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## Activity 12.1 what is mitosis

GENETICS & DEVELOPMENT - Cell division Physical basis of heredity ... Key concepts\* Mechanisms of cell reproduction... egg cells and sperm multiply identically, but w variations (new traits) All living cells arise from existing cells GENETICS asks.... As? mechanisms at the cellular and molecular level of development looks .... on the life cycle of organisms 1. reproduction mechanisms of organisms 2. growth of the body ..... yigoth to adult cell differentiation - as one cell becomes different from another differential gene activity - genes are active at different times totipotency & cloning - exact genetic copies of CELL REPRODUCTION TECHNIQUES INCLUDE ... Fission\* - binary = 2 equal halves (bacteria & cyanobacteria & protozoans) Budding\* - outgrow detach = new organism (uneven) (hydra) Chapter 46.1 video: Video: Hydra Budding Mitosis\* - asexually = identical genetic copies [cytokinesis] genetically equal somatic cells c7 pic 1.5 lungs\* bone, brain, & fertilized egg divisions Meiosis\* - sexually producing sperm & egg with 1/2 chromosome # & new gene combo Mitosis - Asexual reproduction of the cell cycle ... copies & equal duplication of dna of the parent cell and equal separation of chromosom into two cells of the daughter (rates = liver cells 1x / yr - epithelial cells 1x / day) Cell life cycle ... called CELL CYCLE... Conceptual Activity 12.2 - Cell Cycle [3 Stages] - Cell Cycle Is Depicted as Circle 360o Fig 12.5\* [G1 - S - G2 - M] Interphase - period between sequential cell divisions 3 parts = G1 - earlier, DNA synthesis (S), & G2 period after MITOSIS - phase of nuclear separation; separation and duplication by chromosome Cytocinesis \* - physical cell division into two parts: animals/plants Names and figures - (to protect innocents) bacteria have about 3,000 genes & 1 chromosome people have about 20 to 25,000+ genes & 46 chromosoms People have 46 chromosomas or 23 homological pairs 23 maternal chromosomas 23 parent chromosomas Control cell division and cell cycle 2001 Nobel Prize regulated Growth Factors - proteins that contribute to the division of MPF cells - mitotical factor advancement ... [ complex\* of two proteins CDK + cyclin] MPF is a kinase enzyme that switches on/off the proteins of the target cell cycle, phosphoriling them..... inactive protein cycle -----& active P ATP ---& ADP MPF promotes entry into mitosis from phase G2 by phosphorylation of several proteins during mitosis, including one that leads to the destruction of the very cyclin MPF - CDK - protein cell division control - cyclin of the dependent kinase; active only when tied to cyclin; cyclin - a protein, the amount of which cyclically changes\*; when in high concentrations \* binding to CDK makes MPF ... [cyclin + CDK = MPF]... promotes Mitosis Growth Factors are regulated at critical points ... Cell cycle checkpoints \* Concept of activity - 12.1 - Roles of cell division of sex cells reproduction ... «MEYOZIS» compare physical differences\* between the nuclear division of MEIOSIS & MITOSIS, so different differences are: Key concepts \* meiosis = 4 celligen [1 = 2 = 4]... thus, 2 divisions of mitosis = only 2 cells of the daughter ... Thus, 1 cell division of meiosis = half the number of chromosomes mitosis = the same # chromosome as parental cell meiosis = new gene combinations not in parents & chromosomes sort randomly each other's mitosis = daughter's cells are genetically identical to sexual reproduction of cells (Meyosis) Where meiosis occurs during the sex cell cycle ? Meiosis --- & produces cells half chrm # = 23 (sperm & egg - haploid) fertilization (sperm + egg) -----& diploid life cycle\* (chrm # = 46) Alternating generations \* & Human life cycle Conceptual activity 13.1 - Asexual and sexual life cycles Stages of sexual separation of cells are the same 3 phases ... just like in the asexual division (Interfase, nuclear division, cytokinesis), but, 2 departments of Meiosis I and Meiosis II 1 cell = 2 cells = 4 cells The names of the stages are the same and have similar functions of Meiosis I... Profase I = chromosoms condense SYNAPSIS - homologs STEAM together = tetrad crossover\* - exchange for chiasma\* Metafaz I = chromosoms align at the equator Anafaz I = chromosoms migrate towards the poles telofaz I = chromosom at the poles cellular domains of a separate Meyosis I is shared by homologists of homological steam\* Fig 13.7\* MayoZ II... just as mitosis separates

the chromatides of one homologist's homological pair in the same way, as it does in mitosis Comparison (Fig. 13.9)\* Mitosis/Meose - comparative animation Independent assortment\* - random alignment of homologs (fig) Intersection - sharing chromosomal material Concept Activity 13.3 - Meiosis Animation Sumanas, Inc. animation Meiosis\* Summary MEIOSIS [difference table]\* 1. Phase of nuclear division of reproduction of sex cells 2. Two consecutive divisions, results in 4 daughter cells ... Mayoz 1 and Mayoz 2 3. Abbreviation / separation occurs .... diploid ---- > haploid cells daughter 1/2 number of parent cells chromosom 4. Stages have the same nomenclature as profase Mitosis, metaphaz, anathase, telofase, M1 & M2 5. Only one phase S, where DNA is often duplicated, may not be a transfusion between M1 and M2 6. Homologists separate at Meyosis 1 Chromatide separately at Meyosa 2 (mitotic-like) 7. Random assortment is happening ..... homologs are aligned according to the equatorial plates, independent of each other 8. Crossing the... may occur in Profaz 1... synapsis = close paired homologists allow you to exchange chiasma = dot exchange sister chromatids Effects of sex ... new combos of the gene / chromosome, which did not exist in any parent, which will become the material of evolution... Next Lecture Key Concepts\* Concepts\*

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