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Opinion Article

Short Note on Drug Absorption and its Mechanism

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DESCRIPTION

Drug absorption is the process by which a drug enters the bloodstream and reaches its target site. The rate and extent of drug absorption can be influenced by several factors, including the drug's physicochemical properties, formulation, route of administration, and physiological factors. The drug and other constituents are combined in dosage forms (similar as tablets, capsules which are designed to be administered through a range of methods (eg, oral, sublingual, rectal, parenteral, topical, inhalational). Drug must be in order to be absorbed, regardless of the route of delivery. In order to disintegrate and disaggregated, solid forms (like tablets) must be able to do so.

A drug's absorption into the body can be effected by a number of variables. These include:

- Physical and chemical characteristics (e.g. solubility)
- Drug formulation (e.g. tablets, capsules)
- The system of administration (e.g. oral, sublingual, rectal, parenteral, topical, or inhaled)
- The rate of intestines empties

Among the primary pharmacokinetic factors affecting immersions are: Constant absorption rate (Absorption rate/ remaining drug absorption) and Bioavailability (amount of drug available at the systemic circulation for absorption).

To cross semipermeable cell membranes and reach the systemic rotation, a drug needs to be solubilized.

Mechanisms of drug absorption

The three major classifications of drug delivery systems that affect absorption are

Transcelluar transport: Active transport, endocytosis, passive diffusion with an efflux pump and simple passive transport are the several types of trans cellular transport. Simple passive transport is the movement of molecules along a concentration gradient downward. In contrast, active transport uses adenosine triphosphate's energy to move the molecules uphill and against the gradient of concentration (ATP). Endocytosis, which is separated into pinocytosis (fluid phase), receptor-mediated endocytosis, and transcytosis, is mostly followed by the synthesis of polypeptides and proteins. Transcellular transport is more complex than it first appears to be. P-glycoprotein, a 170 kDa protein, functions as an efflux pump that counteracts transcellular drug absorption. P-glycoprotein is found in the epithelial cells of the digestive, renal, and liver tracts.

Paracellular transport: Molecules can travel between nearby epithelial cells through a process known as paracellular transport. Transport through the tight junction is the process in rate-limiting stage. As a result, the tight junction is the main factor affecting the permeability of paracellular membranes. Yet, this simple declaration needs 2 major limitations. Firstly, the passive aspect of paracellular transport which completely depends on local gradient of concentration an immutable aspect of this kind of transport. Second, mechanisms independent to tight junction regulation can have an impact on mucosal permeability, as will be covered in more depth below. Damage to the epithelial, including erosion or ulceration, is the most visible of them. As a result of the loss of epithelial cells in this situation, neither tight junctions nor a functional epithelial barrier are present. It may be self-evident, but a startling number of articles wrongly attribute epithelial damage-associated barrier loss to tight junction regulation; it is necessary to keep this in mind when evaluating results.

Vesicular transport: Hence, a key cellular function known as vesicular transport is in charge of moving molecules between a range of distinct membrane-enclosed compartments. Thus, it is essential for preserving the cell's functional structure that such transport is selective. 3 pathways of vesicular transport

- Secretory pathway: Delivers drug molecules to the plasma membrane.
- Endocytic pathway: Uptake drug molecules from the plasma membrane.
- Retrieval pathway: Recycles cellular molecules.

CONCLUSION

In conclusion, drug absorption is an important pharmacokinetic process that refers to the movement of a drug from its site of administration into the bloodstream. The extent and rate of

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drug absorption are influenced by various factors such as the drug's physicochemical properties, the route of administration, the presence of food or other drugs, and the patient's individual characteristics. Understanding drug absorption is critical in optimizing drug therapy and preventing adverse effects. Healthcare professionals should consider these factors when selecting the appropriate drug and route of administration for their patients.