

Breakthrough in pre-eclampsia test

A team at the University of Leeds has discovered a way of diagnosing pre-eclampsia, a condition which affects almost one in ten pregnant women and accounts for up to 15% of all premature deliveries.

They now plan to develop a user-friendly diagnostic kit within five years which could be used in hospitals all over the world to safely and speedily test all pregnant women. The potential saving of a predictor for the NHS alone has been estimated at up to £500m a year with the reduction in medical care required for the mother and her baby.

The team has been able to distinguish between pregnant women who are healthy and those with pre-eclampsia by studying samples of their blood plasma taken at the same time as routine blood samples.

The symptoms of pre-eclampsia include high blood pressure and protein in urine and fluid retention. Left untreated, the condition can cause a range of problems such as growth restriction in babies and even foetal and maternal mortality.

Dr Julie Fisher, Reader in Biological NMR (nuclear magnetic resonance) and PhD student Elizabeth Turner from the School of Chemistry conducted the research with Jimmy Walker, Professor of Obstetrics at St James's University Hospital. The research was funded by the Engineering and Physical Sciences Research Council (EPSRC).

The team used a technique which is based on the same science as MRI scans but which operates on fluids taken from the body, to identify chemicals in the blood plasma of pregnant women. The amount of these chemicals was found to depend on whether the women were healthy or whether they were suffering from pre-eclampsia.

Dr Fisher said: "The concentration of certain chemicals such as amino acids and fat in the body has been found to vary in a way which is dependent on the health of the woman. We have found that some of these chemicals increase in concentration when the woman is suffering from pre-eclampsia whilst others decrease."

Professor Walker said: "Currently, we monitor all pregnant women in antenatal clinics for signs of pre-eclampsia which develops after 20 weeks of pregnancy. If an early prognostic tool was to become available, doctors and midwives could focus their attention and resources on caring for those more likely to develop the condition and instigate methods of prevention. This would be of significant benefit to the mother and her baby as well as the health service."

Dr Fisher said her work may ultimately be used as a basis for trying to find a cure for the condition. She said: "It is a long way down the line, but if we know what biological chemicals are affected by the disease, then we may be able to determine its cause and ultimately work towards preventing pre-eclampsia."

The findings were published last year in the medical journal *Hypertension in Pregnancy* and another paper on the subject will be published in the same journal in the spring. The discovery has been patented and is being developed by a spin-out company, MetaBio Ltd.

The work was funded by the Engineering and Physical Sciences Research Council (EPSRC), which sponsors around 40 students at the University of Leeds and University of Sheffield to carry out research in the White Rose Doctoral Training Centre (DTC); Physical Methods and Life Sciences.

Dr Fisher made the discovery after giving the project to a new research student as part of her training. She

said: "Originally I had been looking at potential indicators of pre-eclampsia in red blood cells, following some earlier studies by Professor Walker. I stored the plasma simply because it seemed wasteful of material not to! Then, when Elizabeth was interested in our work, I asked her to see if there was anything relevant in the stored plasma, and we went on from there."

Source: University of Leeds

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