

Advantages & Disadvantages - Asexual Reproduction

Advantages - many offsprings produced quickly when conditions are favourable and ensure species may survive when conditions or # of predators change, little energy required to find a mate, large colonies can form to out-compete other organisms for nutrients & water

Disadvantages - negative mutation can make offspring susceptible to disease, can destroy large # of offspring, some ways produce offspring close together = competing for food and space, unfavourable conditions (extreme temperature) can wipe out entire colony

DNA

DNA - a molecule that stores the genetic information of an organism, 4 nitrogen bases (adenine, guanine, cytosine, thymine)

States of DNA of increasing compactness - uncoiled double helix, chromatin, chromosomes

Contains the instructions for a cell to function

Nucleus

Proteins are not made here, activities carried out from here can be studied using nanotechnology, DNA of eukaryotic cells found here

Cytoplasm & duplicated organelles divide during cytokinesis, duplicated contents in cell's nucleus divides during mitosis

Binary Fission

Binary Fission - reproduction of prokaryotic cells (w/out nucleus), into 2 daughter cells after DNA replication, no cell cycle & mitosis

Vegetative Fragmentation

Fragmentation - if an organism breaks apart from injury, each fragment develops into a clone of its parent

Vegetative Reproduction

Reproduction - special cells (usually in plant stems or roots divide repeatedly to form structure that will develop into an identical plant to parent

Disadvantages - new plants grow closely to each other and parent, can lead to competition for soil, nutrients and light - less healthy plants

Cloning

Cloning - technology used in agriculture and research to copy desired organisms, tissues, genes

cloning that produces genetic duplicate of cells, tissues, organisms, for correcting health problems

Reproductive Cloning

Reproductive Cloning - produces a genetic duplicate of existing or dead organisms through somatic cell nuclear transfer, requires stem cells

1: remove nucleus from egg cell 2: remove mammary gland cell from adult female 3: fuse mammary & egg cell w/ electricity 4: fused cell begins dividing 5: insert dividing embryo into a surrogate female's uterus

Reproductive Cloning (cont)

controversial since best stem cells are from embryos which are destroyed when harvesting cells

Stem Cells

Stem Cells - a cell that can become/produce different kinds of cells by differentiation, can be used to replace damaged cells from injuries or disease

Checkpoints

Checkpoints - prevent division if cell's out of nutrients, DNA not replicated or is damaged

Gene Mutation

Gene Mutation - results in the death of an organism, substitution, addition, deletion can occur during DNA replication or when chromosomes fail to move into 2 cells, proteins' effect on the organism may be positive, negative, or neutral, if involved checkpoints = out of control cell cycle = cancer

Genes = segments of DNA, located on chromosomes

Cancer Cells

Cancer cells - damaged cells may replicate unchecked, generally is the result of mutation, cancer doesn't result from cells that don't have adequate nutrients

Chromosome Mutation

Chromosome Mutation - occurs randomly & naturally or because of mutagens (radiation, chemicals), can lead to genetic disease or death, changes in chromosomes can cause changes in Genetic Information (during meiosis), can be passed on to an offspring

Whole Chromosomes Mutation

Whole Chromosome Mutation - can occur in meiosis I when homologous chromosomes fail to separate or when sister chromatids fail to separate in meiosis II

Result: 1 gamete will have 2 copies and 1 will have 0, zygotes rarely survive w/ the result if they do = serious genetic disorder

Advantages & Disadvantages - Sexual Reproduction

Advantages - offspring are genetically different from their parents, may survive new diseases or other threats appeared in a population, more protection to embryo and more parental care to offspring, sperm are deposited inside the female (internal), little energy required to find a mate and great # of offsprings can repopulate an area after a disaster (external)

Disadvantages - fewer offspring produced, if # of predators increase, population will decline, more energy to find a mate and may expose individuals to predators, diseases, or harsh environmental conditions (internal), gametes, embryos, and offsprings unprotected and often are preyed upon (external)

