Cell Biology 201

Final term Past Papers

Solved Question

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Q: ER signal guid ER by which of two components?

The ER signal sequence is guided to the ER membrane by at least two components.oSignal - recognition particle (SRP): cycles between the ER membrane and the cytosol and binds to the signal sequenceoSRP receptoroThe SRP consists of six different polypeptide chains to a single small RNA molecule.oEach ER signal sequence has eight or more nonpolar amino acids at its center.

Q: Polypeptide and anupolied?

Polypepetide a linear organic polymer consisting of a large number of amino-acid residues bonded together in a chain, forming part of (or the whole of) a protein molecule.

Aneuploidy is the presence of an abnormal number of chromosomes in a cell, for example a human cell having 45 or 47 chromosomes instead of the usual 46.

Q: Adult stem cells and theirs benifical and theoptic uses ?

Adult stem cells have been identified in many organs and tissues, including brain, bone marrow, peripheral blood, blood vessels, skeletal muscle, skin, teeth, heart, gut, liver, ovarian epithelium, and testis. They are thought to reside in a specific area of each tissue (called a "stem cell niche"). Stem cell approaches have shown great promise for regeneration in models of glaucoma. Multipotent stem cells are retrieved from tissues such as bone marrow and fat, thus avoiding ethical concerns.

Vision loss from glaucoma occurs when axons in the optic nerve become damaged and can no longer carry visual information to the brain. ... However, these treatments can only preserve remaining vision; they don't improve or restore vision that already has been lost due to glaucoma

Q: What is stem cell and its benefits and therputic uses.?

This type of treatment could be used to: replace neurons damaged by spinal cord injury, stroke, Alzheimer's disease, Parkinson's disease or other neurological problems; produce insulin that could treat people with diabetes and heart muscle cells that could repair damage after a heart attack; or.

Q: Three steps of RNA processing?

A notable example is the **conversion** of precursor messenger RNA into mature messenger RNA (mRNA) that occurs prior to protein **translation**. The process includes three major steps: addition of a 5' cap, addition of a 3' poly-adenylation tail, and splicing.

Q: How nuclear transformation occur in the sheep process..?

Nuclear transfer is a form of cloning. The steps involve removing the DNA from an oocyte (unfertilised egg), and injecting the nucleus which contains the DNA to be cloned. In rare instances, the newly constructed cell will divide normally, replicating the new DNA while remaining in a pluripotent state.

Q: GTF-beta receptors describe mechanism..?10 mrks

Transforming growth factor beta (TGFβ) receptors are single passserine/threonine kinase receptors that belong to TGFβ receptor family. They exist in several different isoforms that can be homo- or heterodimeric.[1] The number of characterized ligands in the TGFβ superfamily far exceeds the number of known receptors, suggesting the promiscuity that exists between the ligand and receptor interactions.

Transforming growth factor beta (TGF-β) is a multifunctional cytokine belonging to the transforming growth factorsuperfamily that includes four different isoforms (TGF-β 1 to 4, HGNC symbols TGFB1, TGFB2, TGFB3, TGFB4) and many other signaling proteins produced by all white blood cell lineages. Activated TGF-β complexes with other factors to form a serine/threonine kinase complex that binds to TGF-β receptors, which is composed of both type 1 and type 2 receptor subunits.

Q: name the antibody of the B cells..?

Antibodies are secreted by B cells of the adaptive immune system, mostly by differentiated B cells called plasma cells. Antibodies can occur in two physical forms, a soluble form that is secreted from the cell to be free in the blood plasma, and a membrane-bound form that is attached to the surface of a B cell and is referred to as the B-cell receptor (BCR).

Q: Mechanism of the olfiction receptors..?

The mechanism of olfactory perception. ... It was assumed that odor perception is initiated in the olfactory epithelium of the nasal cavity, where odorants are detected by the large family of ORs. These receptors are members of the seven-transmembrane domain receptors, also known as G-protein-coupled receptors(GPCRs).

Q: Elborate the machanism of growth promoting mechanism of oncogenes. 10 marks

The activation of oncogenes involves genetic changes to cellular protooncogenes. The consequence of these genetic alterations is to confer a growth advantage to the cell. Three genetic mechanisms activate oncogenes in human neoplasms: (1) mutation, (2) gene amplification, and (3) chromosome rearrangements. These

mechanisms result in either an alteration of protooncogene structure or an increase in protooncogene expression (Figure 6-5). Because neoplasia is a multistep process, more than one of these mechanisms often contribute to the genesis of human tumors by altering a number of cancer-associated genes. Full expression of the neoplastic phenotype, including the capacity for metastasis, usually involves a combination of protooncogene activation and tumor suppressor gene loss or inactivation.

Q: The endopasmic Raticulum is gauided to ER by which 2 components.

At least two cytoplasmic components are involved in the specific targeting of nascent secretory and membrane proteins to the ER, the signal recognition particle (SRP) and the docking protein (DP) or SRP receptor.

Q: How G protein involved in formation of GDP? 2 marks

In the inactive state, the G protein binds the nucleotide GDP. The G-protein has three subunits, alpha, beta and gamma. Activation of the receptor by the neurotransmitter dopamine causes the alpha subunit to exchange its GDP for a GTP.

Q: How sheep is cloned by the nuclear material. Explain it by all steps. 5 marks

The nuclear material was removed from an oocyte taken from an adult female and replaced by that of a somatic cell from another animal. Fusion and activation of this reconstructed zygote gave rise to an embryo that was surgically transferred to a surrogate mother wherein development to term was completed.

Step 1: Preparation of the somatic cell. ...
Step 2: Preparation of the egg/oocyte. ...
Step 3: Nuclear Transfer. ...
Step 4: Post Nuclear Transfer Procedures. ...
Step 5: Embryogenesis.

Q: Write synapse and its steps involved in the machanism. 5 marks

In the nervous system, a synapse[1] is a structure that permits a neuron (or nerve cell) to pass an electrical or chemical signal to another neuron or to the target effector cell

I. Synthesis and Storage of Neurotransmitters

II. Neurotransmitter Release

III. Neurotransmitter Postsynaptic Receptors

IV. Inactivation of Neurotransmitters

Q: TGF-ß Receptor Family. 3 marks

The Transforming Growth Factor beta (TGFβ) receptors are a family of serine/threonine kinase receptors involved in TGF beta signaling pathway. These receptors bind growth factor and cytokine signaling proteins such as TGFβs (TGFβ1, TGFβ2, TGFβ3), bone morphogenetic proteins (BMPs), growth differentiation factors (GDFs), activin and inhibin, myostatin, anti-Müllerian hormone (AMH), and NODAL

Type I
Type II
Type III

Q: inhibitors that binds to the active side of enzymes are

The competitive inhibitor resembles the substrate and binds to the active site of the enzyme (Figure 8.15). The substrate is thereby prevented from binding to the same active site. A competitive inhibitor diminishes the rate of catalysis by reducing the proportion of enzyme molecules bound to a substrate.

Q; inhibitors that bind to the non active side of enzymes are

A noncompetitive inhibitor binds to a different site that is not the active site of the enzyme and changes the structure of the enzyme; therefore, it blocks the enzyme from binding to substrate, which stops enzyme activity.

Q: phosphate and non phosphat group?

A phosphate group is just a phosphorus atom bound to four oxygen atoms, but it has many important roles. Along with sugars and bases, it makes up nucleic acids, like DNA and RNA. As part of energy carriers, like ATP, it provides energy for moving our muscles.

Q: Antibody that appear on the surface of developing B cell?.what is the role of regulatory region explain its two elements?

IgM is not only the first class of antibody to appear on the surface of a developing B cell. It is also the major class secreted into the blood in the early stages of a primary antibody response, on first exposure to an antigen.

The specific variable (V)-region and constant (C)-region coding sequences that the tumor cells used were present on the same DNA restriction fragment in the tumor cells but on two different restriction fragments in the embryos. This showed that the DNA sequences encoding an antibody molecule are rearranged at some stage in B cell development

Q: Describe the two signaling functions of N-terminal ER signal sequence of a soluble protein?

A sequence of hydrophobic amino acids, the ER signal sequence, is recognized and bound by a signal-recognition particle (SRP), which in turn is bound by an SRP receptor on the rough ER membrane. Generally, ER signal sequences are located at the N-terminus and are cleaved from the protein in the rough ER lumen.

Q: MHC I MHC II difference?

MHC I glycoproteins are present in all nucleated cells.MHC II glycoproteins are only present on specialised antigen-presenting cells (APCs),

Q : Diff.b/w stem cell and secilized cell?

Stem cells differ from other kinds of cells in the body. All stem cells—regardless of their source—have three general properties: they are capable of dividing and renewing themselves for long periods; they are unspecialized; and they can give rise to specialized cell types.

Q: Antibodies names?

IgG, IgM, IgA, IgD, IgE.

Q: Functions of growth promotor oncogenes?

An oncogene is a gene that has the potential to cause cancer.[1] In tumor cells, they are often mutated and/or expressed at high levels.

Most oncogenes began as proto-oncogenes, normal genes involved in cell growth and proliferation or inhibition of apoptosis. If normal genes promoting cellular growth, through mutation, are up-regulated, (gain of function mutation) they will predispose the cell to cancer and are thus termed oncogenes.

Q: Process of translation?

In molecular biology and genetics, translation is the process in which ribosomes in the cytoplasm or ER synthesize proteins after the process of transcription of DNA to RNA in the cell's nucleus. The entire process is called gene expression.

Q: B cells and T cells?

An important difference between T-cells and B-cells is that B-cells can connect to antigens right on the surface of the invading virus or bacteria. This is different fromT-cells, which can only connect to virus antigens on the outside of infected cells.

Q: Which mechanism is used in certain birds destination?

Birds use the Earth's magnetic field to navigate but scientists are still unsure of how it works. About 50 animal species, ranging from birds and mammals to reptiles and insects, use Earth's magnetic field for navigation.

Q: Adult stem cells?

Adult stem cells are undifferentiated cells, found throughout the body after development, that multiply by cell division to replenish dying cells and regenerate damaged tissues.

Q: Enlist the function of signaling system ?

Cell signaling in multicellular organisms. In a multicellular organism, signaling between cells occurs either through release into the extracellular space, divided in paracrine signaling (over short distances) and **endocrine** signaling (over long distances), or by direct contact, known as juxtacrine signaling.

Q: Describe the principle and air flow chart ?

Flow of air or any other fluid is caused by a pressure differential between two points. Flow will originate from an area of high energy, or pressure, and proceed to area(s) of lower energy or pressure.

Q: Examples of 3 RNA viruses?

Hepatitis C virus, measles virus, rabies virus, influenza virus and Ebola virus are examples of RNA virus.

Q: Describe the site of large subunit of ribosome?

Ribosomes link amino acids together in the order specified by messenger RNA (mRNA) molecules.Ribosomes consist of two major components: thesmall ribosomal subunits, which read the RNA, and the large subunits, which join amino acids to form a polypeptide chain.

Q: Name 5 major growth promoting oncogenes ?

Epidermal growth factor (EGF)

transforming growth factor alpha (TGFa)

epidermal growth factor receptor (EGFR)

c-erb B-2

Cytoplasmatic mediators K-ras, H-ras, src

Q: Tralation process ?

In molecular biology and genetics, translation is the process in which ribosomes in the cytoplasm or ER synthesize proteins after the process of transcription of DNA to RNA in the cell's nucleus. ... In translation, messenger RNA (mRNA) is decoded in a ribosome to produce a specific amino acid chain, or polypeptide.

Q: Endocytosis and phagosytosis df panocytoces?

Endocytosis and its counterpart, exocytosis, are used by all cells because most chemical substances important to them are large polar molecules that cannot pass through the hydrophobic plasma or cell membrane by passive means. Endocytosisincludes pinocytosis (cell drinking) and phagocytosis (cell eating).

Q: Leminr cabinet flow principle?

A laminar flow cabinet or laminar flow closet or tissue culture hood is a carefully enclosed bench designed to prevent contamination of semiconductor wafers, biological samples, or any particle sensitive materials. Air is drawn through a HEPA filter and blown in a very smooth, laminar flow towards the user.

Q: Parachrine signaling?

Paracrine signaling is a form of cell-to-cell communication in which a cell produces a signal to induce changes in nearby cells, altering the behavior of those cells.

Q: Describe process of translation briefly?

Translation is the process of translating the sequence of a messenger RNA (mRNA) molecule to a sequence of amino acids during protein synthesis. The genetic code describes the relationship between the sequence of base pairs in a gene and the corresponding amino acid sequence that it encodes.

Q: Describe role of MHC in immune system. Differentiation be it's 2 types?

The major histocompatibility complex (MHC) is a set of cell surface proteins essential for the acquired immune system to recognize foreign molecules in vertebrates, which in turn determines histocompatibility. ... The human MHC is also called the HLA (human leukocyte antigen) complex (often just the HLA).

Professional antigen presenting cells (APCs) are immune cells that specialize in presenting an antigen to a T-cell. ... A professional APC takes up an antigen, processes it, and returns part of it to its surface, along with a class II major histocompatibility complex (MHC).

Q:what are Stress elements?

Stress elements are a useful way to represent stresses acting at some point on a body. Isolate a small element and show stresses acting on all faces. Dimensions are “infinitesimal”, but are drawn to a large scale.

Q: How ß-blocker effect the function of adrenaline?

Beta blockers work by blocking the effects of the hormone epinephrine, also known as adrenaline. When you take beta blockers, your heart beats more slowly and with less force, thereby reducing blood pressure. Beta blockers also help blood vessels open up to improve blood flow.

Q: How UV sterilize equipment?

Ultraviolet germicidal irradiation (UVGI) is a disinfection method that uses short-wavelength ultraviolet (UV-C) light to kill or inactivate microorganisms by destroying nucleic acids and disrupting their DNA, leaving them unable to perform vital cellular functions.

Q: what is function of Rod cells?

Rod cells are photoreceptor cells in the retina of the eye that can function in less intense light than the other type of visual photoreceptor, cone cells. Rods are usually found concentrated at the outer edges of the retina and are used in peripheral vision.

Q: short note on transcription?

Transcription is the first step of gene expression, in which a particular segment of DNA is copied into RNA by the enzyme RNA polymerase. Both DNA and RNA are nucleic acids, which use base pairs of nucleotides as a complementary language.

Q: Elaborate the point increased CAMP activity?

Cyclic adenosine monophosphate (cAMP, cyclic AMP, or 3',5'-cyclic adenosine monophosphate) is a second messenger important in many biological processes. cAMP is a derivative of adenosine triphosphate (ATP) and used for intracellular signal transduction in many different organisms, conveying the cAMP-dependent pathway.

Q: Diff b/w homotypic and heterotypic fusion ?

There are two different types of cell fusion that can occur. These two types includehomotypic and
heterotypic cell fusion. Homotypic cell fusion occurs betweencells of the same type. ... If two of the same type of cells fuse, but their nuclei do not fuse, then the resulting cell is called a syncytium.

Q: what is RFLPS? Write its function?

In molecular biology, restriction fragment length polymorphism is a technique that exploits variations in homologous DNA sequences **RFLP** analysis was an important tool in genome mapping, localization of genes for genetic disorders, determination of risk for disease, and paternity testing.

Q: CaM kinase 2 involve in muscles movement explain?

Calmodulin and its roles in skeletal muscle function. ... The overall result of this protein-protein interaction is a physiological effect, e.g., Ca2+ binding to calmodulinin smooth muscle allows it to interact with and activate myosin light chain kinase which catalyzes the phosphorylation of myosin.

Q: Differentiate the confluent monolayer and past confluent stages?

Confluent monolayer refers to cells in tissue culture, e.g. epithelial cells, which form a cohesive sheet comprising of a single cell layer filling the entire surface area of the bottom of the culture dish. Cells have then reached confluence.

Q: Briefly discribe the signal involved in alfaction?

Olfaction is a chemoreception that forms the sense of smell. Olfaction has many purposes, such as the detection of hazards, pheromones, and food. It integrates with other senses to form the sense of flavor.[1] Olfaction occurs when odorants bind to specific sites on olfactory receptors located in the nasal cavity.[2] Glomeruli aggregate signals from these receptors and transmit them to the olfactory bulb, where the sensory input will start to interact with parts of the brain responsible for smell identification, memory, and emotion.

Q: Adapter hypothesis and messenger hypothesis?

The **adaptor hypothesis** is part of a scheme to explain how information encoded in DNA is used to specify the amino acid sequence of proteins. It was formulated by Francis Crick in the mid-1950s, together with the central dogma of molecular biology and the sequence **hypothesis**.

One of the seminal advances in this field came in the late 1950s when Earl Sutherland and his colleagues demonstrated that epinephrine induces glycogenolysis in the liver by stimulating the synthesis of an intracellular second **messenger**, 3′,5′-cyclic adenosine monophosphate (cAMP).

Q: what is the role of regulatory regions explain its two elements?

A **regulatory**sequence is a segment of a nucleic acid molecule which is capable of increasing or decreasing the expression of specific genes within an organism. **Regulation** of gene expression is an essential feature of all living organisms and viruses.

Q: House keeping gene Differential genes?

In molecular biology, housekeeping genes are typically constitutive genes that are required for the maintenance of basic cellular function, and are expressed in all cells of an organism under normal and patho-physiological conditions

Based on the embryological evidence for genomic equivalence (and on bacterial models of **gene** regulation), a consensus emerged in the 1960s that cells differentiate through **differential gene** expression. The three postulates of**differential gene** expression are as follows: 1.

Q: Conditional genes?

Conditional gene knockout is a technique used to eliminate a specific gene in a certain tissue, such as the liver.[1][2] This technique is useful to study the role of individual genes in living organisms.

Q: missense mutation?

missense mutations. A form of point mutation resulting in a codon that codes for a different amino acid, and thus, causes the synthesis of a protein with an altered amino acid sequence during translation.

Q: Euchromatin and heterochromatin?

The DNA in the nucleus exists in two forms that reflect the level of activity of the cell. ... Euchromatin is prevalent in cells that are active in the transcription of many of their genes while heterochromatin is most abundant in cells that are less active or not active.

Q: write short note on COPI?

COPI is a coatomer, a protein complex that coats vesicles transporting proteins from the cis end of the Golgi complex back to the rough endoplasmic reticulum, where they were originally synthesized, and between Golgi compartments.

Q: Function of homotypic acid oxidase?

Nitric oxide provokes vasodilation and inhibits platelet aggregation. We examined the effect of nitric oxide on superoxide anion production by three sources: activated intact neutrophils, xanthine oxidase/hypoxanthine, and the NADPH oxidase

Q: Homotypic and heterotypic fusion and how they form Exocytosis?

There are two different types of cell **fusion** that can occur. These two types include **homotypic** and **heterotypic** cell**fusion**. **Homotypic** cell **fusion** occurs between cells of the same type. ... A heterokaryon is the melding of two or more cells into one and it may reproduce itself for several generations.

In **exocytosis**, membrane-bound secretory vesicles are carried to **the** cell membrane, and their contents (i.e., water-soluble molecules) are secreted into **the**extracellular environment. This secretion is possible because **the** vesicle transiently fuses with **the** outer cell membrane.

Q: Mechanism of homogenetic oxydase?

Homogeneous catalytic O_2 reduction to water by a cytochrome *c* oxidase model with trapping of intermediates and mechanistic insights.

Q: benzer experiment?

The T4 rII system is an **experimental**system developed in the 1950s by Seymour **Benzer** for studying the substructure of the gene.
The **experimental** system is based on genetic crosses of different mutant strains of bacteriophage T4, a virus that infects the bacteria E. coli.

Q: siganaling factors?

Many growth factors bind to receptors at the cell surface and stimulate cells to progress through the cell cycle and divide. ... Many cellular proteins are activated downstream of the growth factor receptors (such as EGFR) that initiate this signal transduction pathway.

Q: what is E.coil cells?

E. coli is a Gram-negative rod-shaped bacteria, which possesses adhesive fimbriae and a cell wall that consists of an outer membrane containing lipopolysaccharides, a periplasmic space with a peptidoglycan layer, and an inner, cytoplasmic membrane.

Q: Define somatic mutation?

An alteration in DNA that occurs after conception. **Somatic mutations** can occur in any of the cells of the body except the germ cells (sperm and egg) and therefore are not passed on to children. These alterations can (but do not always) cause cancer or other diseases.

Q: write 3 names of stop codon?

In the standard genetic code, there are three different stop codons:

in RNA: UAG ("amber") UAA ("ochre") UGA ("opal")
in DNA: TAG ("amber") TAA ("ochre") TGA ("opal" or "umber")

Q: Deffirence between hterotypic nd homotypic?

medical **Definition** of **heterotypic**. 1 : of or being the reduction division of meiosis as contrasted with typical mitotic division — compare **homotypic** 2. 2 different in kind, arrangement, or form. **heterotypic** aggregations of cells.

Q: Antibody used in t cell?

An **anti-CD3** monoclonal antibody is one that binds to **CD3** on the surface of T cells. They are immunosuppresive drugs. The first to be approved was muromonab-**CD3**in 1986, to treat transplant rejection. Newer monoclonal antibodies with the same mechanism of action include otelixizumab, teplizumab and visilizumab.

Q: Use of regulatory system . Explain 2 types?

A two-component regulatory system is a stimulus-response **coupling** mechanism that allows bacteria to sense and respond to changes in different environmental conditions

Q: Role and function of intracellular receptors?

Hormones with Intracellular Receptors. Receptors for steroid and thyroid hormones are located inside target cells, in the cytoplasm or nucleus, and function as ligand-dependent transcription factors. ... Thus, the mechanism of action of steroid hormones is to modulate gene expression in target cells.

Q: Andocytoces and phagosytosis df panocytoces?

Endocytosis and its counterpart, exocytosis, are used by all cells because most chemical substances important to them are large polar molecules that cannot pass through the hydrophobic plasma or cell membrane by active means. **Endocytosis** includes pinocytosis (cell drinking) and **phagocytosis** (cell eating).

Q:panocytoces?

the ingestion of liquid into a cell by the budding of small vesicles from the cell membrane.

Q: note on cell cycle?

The cell cycle or cell-division cycle is the series of events that take place in a celleading to its division and duplication of its DNA (DNA replication) to produce two daughter cells.

The cell cycle consists of four distinct phases: G_1 phase, S phase (synthesis), G_2 phase (collectively known as interphase) and M phase (mitosis or meiosis). M phase is itself composed of two tightly coupled processes: karyokinesis, in which the cell's chromosomes are divided, and cytokinesis, in which the cell's cytoplasm divides forming two daughter cells. Activation of each phase is dependent on the proper progression and completion of

the previous one. Cells that have temporarily or reversibly stopped dividing are said to have entered a state of quiescence called G_0 phase. After cell division, each of the daughter cells begin the interphase of a new cycle. Although the various stages of interphase are not usually morphologically distinguishable, each phase of the cell cycle has a distinct set of specialized biochemical processes that prepare the cell for initiation of cell division.