

New biosensor gives abused infants a fighting chance

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It's a deadly problem that requires a doctor's best detective work.

Babies whose brains are injured from abuse can't speak, parents won't admit what happened, and common symptoms - such as fussiness and vomiting - are typical baby behaviours.

Now, a Toronto-based company has patented a technology that it says could help doctors quickly identify infant brain injuries inflicted by others - the leading cause of mortality from traumatic brain injury in children under 2.

Axela Biosensors has patented a tool that detects two proteins that are markers of brain injuries. With a simple blood test, doctors may know in less than an hour whether damage has occurred, the company says.

Two teams of researchers in Pittsburgh and Salt Lake City are to test the biosensor tool in a five-year trial set to begin this year, using a sample of 1,000 children.

Detecting brain injuries in infants is vital, says lead researcher Rachel Berger, who specializes in head trauma from abuse and is based at the University of Pittsburgh school of medicine.

"If you miss them," Dr. Berger says, "they have a very high incidence of coming back dead."



Axela's biosensor technology at work

The biosensor, developed by researchers at the University of Toronto, detects small amounts of two proteins - neuron-specific enolase and myelin basic protein - that are released after a brain is injured.

Dr. Berger has already run a preliminary trial and found promising results. "It works," she says. But the larger study is necessary if the tool is ever going to make it into emergency rooms.

Ideally, Dr. Berger says, it will be a fast, easy tool to aid doctors when infants wind up there.

Doctors who suspect a child has been hit or shaken often have to use detective work, says Ash Singhal, a pediatric neurosurgeon and director of trauma at B.C. Children's Hospital.

"Very rarely does someone tell us, 'I hit the child,'" he says. "We wind up having to rely almost exclusively on the physical exam or radiology [such as X-rays] or blood work."

During assessments, doctors look for bruises and old fractures, and interview family members to see if stories match. Bleeding in the eye can indicate a head

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injury has occurred, and CT scans can locate brain hemorrhaging.

But in isolation, none of those are “smoking guns” when it comes to detecting abuse, Dr. Singhal says.

Research from the United States and the United Kingdom shows that 1 in 3,000 children are victims of severe or fatal inflicted head injuries. The number of milder cases may be up to 100 times higher, according to research published in the January issue of the Journal of Neurotrauma.

The number of serious brain injuries known to be inflicted may be only the “tip of the iceberg,” according to a 2003 report from the Canadian Medical Association.

It states that abusive head trauma accounts for 95 per cent of fatal or life-threatening injuries attributed to child abuse, but a lack of reporting and difficulty with detection means that many inflicted childhood brain injuries go unreported.

Rocky Ganske, Axela’s president and CEO, said the company’s biosensor may

have diagnostic implications for other conditions, such as heart disease, as well.

He says he’s excited about the possibilities when it comes to childhood brain injuries.

“I was as ignorant as the rest of the public as to the incident rate,” Mr. Ganske said. “It has great public benefit as well as the business side.”

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