

Improved Embryo Development and Comparable Pregnancy Rates Using Single vs. Sequential Culture Media from the Day of Oocyte Retrieval to the Blastocysts Stage of Development

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Introduction

Throughout the 30 plus year history of human IVF there has been a remarkable increase in the length of time embryos are held in the incubator (from two to six days) before returning them to the uterus, without compromising their ability to initiate a pregnancy (1). Part of the reason for this enhanced embryo viability outside the female reproductive system has been the improvements in culture technology, including culture media (2-4).

A significant milestone in human embryo culture was achieved in the late 1990s with the introduction of sequential culture media by Gardner et al (5,6). With this culture system embryos are transferred to a different medium formulation as the embryo develops from the pre-compaction to the blastocysts stage based on the evidence that the nutritional requirements of the early embryo differ between those two stages of development (7,8). With sequential culture media, human IVF entered an era of high blastocyst formation rates that allowed the selection of better quality embryos for transfer. This has undoubtedly contributed to the increase in pregnancy rates and decrease in rates of multiples that have been reported in recent years (1).

The concept that in vitro human embryo development to the blastocyst stage requires the use of sequential media became well accepted partly because attempts to produce viable blastocysts with the culture media available at the time had proven ineffective (2). However, most of these earlier media formulations consisted of simple salt solutions supplemented with heat inactivated patient serum (9,10). The requirement of sequential media for blastocyst development was challenged in 2002 by two reports showing that a single

culture medium was as successful as sequential culture media for the development of human blastocysts from zygotes (11,12). These findings have been confirmed by multiple abstracts and two recent peer review publications (13,14).

While the above studies have focused on comparing the culture media formulations from the zygote (day one) to the blastocyst stage, most of them used a separate media formulation for insemination on the day of oocyte retrieval. This current study was designed to test the hypothesis that using a single culture medium from the day of oocyte retrieval (day 0) to day 6 will result in similar laboratory and clinical outcomes when compared to sequential culture media.