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Hypothalamic-pituitary-adrenocortical response predicts IgE expressions in pregnancy

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Prenatal stress may have long-lasting programming effects on the development of children mediated through altered activity of the maternal hypothalamic-pituitary-adrenocortical (HPA) axis. Stress-induced alterations in maternal HPA axis activity may have immunomodulatory effects that influence IgE expression during pregnancy. Elevated maternal IgE in utero may, in turn, potentiate fetal sensitization to allergens and enhance atopic risk in infancy. We examined the relationship between diurnal salivary cortisol expression and total IgE among 197 pregnant mothers enrolled in the Asthma Coalition on Community, Environment, and Social Stress (ACCESS) project, a prospective study of the influence of early life stress on childhood asthma risk. Salivary cortisol was collected five times per day over three days to assess basal awakening response, morning rise, diurnal slope, and area under the curve. Total IgE was dichotomized above or below the median (48.95 IU/ml). Repeated measures mixed models were run controlling for race, income, maternal smoking, and weeks pregnant at the time of cortisol sampling. Higher maternal total IgE levels were significantly associated with a flatter diurnal cortisol slope ($\beta=0.37$, $p=0.05$). Examination of the cortisol curves showed that those with higher IgE specifically demonstrated less of a decline during the evening. Blunted HPA functioning in these pregnant women is related to higher total IgE expression. The immunomodulatory effects of maternal cortisol expression during pregnancy may have implications for fetal sensitization and childhood allergy and asthma risk which warrants further study. Funding: R01 HL080674, T32 ES007142