ASRM 2007
Washington, DC
Tuesday, October 16, 2007

METABOLOMIC SCREENING THROUGH LONG WAVE LENGTH NEAR INFRARED BIOSPECTROSCOPY OF SPENT EMBRYO CULTURE MEDIA PREDICTS HUMAN EMBRYONIC REPRODUCTIVE POTENTIAL – A PROSPECTIVE BLINDED STUDY.

R. T. Scott, Jr, K. Miller, J. L. Frattarelli, D. Burns. Reproductive Medicine Associates of New Jersey, Morristown, NJ; Obstetrics, Gynecology, and Reproductive Science, UMNDNJ - Robert Wood Johnson Medical School, New Brunswick, NJ; Mc Gill University, Montreal, PQ, Canada.

OBJECTIVE: To determine if metabolomic profiling of embryonic development using infrared biospectroscopy-based metabolomics was associated with delivery rates in IVF.

MATERIALS AND METHODS: Population: Patients undergoing IVF who had spent culture media collected on all transferred embryos. Patients who had either 0% or 100% delivery rates were selected for further study. Specimen Collection: The embryology laboratory cultures embryos in individual droplets. Each is uniquely identified to allow accurate tracking. Spent media were collected on day 3 after _44 hours of embryo culture. All samples were immediately frozen at _80_C until analyzed. Specimen Analysis: 3 to 5 ml of spent culture media from each embryo that was transfered was evaluated using far wavelength near infrared spectroscopy. Data Analysis: Analysis of the spectral data was done by a single investigator who was blinded to all clinical data. The spectra were analyzed by a proprietary modification of a wavelength selective genetic algorithm (Molecular Biometrics, LLC, Chester, NJ). A viability score was obtained for each sample based on its unique metabolomic spectral profile.

RESULTS: 35 embryos transferred to 14 patients were evaluated. 8 patients had a total of 18 embryos transferred and had a delivery rate of 100%. 6 patients had 17 embryos transferred with no implantations. The spectral scores of those embryos which implanted were higher than those which did not ($P<0.03$).

CONCLUSIONS: This prospective blinded analysis demonstrates a clear relationship between the reproductive potential of human embryos and their modification of the culture media in which they have been cultured. These subtle modifications may be detected through infrared based biospectroscopic metabolomic profiling. This technology offers great potential for development as a tool to allow rapid non-invasive assessment of embryonic reproductive potential prior to transfer. Enhanced selection might allow a reduction in transfer order with the desirable effect of lowering multiple gestation rates while maintaining or raising pregnancy rates.
Supported by: None.