2017 Massey TBI Grand Challenge
Award Winner (Traumatic Brain Injury)

Novel Drug Therapies for Improved Neuroprotection
AWARD AMOUNT: $75,711

THE TEAM

Omar Ahmed, PhD
Principal Investigator

Vaughn Hetrick
Key Participant

Shyam Kumar Sudhakar, PhD
Key Participant

Hasan Alam, MD
Mentor

THE PROBLEM

Immediately after a severe TBI, the ionic concentrations in the brain dramatically shift, causing cell death and secondary brain injury. There are currently no drugs that have been approved for use in preventing secondary brain injury.

- Cell death can cause seizures and long-term disabilities
- No pharmacological drug exists for TBI
- Limited treatment options during golden hours of TBI

THE SOLUTION

A novel combination of FDA-approved drugs administered immediately after TBI to reduce secondary brain injury

- Administered immediately after TBI
- Effective in reducing brain cell death
- FDA-approved drugs can be “fast tracked” to clinical trial

A drug therapy consisting of FDA-approved bumetanide and gadoxadal offers substantial neuroprotection if administered during the golden hours of TBI.

When the brain is severely injured, potassium increases outside of neurons while chloride increases inside, creating a “depolarization block” that leads to cell death.

Together, bumetanide and gadoxadal relieve this block by “hyperpolarizing” neurons and bringing them “back online,” thus offering neuroprotection.

THE TECHNOLOGY

GABOXADOL

BUMETANIDE