Cleveland Clinic

PRODUCT

Neurostimulation of the Blood Brain Barrier: Better drug delivery of therapeutic agents to the central nervous system.

INDICATION

Closed Loop Drug delivery, CNS disorders.

VALUE PROPOSITION

- Enables drugs past the bloodbrain barrier (BBB) for central nervous system (CNS) diseases.
- Combines stimulation of the sphenopalatine ganglion (SPG) to open/close the BBB with a closed-loop drug delivery system.
- Existing solutions are not optimal as they lack closed-loop control of BBB opening and closing on demand.
- Inductively powered for handsfree operation

DEVELOPMENT STAGE

Design development

INTELLECTUAL PROPERTY Patent Pending

CONTACT INFORMATION

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Closed Loop Drug Delivery System for Stimulated Blood Brain Barrier Modulation

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PROBLEM

The blood brain barrier (BBB) represents a significant obstacle to the delivery of therapeutic agents to the central nervous system. Techniques to transiently increase the permeability of the BBB have been sought for various clinical applications. However, there has been a need for a system that can provide precise and controlled modulation of BBB permeability in conjunction with drug delivery.

SOLUTION

This invention is a closed loop drug delivery system and pertains to a method and apparatus for electronically stimulating the sphenopalatine ganglion to control the permeability of the blood brain barrier (BBB) to facilitate targeted drug delivery for treating central nervous system diseases. BBB permeability is initiated by low-frequency (<100 Hz approximately 50-60 Hz) stimulation via the sphenopalatine ganglion stimulation (SPG) implant. Following permeability of the BBB, the drug delivery pump becomes activated, releasing the pharmaceutical agent. Upon complete drug delivery, the pump signals the implant to stimulate the (SPG) at a high frequency (>100 Hz approximately 140-150 Hz), closing the BBB. The inductive power sourcing and feedback loop allows the patient a hands-off approach, especially beneficial in incapacitated patients.

