

February 16, 2015

Cell Cycle and Mitosis

Announcements

- Quiz 4 Opens today
- Exam 2: Monday, February 23rd
 - Study guide will be available by Tuesday

Outline

- Types of Cellular Reproduction
- The Cell Cycle
 - Growth
 - DNA Synthesis
 - Mitosis
- Controls on the Cell Cycle
 - Real-World Application: Cancer

Cells are the first level with “life”

- 7 Properties of Life
 1. Order
 2. Regulation of internal environment
 3. Growth and Development
 4. Energy Processing
 5. Response to the Environment
 6. Reproduction
 7. Evolutionary Adaptation

- Cell Theory: Living things are made of cells and cells reproduce from other cells

Cell Reproduction

- Asexual reproduction: Cells divide creating identical cells
 - o Replacement
 - o Growth
 - o Produce new individuals, identical to parent cell
- Sexual Reproduction: Gametes fuse to create zygote
 - o Produce new individuals, different from parent cells

Asexual reproduction

- All prokaryotes
 - o All prokaryotic cells reproduce asexually
 - o Primitive reproduction
- Some unicellular protists, invertebrates, plants
 - o Some multicellular organisms reproduce both sexually and asexually
 - o Many eukaryotes (invertebrates and plants) reproduce both sexually and asexually
- Processes of Asexual reproduction
 - o Budding: creation of new individuals from growths of existing individuals
 - Corals and sponges create new columns from the side and end up creating a new organism
 - o Fission: splitting of one organism into 2 organisms
 - Unicellular organisms (bacteria) grow bigger and bigger until they split themselves apart

- o Fragmentation and Regeneration: Breaking of body part, followed by growth and development
 - Invertebrates and plants
 - Starfish: if you break off an arm of a starfish it can grow into a completely new individual
 - Will be genetically the same though
 - Taking a spike of Aloe and planting it in a different pot
- Advantages
 - o Sessile animals can reproduce without a mate
 - Sponge and Corals are settled in one place and can reproduce without trying to find a mate
 - o Produce many offspring quickly, without energy invested in sperm and eggs or in mating
 - Bacteria spreading is the bacteria reproducing quickly
 - o Produce offspring with optimal genetics for environment
 - Offspring have very specialized genes for CURRENT environmental situation
- Disadvantages:
 - o Genetically uniform populations
 - Genetically well suited for the current environment but not for the future environment should the environment change
 - Prevents adaptation of population in changing environment

Cell Cycle