Researchers at the University of South Florida have developed a combination treatment of hypothermia and mesenchymal stromal cells neuroprotection hypoxic-ischemic-like injury via the opioid system.

Hypoxic-ischemic encephalopathy (HIE) is defined as damage to cells in the central nervous system due to insufficient oxygen. HIE may cause death in the newborn or result in what is recognized as mental retardation, or cerebral palsy later in life. There has been major research progress in HIE over the last 20 years and new molecular mechanisms have been identified. HIE is a serious condition that causes significant mortality and long-term morbidity. This is an area of considerable medical debate; therefore, a therapeutic intervention is necessary.

The technology developed by University of South Florida is the use of combination of moderate hypothermia treatment and bone marrow-derived stem cell transplantation against hypoxic-ischemic-like injury in vitro.

The pathology of hypoxic-ischemic-like injuries (e.g., cerebral palsy, stroke) entails multiple cell death processes requiring a treatment intervention that targets multi-pronged therapeutic pathways, instead of a single cell death mechanism in order to afford improved clinically relevant outcome. The present invention of combination therapy acting on multiple therapeutic pathways solves this problem. The technology is directly applicable to neonatal, as well as adult neurology.

**ADVANTAGES:**

- Ameliorate neonatal and adult hypoxic-ischemic-like injuries
- Multi-pronged neuroprotective targets thereby enhanced benefits compared to stand-alone treatments
- Wider therapeutic windows post-injury

**Combination Therapy of Moderate Hypothermia, MSCs and DADLE**

The combined treatment, with or without DADLE, significantly improved both mitochondrial activity and cell viability in PRNCs, which was significantly reduced by opioid antagonist naltrexone.