Inhibition of enzyme action pdf

Enzyme action: The enzyme accelerates the reaction rate without experiencing constant chemical modification as a result of participation. Enzymes have an active site. It is a part of a molecule that has only the correct shape and functional groups to bind to one of the reacting molecules. The reacting molecule that binds to the enzyme is called a substrate. The reaction of the enzyme catalysis follows a different path. Enzymes and substrate form an intermediate reaction. Its formation has a lower activation energy than the reaction between reactionaries without a catalyst. In order for two molecules to react, they must collide with each other. They must face in the right direction with enough energy. The energy needed to overcome the energy barrier of the reaction is called activation energy. Route Reactant 1 Reactant 2 Product Route B Reactant 1 - Enzyme Intermediate Intermediate - Reactant 2 Product - Enzyme 1) Blocking and Key Hypothesis: Here the substrate simply fits into the active site to form an interim reaction. 2) Induced fit hypothesis: In this model the enzyme molecule changes shape as the substrate molecule gets close. The change in shape is caused by an approaching substrate molecule. This more complex model builds on the fact that the molecules are flexible. For example: Single-valent bonds can rotate freely. Inhibition of enzyme activity: Some substrates reduce or even stop the catalytic activity of the enzyme in the biochemical response. They block or distort the active place of the enzyme. These chemicals are called inhibitors because they suppress the biochemical response. Inhibitors are basically of three types: I.Competitive inhibitors II. Non-competitive inhibitors III. Uncompetitive inhibitors 1) Competitive inhibitors: inhibitors that take an active place and prevent the binding of the substrate molecule with the active part of the enzyme. They are said to have an active website targeted. They are called competitive because they compete with the substrate for active sites. 2) Non-competitive inhibitors: inhibitors with other parts of the enzyme molecule, perhaps distorting its shape is said to be non-active site directed or non-competitive inhibitors. 3) Uncompetitive inhibitors: Uncompetitive inhibitors differ from competitive inhibitors in that they have a separate mandatory phase on the enzyme. In addition, they bind to the enzyme only when the substrate is associated with the enzyme. Factors influencing the catalytic activity of the enzyme: I. Temperature: As the temperature rises, the reacting molecules have more and more kinetic energy. This increases the probability of a collision and therefore the speed increases. There is a certain temperature at which the catalytic activity of the enzyme is at its highest. This optimum temperature is about 37.5 degrees Celsius for an enzyme in human cells. Over this structure the temperature enzyme begins to denature since at a higher temperature the splitting of the enzyme occurs. II. p H: Each enzyme works within a certain range of p H. This is called the optimal range of p H. In this p H range of enzyme activity is greatest. The change in p H can make and break down intermolecular and intramolecular bonds, altering the shape of the enzyme and its effectiveness. III. Concentration of enzyme and substrate: The rate of enzyme catalysis depends on the concentration of the enzyme and the substrate. As the concentration of any of them increases, the speed of reaction increases. For this enzyme catalytic reaction, the reaction rate increases with an increase in the concentration of the substrate to a point higher than any further increase in the concentration of the substrate does not result in a significant change in the reaction rate. This is due to the fact that the active place of the enzyme molecule at any given time is almost saturated with a substrate. The E-S complex must be divided before the active site is available to accommodate a larger substrate. Enzyme function: 1) Enzymes are biological catalysts. Biological means that the substance is derived from some living organism. Catalyst is a substance that has the ability to increase the rate of chemical reaction and is not altered or destroyed by a chemical reaction that accelerates. They accelerate the rate at which the myagnos interact to form a product in a chemical reaction without being used in a reaction. 2) Enzymes are the main components in signal transduction and cell regulation. Phosphates and Kinases help in this function. 3) Myosine (muscle protein) helps in muscle contraction in living organisms. 4) ATPases in the cell membrane act as an ion pump in active transport mechanisms 5) Enzymes play a role in the digestive activity of the enzyme. 6) Amylase and proteases are enzymes that disrupt carbohydrates (amylase) and protein in its more absorbable forms. 7) Different enzymes work together in the form of metabolic metabolic For example : Glicolysis 8) ATPases in the cell membrane act as ion pumps in the active transport mechanisms of Page 2 Protein Protein name derived from the Greek word proteios means outstanding or first. · This name was suggested by the Swedish chemist Berzelius. · Proteins are macromolecules, which make up half of the total weight of biomolecules in the cell. · Proteins are also known as the building blocks of life, which consist of some small units known as amino acids. The structure of protein proteins consists of monomers called amino acids. There are 20 different types of amino acids found in nature and 21st amino acid Selenocystein. Amino acids mostly consist of four components: i. Central carbon with one hydrogen ii. One group iii carboxil. One amino acid group iv. One R group Carbon needs four connections in which the R group is anonymous, i.e. the R group can be a hydrogen or hydrocarbon chain. The R group can be polar, non-polar or even charged. Amino acids bind to each other by the process of dehydration, in which water is removed as a by-product, where oh group of single amino acids (COOH) is combined with H second amino acid (NH2), leading to the formation of a covalent (peptide) bond. When many amino acids bind to each other, they form a polypeptide chain. H2N-CH-C-OOH-H-NH-CH-C-OOH R H2O H2O H2N-CH-CO-NH-CH-C-OH PEPTIDE Bond Proteins have four levels of structure. These are: i. Primary structure ii. Secondary structure iii. Tertiary structure iv. The quarterary structure i. Primary structure: A long string or linear sequence of amino acids is found in the primary structure. For example: Gli-Il-Ala-Val-Lys ii. Secondary structure: Occurs when intermolecular forces, especially H-links between amine and carboxyl group amino acids cause primary sequence to bend or twist. The secondary structure is also characterized by two types: (a) Alpha spiral: When the secondary structure is in the form of turns, it is called an alpha spiral. b) Beta-pleated sheets: When the bend is in the structure, it is called β pleated sheets. iii. Tertiary structure: When the primary and secondary bends and folds on itself, they allow for a tertiary structure. This is caused by intermolecular forces (hydrophobic interaction or H-link), ion communication and covalent disulfide bridge. iv. quaternary structure: Some proteins combine to perform their function. They results as soon as all the interacting units of proteins stick together. Here, several polypeptides interact with each other to fold. For example: Collagen, Hemoglobin Protein Characters: i. Proteins are an organic substance, composed of carbon, hydrogen, oxygen, nitrogen. Proteins are the main component of cell cytoplasm. They are structural elements of body tissue. proteins are polymers that are made up of a monomeric amino acid. V. Their molecular weight is 5-300KD. The classification of protein proteins is classified according to their form: (a) globuular or corpuscular protein: they compactly folded protein have a relatively spherical form. For example: Insulin, Albumin, Globulin b) Fiber protein: When proteins resemble ribbons or fibers in shape, they are called fibrous protein. For example: Collagen, Keratin Protein Function: i. Proteins are enzymes. They function as a catalyst, such as Ribonuclease, which accelerate specific chemical reactions many times faster than they will spontaneously occur. ii. They also function as structural materials, such as keratin protein found in hair and nails, and collagen found in connective tissue. iii. Proteins are antibodies that have a specific binding that specifically binds to another substance that fights disease and protects our body. they also serve as a specific carrier, including a membrane transport protein that moves the substance through cell membranes. Blood protein hemoglobin (Hb) carries oxygen and is transported to the bloodstream. V. Proteins also help in reducing (actin, myosin) fibers that interact in muscle tissue. Vi. Proteins are also involved in signaling like insulin, which regulates blood glucose levels Page 3 Reflex Action Word Reflex derived from the Latin word reflux, which means bending backwards. Reflex action can be defined as a quick or immediate reaction to the stimulus. It is also called an involuntary or automatic reaction because it occurs without brain involvement. Here the response to stereotypical means the response to the same stimulus is always similar. There are two types of reflex action: 1) SIMPLE OR UNCONDITIONAL REFLEX ACTION: Simple reflexes are innate or unapproved. For example: Secret saliva in the mouth seeing sweet or acidic foods. Close your eyes when approaching an object. Sudden removal of the part of the body that comes into contact with the object, which are extremely hot, cold or pointed. 2) CONDITIONAL OR REFLEX COMPLEX ACTION: When the response is caused by training or experience without brain involvement, it has come into the category of conditional reflex action. For example: Ringing bell Reflex Mechanism: The reflex mechanism includes receptor organ, organ-effector, sensory and motor neuron. The message moves from the spinal cord along the motor neuron to the effector organ, which shows the reaction. The reflex refers to behavior that is mediated through a reflex arc. REFLEX ARC: The reflex arc route followed by a nerve impulse to produce a reflex act from the peripheral organ through the afferent nerve to the central nervous system (C.N.S.) and then through the efferent nerve to the organ-reactor. It is followed by this route: The Sensory Organ Sensory Neuron of the Spinal Cord Motor Neuron Effector Organ Reflex Arc can be classified depending on the degree of complexity of the organization of neurons in the reflex arcs: Monosynaptic (Monosegmental neuron): The sensory neuron has a single synaptic connection with the motor neuron. Relay Neuron (Association of Neuron): This makes a synaptic connection with the nerves that pass up in the area of the brain association. If the reflex arc control center is located in the brain, it is called a cerebral reflex. If it is located in the spinal cord, it is called a spinal reflex. Reflex arcs have two types: 1) The Somatic reflex arc with the participation of effect organs located in (soma) body structures. for example, skeletal muscles. 2) The visceral reflex arc includes located in visceral organs. for example, glands or smooth muscles. Page 4 Related articles Uncontrolled cell division leads to the formation of a tumor that has two types of benign and malignant tumor. It can be treated with chemotherapy, radiotherapy and alpha interferons. The ability to fight diseases is known as immunity; it has two types of congenital immunity and acquired immunity. It can be active or passive immunity. In autoimmune cells, the body cells attack it. Different organs in our body act as an organ of the immune system, like the lymph node, spleen, MALT. Page 5 of the CELL CYCLE Cell cycle series of growth and development stops cells from passing between its birth formation by dividing the mother's cell and reproductive division to make a new daughter's cell. Cell division or cell reproduction or cell reproduction is the process of forming new or daughter cells from pre-existing or parent cells. Cell division value: This is necessary for the continuity of life. It is the basis of evolution. In single-celled organisms, cell division is a means of asexual reproduction that produces two or more new individuals from the mother's cell. The group of such an identical individual is known as a clone. In mutichelular organisms, life begins with a single-celled zigota and turns into an adult, cell division is the basis for the restoration and regeneration of old and worn tissues. Cell division is divided into three types: I. Amitosis II. Mithos III. Mayoz I. Amitosis: In Greek a' no, mitos filament, osis-state Introduction: Remack (1955) discovered amitosis in the RBC chicken embryo, but a term coined by Flemming (1882). This is followed by the centripetal narrowing of the cytoplasm to form the daughter's two cells. Amitosis occurs in mega-nucleus paramecia, endosperm seed cells, cartilage cells and diseased cells. Amitosis is described: The untouched nuclear shell is located throughout the department. Chromatin does not condense into a specific chromosome. Spindle fibers do not form. The distribution of chromatin occurs unevenly, which causes metabolic disorders and reproduction. II. Mitoz: In Greek mitos - thread, thread. History: Mithoz was first discovered in the plant cell of Strasburger (1875), later W. Flemming was discovered in animal cells. · The term mitosis was coined by Flemming in 1882. Introduction: Mithosis is a type of cell division in which chromosomes are evenly distributed resulting in two genetically identical mithos daughter cells being the process of forming identical daughter cells by replicating and dividing the original chromosomes. Mitosis only deals with segregation of chromosomes and organelles in daughter cells. In mitosis, the cell's nuclear DNA condenses into visible chromosomes and disintegrates into a mitotic spindle, a structure that is tilted by microtubules. Mitosis is a description of how somatic or unproductive cell division. Somatic cells make up most of the tissues and organs of our body, including the skin, muscles, lungs, intestines and hair cells. In mitosis, each cell of the daughter has the same chromosomes and DNA as the parent cells. Daughter cells developed as a result of mitosis are called diploid cells (have complete sets of chromosomes). Since dosion cells have exact copies of their parent cell DNA, no genetic diversity is created through mitosis in normal healthy cells. Mitosis is found in somatic cells. Mitosis is carried out in the following stages: 1) Interphase: The prefixter means between them, reflecting that the interphase occurs between one mitotic division and the other. It is divided into three stages: phase G1 (gap one): The cell grows physically more, copies organelles and makes molecules building blocks. Metabolic changes prepare the cell for division. At some point; Limit point (R point), the cell tends to divide and moves to the S-phase. S- Phase (Synthesis Phase) : The cell synthesizes a complete copy of THE DNA in its nucleus. It also duplicates a micro-tubecoon organization structure called a centrosome. Helps in DNA separation during the M-phase. DNA synthesis replicates genetic material. Each chromosome now consists of two chromatids. Phase G2 (break two): The cell becomes larger, synthesizes proteins and organelles and begins to reorganize its contents in preparation for mitosis. G2 ends with the beginning of mitosis. M-phase: It is divided into the following phases: a) Profase b) Metaphase c) Anafaza d) Telofaz a) Profaz: During the profaise, chromosomes become condensed and become more visible. · Spindel fibers flow from the center. · The nuclear envelope breaks. · The centriole is divided and migrated to opposite poles. · Forms of kinetohores fibers (spindle fastening point). Promethafase: Chromosomes continue to condense. · Kinetochors appear on the center. · Microtubes in spindle fibers are attached to kinetohores. b) Metaphase: Chromosomes are located on the equator of the cell or are lined up on a metaphasic plate. · Each sister chromatids is attached to spindle fibers originating from opposite poles. · Chromosomes migrate to the spindle equator, where spindles are attached to the fibers of kinetohor. c) Anafasa: divide into two parts. · Sister chromatids (now called chromosomes) are drawn to opposite poles. · Anaphase begins with the separation of centrifors and pulling chromosomes to the opposite poles of the spindle. · Some spindle fibers begin to lengthen the cell. d) Telophase: Chromosomes come to opposite poles and begin to deposit. · The nuclear envelope material surrounds each set of chromosomes. · The mitotic fibers of the spindle break down. · Spindle fibers continue to push the spindle apart. · When chromosomes reach the poles of their spindles, the nuclear shell reforms. Chromosomes are unwinding in chromatin and nucleol reforms. Cytokinesis: This is a cytoplasmic division that begins during anaphase and ends towards the end of the telphase. This happens in two ways: i. Cell plate method: This occurs in a plant cell. Spindle fibers are stored on the equatorial plane. Golgi vesicles fuse in the center to form a barrel form phragmoplast. Further addition of bubbles causes centrifugal development of fragmoplast until it meets the plasma membrane of the mother cell. The contents of the fragmoplast harden to become a cell plate or future medium lamella that separates the two cells of the daughter. ii. Furrow splitting method: This occurs in animal cells and maternal cell pollen in some angiosperm. Here in the middle there is a furrow for cleavage, which gradually deepens and breaks the parent cage into two daughters. A special structure called the middle body is formed in the center in a center-special (center) manner. The value of mitosis: (a) Genetic stability: Mithosis maintains constant chromosomal strength and genetic stability in all somatic and vegetative cells of the body. b) Growth: Mithosis increases the number of cells so that the zygote turns into a multicellular adult. c) Surface-volume ratio: As cell size or volume increases, the surface area increases accordingly. d) Nucleoplasmic ratio: When a cell grows in size, the nucleotopmics ratio decreases. (e) Mithosis is a method of asexual reproduction and vegetative spread. Mithos provides new cells for repair, regeneration and healing of wounds. (g) The DNA content is reduced to half from the parent cell to the daughter's cell. Mayoz: In the Greek may to reduce, osis'state History: Vanzeneden (1883), first reported by meiosis. Farmer and Moore (1905), coined the term meiosis. Appearance: Cells undergo meiosis known as meiocytes. In plants, these mayocytes are known as microsporophites dust and megasporophiitis eggs. In animals, these mayyocytes are primary sperm in the testicles and primary eggs in the ovaries. Ovaries. It is also known as a reduction in division, during which genetic material is exchanged between homologous chromosomes and such division of genetic material, leading to the formation of the daughter of cells. It creates sex cells such as female eggs or male sperm. Each new one contains a unique set of genetic information. After meyosis, sperm and eggs can join the creation of a new organism. During the meiosis, a small part of each chromosome breaks off and attaches to other chromosomes. This process is called intersection or recombination. Meiosis occurs after the G2 phase, when DNA replication is already completed so that the cells carry 2n and 4C at the beginning of the meiosis. During meiosis, genetic information is exchanged between maternal and paternal inherited copies of pairs of chromosomes to create a new combination of genes. This process of genetic recombination contributes to increasing genetic variability within the species. This allows the transfer of a virtually limitless combination of genes from parents to offspring. As a result, gametes have 23 new chromosomes, one combination of each of the 23 pairs, representing a unique combination of original maternal and paternal copies. Mayosis is classified by two types: a) Mayoz I b) Mayo II (a) Mayosis I: meiosis I leads to the formation of haploid cells containing a single set of chromosomes, i.e. 23 chromosomes in human cells. (Diploid cells contain 23 pairs or 46 chromosomes) This is twice the size of chromosomes. Before the meiosis, I carry the cells through the interphase. The parent cell uses this time to prepare the cell for cell division by collecting nutrients and energy and copying its DNA. Mayosis I is also divided into the following stages: I. Profaz I: 1) Chromosomes condense and become visible. 2) Cetrioles shape and move to the pole. 3) The nuclear membrane begins to dissolve. 4) Homologous chromosomes of pairs and the formation of tetrad (when homologous chromosomes line up in a linear manner). 5) Each tetrad consists of four chromatids. (two homologous chromosomes each with their sister chromatids) 6) It is subdivided into the following phases: 1) Leptoten: At this stage chromosomes appear in the filary as a method called chromatin. There is a condensation of chromatin and begin to develop chromosomes. 2) Sigoten: The pairing of the homologous chromosome occurs at this stage and leads to the formation of a synaptonemal complex. This process is known as synapsis. Here homologous chromosomes become closely related to form pairs of chromosomes that are known as bivalent. It consists of four chromatids, which are known as tetrad. 3) Pachytene: Segment exchanges are not homologous chromosomes like a transition. The chromosome exchange point is known as hyasmata. It is also known as a crossing. 4) Diploten: Homologous chromosomes begin to separate, but remain attached at certain points by the kyasmat. 5) Diakinesis: At this stage, chromosomes are termified. Homologous chromosomes continue to separate and chiasmata moves to the ends of chromosomes in a zipper-like manner. II. Metaphase I: Homologous pairs of chromosomes (bivalent) are arranged as a double row along the metaphasic plate. The location of the connected chromosomes in relation to the poles of the spindle apparatus is random on the metaphase plate. III. Anaphasa I: Homologous chromosomes in each bivalent are separated and moved to opposite poles of the cell. BODY I: Chromosomes become diffuse and reform the nuclear membrane. Mayosis II: 1) Profaz II: chromosomes begin to condense, the nuclear membrane dissolves, spindle fibers are formed. 2) Metaphase II: Spindel fibers are attached to the kinethohor chromosomes, chromosomes line up in the center of the cell. 3) Anaphse II: Centromere divide and sister chromatids move to opposite cell poles and spindle fibers cut. 4) Telophase II: Chromosomes reach opposite poles of cellular and nuclear membrane reforms. Cytokinosis: Cell division occurs here as meiosis I. The value of meiosis: i. Mayosis essentially supports permanence in chromosomes from generation to generation. Crossing and disengagement bring genetic changes within the species. Variations are essential for the evolution and improvement of races. iii. Mayosis causes a shift from the sporophytic generation to the gametophytic generation in plants. This leads to the formation of haploid goths, which is an important process in the sexual reproduction of organisms. Fertilization restores the normal somatic (2n) number of chromosomes. V. Mayosis generates genetic diversity by exchanging genetic material between homologous chromosomes during meiosis I, the accidental location of the maternal and paternal chromosome in meiosis I, the accidental alignment of the sister chromatid in meiosis II. vi. Mayosis reduces the number of chromosomes in half, allowing sexual recombination. Vii. Meiosis diploid cells produces daughter's haploid cells that function as gametes. viii. Gametes undergo fertilization, restoring a diploid number of chromosomes in the zygote. the role of sexual reproduction in evolution. X. Total Results 2n. Cell Cycle Regulation: Some cells divide rapidly (RBC must share at a rate of 2.5 million per second). Such as nerve cells have lost the ability to divide as soon as they reach maturity. The cell cycle is controlled by a cyclical set of sequences of reactions that simultaneously triggers and coordinates. Key events in the cell cycle: The cell cycle control system is controlled by a built-in cluster that can be controlled by external stimuli. · A checkpoint, a critical checkpoint in the cell cycle where stop and motion signals can regulate the cell cycle. · The three main checkpoints are in the G1, G2, M Phase G1 checkpoint (group of restrictions) ensures that the cell is large enough to divide and have enough nutrients available to support the resulting daughter cell. Most cells in the human body are in the G0 phase. · G2 checkpoint ensures successful dna reproduction at S. The metaphase checkpoint ensures that the entire chromosome is attached to the mitotic spindle kinetohor. 'The Page 6 Related Articles Green House effect a natural process that heats the Earth's surface from radiation that is not reflected back into the atmosphere due to the presence of greenhouse gases. The green house effect leads to global warming. Page 7 Associated Article ozone layer is present in the stratospheric part of the atmosphere, which protects against harmful radiation and gases (CFC's) Page 8 Related Article AIDS is a disease where the immune system has been too weakened to protect itself from infections. AIDS is not treated, but prevention exists to avoid AIDS The ability to fight diseases known as immunity; it has two types of congenital immunity and acquired immunity. It can be active or passive immunity. In autoimmune cells, the body cells attack it. Different organs in our body act as an organ of the immune system, like the lymph node, spleen, MALT. Malt. inhibition of enzyme action notes. inhibition of enzyme action ppt. competitive inhibition of enzyme action involves. feedback inhibition of enzyme action is affected by. competitive inhibition of enzyme action. allosteric modulation is due to the inhibition action of enzyme by. give an account of enzyme action and enzyme inhibition. mechanism of enzyme action and inhibition