Prenatal stress could enhance protective mechanisms of babies

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Maternal stress and depression during pregnancy may activate certain protective mechanisms in babies. Psychologists from the University of Basel together with international colleagues report that certain epigenetic adaptations in newborns suggest this conclusion. Their results have been published in the journal *Social Cognitive and Affective Neuroscience*.

In their study, the researchers observed that increased concentrations of maternal stress hormones, depressive symptoms and general adversities during pregnancy were accompanied by epigenetic changes in the child. As a result of these changes the oxytocin receptor gene, which is important for social behavior and stress adaptations, is activated more easily. This mechanism could indicate that in these cases, the babies adapt to develop more resilience to cope with future challenges and adversities.

Switch reprogrammed

Whether a gene can be activated or not also depends on methyl groups that attach to the DNA and function as a switch. The researchers found that children from mothers with increased stress and depressive symptoms show a reduced methylation of the oxytocin receptor gene at birth. This results in the gene becoming more easily activated, which leads to a facilitated production of oxytocin receptors for oxytocin to react with and unfold its effects. Oxytocin not only has an important function in mother-child bonding and in induction of labor and lactation,

it also influences social behavior.

For their study, the team of Prof. Gunther Meinlschmidt from the Faculty of Psychology at the University of Basel examined 100 mothers and their babies during and after pregnancy. They collected umbilical cord blood from 39 newborns and assessed the stress hormone cortisol in saliva samples of the mothers. In addition, the researchers evaluated stressful life events and mental health of the mothers via questionnaires. Since the data were only analyzed up to the newborn phase, no conclusions were drawn with regard to the long-term consequences that the epigenetic programming of oxytocin receptors might have for the children.

Resilience research only at the beginning

Researchers from the University of Basel, Ruhr University Bochum, Exeter University, McGill University Montreal, Ludwig Maximilian University of Munich, University of Trier, Zurich University of Applied Sciences and the Stress Center Trier were involved in this study funded by the Swiss National Science Foundation. Previous studies have shown, that adversities during pregnancy can increase the risk for mental disorders and physical diseases in the mother's offspring. However, science has so far dedicated much less attention to potential protective mechanisms of the child.

"Resilience research in this area is only at the beginning," explains Meinlschmidt. The observations made provide first evidence that an adverse environment during pregnancy could also activate protective mechanisms. "We need a comprehensive understanding of the psychological processes that allow humans to sustain long-term health even over generations despite adversities," says Meinlschmidt. Based on this knowledge, resilience processes could be promoted in order to try preventing the development of mental disorders and physical illnesses.

More information: Eva Unternaehrer et al. Maternal Adversities during Pregnancy and Cord Blood Oxytocin Receptor (OXTR) DNA Methylation, *Social Cognitive and Affective Neuroscience* (2016). DOI: 10.1093/scan/nsw051