



Pharma | Technology offer

Efficient and safe nose-to-brain drug delivery method for treatment of central nervous system (CNS) diseases

Field of application

More than a billion of people worldwide are suffering from diseases of the central nervous system (CNS). Unfortunately, most drugs have a low central bioavailability due to the blood-brain barrier which makes CNS therapy often unsatisfying. However, intranasal drug delivery has recently gained growing interest as an alternative CNS therapy method.

Here we present an innovative and efficient nose-to-brain drug delivery method via the olfactory region (olfactory cleft) for use in diagnosing, treating and preventing CNS diseases.

State of the art

The blood-brain barrier is a major hindrance of efficient CNS therapy. Only a limited number of essential nutrients like glucose and amino acids, co-factors like iron and peptide hormones like insulin are actively transported across the blood-brain barrier. Molecules that do not possess a specific transport mechanism can only pass the blood-barrier via passive diffusion.

Though the central bioavailability of small molecule drugs by chemical modification can be slightly enhanced – this does not work for large molecules like peptides and proteins. Therefore, most CNS active drugs have to be administered via invasive methods into the cerebrospinal fluid (CSF) of the CNS, e.g. intrathecal, intracerebroventricular or intraparenchymal. These routes of administration are not only invasive but also have lots of adverse side effects and contraindications.

Innovation

Scientists at Hochschule Biberach who have several years of experience in industrial CNS research and development and also in clinical research have developed an innovative and efficient intranasal drug delivery method. For this purpose a film consisting of different compounds/particles for a safe and controllable CNS disposition is formed in situ at the olfactory region. This film patch continues to adhere on the olfactory region as long as the pharmaceutically active compound is released and then disappears.

This innovative method is non-invasive and provides a maximal dose delivery at the olfactory region and a minimal delivery at the respiratory epithelium or other region of the nasal cavity.

Your benefits at a glance

- ✓ efficient nose-to-brain drug delivery method by generating an in situ-film on the olfactory region
- ✓ film consists of different compounds/particles for a safe and controllable CNS disposition
- ✓ film patch residence time can be fine-tuned to patients' individual requirements
- ✓ maximal dose delivery at the olfactory region and minimal delivery at the respiratory epithelium or other region of the nasal cavity
- ✓ mucosal irritations, local effects and immune interactions significantly reduced
- ✓ CNS active drugs with a molecular weight between 150 Da up to 150 kDa can be administered
- ✓ maximum protection for sensitive drugs like mAbs

Technology transfer

Technologie-Lizenz-Büro GmbH is responsible for the exploitation of this technology and assists companies in obtaining collaborations/licenses.

Patent portfolio

European patent application is pending.

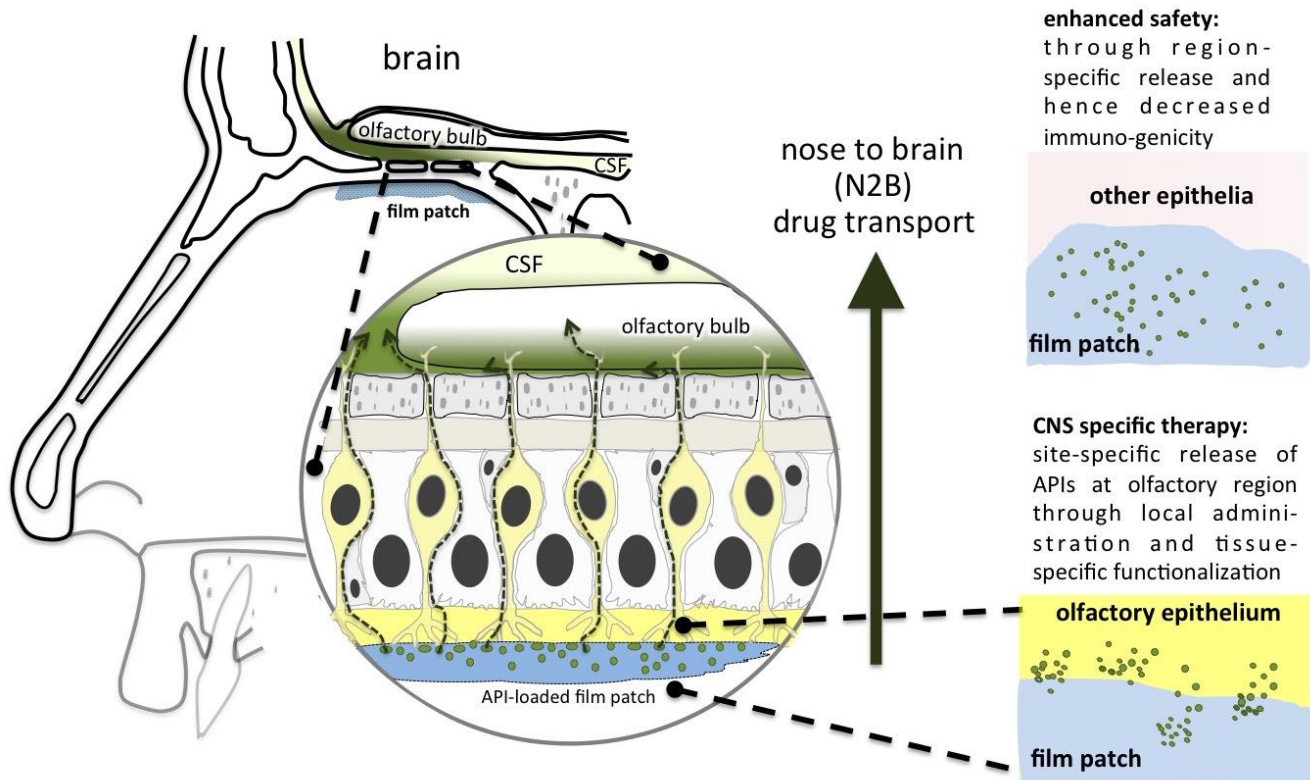


Figure 1: Technology of the invention: An active substance is encapsulated in particles (e.g. PGLA, PLA or chitosan, shown in green) and embedded in a hydrogel matrix (e.g. hyaluronic acid or gelatin, shown in blue). With an application aid (e.g. endoscope), the matrix is applied as a film to the nasal roof.

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