

## Stress in pregnancy: Effects persist even 10 years later

Press Release 28/09/2005

Children whose mothers experienced significant stress or anxiety during pregnancy have a greater vulnerability to psychological problems, even 10 years later.

Analysis of stress hormone levels in 10-year-old children has provided the strongest evidence yet that prenatal anxiety may affect the baby in the womb in a way that carries long-term implications for well-being.

The study suggests that fetal exposure to prenatal maternal stress or anxiety affects a key part of their babies' developing nervous system – leaving them more vulnerable to psychological and perhaps medical illness in later life.

The research, involving families taking part in the Children of the 90s project at the University of Bristol, is published in the journal *Biological Psychiatry*.

Previous studies of animals had shown how stress in pregnancy affects the hypothalamic-pituitary-adrenal axis, the body's stress response system. But until now scientists have been unable to show that it also affects humans in the same way.

Seventy-four children were asked to take part in the pilot study, which involved taking saliva samples first thing in the morning and three times during the day on three consecutive school days. Scientists then tested the samples for levels of the stress hormone cortisol.

Psychologist Dr Thomas O'Connor from the University of Rochester in New York compared those results with psychological tests completed by their mothers during the last stages of pregnancy, ten years earlier.

He says: "We found that anxiety in late pregnancy was associated with higher levels of cortisol in children many years later.

"These results provide the strongest evidence to date that prenatal stress is associated with longer term impact on the HPA axis in children, a finding repeatedly demonstrated in animal investigations."

One theory suggests that anxiety or stress in pregnancy increases the mother's own levels of cortisol, which crosses to the fetus and influences the baby's brain development, notably its stress response system. These changes to the stress response system may make children more susceptible to a range of psychological and medical problems.

Dr O'Connor says: "Findings from several human studies of children and adults suggest that elevated basal levels of cortisol are associated with psychological risk or psychological disturbance, notably depression and anxiety. Our findings point to a possible mechanism by which prenatal stress or anxiety may predict these disturbances into early adolescence, and possibly into adulthood.

"More work is needed now to consider why cortisol should be associated with particular forms of psychiatric disturbance, and what factors accentuate or mollify the links."

### **Prenatal Anxiety Predicts Individual Differences in Cortisol in Pre-Adolescent Children**

*Thomas G. O'Connor, Yoav Ben-Shlomo, Jon Heron, Jean Golding, Diana Adams, and Vivette Glover. Biological Psychiatry 2005; 58:211-217.*

#### **NOTES**

- The hypothalamic-pituitary-adrenal axis (HPA axis) is a major part of the neuroendocrine system which controls certain activities of the body, including reactions to stress, by means of both nerves and circulating hormones
- ALSPAC The Avon Longitudinal Study of Parents and Children (also known as Children of the 90s) is a unique ongoing research project based in the University of Bristol. It enrolled 14,000 mothers during pregnancy in 1991-2 and has followed most of the children and parents in minute detail ever since.

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