CHAPTER 1

AIM AND HYPOTHESIS
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AIM OF WORK

The present work was undertaken to develop novel, patient friendly stable carbamazepine/phenytoin, by using generally regarded as safe excipients, loaded transanasal microemulsion for brain targeting for treatment of epilepsy to achieve following advantages:

- To increase patient compliance
- To achieve higher brain concentration of carbamazepine/phenytoin
- To reduce systemic side effects
- To achieve faster onset of action

The proposed plan of work includes following steps:

1. To develop suitable UV analytical methods for carbamazepine (CBZ) and phenytoin (PHN).
2. To check solubility of drugs in various oils, surfactant and cosurfactants.
3. To select oil, surfactant and cosurfactant for CBZ and PHN microemulsion (ME) based on solubility results.
4. To develop pseudoternary phase diagrams for selection of optimum ratio of surfactant: cosurfactant.
5. To prepare different CBZ MEs and PHN MEs with optimum ratio of Smix and evaluate microemulsions on the basis of physicochemical parameters like globule size, pH, viscosity, conductivity, % Assay, % transmittance.
6. To incorporate vitamin B6 in aqueous phase of CBZ ME after development of simultaneous estimation method for CBZ and vitamin B6.
7. To evaluate the optimized CBZ ME/CBZ and Vitamin B6 ME/ PHN ME by pharmacodynamic study by developing seizures using electroconvulsimeter in rats.
8. To study irritancy effect of optimized CBZ/PHN ME on sheep nasal mucosa by histopathological study.
9. To check brain uptake of CBZ/PHN from CBZ/PHN MEs administered intranasally in rats and find out Brain/Plasma ratio for CBZ/PHN.

10. To perform stability study.

**Hypothesis:**

It was hypothesized that this study will develop stable and safe intra nasal microemulsion of CBZ and PHN. This optimized microemulsion based nasal drug delivery system loaded with these drugs (CBZ/PHN) will selectively and effectively transport the drugs directly to the brain through olfactory epithelium. Thus higher brain concentration of drug can be obtained with in shorter duration of time by administration of optimized CBZ/PHN microemulsion by intra nasal route. It will provide rapid onset of action which is required during severe bouts of seizures. The developed CBZ/PHN microemulsion will reduces systemic exposure of drug and hence will reduce systemic side effects. It was hypothesized that the prepared microemulsion will maximize therapeutic benefits compared to conventional therapy and will be expected to help in management of epilepsy in better way.