2018 Massey TBI Grand Challenge Award Winner (Traumatic Brain Injury)

AWARD AMOUNT: $120,000

THE PROBLEM

The mortality of patients suffering TBI induced coagulopathy is as high as 50.45% vs. a mortality of 17.3% for patients without coagulopathy.

The current standard of coagulopathy diagnosis relies on expensive benchtop equipment not widely used in intensive care or emergency rooms.

- High cost of coagulopathy diagnosis equipment
- Need for trained personnel for data collection and analysis
- Technology not widely available

THE SOLUTION

Developing a point-of-care diagnostic tool to measure coagulation abnormalities

A microfluidic device that can detect coagulation process in minutes. Early detection will help determine the best course of treatment. The device is inexpensive to fabricate and easy to use allowing for repeated measurements throughout treatment.

- Point-of-care technology
- Use microliters of blood in analysis (fingerprick)
- Disposable one-time used chips costing less than $10

THE TECHNOLOGY

- The coagulation process involves a blood change of state from liquid to a solid gel. The viscosity of the blood changes due to the coagulation cascade.
- Forms droplets, blood viscosity determines size
- Smaller droplets = Larger viscosities (and vice versa)
- Characteristic points detected in coagulation curves including the gel point, the time-to-gel-point and the maximum clot viscosity

CHIP DEVICE