

# Gestational diseases and disorders in pregnancy: prevention, identification, treatment and control

Friday 18th October 2013

Cineworld: The O2, London, SE10 0DX, UK

Gestational maternal diseases and disorders, brought on by pregnancy, can impact on maternal and foetal health both during and after pregnancy. This event aims to look at current research and practice into early identification of disease development and treatment that has low foetal impact. This event has CPD accreditation and is part of the **2013 Pregnancy Summit** - [www.PregnancySummit2013.com](http://www.PregnancySummit2013.com)

**Meeting Chair:** *Professor Ray Iles*, Chief Scientist, The ELK-Foundation for Health Research and MAP Diagnostics, UK

## Who Should Attend

**Biotech and Pharma Industry:** CEOs, Chief Scientists, Group Heads, Senior and Junior Scientists, Research working in the field of autoimmunity or pregnancy

**Academic and Research Institutes:** Group and Lab Heads, Postdoctoral Scientists and Research Students working in the field of autoimmunity or pregnancy

**Clinicians:** Anyone working in the field of pregnancy and diagnosing pregnancy-related illnesses and pregnancy outcome

9:00 – 9:45      **Registration**

9:45 – 10:15      **Introduction by the Chair: Should we be measuring maternal cortisol throughout pregnancy?**

*Professor Ray Iles*, Chief Scientist, The ELK-Foundation for Health Research and MAP Diagnostics, UK

Stress is both a physical and psychological manifestation but has profound endocrinological responses which not only leads to aging/allostatic loading of adult tissues but effect both physical and psychological neurological development of the fetus. A major driver in the stress response is cortisol which not only activates many of these metabolic and neurological changes but can act as a marker of the amount of stress hormones to which the developing fetus is being exposed. The importance of cortisol in maternal and fetal health post pre and post partum is discussed as are studies suggesting the long term effects on the determination of the anxiety personality of an individual may be affected by fetal exposure to cortisol in utero. If maternal stress and cortisol does profoundly effect the psychoneuroendocrinology of the newborn how and when should we measure it.

10:15 – 10:45      **How Gestational Syndromes predict future maternal and paternal health**

*Dr David Williams*, University College Hospital, UK

Pregnancy acts as a physical stress test for the mother. In order for pregnancy to succeed a woman needs to make profound physiological adaptations. Failure to make these changes adversely affects pregnancy outcome and can lead to gestational syndromes. Delivery of the baby is the cure, but pregnancy outcome can predict a mother's future health and even the health of the father. This talk discusses these issues and potential measures to prevent primary disease in the parents.

10:45 – 11:15      **C19MC microRNAs – potential biomarkers for preeclampsia, gestational hypertension and fetal growth restriction**

*Professor Ilona Hromadnikova*, Head, Dpt. Molecular Biology and Cell Pathology, Third Faculty of Medicine, Charles University Prague, Czech Republic

MicroRNAs belong to a family of small noncoding RNAs that regulate gene expression. There has been a trend in prenatal medicine over the last 10 years to develop non-invasive methods utilizing quantification of circulating nucleic acids, inclusive of microRNAs. For the first time we demonstrated that the expression profile of C19MC microRNAs differed in placental tissues between pregnancy-related complications and controls. The down-regulation of C19MC microRNAs was more common in patients with preeclampsia and fetal growth restriction and less common in gestational hypertension. Likewise, we showed that circulating C19MC microRNAs also played a role in the pathogenesis of preeclampsia, but not in the pathogenesis of gestational hypertension, and fetal growth restriction. The study brought interesting finding that the up-regulation of circulating C19MC microRNA biomarkers (miR-517\*, miR-520a\* and miR-525) is a characteristic phenomenon of pregnancies with established preeclampsia.

**11:15 – 11:45 Speakers' photo then mid-morning break and poster exhibition and trade show**

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**11:45 – 12:15 A newly designed pathway for the management of suspected inguinal hernias in pregnancy**

*Dr Michael N. Lechner, Surgeon, Department of Surgery, Paracelsus Medical University, Salzburg, Austria*

Pregnant women with a swelling of the groin are often referred for herniotomy after clinical examination only. Differential diagnosis are hardly considered, sonography is not usually employed and patients are occasionally subjected to surgical exploration of the inguinal region. We evaluated 18 cases prospectively, detected no hernias but always noted the presence of round ligament varicosis. All women gave uncomplicated birth, their complaints subsided within weeks after delivery and no patient had developed hernias by the end of follow-up after a median 11 months. With the described diagnostic pathway the correct diagnosis can be made and surgery is avoided.

**12:15 – 12:45 The Baby Bio Bank: a collection of biological samples and medical data from 2500 families affected by recurrent miscarriage, preterm birth, intrauterine growth restriction and pre-eclampsia available to researchers internationally**

*Dr Nita Solanky, Postdoctoral Research Associate, Institute of Child Health, University College London, UK*

The BabyBioBank is a unique collection of biological samples and medical data available to researchers interested in understanding pregnancy complications. Our target is to recruit 2000 trios (mother, father and baby) from pregnancies affected by recurrent miscarriage, preterm birth, intrauterine growth restriction and pre-eclampsia, and 500 normal trios for comparative purposes. Blood samples for DNA, serum and plasma, and urine, are collected from parents. After delivery we collect placental tissue, membranes, umbilical cord and cord blood for DNA, RNA and protein isolation. Quality control has shown that the samples are of high quality. We also collect 300 fields of clinical information relating to factors affecting pregnancy and fetal outcome. Information on the BabyBioBank is available at <http://www.ucl.ac.uk/babybiobank> including protocols and information about the application procedure.

**12:45 – 13:45 Lunch, poster exhibition and trade show**

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**13:45 – 14:45 Discussion session**

This discussion session is an informal question and answer session. This is an ideal opportunity to get advice and opinion from experts in this area. This session is not for questions about specific talks, which can be asked after the speakers session, but for discussing either general topics or specific issues.

There are three ways you can ask questions:

1. *Before the session* you can submit your question to Euroscicon staff at the registration desk,
2. *Before and during the session* you can submit a question or comments, by email, which will be provided on the day of the event
3. *During the session* you can put your hand up and join in

**14:45 – 15:00 Oral Presentations:**

**14:45 – 15:00 Dietary treatment in gestational diabetes relation with birth weight**

Marianne Vestgaard, Allan Stubbe Christensen, Lone Viggers, Finn Friis Lauszus

*Dept. of Obstetrics and Nutrition, Herning Hospital, Denmark, Corresponding author: Finn Friis Lauszus.*

**15:00 – 15:30 Afternoon Tea, last poster session and trade show**

**15:30 – 16:00 Is it time for universal thyroid screening for pregnant women?**

*Dr Bijay Vaidya*, Consultant Endocrinologist & Honorary Associate Professor, Royal Devon & Exeter Hospital & University of Exeter Medical School, UK

Thyroid hormones are important for neurological development of the fetus. However, the fetal thyroid gland does not secrete thyroid hormones until about 14 weeks gestation; the fetus relies on maternal thyroid hormones in early pregnancy. There is increasing evidence that even mild thyroid hormone insufficiency in pregnancy is associated with impaired neurological development of offspring and other adverse obstetric outcomes. Therefore, should all pregnant women be screened and treated for mild thyroid dysfunction? This talk discusses the evidence for and against universal thyroid screening in pregnancy.

**16:00 - 16:30 Non-invasive prenatal testing: Towards point-of-care tools in clinics and hospitals**

*Dr Maiwenn Kersaudy-Kerhoas*, Royal Academy of Engineering Research Fellow, Heriot-Watt University, UK

The flow of circulating foetal nucleic acids (cfNA) in maternal circulation provides a unique opportunity towards the development of techniques for Non Invasive Prenatal Testing (NIPT) for identifying and controlling gestational diseases and disorders such as pre-eclampsia and chromosomal abnormalities. However, the requirement of specialist and costly equipment limit the broad implementation of existing techniques. Microfluidics, the precise manipulation of fluid at the microscale, is an enabling technology which may overcome some of the current NIPT challenges and deliver faster results at a cheaper cost. In the discussion for near-patient testing, a novel direct cfNA sample preparation will be presented.

**16:30- 17:00 Chairman's Summary and Close of Meeting**

Keywords: pregnancy, biomarkers, gestational diabetes, autoimmune disease, Pre-eclampsia, postpartum depression, fetal growth restriction, pregnancy, Prenatal testing, non-invasive, point-of-care, microfluidics, circulating DNA, inguinal hernia, pregnancy, management, round ligament varicosis, pathway, Thyroid, pregnancy, screening, Biobank, Recurrent miscarriage, IUGR, Prematurity, Pre-eclampsia

**Registration Website:** <http://www.regonline.co.uk/gestation2013>

**About the Chair**

**Ray Iles** has 25 years experience in clinical chemistry and molecular diagnostics from Down's Syndrome screening to biomarkers of cancer metastasis. He has eight years of University senior manager experience, whilst maintaining active research as a Professor of Biomedical Sciences and expert in Biomarkers and oncofetal antigen biology. Ray is currently developing IP to market biotechnology tech transfer in cancer and prenatal diagnosis; also future patents linking salivary biomarkers with stress profiling and wellbeing.

**About the Speakers**

**David Williams** is a Consultant Obstetric Physician at The Institute for Women's Health, University College London Hospital (UCLH) and honorary senior lecturer in maternal medicine at UCL. His clinical work is centred on the management of medical disorders during pregnancy. He has a particular expertise and interest in the management of hypertension, kidney disease, diabetes, thyroid disease, rheumatic disorders and gestational syndromes during pregnancy. His research team is investigating the causes of pre-eclampsia. His team are also investigating the long-term consequences of gestational syndromes on women's future health as well as the future health of the fetus and of the father of the pregnancy.

**Ilona Hromadnikova** is a Professor of Immunology and the Head of the Department of Molecular Biology and Cell Pathology at the Third Faculty of Medicine, Charles University Prague, Czech Republic. She was one of the pioneers of non-invasive prenatal diagnosis based on the presence of fetal cells and fetal nucleic acids in maternal circulation in Europe. Ilona's team participated on the standardisation of non-invasive fetal sex and Rh status determination methods in pregnancies at risk of X-linked disorders and haemolytic disease of newborn (EC, Sixth Framework Programme, SAFE - The Special Non-Invasive Advances in Fetal and Neonatal Evaluation Network, LSHB-CT-2004-503243). Her team was awarded in 2007 by International Research Award from Turkish German Gynecological Association (the publication of the year: Non-invasive Determination of Fetal c and E Allele of RHCE Gene Via Real-Time PCR Testing of Extracellular DNA Extracted from Maternal Plasma Sample). Dr. Ilona Hromadnikova was a Chairwoman of Organising Committee of 12th Fetal Cell Workshop, Satellite Symposium of the 10th International Congress of Human Genetics 2001, Prague, Czech Republic.

**Michael N. Lechner** graduated from Karl-Franzens-Universität, Graz (2002). He was trained in Austria, Germany and Australia and obtained his registration as a general practitioner with the Austrian Medical Council and the right to practice in 2005. Upon completion of his surgical training in 2011 he spent a fellowship of six months in Vascular Surgery and is currently employed as a surgical specialist at the teaching hospital of Paracelsus Medical University in Salzburg, Austria. He is the deputy head of the department's hernia clinic and has a special interest in thoracic surgery and in the management of abdominal trauma.

**Nita Solanky** was awarded her PhD in the regulation placental iron transport from the Royal Free Hospital, UCL in 2005. Following this Nita continued her research in placental nutrient transport at the University of Manchester where she researched placental folic acid transport and the role of homocysteine on placental vasculature. Currently based at the Institute of Child Health at UCL and Chelsea and Westminster Hospital at Imperial College, Nita is a Research Associate on the Baby Bio Bank, a research project that collects tissue samples for the four major complications of pregnancy—recurrent miscarriage, preterm birth, fetal growth restriction, and pre-eclampsia.

**Bijay Vaidya** is a consultant endocrinologist at the Royal Devon & Exeter Hospital and honorary associate professor (reader) at the University of Exeter Medical School. He has special clinical and research interest in thyroid diseases in pregnancy. He has served as treasurer and a member of executive committee of the British Thyroid Association. He is an editorial board member of a number of journals, including QJM and BioMed Research International.

**Maiwenn Kersaudy-Kerhoas** is a Royal Academy of Engineering/EPSRC Fellow in the Institute of Biological Chemistry, Biophysics and Bioengineering at Heriot-Watt University. She holds two MSc degrees in Micro and Nanotechnologies and Electronics. Her PhD study (Heriot-Watt University) involved the development of a microfluidic chip for blood plasma extraction. She also initiated and set up a clinical study in collaboration with NHS Lothian, to demonstrate the concept of amplifying fetal cell-free DNA in maternal plasma extracted on-chip. Her current research aims at applying microfluidic concepts to develop affordable, non-invasive, prenatal testing tools for use in clinics and hospitals.

## POSTER PRESENTATIONS

### DIETARY TREATMENT IN GESTATIONAL DIABETES: RELATION WITH BIRTH WEIGHT

Marianne Vestgaard, Allan Stubbe Christensen, Lone Viggers, Finn Friis Lauszus

*Dept. of Obstetrics and Nutrition, Herning Hospital, Denmark. Corresponding author: Finn Friis Lauszus. Email: finlau@rm.dk*

**Aims:** Does diet affect birth weight in gestational diabetes mellitus (GDM)? One of the aims in the treatment of GDM is to reduce macrosomia. The question is whether subtle, untreated disturbance of maternal metabolism influences the incidence of deliveries with macrosomia? **Methods:** We analyzed and compared the perinatal outcome of a two-year cohort of 189 women with GDM with a control cohort of 254 women with a non-diabetic OGTT. The women with GDM excluding type 1 and 2 diabetes mellitus and the women with a non-diabetic OGTT had a similar background predisposition. The dietary habits in GDM were scored into three groups: low, medium, and high adherence to current guidelines. Birth weight was adjusted for gender and gestational age by calculating a birth weight ratio and further adjusted for BMI, parity, and insulin treatment in regression analysis. **Results:** Of the women with GDM 135 women had dietary advice by a registered dietician during pregnancy and 54 did not consult a dietician. Dietary intervention lasted median 49 days (range 3-191) with a delay of median 25 days (range 0-88) from diagnosis to intervention. The dietary habits were scored at first visit as 'high adherence' in 48 % of the women while 12 % were scored as 'low adherence'. Macrosomia was more prominent in women with a non-diabetic OGTT (28%) than in diagnosed GDM women (21%). In the dietary treated GDM women, higher birth weights were found associated with short length of treatment ( $r = -0.21$ ,  $p = 0.02$ ). The birth weight was decreased 2.1 grams per day of treatment. A habitual diet with adherence to current guidelines tended to have lower birth weight ratio (high adherence. 1.04 vs. low adherence 1.08,  $p=0.12$ ). **Discussion/Conclusions:** Macrosomia was as prominent in the women with a non-diabetic OGTT as in the diagnosed GDM women. Dietary intervention reduces the fetal weight in women with GDM and the effect increases with length of treatment. The risk of large birth weight is reduced with adherence to current dietary guidelines but increases with early onset of GDM and the weight gained before diagnosis of GDM.

## **N-Acetylcysteine as a promising antioxidant in Pre-eclampsia**

SM Motawei<sup>1</sup>, SM Attalla<sup>1</sup>, HE Gouda<sup>2</sup>, MA El-Harouny<sup>1</sup>, AM El-Mansoury<sup>1</sup>

Forensic Medicine and Clinical Toxicology Department<sup>1</sup> and Obstetrics and Gynaecology Department <sup>2</sup>, Faculty of Medicine, Mansoura University. *Correspondence: sh-mm@mans.edu.eg*

**Introduction:** N-acetylcysteine (NAC) is a potent antioxidant that removes reactive oxygen species and booster the antioxidant defense mechanism of the body. The powerful antioxidant effects of N-acetylcysteine are evident in many diseases and infections. However, NAC is less investigated in pregnancy disorders like pre-eclampsia.

**Objectives:** To investigate the role of N-acetyl cysteine in pre-eclampsia (PE); the pregnancy complication which is well-known to be associated by a state of oxidative stress. **Patients and Methods:** Oxidative stress markers were measured in 25 full-term healthy pregnant females and compared with 50 PE patients. N-acetyl cysteine supplement was given to 25 PE patients, with continuation of the conventional therapy of PE, and were compared with 25 PE patients who received the conventional therapy only without receiving the supplement. Oxidative stress markers were measured overtime of follow up together with clinical parameters in all patients. **Results:** There were highly significant differences between levels of oxidative stress markers in PE patients and healthy pregnant females. There were no significant differences in the levels of markers of oxidative stress between PE patients, that turned significant and highly significant after 4 and six weeks of receiving NAC supplement or the conventional therapy of PE alone. There were found significant differences in blood pressure and degree of proteinuria between the two groups of PE. Also, NAC has produced marked improvement of kidney and liver function tests and other laboratory indicators between the two groups of PE patients. **Conclusion:** N-acetyl cysteine supplementation is very useful in PE. It helps to improve the oxidative damage associated with the disease. NAC improves the deteriorated kidney and liver functions secondary to PE and was found to improve hypertension and proteinuria which are two of the hallmark clinical signs of PE. NAC, hence, can prolong pregnancy in PE cases if given early in the disease and for sufficient duration but cannot reverse the already established severe PE.

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