

VOCs As A Tool For The Assessment Of Embryos In IVF

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Abstract Body

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The quality of embryos in IVF (in vitro fertilization) influences success rate and accompanied medical, psychological and financial consequences. Due to many limitations in the current assessment methods; morphology and morphokinetic monitoring, much research has been focused on the ECM (embryo culture medium). VOCs (volatile organic compounds) contributed by cellular processes, might provide a much greater understanding of the embryo at a molecular level for their ability to contribute information non-invasively, simultaneously and in an on-line manner enabling continuous monitoring of the embryo. Moreover, VOCs facilitate exploring potential chemical communication between adjacent embryos. We have investigated VOC patterns in embryos/ECM through the developmental potential and genetic status of the embryo. Two complementary methods have been used to characterize samples. The first method uses gas chromatography mass spectrometry (GC-MS) to identify and quantify specific VOCs. The second method deploys cross-reactive nanoarrays combined with pattern recognition methods providing collective VOC patterns rather than identifying specific VOCs. Nanoarrays are inexpensive and has a more realistic potential for fast, cost-effective and high-throughput GC diagnostics. Our preliminary results indicate that measurable VOCs emanate from the embryos and their medium. Variance in the combination and concentration of VOCs in relation to the number of embryos per culture have been detected as well as alterations in VOC patterns as a function of culturing time. This research provides the ability for determining embryo quality and its genetic status using VOCs and ultimately increasing the success rate.