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367. Increased Risk for Affective Disorders Programmed in Utero? High Prenatal Maternal Cortisol and Volumes of the Amygdala and Hippocampus in the Offspring at 6-9 Years Age

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Background: Because fetal brain development proceeds at a rapid pace, early life experiences have the potential to alter the trajectory of neurodevelopment. Alterations especially in limbic structures have been associated with a range of neuropsychiatric disorders, including affective disorders. Studies in non-human primates and rodents have shown that such alterations can be induced in the offspring of mothers by maternal exposure to exogenous glucocorticoids or chronic stress.

Methods: In the current prospective longitudinal study we included 37 women for whom serial data on cortisol concentrations were available at 15 (± 1.03 , SD), 19 (± 0.83), 25 (± 0.91), 31 (± 0.89) and 37 (± 0.82) weeks gestation. When the offspring from the target pregnancy were between six to nine years of age, volumes of the hippocampus and amygdala were assessed by manual segmentation of T1 magnetic resonance (MR) images, acquired by a Siemens 3T Tesla.

Results: After controlling for potentially confounding postnatal factors high maternal cortisol concentrations at 15 weeks gestation were associated with a larger right amygdala volume in the 6-9 year old offspring. Furthermore, the increase of maternal cortisol concentrations over the course of gestation was associated with volume of the left hippocampus. Analyses stratified by sex suggested that these associations were significant in female but not in male offspring.

Conclusions: These findings are in line with studies in rodents and non-human primates and suggest that higher maternal cortisol concentrations and steeper increases in cortisol during pregnancy are associated with changes in limbic structures, which may increase the offspring's susceptibility for neuropsychiatric disorders.

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