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Nose to brain targeting of peptide drug delivery system of octreotide acetate for pituitary cancer

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Transporting drugs to the brain via systemic circulation is a difficult task due to the presence of a tight blood-brain barrier. The aim of this study is to formulate in situ gel for brain targeted delivery of Octreotide Acetate (OA) to overcome degradation, first pass metabolism and to enhance bioavailability of proteins and peptides. A cold method was used for the preparation of *in situ* gel. The 3^2 full factorial design was used to study the effect of concentrations of gelling agent and mucoadhesive agent, on dependent variables like viscosity, gelation temperature, mucoadhesive strength and percentage drug release. Optimized formulation was evaluated for various parameters such as pH, flow-ability, *in vitro* drug release, *ex vivo* permeation, nasal cytotoxicity and accelerated stability studies as per ICH (Q1A) guidelines. Drug targeting efficiency was determined by brain scintigraphy and bio-distribution study using technetium 99 m (^{99m}Tc) labeled formulation. The gamma scintigraphy study confirmed that developed formulation exhibited sustained drug release with prominent effect on pituitary adenoma. Hence, intranasal octreotide acetate *in situ* gel can be considered as promising safe and novel for treatment in pituitary cancer.

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