BIODISPONIBILITATEA ŞI FARMACOCINETICA SUBCELULARĂ [Subcellular bioavailability and pharmacokinetics]

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Biopharmaceutics and pharmacokinetics have acquired a well-deserved place in medical and pharmaceutical research and practice of recent decades, contributing to the optimization of pharmaceutical formulation, ensuring bioequivalence, the safety and effectiveness of drug dosage forms in therapy.

New discoveries in molecular biology and genomics make possible to establish a diagnosis at the molecular level for more and more diseases. In this context it is necessary to make the treatment of diseases at the molecular level and this requires a pharmaceutical system capable of delivering the drug substance, micromolecular or macromolecular, to its site of action in biophase in the vicinity of specific biological receptors.

The way to achieve this goal is the use of nano-pharmaceutical systems for delivery at the site of action. This opens the way for the evaluation of drug bioavailability in biophase, as well as its pharmacokinetic study at the site of action, intracellular, in the organelles of the cell, including the nucleus.

Bioavailability and pharmacokinetics of drug substances administered using nanoparticulate pharmaceutical systems is at an emergent stage, but will accelerate the achievement of the goal of improving knowledge for more effective and safe pharmacotherapy, not only in the external manifestations of the disease, but also to their molecular cause.

The source for biophase bioavailability can be the systemic bioavailability following common routes of adminstration (generally for systemic delivery of medicines), or directly the site specific biophase bioavailability for the formulations capable of cellular internalization where the drug release only will take place (for nanoparticulate DDS).

Two major mechanisms can be distinguished for addressing the desired sites for drug release: passive and active targeting. An example of passive targeting is the preferential accumulation of chemotherapeutic agents in solid tumors as a result of the enhanced vascular permeability of tumor tissues compared with healthy tissue. A strategy that could allow active targeting involves the surface functionalization of drug carriers with ligands that are selectively recognized by receptors on the surface of the cells of interest.

Effective treatment of diseases at the molecular level is possible by directing the drug substance (micromolecular, protein or peptide drugs, DNA, oligonucleotides, siRNA) with the aid of a specialized nanoparticulate carrier, for safe and effective transport to the specific site of action in the cytosol and its organelles including nuclear targeting. This is the reason for an efficient cytosolic delivery of the drug delivery system (DDS) and appropriate targeting of subcellular organelles for direct amelioration of genetic and metabolic disorders, but also to help cure for diseases whose causes are the malfunctioning of organelles.

The book has a high scientific value, both of the text and the systematizing data, which is revealed by a simple review of the titles of the four chapters:

- The discovery and development of drugs with high absolute bioavailability, effective and safe, by chemical synthesis, and by pharmaceutical biotechnology.
- Medicines with modified release for systemic bioavailability and nanoscale pharmaceutical systems for internalization and subcellular bioavailability.
- Cellular internalization of drug substances and pharmaceutical nanoparticulate systems.
- Vectorization, bioavailability and pharmacokinetics in the cytosol and organelles.

The monograph is useful for physicians, pharmacists, biologists, chemists, professionals involved in the discovery of new drug substances by chemical synthesis or pharmaceutical biotechnology, in formulation of new pharmaceuticals, new pharmaceutical nanotechnologies for the production of new drug delivery systems transport systems for biophase, and in the study of the biological and clinical effect of drugs. It is also useful for professionals in the organization of production of medicines, and organisms for medicines authorization on the market. And of course students in faculties of medicine, pharmacy, biology and chemistry will also benefit from it.

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