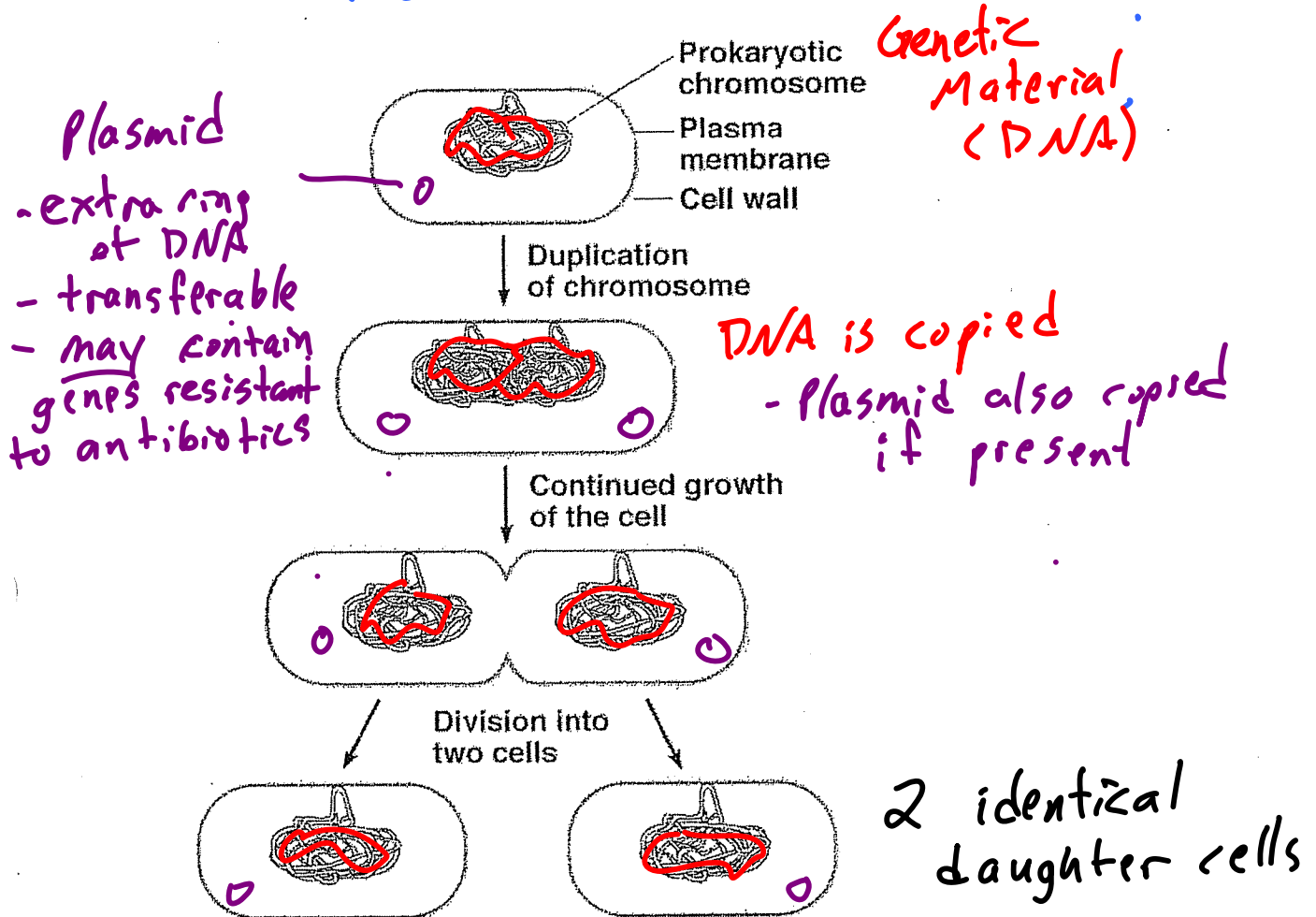


Reproduction in Bacteria

without sex \rightarrow *split*
Asexual Method - Binary Fission

Bacteria reproduce asexually by a process termed binary fission. This process involves one parent and results in offspring identical to the parent.



During binary fission.

- (i) DNA is replicated. The bacterial cell's large circular chromosome is copied. (The bacterial plasmid is also copied if present)
- (ii) Two identical chromosomes (& plasmids) align at the centre of the cell, separate and move to opposite ends of the cell.
- (iii) The cell divides and 2 identical daughter cells result.

This is the most common form of bacterial reproduction.

This increases the number of bacteria

Advantages of Binary Fission:

- (i) large number of bacteria quickly
- (ii) one individual can ensure species survival
- (iii) Because of their rapid reproduction, a population of bacteria can adapt quickly to their environment. A mutation that increases the fitness of the species will be passed relatively quickly through out the population.

Disadvantage:

Offspring are genetically identical to the parent cell and each other. A change in the environment could cause the demise of the entire population. i.e. virus is introduced \rightarrow death

Sexual Reproduction – Conjugation: "come together"

Bacteria reproduce sexually by a process termed conjugation. This process involves 2 parents and results in "offspring" different from the parents. \rightarrow modified bacteria

Conjugation involves the direct transfer of genetic material between two bacterial cells that are temporarily joined.

During conjugation,

- (i) Two bacteria cells come into contact. A protein link (termed a sex pilus or conjugation tube) is formed between the two cells.
- (ii) Part of the DNA (usually the plasmid) from one cell is copied and passed through the conjugation tube to the second cell.
- (iii) The plasmid gets incorporated into the new cell's genome. The recipient cell now possess new combinations of genes, increasing diversity.

Note: The two cells involved in conjugation are generally of two different mating types. The donor cell carries the F factor. \star fertility

F factor: DNA segment (gene) that codes for the ability to form a conjugation tube.

The F factor may be part of a plasmid or the bacterial chromosome.

Advantage of Conjugation: Genetic Diversity

The population is more likely to possess individuals who can survive a change in the environment.

Disadvantages:

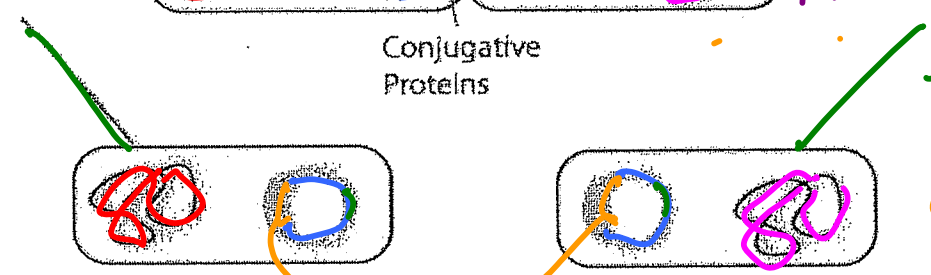
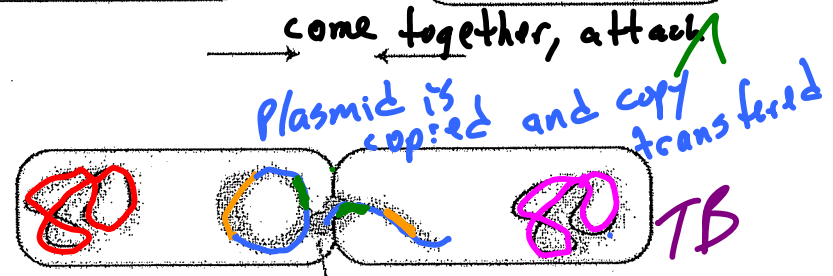
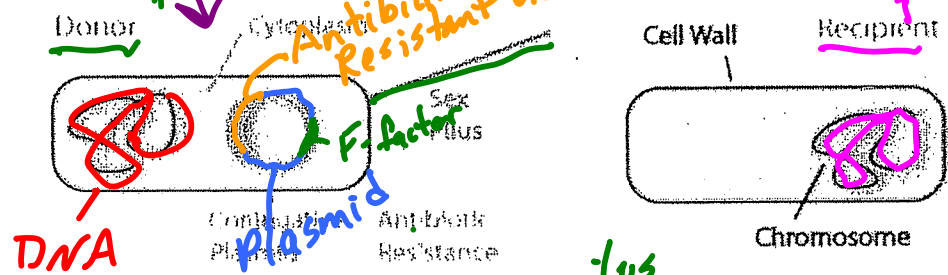
- (i) need a mate (with F factor!)
- (ii) doesn't increase # of bacteria

Conjugation

S strain #1

TB

S strain #2



Antibiotic Resistant Genes

New strain of antibiotic resistant bacteria that is able to produce sex pilus.

Donor of AMR genes.

