



Media release - International Federation of Fertility Societies

Embargo: Monday 13 September, 00.01, Central European Summer Time

New techniques “ will probably revolutionise the success of IVF”

Assisted Reproduction – including IVF - is on the verge of a step-change in success rates. This is the message given by Professor Samir Hamamah (Montpellier, France), addressing the World Congress of Fertility and Sterility in Munich. Professor Hamamah used the occasion of his talk to show how pulling together the strands of emerging analysis techniques known as ‘-omics’ will change the way clinics are able to evaluate and select eggs and embryos, so giving the real potential to significantly increase viability of embryos and the success of IVF.

Professor Hamamah explains that the general change will come with the adoption of techniques to micro-measure what cells are doing at any one time. This will allow us to build up a profile of what makes a successful cell, and how best to return it to the womb, so that we can identify of which cells go on to produce viable embryos. This means measuring the expression level of mRNAs (transcriptomics), the production of protein levels (through proteomics) and the metabolites the cells produce (via metabolomics).

In normal cell functioning, the genes (DNA) produce RNA, which then goes on to make cell components such as proteins. The ability to detect this RNA shows which genes are active at any one stage of egg or cell environment or embryo development. Knowledge of this gene activity can then be used to select which eggs or embryos will be more likely to lead to a successful pregnancy. This is done through transcriptomics. As RNA is produced by the genes, it is “amplified” (by producing enough copies to be able to be detected), and then it binds to specific areas on microarray chips – small chips which may contain sample sequences of many thousands of genes. This can be measured by a specialised microarray reader, which will tell the clinician which genes are active at which time. This technique has identified several differentially expressed genes with roles in (for example) cell division and chromosomal movement.

Proteomics describes the changes in all proteins expressed and translated from genes. Recent advances in mass spectrometry (MS) have led to the development of methods sensitive enough to allow the examination of proteins which are secreted by single oocytes and embryos, and which are present in the local external cell environment.

Metabolomics is a high sensitivity screening technology using Raman and near infra-red (NIR) spectroscopy, to look at all the metabolites which are secreted in the local environment of a cell or organ. These techniques allow the clinician to characterize the egg, embryo, and even the lining of the womb, to optimise the conditions for embryo development.

Professor Hamamah said:

“Currently, one of the problems in IVF is that we have to evaluate such things as egg or embryo quality largely by looking at it through a microscope. This is useful to an extent, but it’s a bit like judging a book by its cover – you don’t really know what happens inside the cell.

The application of these techniques will allow us to find out exactly which processes go on in the cell or developing embryo, and when these processes take place. It will help us select viable embryos and maximize the chance of successful pregnancy by applying similar processes to the endometrium, so we will know the best time for implantation in the womb. We will also be able to reduce and eliminate many of the risks of multiple pregnancies resulting from IVF treatment, and accurately evaluate the viability of embryos before returning them to the womb.

These techniques are non-invasive, and once adopted they will allow us to maximise the success of IVF treatment options. Each technique is powerful in itself, but the combination of these techniques will probably revolutionise the success of IVF”.

ENDS

Notes for editors

This work is being presented during the 20th World Congress on Fertility and Sterility, which is taking place in Munich from 12-16 September, <http://www.iffs2010.com/>

The World Congress on Fertility and Sterility is organised by the International Federation of Fertility Societies (IFFS), which represents national fertility societies from all parts of the world. We have more than 70 member societies from all parts of the World. The IFFS website is <http://www.iffs-reproduction.org/>. The next World Congress will take place in Boston in 2013. We can assist with press comment on any assisted reproduction matters, especially in an international context.

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