

# Mother's stress affects the baby through amniotic fluid

May 29 2017

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If the mother is stressed over a longer period of time during pregnancy, the concentration of stress hormones in amniotic fluid rises, as proven by an interdisciplinary team of researchers from the University of Zurich.

Short-term stress situations, however, do not seem to have an unfavorable effect on the development of the fetus.

The feeling of constantly being on edge, always having to take care of everything, not being able to find a balance: If an expectant mother is strongly stressed over a longer period of time, the risk of the unborn child developing a mental or physical illness later in life – such as attention deficit hyperactivity disorder (ADHD) or cardiovascular disease – increases. The precise mechanism of how [stress](#) affects the baby in the womb is not yet been completely clarified. In cooperation with the University Hospital Zurich and the Max Planck Institute Munich, researchers of the University of Zurich have discovered that [physical stress](#) to the mother can change the metabolism in the placenta and influence the growth of the unborn child.

## **Stress hormone affects the growth of the fetus**

When stressed, the human body releases hormones to handle the higher stress, such as the so-called corticotropin-releasing hormone (CRH), which results in an increase in [stress hormone cortisol](#). This mechanism also persists during pregnancy, and the placenta, which supplies the fetus with nutrients, can also emit stress hormone CRH. As a result, a small amount of this hormone enters the [amniotic fluid](#) and fetal metabolism. Animal studies have shown that this hormone can boost the development of the [unborn child](#): Unfavorable growth conditions in the woman lead to an increased release of the hormone, thereby improving the chances of survival in case of a premature birth. Under certain circumstances, however, this increase can also have negative consequences: "An excessive acceleration of growth may occur at the expense of the proper maturation of the organs," says Ulrike Ehlert, psychologist and program coordinator.

## Short-term stress – no effect

How does mental stress to the mother affect the release of stress hormones in the placenta? The research team tested 34 healthy pregnant women, who took part in amniocentesis within the scope of prenatal diagnostics. Such a test constitutes a stress situation for the expectant mother as her body secretes cortisol in the short term. To determine whether the placenta also releases [stress hormones](#), the researchers compared the cortisol level in the mother's saliva with the CRH level in the amniotic fluid – and determined that there was no connection: "The baby obviously remains protected against negative effects in case of acute, short-term stress to the mother," Ehlert concludes.

## Longer-term stress can be measured in amniotic fluid

The situation of the results regarding prolonged stress is completely different, as was determined using questionnaires for diagnosing chronic social overload: "If the mother is stressed for a longer period of time, the CRH level in the amniotic fluid increases," says Pearl La Marca-Ghaemmaghami, psychologist and program researcher. This higher concentration of stress hormone in turn accelerates the growth of the fetus. As a result, the effect of the hormone on growth is confirmed, as has been observed in animals such as tadpoles: If their pond is on the verge of drying out, CRH is released in tadpoles, thereby driving their metamorphosis. "The corticotropin-releasing [hormone](#) CRH obviously plays a complex and dynamic role in the development of the human fetus, which needs to be better understood," La Marca-Ghaemmaghami summarizes.

## Strengthening mental resources with specialized help

The psychologists advise pregnant women who are exposed to longer-

term stress situations to "seek support from a therapist to handle the stress better." Stress during pregnancy cannot always be avoided, however. "A secure bond between the mother and child after the birth can neutralize negative effects of stress during pregnancy," La Marca-Ghaemmaghami says.

**More information:** Pearl La Marca-Ghaemmaghami et al. Second-trimester amniotic fluid corticotropin-releasing hormone and urocortin in relation to maternal stress and fetal growth in human pregnancy, *Stress* (2017). DOI: [10.1080/10253890.2017.1312336](https://doi.org/10.1080/10253890.2017.1312336)

Provided by University of Zurich

Citation: Mother's stress affects the baby through amniotic fluid (2017, May 29) retrieved 1 May 2024 from <https://medicalxpress.com/news/2017-05-mother-stress-affects-baby-amniotic.html>

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