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The use of Styrene Maleic Acid (SMA) nanomicelles for effective oral delivery of bioactive therapeutics

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The oral route is the most preferred mode of administration among patients, due to its non-invasive nature. Oral administration of therapeutics can improve the patient`s quality of life, reduce costs associated with hospitalization and avoid complications associated with intravenous injections. The primary barrier to clinical application of an oral therapeutic, is poor oral bioavailability, a result of the combination of low water solubility, low pH stability, poor mucosal penetration, extensive first pass metabolism, and P-glycoprotein (P-gp) efflux and enzymatic degradation. Nanocarriers present a unique opportunity to overcome these barriers due to their design flexibility, surface functionality, and ability to deliver a wide range of therapeutics. Nanocarrier systems can enhance the solubility of the bioactive, protect them from enzymatic degradation and allow incorporation of the appropriate surface functionalization to favor uptake through the intestinal epithelium. Additionally, nanocarriers can prevent the direct contact of the bioactive agent with the cells of gastrointestinal (GI) tract. Nanocarriers can thus reduce the toxicity, prolong the circulatory half-life of the bioactives and accommodate targeting moieties to enhance further their prospects as site specific delivery systems. In this presentation, we will discuss our work utilizing Styrene Maleic Acid (SMA) nanomicelles for oral drug delivery through two case studies. The first example involves the use of oral paclitaxel nanomiceller formulation for treatment of colon cancer. The second case will discuss the successful use of oral nanoformulation of the selective estrogen receptor modulator (raloxifene) for treatment of Inflammatory Bowel Disease (IBD).

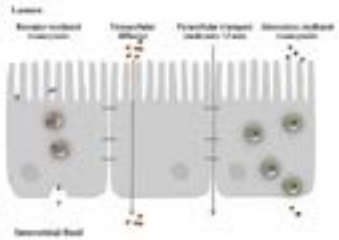

Figure: Mechanisms exploited by nanoformualtions to cross the intestinal barriers

Biography

Khaled Greish graduated from the Faculty of Medicine, Suez Canal University, Egypt in 1992. He received his Master's degree in Clinical Oncology in 1997. From 1999 to early 2008, he joined the lab of Professor Hiroshi Maeda, a world leader in the field of Anticancer Nanomedicine. Along with Professor Maeda, he developed an affordable platform nanotechnology micellar system for targeting anticancer drugs to solid tumors. In 2008, he moved to The University of Utah, as Research Assistant Professor. He joined Otago University in 2011, and currently Associate Professor at Arabian Gulf University, Bahrain. His areas of interest span the formulation and characterization of different advanced drug delivery systems, anticancer drug discovery/development, tumor vascular biology and animal tumor models. He was awarded the CRS Postdoctoral Achievement award in 2008 and, in 2010 he was elected as member of the CRS College of Fellows.

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