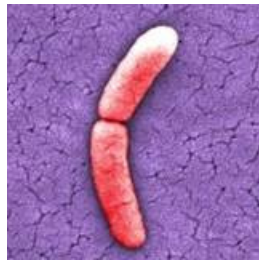
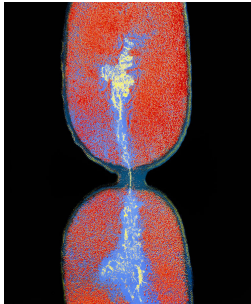


## Reproduction Outline

I) Asexual Reproduction: only requires a single parent and produces offspring that are genetically identical to the parent

A) Types of Asexual Reproduction

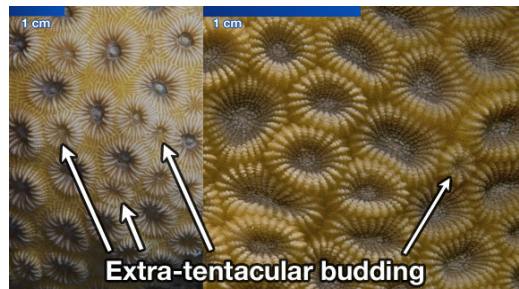
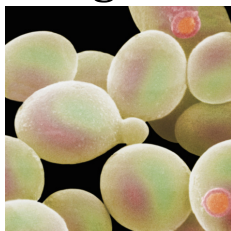
1) Binary Fission: cell division in prokaryotes that produces two genetically identical daughter cells



2) Fragmentation: an organism is separated into different pieces and each piece grows into an individual



3) Budding: a new organism grows out of an existing one



## Reproduction Outline

- 4) Parthenogenesis: an egg produced by a female matures into an individual without being fertilized



### B) Advantages of Asexual Reproduction

- 1) Organisms do not have to use a lot of energy and resources to find a mate
- 2) Process is quick and simple
- 3) Can potentially produce many offspring

## Reproduction Outline

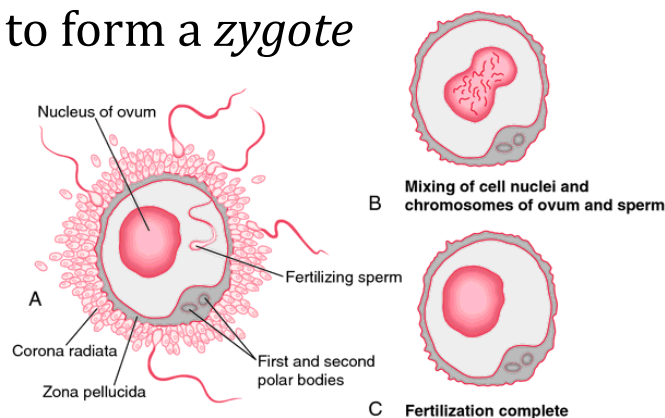
### C) Disadvantage of Asexual Reproduction

- 1) Offspring have no genetic variation and are unable to adapt in a changing environment



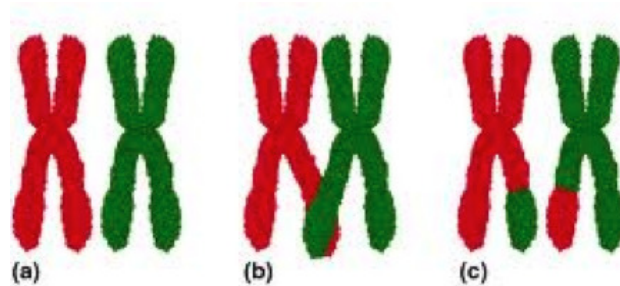
### II) Sexual Reproduction: requires the union of two different gametes (egg and sperm) and produces offspring with genetic variation

- 1) Sexual reproduction requires *fertilization* of an egg cell by a sperm cell to form a *zygote*



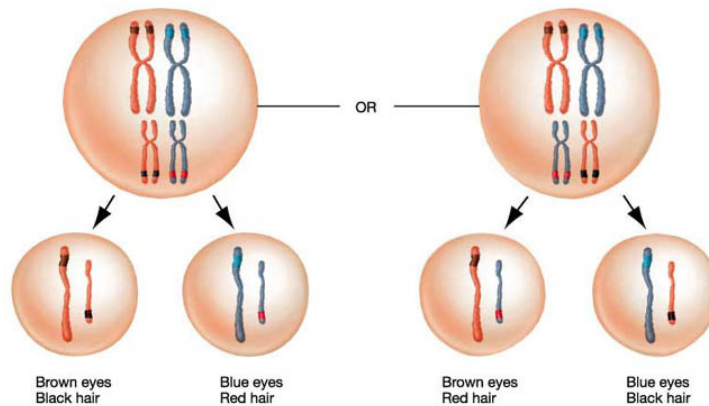
## Reproduction Outline

- B) Advantage of Sexual Reproduction:  
**GENETIC VARIATION!** There are three major sources of genetic variation:
- 1) Crossing over: exchange of genetic material between homologous chromosomes



- 2) Independent Assortment (Mendel's Third Law): alleles separate from each other independently; the inheritance of one allele does not guarantee the inheritance of another

During meiosis I, tetrads can line up two different ways before the homologs separate.





## Reproduction Outline

- 3) Random Fertilization: it is random which sperm cell makes it to the egg to fertilize it first



### C) Disadvantages of Sexual Reproduction

- 1) Takes time and energy to find a mate



- 2) Much more complicated process than asexual reproduction