Medical Xpress

New treatment may work with folic acid to prevent neural tube defects like spina bifida

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Researchers at the UCL Institute of Child Health (ICH) are investigating a new treatment that could work alongside folic acid to boost its effectiveness and prevent a greater proportion of neural tube defects – such as spina bifida – in early pregnancy.

A new study published in the journal *Brain* shows that the new treatment, when tested in mice, reduced the incidence of neural tube defects (NTDs) by 85 per cent. This new approach was also successful in

preventing some kinds of NTDs that are currently unresponsive to folic acid.

Researchers at the ICH, which is the research partner of Great Ormond Street Hospital for Children NHS Foundation Trust, believe the findings could make way for future trials in patients, to investigate whether the same level of prevention can be achieved for human NTDs.

NTDs such as spina bifida and anencephaly are still among the most common birth defects worldwide, affecting about 1 in 1,000 pregnancies with much higher rates in some countries.

Folic acid supplements taken in the very early stages of human pregnancy, when an embryo's central nervous system is still developing, currently prevent a proportion of NTDs (20-80 per cent depending on geographic region). Folic acid works by helping the embryo's neural tube to close normally, which is an essential step of development (failure of this process results in NTDs). However, a significant number of NTDs are unresponsive to folic acid supplements.

One reason why folic acid might not always be effective is that a 'genetic blockage' can occur in the way folic acid is handled, or metabolised, in cells. In such cases, even if folic acid is taken early in pregnancy it is blocked from having the desired effect on the embryo. The new treatment being tested at the ICH involves supplementing with 'nucleotides', which are needed to make DNA as cells divide in the growing embryo. Nucleotides can bypass the blockage in the way folic acid is handled, ensuring the growth of crucial cells in the embryo.

NTDs are likely to have many possible causes and the ICH team considers that the most effective way to reduce the risk of NTDs is to use a combination of different treatments. In previous studies they found that a particular vitamin, inositol, has a protective effect and this is being

tested in a clinical trial.

Similar studies are now proposed for the 'nucleotide' treatment, and researchers envisage that a single tablet could eventually be developed for women planning a baby, which would contain folic acid and the new protective compounds.

Commenting on the new research, Nicholas Greene, Professor of Developmental Neurobiology at the ICH, said: "We are still in the early stages of this research, but we hope that these promising results in mice can eventually be replicated with human NTDs. If it is found to be effective, this nucleotide treatment could boost the effects of folic acid and offer expectant mothers an even more reliable safeguard against relatively common defects like spina bifida."

Professor Greene added: "While we continue our research into this new treatment, it's important to emphasise that folic acid supplements remain the most effective prevention against NTDs currently available for women who are planning a baby. While we are greatly encouraged by these new findings, I would strongly urge women to continue taking folic acid in its current form until we reach a point where additional supplements might become available."

Provided by University College London

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