Peptides Delivery to Brain by Nasal Administration

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Delivery of peptides to brain via conventional administration routes is a challenging task, mainly due to the presence of the blood brain barrier and the enzymatic degradation process in the GI track. The nasal pathway could be considered, being a convenient and noninvasive drug delivery alternative. However, efficient absorption could be possible only by overcoming the low permeability of the nasal mucosa. We have designed and investigated Phospholipid Magnesome, a new nasal carrier containing Magnesium and phospholipid soft vesicles. In experiments using Multiphoton Microscopy, Insulin administrated nasally in Phospholipid Magnesome, was delivered to the olfactory region of the mice brain. Near infrared imaging of whole mice brain showed that Epidermal Growth Factor accumulated in the cerebrum and in the olfactory bulb following nasal administration in the new carrier. The florescence intensity into the brain measured 10 min after administration of the above two peptides incorporated in Phospholipid Magnesome, was found to be 8 folds higher in comparison with that obtained when other carriers were used: a water solution, liposome or a non-vesicular carrier. Further, in a pharmacodynamic evaluation of the antinociceptive effect in an acetic acid pain animal model, a Maximum Possible effect (MPE) of more than 60% was measured for Oxytocin Phospholipid Magnesome with an onset of action of only 5 min. The results of this study encourage further investigation of the new nasal carrier for the design of nasal pharmaceutical products containing peptides for noninvasive treatments that need rapid onset of action.

Biography

Hiba Natsheh is a post-doctoral fellow at Prof. Elka Touitou's lab at The Institute for Drug Research, School of Pharmacy, Faculty of Medicine, The Hebrew University of Jerusalem. Prof. Touitou (elka.touitou@mail.huji.ac.il) is worldwide recognized for designing novel approaches for enhanced dermal and transmucosal drug delivery.

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