

## **Metabolomic Profiling Accurately Identifies Stages of Oocyte Maturation in IVF**

**Washington, DC and Chester, NJ – October 15, 2007** – Molecular Biometrics, a privately held metabolomics company, presented results of a clinical study investigating the use of metabolomic profiling to establish the maturational stage of oocytes. The findings were reported yesterday at the American Society of Reproductive Medicine's 63<sup>rd</sup> Annual Meeting (ASRM) in Washington, D.C. The Company had previously reported that metabolomic profiling can accurately identify viable embryos with the highest reproductive potential for transfer during in vitro fertilization (IVF) procedures.

Principal Investigators, Zsolt Peter Nagy, M.D., Ph.D., of Reproductive Biology Associates, (RBA), Atlanta, Georgia, and Barry Behr, Ph.D., HCLD, Embryology Laboratory Director, Stanford University, described the results of their multi-center study in a podium presentation titled, *Unique Biomarkers of Human Oocyte Maturation Assessed by Non-Invasive Metabolomic Profiling*. The prospective study was conducted in collaboration with Molecular Biometrics and the Department of Chemistry, McGill University, Montreal.

The study's objectives were to determine whether novel metabolomic profiles, or "fingerprints," could be established using near infrared spectroscopic analysis (NIR) of specific biomarkers from culture medium obtained from oocytes at different maturational stages (Metaphase I and II, Prophase I). A secondary objective was to determine how metabolomic profiles obtained from oocyte medium correlated with the egg's oxidative metabolism, or the state of the cell's respiratory processes. These processes are closely tied to oocyte quality and may prove useful in predicting post-fertilization developmental capacity and embryo quality.

Based on rapid (~1 minute), non-invasive NIR analysis of specific novel biomarkers in oocyte culture media, the investigators consistently identified unique metabolomic profiles for eggs at each of the three developmental stages. These data were correlated with microscopic morphological assessment of nuclear maturity of the corresponding oocytes using multivariate analyses with a P level of 5%. Profiles of Metaphase I and II (M I and M II) oocytes differed significantly from each other and from profiles of Prophase I (GV) oocytes ( $P < 0.001$  at the 95% confidence interval). NIR biomarker analysis required a minimum of three wavelength regions, resulting in 83% specificity and 85% sensitivity for GV versus M I oocytes and 93% specificity and 100% sensitivity between M I and M II oocytes. The authors concluded that significant differences in oocyte metabolic activity can be consistently demonstrated among the metabolomic profiles of OM biomarkers in culture media from oocytes at specific maturational stages.

James Posillico, Ph.D., President and CEO of Molecular Biometrics, in commenting on the study, said, “The ability to confirm stages of oocyte maturation using rapid, non-invasive metabolomic profiling may offer an altogether new method to help IVF practitioners ensure development of a viable embryo with high reproductive potential. With further developmental work, we believe these findings may serve as the cornerstone of a non-invasive test of oocyte maturation that is based on objective biological metrics of cellular metabolism. Such a test could be used in conjunction with morphological criteria for identifying high quality pre-fertilization oocytes. These data also demonstrate the potential broader utility of Molecular Biometrics’ metabolomics platform for other applications in ART.”

Principal Investigator, Zsolt Peter Nagy, M.D., Ph.D., Scientific and Laboratory Director at Reproductive Biology Associates, Atlanta, Georgia, also commented on the study, “Noninvasive assessment of gametes and embryos opens new frontiers in reproductive medicine. Establishing correlations between metabolomic “fingerprints” of oocyte and embryo development and embryo viability will be a critical contribution to improve efficiency of assisted reproduction treatment procedures. This test may be the first, objective, operator-independent procedure that all IVF professionals – and patients, were awaiting for decades. We expect that this platform will contribute to progress in many different aspects of embryology and will result in improved patient care in IVF.”

### **Metabolomics Background**

Metabolomics is the systematic study of the unique biomarkers, or ‘fingerprints,’ that processes of cellular metabolism leave behind, specifically, the study of their small-molecule metabolite profiles. Oxidative metabolism (OM), an intracellular process often referred to as cellular respiration, is known to affect the quality of spermatozoa, eggs and embryos. Complex interactions between pro-oxidants and antioxidants are crucial in the maintenance of normal intracellular homeostasis and this balance is closely related to OM. Molecular Biometrics uses biospectroscopy-based metabolomics to rapidly identify and simultaneously analyze multiple small molecule biomarkers of OM in IVF culture media. The unique metabolomic profiles of these biomarkers are analyzed by bioinformatics to yield new information about embryo quality.

For more information about ASRM, please visit <http://www.asrm.org>

### **About Molecular Biometrics**

Based in Chester, New Jersey, with a research and development facility in Montreal, Quebec, Molecular Biometrics, LLC is a privately held metabolomics company developing highly specific and sensitive analytical methodologies for molecular diagnostic and monitoring applications in medicine, and for drug discovery and development through pharmacodiagnosics based on its novel technology platform of metabolomics. For more information, please visit <http://www.molecularbiometrics.com/>

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