Emulsification in aqueous media is not effective for the encapsulation of hydrophilic drugs. Peptides and proteins may deteriorate when exposed to aqueous-organic interfaces.

Neuropeptides are potent CNS neuromodulators and have many potential clinical uses.

Currently, no neuropeptides are being used to treat CNS disorders due to their lack of BBB penetration and rapid metabolism in nearly all tissue compartments.

Our Innovation

A new non-invasive biodegradable neuropeptide nanoparticulate system for a brain delivery of peptides via nasal spray to the olfactory tissue.

- Easy to separate dry powder formulation
- A dry powder formulation which is fast dispersed in water with desirable drug release
- Fast disperse to water into uniform nano-dispersion
- Enhancement of CNS neuropeptide delivery and site-specific bioavailability of CNS neuropeptide
- Non-immunogenic, non-mitotic, enhances olfactory nerve uptake, protect neuropeptide against metabolism
- Reproducible technique for largescale production

Technology

- Biodegradable Neuropeptide Nanoparticles (TRH) is found to be effective in alleviation of depression and epilepsy but its entry into brain is limited due to its hydrophilic nature and large size as these properties make it unsuitable to pass through BBB.
- Nose to brain delivery was found to be a potential route for brain delivery bypassing the brain blood barrier. Nanoparticles of sufficiently small size could be transported via axonal pathway through the olfactory bulb into the olfactory cortex and from there to the caudal pole of the cerebral hemisphere, cerebrum and the cerebellum.
- An effective treatment for CNS disorders will require sustained action of TRH but its short half-life (around 5 min) does not allow it to be effective for long time. Therefore, a delivery of TRH as polymeric nanoparticles will provide a more prolonged release of TRH.
Fig. 1: Intranasal delivery of neuropeptides loaded

Fig. 2: TRH loaded PSA NPs

**Opportunity**

- Potentially effective treatment for CNS disorders like depression and epilepsy
The formulation could be used as a promising protein and peptide drug carriers for drug delivery systems.

**Patent Status**


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