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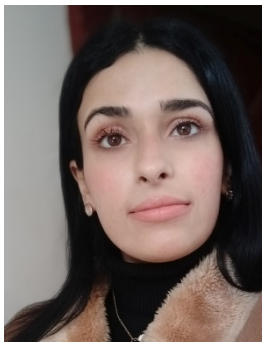
Nasal polymeric nanoparticles for enhanced therapeutic effects



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The administration of therapeutic agents through intranasal drug delivery has gained considerable interest due to its non-invasiveness and effectiveness in increasing the bioavailability of most active substance [1]. One strategic approach is to administer polymeric based nanoparticles, one of which are polymeric micelles, which are nanoscale self-assembles formed by amphiphilic block copolymers, offering a versatile platform for various drug delivery routes [2]. Polymeric micelles are a great option for intranasal delivery because of their special physicochemical characteristics, which include stability, biocompatibility, and the capacity to encapsulate hydrophobic drugs with water solubility [3].

To improve on the physicochemical and pharmacokinetic properties of a variety of medicinal agents, including peptides, nucleic acids, and small molecules, polymeric micelles can be specifically designed to encapsulate them. Moreover, the mucoadhesive properties of certain polymers contribute to prolonged residence time in the nasal cavity, improving drug absorption and distribution [1]. Local therapy can also be exploited via these nanocarrier systems due to their high adhesiveness to the nasal cavity, and some of the applicable micelle-forming polymers also contribute to provide a sustained release profile. The other main advantage of these polymeric nanoparticles is the ability to bypass the blood-brain barrier via direct axonal transport to the central nervous system.

To tackle challenges regarding the local and central nervous system associated diseases, the utilization of quality controlled nasal dosage form development in the form of colloidal polymeric micelle formulations as representatives of the non-biological complex drugs can be advantageous.

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