Docket #: S22-069

Exosomes from Postpartum Nursing Females as Therapy for Ischemic Injury

Stroke remains the second leading cause of death worldwide and the leading cause of disability in the US. The only pharmacological treatment for stroke remains early administration of thrombolytics, which must be administered within a limited therapeutic window, have only a modest (~35%) efficacy, and are associated with several risks and contraindications. Interventional thrombectomy is an alternative rescue, but requires a surgical approach, is associated with adverse outcomes secondary to mechanical manipulation of ischemic vessels and is typically employed only as a delayed option secondary to pharmacological failure and after brain tissue has already been lost.

To circumvent these present challenges, inventors at Stanford have developed a novel exosome method to protect against ischemia. Exosomes are nanoscale extracellular vesicles released by most cell types present in the circulation that contain a variety of biological cargoes including RNAs and proteins derived from their host cells, facilitating intercellular communication and regulating recipient cell function. Exosomes cross the blood-brain barrier, and are transported into brain cells. Exosomes can deliver their contents to specific cell types and serve as potential selective drug delivery devices.

The novelty of the invented technique involves isolating exosomes from the plasma of postpartum nursing females and administrating the vehicles as a post-injury therapy for stroke. The inventors have demonstrated in small animal studies that a post-stroke treatment with nursing exosomes is protective for non-pregnant female mice, young adult male mice, and aged female mice. Exosomes are protective even when given intravenously after experimental stroke, underscoring their translational therapeutic potential. Due to its increased safety profile, the technique could be

administered to high-risk individuals as a stroke therapy adjuvant or even as a replacement for tissue plasminogen activator. This novel invention would also enable pretreatment of patients at risk of stroke and applications beyond brain ischemia, protecting against other organs at risk of ischemia.

Stage of Development
Research In Vivo

Applications

- Stroke therapy
- Ischemia protection
- Exosome drug delivery

Advantages

- Can be administered before stroke occurs and in high-risk patients
- No adverse side effects compared to existing stroke treatments
- Biocompatible

Innovators

- Creed Stary

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