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CHARACTERISTICS OF RIBOZYME

AND

DIFFERENCE BETWEEN LIGAND AND SUBSTRATE.

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**CHARACTERISTICS OF RIBOZYMES.**

1. RNA nature: this is the important characteristics of ribozymes. This refers to the facts that ribozymes are composed of RNA. Unlike other enzymes that are made up of proteins, so this characteristics of ribozymes distinguish it from other enzymes.
2. Catalytic activates: ribozymes has the ability to act as catalyst, i.e. the help speed up chemical reactions in the body. Therefore the act as enzymes by facilitating specific biochemical reactions within cells.
3. Substrate specificity: ribozymes can bind to or catalyze reaction of a specific target molecules known as substrate. Ribozymes which has catalytic activity similar to enzymes and can stick to a particular substrate and accelerate its chemical reactions then, convert them to products.
4. Self-cleavage: this is a unique property of certain ribozymes, wherein they can catalyze their own cleavage (cutting) or ligation (joining) reactions without the needs for additional proteins or enzymes. Self-cleavage ribozymes are fond in different organisms. One typical example of it is the hammered-head ribozymes found in some plants pathogens.
5. RNA folding: it is an integral part of ribozymes characteristic because it directly influences the structure, stability and function of the ribozymes molecules. The folding of RNA refers to process by which the linear RNA sequences adopt a three-dimensional confirmation stabilized by intermolecular interactions, such as base paring and stacking interaction.
6. RNA world hypothesis: ribozymes are significant in RNA world hypothesis, which proposes that early life on earth relied on RNA molecules for both genetic information storage and catalytic functions.
7. Evolutional importance: ribozymes provided insights in early stages of life evolution. Their existence suggests that RNA may have played a crucial role in the emergences of life before protein took over as the primary catalyst.
8. Variety of reactions ribozymes can catalyze a wide range of chemical reactions. Including RNA splicing, RNA synthesis, peptide bond formation and RNA degradation.
9. They are involved in important cellular processes such as gene expression and RNA processing.
10. Medical and biotechnological applications: ribozymes have potential applications in medicine and biotechnology. They can be engineered to target and cleave specific RNA molecules involved in disease-causing processes, making them attractive candidates for gene therapy and antiviral strategies.

**DIFFERENCES BETWEEN LIGAND AND SUBSTRATES.**

1. Ligand: a ligand is a molecule that binds to a receptor, typically a protein, to form a complex. Ligands can be small molecules or larger compounds, and they interact with receptors through various chemical interactions, such as hydrogen bonding, electrostatic interactions, or hydrophobic interactions.

**While,**

Substrate: a substrate refers to a molecule that is acted upon by an enzyme. It is the specific molecule upon which an enzyme acts, and it undergoes a chemical transformation or reaction catalyzed by the enzyme.

1. Ligand: ligands exhibit a degree of specificity for their target receptors. They typically bind to specific binding sites on the receptor with high affinity, resulting in the formation of a ligand-receptor complex.

**While,**

Substrate: substrates are specific to the enzyme they interact with. Enzymes are highly selective in recognizing and binding their substrates based on complementary shapes, charges, or other chemical properties.

1. Ligand: ligands can have various functional roles depending on the receptor they bind to. They can act as signaling molecules, agonists (activators), antagonists (inhibitors), or modulators of receptor activity. Ligand-receptor interactions play crucial roles in cellular signaling, regulation, and other physiological processes.

**While,**

Substrate: substrates are molecules upon which enzymes act to catalyze specific chemical reactions. Enzymes facilitate the conversion of substrates into products by lowering the activation energy required for the reaction. Substrates are transformed or modified during the enzymatic reaction.

1. Ligand: ligands bind to receptors to form ligand-receptor complexes. These complexes may trigger downstream cellular responses, signaling cascades, or conformational changes in the receptor protein.

**While,**

Substrate: substrates bind to enzymes to form enzyme-substrate complexes. This binding allows the enzyme to facilitate the specific chemical reaction, leading to the conversion of the substrate(s) into product(s). The enzyme-substrate complex is transient and dissociates into the enzyme and product(s) after the reaction