**BACKGROUND**

Hydrocephalus occurs when excess fluid builds up in the brain’s ventricles causing increased pressure. The standard of care is a shunt with three main components: a ventricular catheter, a shunt valve, and a distal catheter.

![Physiological location of a CSF shunt and its three main components.](image1)

**NEED**

Neurosurgeons need a method to allow unobstructed cerebrospinal fluid flow in hydrocephalus patients to minimize ventricular obstruction following shunt insertion.

**MODEL**

![Proposed ventricular obstruction model simulating protein and blood obstruction, with inflow pump and outflow shunt valve.](image2)

**INITIAL RESULTS**

Flow Rate (mL/min) vs. Tubing Height (cm H2O)

![Verification of model to identify tubing height necessary to achieve equal inflow and outflow.](image4)

Flow Rate (mL/min) vs. Time (min)

![Verification of constant flow through model over five-minute time period.](image5)

**REFERENCES**


**HOW DOES IT WORK?**

1. Peristaltic pump generates variable flow into the ventricular box
2. Pig blood and egg whites are used to cause obstruction of the catheter
3. Tubing height is varied to generate physiological flow out of box

**Fig 1.** Physiological location of a CSF shunt and its three main components.

**Fig 2.** Proposed ventricular obstruction model simulating protein and blood obstruction, with inflow pump and outflow shunt valve.

**Fig 3.** Most recent model prototype, with input flow of 0.6 mL/min.