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PRO-NANOLIPOSPHERS (PNL) FOR IMPROVED ORAL BIOAVAILABILITY OF INSOLUBLE DRUGS

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Many dispersion systems are currently in use as carriers of substances, particularly biologically active compounds. Despite the great advancements in the area of oral drug delivery systems, many drugs are prone to poor oral bioavailability due to biological barriers that do not allow drug penetration or metabolize the drug. Pro-nanoliposphere (PNL) is a type of self-emulsifying delivery system, which can enhance the oral bioavailability of poorly water soluble compounds by multiconcerted mechanisms which encompass enhanced solubility of the incorporated drug. This formulation spontaneously forms nanoparticles when gently mixed in an aqueous media, such as the upper GI lumen content. When given orally, a drug is absorbed into the enterocytes monolayer in the basolateral side of the intestine. From the apical side of the enterocytes the drug is delivered via the portal vein to the liver and thereafter into the systemic blood circulation. We developed oral formulations for some insoluble drugs, like non psychotropic lipophilic phytocannabinoid cannabidiol (CBD), with improved bioavailability using the PNL technology. Improved PNL formulations were created using GRAS components which dissolved the drug and enhance oral bioavailability. CBD shows therapeutic efficacy in various indications. However, it has poor solubility and extensive Phase I and Phase II metabolism at the enterocyte level, resulting in 6% oral bioavailability. The PNL pre-concentrate with high load drug (50-150 mg per capsule), is composed of lipidic and emulsifying excipients of GRAS status, upon addition to aqueous media, such as stomach liquids, spontaneously form nano-droplets of 500 nm or below, preferably below 50 nm. The solvent, type of the triglyceride, surfactants and their ratios are some of the most effective parameters. This formulation possesses improved oral bioavailability when given to animal or human. The liquid formulation can be packed in soft gelatine capsule or absorbed in an absorbent to form semi-dry powder.

Biography

Eliyahu Shmoeli has completed his PhD from Tehran University. He is a Post-doctoral fellow in the laboratory of Prof. Domb at the Hebrew University of Jerusalem. He has published 8 papers in reputed journals and contributed to a patent application.

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