New method: Research team analyzes stress biology in babies

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After waking up, the concentration of the stress hormone cortisol in saliva rises considerably; this is true not only for grown-ups but for babies as well. A research team from the Ruhr-Universität Bochum and from Basel has reported this finding in the journal *Psychoneuroendocrinology*.

"This gives us a new, non-invasive and uncomplicated possibility to already research the activity of the stress system during infancy," Prof. Dr. Gunther Meinlschmidt, of the Clinic of Psychosomatic Medicine and Psychotherapy at the LWL University Hospital of the RUB, said. The information not only open doors to the pursuit of as-yet unresolved research inquiries, but could also be used in the future to diagnose illnesses in the hormone-producing organs, such as the adrenal gland, of infants.

Scientists usually test the stress hormones of grown-ups by placing test subjects in an experiment under stress-inducing conditions. Since a similar practice is, for ethical reasons, unthinkable to use with babies, it is rather more difficult to find out how well-developed their stress systems are. The German-Swiss research team circumvented this problem by observing a naturally occurring "stress situation" – waking up. The cortisol-concentration in grown-ups rises after they wake up, presumably to prepare the body for the requirements of the day. At what age this cortisol-reaction develops has long been unclear.

Data from 64 newborns and infants between the ages of three weeks and

six months were used in the study. On two days the infants' parents had their children suck on a small cotton swab at home, once right after waking up and once half an hour later. Through this saliva, the scientists determined the cortisol-concentration. The cortisol amount rose considerably after the infants awoke in 63 % of cases. Neither the hour that the child woke up nor breastfeeding after waking played any role in these findings.

Instead the length of the pregnancy had an effect. The earlier the children were born, the less their cortisol-levels rose after they woke up. "The stress hormone system may be less mature in babies who were born after a shorter pregnancy, which could have negative consequences," assistant professor Marion Tegethoff, of the Faculty for Psychology at the University of Basel, said. Since cortisol can inhibit the immune system, the lack of cortisol-level rises could lead to excess immunological responses, similarly to what occurs with allergies.

Stress increases the risk for mental disorders and bodily illnesses. There is now a new method available to investigate the stress systems easily in babies. Prof. Meinlschmidt, head of the Research Department of Psychobiology, Psychosomatics, and Psychotherapy at the LWL University Hospital in Bochum explains future research questions: "In some rodents the hormonal stress response in the first weeks of life is, for a specific timeframe, close to shut down – perhaps to protect organs that are developing during this time. It is still unknown if there is a comparable phase in humans, since it has long been impossible, because of ethical reasons, to repeatedly assess the hormonal stress reaction."

More information: M. Tegethoff, N. Knierzinger, A.H. Meyer, G. Meinlschmidt (2012): Cortisol awakening response in infants during the first six postnatal months and its relation to birth outcome, *Psychoneuroendocrinology*, doi: 10.1016/j.psyneuen.2012.08.002