

## **Oral delivery of insulin for diabetes therapy: Development and evaluation of insulin loaded polymer based carrier system**

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Diabetes is a chronic metabolic disorder that affects nearly 346 million people worldwide. Its hallmark feature, hyperglycaemia is caused due to insulin deficiency and/or resistance. Poor patient compliance of subcutaneous insulin injections warrants development of a formulation for alternative non-invasive administration. The current study aims to develop a polymer based carrier system for oral delivery of insulin. Specific objectives of this study include formulation of polymer based micro/nanoparticles followed by critical evaluation of their characteristics i.e. particle size, surface properties, loading-efficiency, computational modelling of molecular interactions etc. Moreover, evaluation of the release profile of insulin following the loading of micro/nanoparticles into enteric-coated gelatin capsules; their protection-efficiency in simulated-gastrointestinal media would be carried out. Morphological analysis of the micro/nanoparticles using electron microscopy, evaluation of the toxicity of these formulations and permeation of insulin across epithelial cell monolayer (e.g. Caco-2 cells) would be undertaken. The *in vivo* hypoglycaemic activity of formulated insulin would also be investigated following its administration via oral route using a rat model. It is anticipated, based on the previous evidence, that the micro/nanoparticulate system once released from the capsule would enhance insulin absorption through the intestinal barrier, presumably by opening up the epithelial tight-junctions thus enhancing insulin bioavailability.