

**Embryo Selection: A New Era**  
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## **Reducing Multiple Pregnancies Using a New Rapid Non-invasive Embryo Selection Technique**

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IVF is largely governed by two opposing results (Failure and Success). Failure is observed in up to 85% of the embryos we transfer, while success is sometimes paid dearly by the high multiple pregnancy rates caused by in-vitro fertilization (IVF). Both these outcomes cost the individual patient immensely.

To overcome the dangers of multiple births many countries have already mandated single embryo transfer in IVF. The aim is therefore to develop a more efficient strategy to predict which embryo to transfer and improve the probability of successful implantation and pregnancy.

The commonly accepted clinical practice and standard of care for assessing embryo viability in IVF is based on the developing embryo's morphological characteristics. Cleavage rates and morphology have been used since the earliest days of IVF but it still falls short of being a highly accurate method for successfully identifying embryos capable of sustaining an ongoing pregnancy. It is however the only tool available to embryologists today for the assessment of embryo quality.

As a result, new embryo assessment tools, based on either invasive or non-invasive techniques have been sought-after by IVF clinics in order to overcome this problem. Numerous animal and human studies in the past have shown that the embryo changes its surrounding culture media in a manner which can be used to predict if that embryo will implant. The problem for clinical IVF has always been:

1. The ability to measure the change without damaging the embryo
2. The ability to measure the change quickly.
3. The ability to measure the change consistently and accurately

Here we present an overview of current technologies available to predict these changes and show that one new technique has the ability to fulfill all 3 of the above criteria. This technique involves non-invasive metabolomic profiling of the embryos surrounding culture media. The technique involves the use of Near Infrared (NIR) spectroscopy to profile biomarkers of oxidative and energy metabolism giving us more advanced diagnostic capabilities to accurately identify embryos with reproductive potential in IVF. Data will be presented of the use of this technology in more than 1000 single and multiple embryo transfer scenarios, showing that in all cases it was able to more accurately predict the outcome of the embryo transfer. In the near future non-invasive technology will definitely be used in conjunction with current clinical practices

(e.g. morphology) to aid in the identification of viable embryos and improve patient outcomes.