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Even natural products can be harmful for the unborn child

Plant products ingested by pregnant women through their diet are broken down by the intestinal microbiota into chemical substances, some of which can cross the placental barrier and reach the fetus. These foreign substances can harm the unborn child, even if they are of "natural origin". Researchers at the Department for BioMedical Research (DBMR) at the University of Bern and Inselspital, University Hospital Bern, therefore warn against underestimating the effects of such substances.

All mammals, including humans are colonized by billions of microbes. These mainly live in our intestines, but which can also be found in the respiratory tract, on the skin and in the urogenital tract. In the gastroenterology research group of the Department for BioMedical Research (DBMR) at the University of Bern and at the University Hospital Bern, Inselspital, Stephanie Ganal-Vonarburg and Andrew Macpherson investigate the interaction of these benign intestinal microbes with the host organism. The positive influence of the intestinal flora on our immune system has been recognized for a long time. Interestingly, even the maternal intestinal microbiota already has an effect on the development of the child's immune system during pregnancy as well as immediately after birth. In a review article published in the journal Science, Stephanie Ganal-Vonarburg and Andrew Macpherson compiled the latest knowledge of the extent to which the maternal intestinal flora is involved in the development of the child's immune system. They also found evidence that the effects of plant-based substances that pregnant women ingest through diet have so far been underestimated in research and may pose a potential risk to the unborn.

The placenta only offers partial protection

Scientists have always assumed that the developing embryo and fetus grow in a completely sterile environment in the womb, i.e. in the absence of colonizing microbes, and that colonization with microbes only takes place at the time of birth. "However, the fetus is not protected against microbial metabolites that originate from the maternal intestinal flora," says Ganal-Vonarburg. The placenta offers only partial protection and transfer of microbial substances leads to the maturation of the offspring innate immune system already during pregnancy. Previous studies by the group around Ganal-Vonarburg and Macpherson have shown this. "It is common for pregnant women to take medication with great caution and only after consulting their doctor, since many medications can cross the placenta and interfere with the child's development. However, much less is known about which naturally occurring substances present in the diet can pass on to the unborn child and to what extent this can be beneficial or harmful for the development of the child's immune system", explains Ganal-Vonarburg.

Even plant substances need to be handled with caution

Together with Andrew Macpherson, she has now summarized published research results and found evidence that metabolic products from the diet cannot only directly reach the the maternal organism and thus into the developing fetus, but that this often only occurs after metabolism through the intestinal flora. This also applies to the intake of herbal products, such as superfoods that are considered particularly healthy during pregnancy, such as goji berries or chia seeds: "Although plants products are 'natural' substances, they are always so-called xenobiotic substances that are foreign to the body and should be handled very carefully", says Macpherson. "Especially when pregnant women take plant-based products in large quantities".

Ganal-Vonarburg and Macpherson recommend that future studies should investigate which natural substances could have a beneficial or negative effect on the development of the unborn child and what influence differences in the maternal intestinal flora can have on this process.

How our immune system develops

As soon as the newborn crosses the mother's birth canal, the colonization of its body surfaces with the benign flora begins. Over the first few years, it matures into a complex community of microbes. External influences, such as childbirth (spontaneous delivery, caesarean section), as well as nutrition (breastfeeding or formula feeding) have a long-term influence on this process. In parallel, the child's immune system develops. It is now proven that certain microbial stimuli during this early period shape the immune system lifelong.

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