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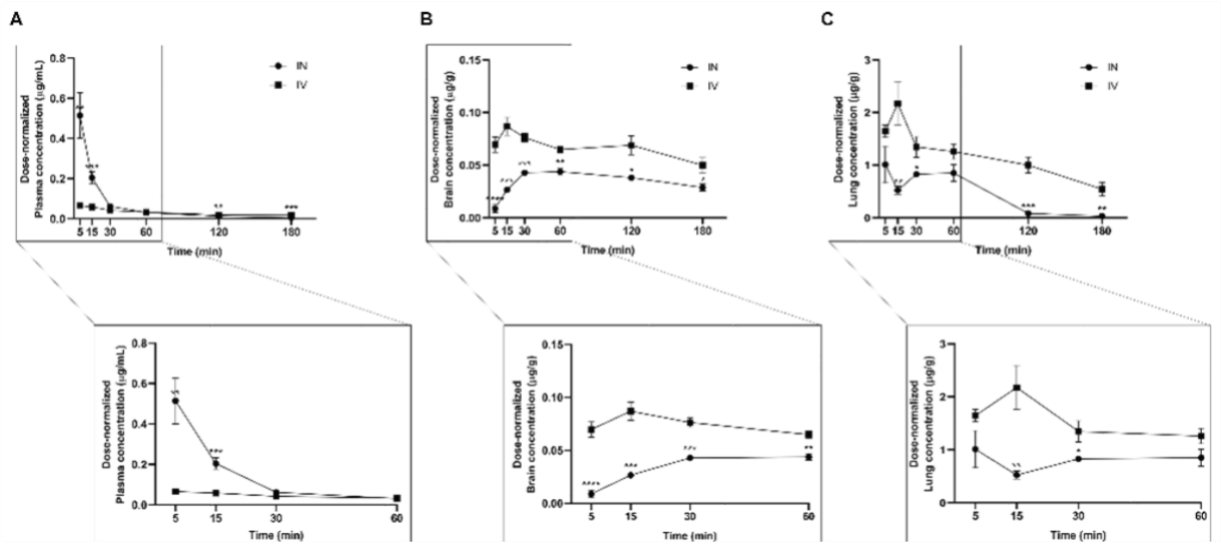
# Intranasal Administration for a Sustained Brain Delivery of Highly Protein-Bound Drugs

**KEYWORDS:** Brain Delivery; Central Nervous System Disorder; Depression; Intranasal Administration; Plasma Protein Binding; Sustained Drug Delivery.

The present invention provides a method for the controlled release of highly plasma protein-bound drugs to the brain by means of intranasal administration. It sustains highly plasma protein-bound drug release to the brain, in comparison with intravenous and oral routes, reducing lung drug exposure and consequently envisioning the reduction of pulmonary side effects. It discloses, but is not limited to, a formulation and a device for brain sustained delivery of a selective serotonin reuptake inhibitor.

The strategy enables multiple administrations and promotes reduced peak-to-trough fluctuations of steady-state brain concentrations, thereby decreasing the potential to develop central toxic and subtherapeutic effects. Therefore, the present innovation improves the efficacy and safety of highly plasma protein-bound drugs that are used in chronic central nervous system diseases, such as depression, and other neurological and neurodegenerative diseases.




*The time evolution of sertraline concentrations in plasma (**A**), brain (**B**) and lungs (**C**) after intranasal (IN) and intravenous (IV) administration to mice, at the dose of 4.87 mg/kg (n = 5, per time point). Results are represented as mean ± standard error of the mean. *p<0.05; **p<0.01; ***p<0.001; ****p<0.0001.*



**A** *Different devices that ca be used as well as the thermorreversible gel tested in the current innovation.*

**B** *Representative image of healthy CD-1 male mice in cage with environmental enrichment.*

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| ADVANTAGES | APPLICATIONS |
|---|---|
| • Allows a sustained brain drug delivery.<br>• Reduces peak-to-trough fluctuations.<br>• Requires smaller drug doses (comparatively to classical routes of administration).<br>• Overcomes limitations of highly plasma protein-bound drugs, namely drug-drug interactions.<br>• Decreases lung exposure and side effects.<br>• Enables self-administration and is non-invasiveness.<br>• Involves a cost-effective production. | • Sustained brain delivery of CNS-acting drugs, highly bound to plasma proteins, by means of intranasal administration.<br>• Several drug formulations can be used.<br>• Applicable in a wide range of therapeutic unmet needs including neurodegenerative, neuropsychiatric and neurological disorders. |

**VIDEO (QR Code or YouTube):**

**STAGE OF DEVELOPMENT:** TRL 3

**IPR LEGAL STATUS:** Patent Pending n.° 117625/117792 filed on 07.12.2022/16-02-2022.

**OWNERSHIP:** The rights to the technology are held by the University of Coimbra.

**COLLABORATION SOUGHT:** Licensing for further developments or R&D partnership.

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