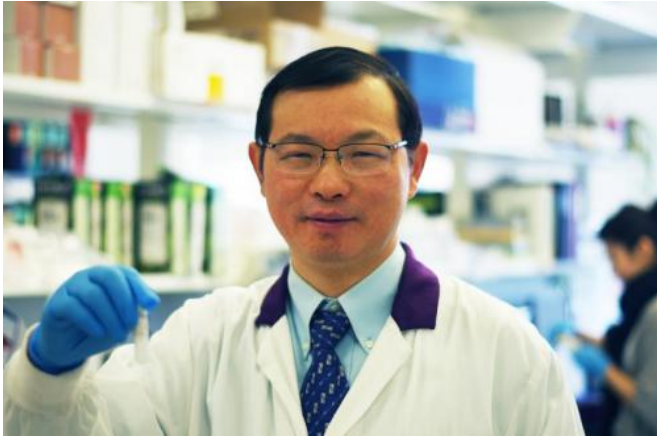


Study may identify new cause of brain bleeds in fetuses and newborns

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Credit: St. Michael's Hospital

A newly discovered bodily process in mice may explain why some human fetuses who have different antigens than their mothers suffer life-threatening brain bleeds, according to a new study.

"Antigens are like the body's national flag. They're planted on each cell in the body and tell the immune system whether something in the body, such as a bacteria or virus, is foreign," said Dr. Heyu Ni, a scientist in the Keenan Research Centre for Biomedical Science of St. Michael's Hospital. "Because each parent's DNA is different, a fetus can have different [antigens](#), or flags, on some cells than his or her mom. When a mom's immune system identifies those cells as foreign to the body it attacks them, which can cause brain bleeds and result in neurological impairment or even death."

The condition where mothers and [fetuses](#) have different antigens is called fetal and neonatal alloimmune thrombocytopenia, or FNAIT. It affects about one in 1,000 live births. Fetuses experience bleeding in the brain in about 10 to 20 per cent of

FNAIT cases. The disease can also cause miscarriages, although that has not been well studied.

Platelets—cells in the blood that help form blood clots and stop bleeding—are one of the cell types that commonly have different antigens. Because they are often different in the mother and fetus, they can be targeted by the mother's immune system. Until now, low amounts of platelets were considered the cause of brain bleeds in fetuses and newborns.

"Our research challenges the idea that low [platelet](#) counts are responsible for fetal brain bleeds and instead shows that the [immune system](#)'s attack on the new [blood vessel cells](#) in the brain are more likely responsible," said Dr. Ni, who is also a Canadian Blood Services scientist. "An antigen, called beta 3 integrin, is found both on platelets and on the cells responsible for developing blood vessel in fetuses."

Newborn platelet levels are tested at birth since it's believed a lower platelet count signifies the newborn lacks the ability to stop bleeding. A safe level of platelets for newborns is between 150 million and 450 million cells per ml of blood. Babies with low platelet counts (less than 150 million [cells](#) per ml of blood) are usually treated right away with platelet transfusions.

"What we've discovered means that platelet transfusions are necessary to control bleeding after birth but may not be an effective therapy for brain bleeds in fetuses since platelets may be not essential to stop fetal bleeding," said Dr. Ni. "We should consider different therapies to prevent brain bleeds and ensure blood vessels in the brain are developed properly before birth."

Dr. Ni's research team also looked at the potential treatment of intravenous immunoglobulin transfusions. He said IVIG—made of plasma from

donated [blood](#)—may be an effective therapy to control this devastating disease, although more research is needed to confirm this.

The study was published in the *Journal of Clinical Investigation*.

Provided by St. Michael's Hospital

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