

Previously unknown effect of vitamin A identified

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The signal molecule, retinoic acid, is a product of vitamin A which helps to instruct how different types of tissue are to be formed in the growing embryo. For the first time, Professor Niels-Bjarne Woods' laboratory, Lund Stem Cell Center in Sweden, has studied the effects of retinoic acid in relation to how blood cells develop from human stem cells. In the laboratory model, the stem cells are exposed to specific signal molecules, thereby developing into blood-producing cells.

The researchers observed that increased levels of [retinoic acid](#) drastically reduced the number of [blood cells](#) that could be produced. A reduction in the retinoic acid instead increased the production of blood cells by 300 per cent. On the basis of these results, Niels-Bjarne Woods and his colleagues propose a new explanatory model of how retinoic acid affects the embryonic development of blood.

Even if vitamin A is required for a normal pregnancy, it has long been known that too much vitamin A can be damaging to the foetus, with the risk of foetal malformation and miscarriage. Pregnant women have therefore been recommended to limit their consumption of foods that are high in vitamin A in the form of retinoids, such as liver.

"Our results show that vitamin A in high doses has a negative effect on blood development. This suggests that there is an additional reason for [pregnant women](#) to avoid excessive intake of vitamin A during pregnancy," says Niels-Bjarne Woods.

While the concept that retinoic acid affects blood cell development has been demonstrated in animal models, this is the first time the experiments have been done using human cells.

Niels-Bjarne Woods' research is about finding ways of artificially generating [blood stem cells](#) for use in blood stem cell transplants to patients with blood disorders and cancers, who do not have access to a suitable donor.

"The current [research findings](#) increase our understanding of the complexity of the process of blood formation during [embryonic development](#). We hope that this, together with new future discoveries, will lead to the generation of blood [stem cells](#) in the laboratory, which in turn can be used to treat blood disorders and malignancies," says Niels-Bjarne Woods.

Provided by Lund University

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