

## Society for Endocrinology – Media Release



Embargoed until 00:01am GMT, Thursday 18 March 2010

### **Pregnancy may cause impairments in ability to recall previously seen locations**

New research has found that pregnant women's ability to remember the position of objects previously seen is reduced as pregnancy progresses. These findings will be presented this week at the annual Society for Endocrinology BES conference in Manchester. Led by research midwife Ms Diane Farrar, the team found that pregnant women's spatial recognition memory ability was reduced during the later stages of pregnancy, and this effect persisted for at least three months following birth.

To remember our way to work or where we left our belongings we have to be able to lay down memory for that location, orientate ourselves within those surroundings and retrieve the information later; this is known as spatial memory. Spatial memory is particularly associated with a region of the brain called the hippocampus. If hormone levels are altered; as they are in pregnancy, hippocampal function can be affected. Many expectant mothers report memory problems related to their pregnancy, yet scientists are still unsure what the effects of pregnancy are on memory and attention, and if indeed there are any. This new research, conducted by the Bradford Institute for Health Research, University of Bradford and University of Leeds, looked at the effect of pregnancy on maternal memory and wellbeing.

Expectant mothers (n=23) and non-pregnant women (n=24) were assessed using four tests from a computer based assessment tool to see how well they could remember patterns and previously seen locations, plan spatial moves and learn rules. Working memory, spatial recognition memory, attention, mood and anxiety were measured. The team also assessed circulating levels of the hormones oestradiol, progesterone, cortisol, prolactin, dehydroepiandrosterone-sulphate and sex hormone binding globulin. Women's mood and level of anxiety were measured using the Edinburgh Postnatal Depression Scale and General Health Questionnaire 12.

Overall, pregnant women performed significantly worse compared to the non-pregnant women on the spatial memory test during the second (70% vs. 82%  $P=0.001$ ) and third (73% vs. 80%  $P=0.03$ ) trimesters, and at three months following birth (68% vs. 80%  $P=0.0001$ ). Mood and anxiety questionnaire scores suggest that pregnant women have lower mood, greater anxiety and greater risk of depression compared to the non-pregnant women. Scores following birth were then the same as non-pregnant women. Hormone level measurements confirmed substantially increased blood levels of oestradiol, progesterone, cortisol, prolactin, and sex

hormone binding globulin, while dehydroepiandrosterone-sulphate levels halved during pregnancy. These findings are consistent with previous research.

This research shows that women have reduced spatial recognition memory ability in the second and third trimesters of pregnancy and this effect persists until at least three months following birth. The findings help to elucidate the potential effects of pregnancy on memory, increasing our understanding of the maternal brain and informing those providing care for pregnant women.

**Researcher Ms Diane Farrar of the Bradford Institute for Health Research said:**

*“Forgetfulness and slips of attention are phenomena commonly reported by pregnant women, but scientists have yet to identify a specific mechanism by which this memory impairment might occur. Indeed, some question whether the reported memory loss exists at all. Altered hormone levels during pregnancy may affect brain regions involved in memory processing. Altered mood and increased anxiety, which may be due to altered hormone levels or pregnancy related worries, may also adversely affect memory function.*

*“The research presented here shows that expectant mothers may experience reduced spatial memory ability and this persists for at least three months following birth. Mood and level of anxiety improved following pregnancy, suggesting hormonal influences may be responsible. More research is now needed to identify the neurological effects of pregnancy to help guide future research and provide information for women and those involved in maternity care.”*

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Notes for editors

The poster will be presented at the Society for Endocrinology BES meeting from 12:00 to 13:30 on Tuesday 16 March and from 12:45 to 14:15 on Wednesday 17 March 2010. The abstract for this work is reproduced below: see <http://www.endocrine-abstracts.org/ea/0021/ea0021p325.htm>.

The Society for Endocrinology BES meeting 2010 is Britain’s biggest scientific meeting on hormones, and is taking place at the Manchester Central Convention Complex, Manchester, from 15-18 March 2010. For the full programme, please see <http://www.endocrinology.org/meetings/2010/sfebes2010/>

**Please mention the Society for Endocrinology BES meeting in any story**

**For more information:** please contact the Society for Endocrinology press office

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## **ABSTRACT**

### **Pregnancy adversely affects ability to recall previously seen spatial locations**

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**Background:** Female sex steroids influence learning and memory and the neurobiology of brain regions involved in memory processing such as the hippocampus. Pregnancy allows overriding of regulatory feedback loops leading to substantial elevation of endogenous serum hormone levels, depending on concentration; oestradiol can be either neurologically protective or toxic. This investigation aimed to increase understanding of the influence of sex steroids on memory and attention during pregnancy.

**Method:** Participants were tested each trimester and at 3 months following birth, some were also tested preconceptually and at 12 months, a non-pregnant control group were also included. Memory and attention were examined using the Cambridge Neuropsychological Test Automated Battery, a computer based assessment tool. Edinburgh Postnatal Depression (EPDS) and General Health Questionnaire12 (GHQ12) scores were collected; the National Adult Reading Test (NART) a measure of verbal intellectual ability was also administered. Steroid/peptide analysis was carried out on a subset of participant's plasma. Data were analysed using STATA version 10 and SPSS version 16. Antenatal/postnatal and control group and preconception and control group scores for each test session outcome measure were compared. The study received ethics approval.

**Results:** Data reveal a significant pregnancy group deficit in mean spatial recognition memory (SRM) % correct score compared to the control group during the second (70 vs 82%  $P=0.001$ ) and third trimesters (73 vs 80%  $P=0.03$ ) and at 3 months following birth (68 vs 80%  $P=0.0001$ ). There was also a significant reduction in antenatal SRM score between first and subsequent testing occasions. The pregnant group also had significantly higher mean EPDS and GHQ12 scores in the first and second and first, second and third trimesters respectively. Control group scores were stable across all testing occasions and on all measures apart from intra/extra dimensional shift adjusted errors which indicated a learning effect. There were no group differences when NART, BMI and age were compared.

**Conclusion:** Data support the hypothesis that pregnancy adversely affects ability to perform certain cognitive tasks, specifically memory for previously seen spatial locations. Increased EPDS and GHQ12 scores indicate pregnant women have lower mood and greater risk of depression.