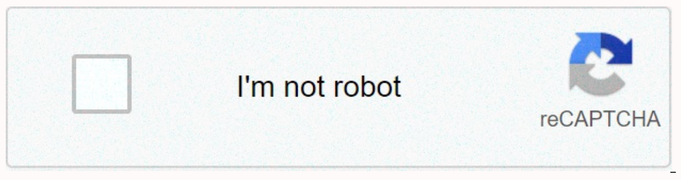

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Introductory cell biology and genetics pdf

Bachelor of Science in Genetics and Cell Biology Core Courses Students take the following core courses as well as other university, university and study requirements. Biol 106 & 107—Introductory Biology I & IIChem 105 & 106—Principles of Chemistry I & IIChem 345—Elementary Organic Chemistry I Math 140—Mathematics for Life Sciences or 171—Calculation IMath 21 2 —Introduction to Statistical Methods or Stat 412—BiometryPhys 101 & 102—General Physics I & II or 201 & 202—Physics for Scientists and Engineers I & II MBioS 301—General Genetics MBioS 303—Introduction of Biochemistry MBios 304—Micro/Molecular Biology LabMBioS 305—General Microbiology Lecture MBioS 401—Cell BiologyMBioS 402—General Genetics LabMBioS 404 —Molecular Biology MBioS 423—Human GeneticsMBioS 442 General Virology or Biology 476 EpigeneticsMBioS 478—BioinformaticsMBioS 494—Senior Project One Lecture and a Laboratory Choice Course. Pre-Med students and interested advanced degrees should take a year of organic chemistry, which includes Chem 345 and 348. Completion requirements See The WSU catalogue for study requirements and talk to your academic advisor about planning and planning your courses. All students must meet the requirements described in the catalogue in order to complete their degree. Cells form the basis of all living beings. They are the smallest unit of life, from the simplest bacteria to blue whales and huge sequoias. Differences in the structure of cells and they perform their internal mechanisms form the basis of the first great divisions of life, in the three kingdoms of Archaea (old bacteria), Eubacteria (modern bacteria) and Eukaryota (everything else, including us). An understanding of the cells is therefore crucial in any understanding of life itself. Cell biology is the study of cells and how they function, from the subcellular processes that keep them functioning to the way cells interact with other cells. While molecular biology largely focuses on the molecules of life (mainly nucleic acids and proteins), cell biology deals with how these molecules are used by the cell to survive, reproduce and perform normal cell functions. In biomedical research, cell biology is used to learn more about how cells normally function and how disorders in this normal function can lead to disease. An understanding of these processes can lead to therapies that work through targeted stonant function. Common Cell Biology Techniques The following list covers some of the most commonly used cell biology techniques – it is by no means exhaustive. cell/tissue culture – just like bacteria and other simple organisms in the laboratory outside normal environment, cells and tissues from more complicated organisms can also be cultivated. The techniques are slightly different, and the culture media are more complex to reflect the complex internal environment within the host from which the cells are derived. Are. and tissue culture is a powerful tool that provides an almost unlimited supply of test material for researchers without having to resort to whole organisms. In addition, the controlled conditions in cell and tissue culture allow researchers to conduct experiments with a smaller number of variables that can influence the outcome of the test. Cell culture can use cells that are removed directly from an organism (primary culture), or it can use lines of cultured cancer cells. The advantage of the latter approach is that cancer cells continue to divide, while primary cultures stop dividing after a series of cycles. Microscopy – the basic tool of cell biology is microscopy. Recent advances in imaging technology have made it possible to extract an unprecedented amount of information from microscopic analyses. Microscopic techniques used include: Brightfield – traditional microscopy, in which cells are illuminated by visible light. Brightfield microscopy provides a general picture of cell function, although this information is not very detailed or specific. Because there is a lack of cell walls in animal cells, bright field microscopy can use special techniques such as phase contrast to show cellular structures in more detail. Brightfield microscopy enables the imaging of living or solid (dead) cells and tissues) electron microscopy – using a focused electron beam instead of light. Electron microscopy allows for a much higher magnification of the samples than light microscopy and is useful for obtaining detailed information about subcellular structures. Electron microscopy requires extensive processing and can therefore only be performed on solid samples. Transmission electron microscopy provides a cross-section of a sample, while scanning electron microscopy provides a three-dimensional image of the surface of a sample. Fluorescence microscopy – uses fluorescent materials to display structures in a sample. Fluorescence occurs when light from one wavelength excites a material and causes it to emit light from another wavelength. Most fluorescent materials emit visible light after being stimulated by ultraviolet light. Structures can be characterized naturally fluorescent (autofluorescence) or with a compound that is fluorescent (e.B. DAPI is a dye that binds to DNA. The DNA and nuclei of cells colored with DAPI emit a blue light under ultraviolet light). Immunofluorescence – antibodies are proteins produced by the immune system and bind to certain parts of proteins. Antibodies can be used against any protein in the cell Be. If these antibodies are attached to a fluorescent day, the tag is only displayed where this antibody is attached (i.e. where the target protein is found in the cell). Immunofluorescence allows a very specific alignment of cellular structures. RNA Interference – RNA interference uses short sequences of RNA that are complementary to mRNA, which contains instructions to translate proteins from DNA into the ribosomes. The disturbing RNA binds to the sequence to prevent it from being translated. As a result, a careful selection of the disruptive RNA can be used to silence a particular gene. This allows researchers to study the role of a protein in a cell by observing what happens when that protein is missing. Time-lapse microscopy – many cellular processes (e.B mitosis) occur over a period of time that is not practical for direct observation. Forming cells over a certain period of time (e..B. a photo is taken every 20 minutes for 24 hours) allows us to combine these images into a film that compresses a long period of time to a shorter one. After you successfully complete this module, you will be able to understand and describe the characteristics of prokaryote and eukaryot cells, the composition and spatial organization of the cell. The structure and characteristics of the main organal systems including the nucleus, the secretory vacuolation system (endoplasmic reticulum, golgi, lysosomes), mitochondria, plant cells with chloroplasts and cytoplasmic vacuool. plasma membrane and transport mechanisms into and out of the cell. Protein production and sorting. The cytoskeleton and its role in the cell.Understand and describe the chromatin structure, gene regulation and the way molecular biology sheds light on gene function and genetic regulation of cell specialization. Techniques of recombinant DNA and cloning, their use and implications in biotechnology and genetic engineering. cancer, tumor genesis and the cell cycle. cell determination and differentiation and the role of stem cells in cell replacement in humans. The transfer of genetic material in cell division by mitosis or meiosis, the control of these processes and how cell division fits into the cell cycle. Human spermatogenesis and oogenesis in relation to cell division. The phenomenon and implications of chromosome caryogamy, variation of the number of chromosomes (polyploia and aneuploidie). Analysis of genetic variation in heredity and transmission genetics, including epistasis. Gender determination, sex linking, human pedigree analysis. The content may change from year to year. Laboratory practice should allow you to understand the application and describe the theory behind the practical experiments. Develop hands-on expertise relevant to the experiments performed and interpret the results. Current practical measures include: immunocytochemistry and cell proliferation, DNA restriction & electrophoresis, induction of B-galactosidase in E.coli, mitosis and chromosomal caryogamy. This module is an introduction to cell biology & genetics from general principles to modern applications. See aboveLectures, wet practicals, Blackboard, formative and summative assessment, and independent studyTypeHoursIndependent Study111Practical classes and workshops15Lecture24Total study time150Resources & Reading listCampbell, N.A. & Reece, J.B. Biology. Klug, W.S. et al.. Concepts of genetics. Alberts, B B al. Molecular biology of the cell. WWW Assessment SitesSummativeMethodPercentage ContributionLabor Practice 25%Written Exam (1 hours) 75%ReferralMethodPercentage ContributionCourse Work 25%Written Exam 75%Repeat InformationRepeat Type: Internal & External External