Research and Reviews: Drug Delivery

Drug Absorption and Ocular Bioavailability of Solid Lipid Nanoparticles

Hyung Hinjin*

Department of Pharmaceutics, Shandong University, Jinan, China

Commentary

Received: 11-April-2022, Manuscript No. DD-22-63562; **Editor assigned:** 13-April-2022, PreQC No. DD-22-63562(PQ); **Reviewed:** 27-April-2022, QC No DD-22-63562; **Revised:** 03-May-2022, Manuscript No. DD-22-63562(R); **Published:** 10-May-2022, DOI : 10.4172/resrevdrugdeliv.6.2.004

***For Correspondence:**
Hyung Hinjin, Department of Pharmaceutics, Shandong University, Jinan, China
E-mail: hyung7hin@gmail.com

ABOUT THE STUDY

The fraction of the administered dose that enters the systemic circulation is known as drug bioavailability. The percentage of active medicine that enters the central compartment is the most important concern for the doctor. The rate at which the drug is absorbed is not taken into account while calculating bioavailability. Factors that alter absorption have an impact on bioavailability. By comparing the respective Areas under the Plasma Concentration Curve (AUC) following oral and intravenous delivery, the absolute availability of a medication can be estimated.

Drug absorption research is crucial for creating new treatments and determining therapeutic equivalency of novel formulations or generic copies of existing medications. The molecule size and shape, degree of

ionisation, and lipid solubility of a medication all play a role in passive diffusion absorption. Some regularly used medications with substantial first-pass metabolism or intestinal P-glycoprotein transport include morphine, organic nitrates, propranolol, lidocaine, and cyclosporine.

The relative amount of a medication delivered in a pharmaceutical product that enters the systemic circulation in an unmodified state, as well as the rate at which this occurs, is known as bioavailability. Controlling the effects of administration sequence is commonly done using a two-formulation, two-period, two-sequence cross-over design. When comparing the bioavailability of two oral medication formulations, the relative bioavailability is calculated.

Effective drug delivery to the anterior and, especially, posterior segments of the eye is difficult due to limited ocular drug absorption *via* topical routes. The main issues are lachrymal fluid removal and the ocular barrier following topical application. Furthermore, due of BRB, different delivery routes (such as periocular and intravitreal) are usually required for targeting the posterior portion of the eye. Repeated intravitreal injections, in particular, are linked to recurrent endophthalmitis, which can be blinding.

Nanocarriers can help ophthalmic medications achieve their therapeutic goals while also improving compliance and safety; lipid-based nanocarriers are the most biocompatible and flexible. Lipid nanoparticles are one of the most revolutionary colloidal systems for drug delivery, as they are made up of biocompatible GRAS lipid molecules and are made without the need of solvents.

The primary goals of topical LN administration to the anterior part of the eye are mucoadhesion, which leads to increased corneal retention, and corneal epithelial cell uptake. Surfactants employed in LN formulations can also help to promote these occurrences. Furthermore, corneal retention may be improved by functionalized, cationic, or thermogelled formulations. In reality, topical administration is the focus of the majority of LN research, which covers a wide spectrum of disorders that require pharmacological therapy. LNs can be employed as drug delivery systems to the posterior portion of the eye because of their high kinetic stability and controlled release qualities, lowering the frequency of administration.

Varying investigations on LNs for ocular drug delivery have been conducted to date, at various levels of development. Clinical trials are currently lacking, which is a significant constraint. This is due to a more contemporary approach, as opposed to more established formulations (i.e., liposomes).

If commercially available LN formulations (the ultimate aim for ocular drug delivery) are currently unavailable, the expanding literature and patenting activity surrounding LNs for ocular delivery signal their future promise, given their variety of manufacture and ease of functionalization. To this end, transport of macromolecules (particularly peptides) within LNs is a worthwhile study issue, even if no specific application for ocular delivery has yet been investigated.

Ocular genetic illnesses, for which there is now no pharmacological treatment, should receive special attention. Gene delivery to the retina *via* intravitreal injection of plasmid complexed LNs have demonstrated to have a lot of promise. Because of the sensitivity of the retina, this route of administration should be further explored before being used on patients.