

Natural birth could be key to infant health

Hormones linked to natural delivery may be needed for baby's liver to function well



Professor Walter Wahli's experiments with mice point to a connection between the birth process and the way a newborn's liver breaks down fats.

PHOTO: DON WONG FOR THE STRAITS TIMES

Audrey Tan

ADAPTING TO CHANGES

Failing to cope with this change in diet leads to serious complications and sometimes death... We wanted to get a better understanding of how the body adapts to these changes, which could pave the way for understanding metabolic health in later life.



NTU PROFESSOR OF METABOLIC DISEASE WALTER WAHLI, on how the body of a newborn must get prepared to switch from a sugar-rich diet through the placenta to a fat-rich diet after the infant starts drinking his mother's milk.

A natural vaginal birth is a stressful process for both mother and child, but it could be key to unlocking healthy metabolism in infants, a new study has suggested.

Scientists from the Nanyang Technological University's (NTU) Lee Kong Chian School of Medicine have discovered that the glucocorticoid stress hormones involved in the natural birth process could function as a signal which activates healthy energy metabolism in an infant's liver.

This could be key in lowering the risk of the newborn developing metabolic diseases later in life, such as obesity, Type 2 diabetes or fatty liver disease.

The research is still in its early days, but NTU professor of metabolic disease Walter Wahli's findings suggest that the method of delivery could have an impact on the long-term metabolic health of the baby.

Professor Wahli and his team found that, in mice, these stress hormones not only induce labour in the mother but are also an important signal to kick-start the process

of milk-fat breakdown in the liver of the newborn baby.

When these hormones are produced days before natural birth, they activate a protein in the fetal liver known as peroxisome proliferator-activated receptor alpha (PPAR-alpha), which helps the liver get ready to break down and absorb lipids (fats).

This is important as it prepares a newborn for the drastic change in diet after birth – from a sugar-rich diet through the placenta, to a fat-rich diet when he begins to drink his mother's milk.

"Failing to cope with this change in diet leads to serious complications and sometimes death.

"We wanted to get a better understanding of how the body adapts to these changes, which could pave the way for understanding metabolic health in later life," said Prof Wahli, who worked with scientists from Switzerland and France on the research.

The study was published in July in the science journal *eLife*.

During the study, scientists detected an increase in stress hormones in mice fetal livers about six days before the eventual delivery date, usually in the third week of

pregnancy for mice.

About two days later, the researchers noted a corresponding increase in PPAR-alpha activity in the liver as well.

"Preliminary results indicate that if the baby mice are delivered before the glucocorticoids are produced, then there would be insufficient PPAR-alpha in the fetal liver," said Prof Wahli, who added that further studies have to be done to determine if this was also true for humans.

For the mouse model engineered only without the PPAR-alpha in its liver, the newborns developed juvenile steatosis, a condition in which fats accumulate in the liver.

This could predispose them to developing other metabolic diseases in the future, said Prof Wahli, 70, a father of three and grandfather of four.

Moreover, he also found that the PPAR-alpha triggers a chain reaction.

The PPAR-alpha protein induces a breakdown of lipids to form a substance known as beta-hydroxybutyrate. The presence of this is crucial for the activation of other genes involved in fat-burning.

Prof Wahli said the findings from the study were significant, as it was previously not known whether increased fat metabolism at birth was due to adaptation to a change in diet, or whether it was a response to a stimulus, such as glucocorticoids.

"Further research needs to be done, but the finding could pave the way to study how stress hormones could be used as a therapy to treat inborn metabolic disorders," he added.

Dr Lee Guan Huei, a consultant in the Division of Gastroenterology and Hepatology at National University Hospital, said: "The study was well-designed and adds another important piece of the puzzle to the complex and rapid anatomical and physiological transition from a life in the uterus to a life outside."

However, he added that studies on mice should be interpreted with caution, especially when the intention is for human application.

audreyt@sph.com.sg