# Society for Endocrinology - Media Release

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## Levels of key hormone during first trimester of pregnancy could lead to earlier diagnosis of gestational diabetes

New research shows women who develop diabetes during pregnancy (gestational diabetes mellitus) have reduced levels of an insulin-sensitive hormone, adiponectin, as early as nine weeks into the pregnancy. The findings, published in the latest edition of *Clinical Endocrinology*, show early warning signs of gestational diabetes (GDM) are evident months before the clinical diagnosis is currently made (20-22 weeks).

Researchers, led by Dr Kristine Lain at the University of Kentucky, USA, compared 30 pregnant women, who developed GDM later in pregnancy, with 29 pregnant women who did not develop GDM, as controls. Levels of the hormone, adiponectin, were measured from blood samples taken during the first trimester of pregnancy, at an average of 9 weeks gestation. Adiponectin measurements were then grouped into quartiles, and the highest quartile used as a reference. All patients underwent routine screening for GDM in the second trimester of pregnancy at 24-28 weeks. Logistic regression analysis was used to assess the odds of developing GDM based on adiponectin concentration.

First trimester adiponectin levels were significantly lower in women who went on to develop GDM (4.3 ± 0.4 µg/ml) compared to the control group (6.9 ± 0.6 µg/ml). Normal pregnancy adiponectin concentration is approximately 7 ± 0.8 µg/ml. Women with adiponectin levels in the lowest quartile (< 2.85 µg/ml) were 10 times more likely to develop gestational diabetes. There was no difference between the experimental and control groups in terms of maternal age, race, BMI, gestational age of delivery and birth weight. As GDM prevalence increases with maternal age, BMI, non-white race and smoking[1], linear regression analysis was repeated taking into account these variables, with no change to the result.

Adiponectin has insulin sensitising properties, and protects against metabolic syndrome and related conditions that can lead to type 2 diabetes. Decreased levels of adiponectin are associated with an increased risk of developing type 2 diabetes, in healthy, non-pregnant individuals. Studies on adiponectin levels in GDM patients have, until now, been limited. This study shows for the first time that adiponectin concentrations are reduced as early as nine weeks into pregnancy in patients with gestational diabetes. Such changes could contribute to patients' lifelong risk of developing type 2 diabetes, and also lead to an earlier diagnosis of GDM. This study now needs to be repeated in a larger cohort of women, with the goal of measuring adiponectin levels in the pre-pregnancy state, ultimately to determine if the low adiponectin/high GDM risk group can be identified pre-pregnancy.

**Researcher Dr Kristine Lain said:**

*"Gestational diabetes, if untreated, leads to increased risk of neonatal complications such as excess growth, jaundice, and respiratory problems. In addition, GDM places women at an increased risk of developing type 2 diabetes later in life. We already know that adiponectin levels are reduced in gestational diabetes patients later in pregnancy, but our results show that women with gestational diabetes have detectable metabolic differences at nine weeks of gestation, much earlier than the current clinical diagnosis. At this stage of pregnancy, most women who develop gestational diabetes have normal glucose tolerance, so lower adiponectin concentrations could act as an early indicator for gestational diabetes. Using adiponectin, we may be able to predict quite early in pregnancy who is at risk of developing gestational diabetes. Our study is based on a relatively small group of women, and the role of adiponectin as a predictor of gestational diabetes now needs to be assessed in a larger cohort of patients. Although further research is needed to determine the exact relationship between adiponectin levels and glucose tolerance during pregnancy, our results suggest adiponectin levels may be an early useful marker of gestational diabetes."*

**General Information**

GDM results when maternal blood glucose levels increase, and the body cannot produce enough insulin to cope with the elevated glucose levels. The high glucose levels can cross the placenta and lead to increased growth of the baby, which can then cause a difficult delivery. GDM also increases the mother's risk of developing pre-eclampsia, high blood pressure during pregnancy. Risk factors for developing GDM include obesity, a family history of type 2 diabetes, and previous GDM.

Adiponectin is a hormone released from fat cells into the bloodstream, where it plays a role in regulating glucose levels and insulin sensitivity, and protects against the umbrella of conditions that can lead to the development of type 2 diabetes. GDM can usually be treated by dietary control, but sometimes insulin may need to be taken. Women with GDM have a 30-50% risk of developing type 2 diabetes during their lifetime, compared to a 10% risk in healthy individuals.

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Notes for editors

**References**

1. Solomon et al. (1997). A prospective study of pregravid determinants of gestational diabetes mellitus. *Journal of the American Medical Association,* **278,** 1078-1083.

**Contact information**

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## ABSTRACT

### First trimester adipocytokine concentrations and risk of developing gestational diabetes later in pregnancy


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**Objective** Adipocytokines are important regulators of insulin resistance. The aim of this study was to compare maternal adipocytokines in early pregnancy among women diagnosed with and without gestational diabetes (GDM) months later.
**Design** A nested case-control study.
**Patients** Adiponectin, resistin and interleukin-6 (IL-6) were measured in 59 nulliparous women (30 women with GDM and 29 controls) in plasma obtained in early pregnancy. Patients underwent routine testing for GDM in late pregnancy.
**Measurements** Adiponectin was measured using radioimmunoassay. Resistin and IL-6 were measured by ELISA. Statistical analysis included Student's *t*-test, logistic regression and Pearson's correlation.
**Results** Groups were not different by baseline descriptors or obstetric outcomes. Mean gestational age at sampling was 9·3 ± 2·6 weeks. Adiponectin was lower ($P$ <0·001) in women who later developed GDM compared to controls (4·3 ± 0·4 *vs*.6·9 ± 0·6μg/ml). Adiponectin was negatively associated with the development of GDM ($P$ = 0·002; OR: 0·70, 95% CI: 0·56, 0·88) and the association persisted in multivariable analysis controlling for confounders ($P$ = 0·01; OR: 0·69, 95% CI: 0·52, 0·92). Women with first trimester adiponectin concentrations < 25th% were 10 times more likely to be diagnosed with GDM (OR 10·2; 95% CI 1·3, 78·7). Early adiponectin concentrations negatively correlated with BMI ($P$ =0·01; $r$= –0·32) and subsequent 50 g glucose challenge ($P$ =0·03; $r$= –0·29). Mean resistin and IL-6 concentrations were not different between the two groups.
**Conclusions** Women with GDM have evidence of altered adipocyte function as measured by adiponectin early in pregnancy, months before the clinical diagnosis of GDM is traditionally made.