

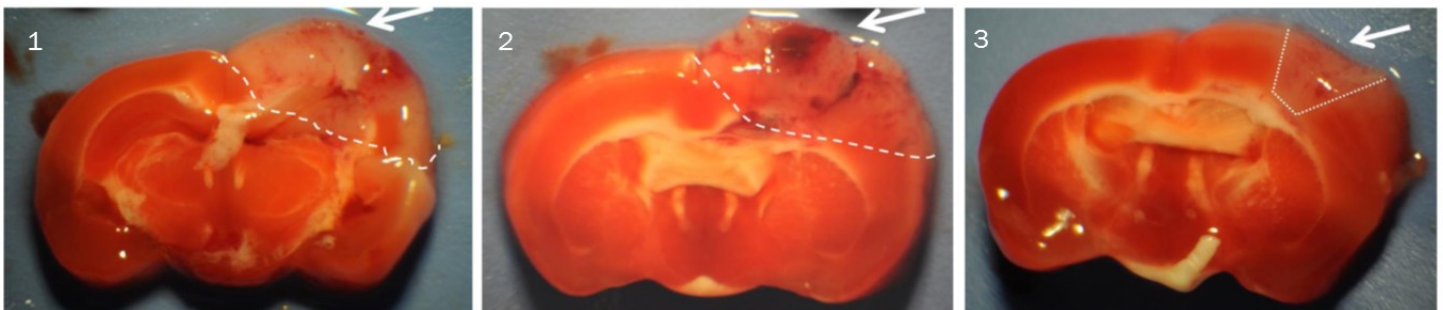
Novel Neuroprotective Strategy for Treating Traumatic Brain Injury

OU ID: #15016

Overview

Traumatic brain injury (TBI) is a significant medical issue, costing the US healthcare system around \$50 billion dollars each year¹. Symptoms range from mild and can completely resolve, to severe, causing long-lasting limitations in social, behavioral, physical, and cognitive abilities. The CDC estimates that in 2010, TBI accounted for approximately 2.5 million emergency department visits, hospitalizations and deaths in the US. The Department of Defense has reported that between 2000 and 2011, over 235,000 service members were diagnosed with TBI².

When TBI occurs, free ions accumulate in neurons and cells due to the acidic environment in the impacted area of the brain. Hypertonic saline is often used to decrease intracranial pressure by reducing tissue swelling. As a result of the saline wash, the pH of the injured area is corrected and the free ions precipitate, causing neuron and cell death. The solution developed by Dr. Yang Li is formulated to remove excess ions, preventing neuron and cell death and reducing the likelihood of secondary brain damage beyond the immediate physical injury.



Animals subjected to TBI (Image 1) were then treated with regular physiological saline perfusion at pH 7.4 (Image 2) or hypertonic saline + 20% glucose at pH 4.3 + CaEDTA (Image 3). Animals treated with physiological saline experienced secondary injury in addition to the primary impact injury. Acidic saline with CaEDTA was able to limit brain injury to the primary impact area.

Commercial Application

This solution is designed to be utilized as a supportive treatment for TBI, in combination with surgery to remove debris and swollen tissue. The injured brain area will be washed or covered with acidic saline containing a metal ion chelator to prevent secondary brain damage.



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Benefits

- Therapy minimizes secondary damage after TBI
- Chelation therapy, including calcium disodium EDTA and dimercaptosuccinic acid, is an accepted treatment method for removing metals from the body

About the Inventor

Dr. Yang V. Li is a Professor of Neurosciences in the Biomedical Sciences department at Ohio University. His research is largely funded by NIH to understand the cell-to-cell communication in the brain and to investigate the cell & molecular signaling of cell death or survival.

References

¹Traumatic Brain Injury. <http://www.aans.org/patient%20information/conditions%20and%20treatments/traumatic%20brain%20injury.aspx>

²Traumatic Brain Injury In the United States: Epidemiology and Rehabilitation. https://www.cdc.gov/traumaticbraininjury/pubs/congress_epi_rehab.html

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