A Single Medium Can Support Development of Human Embryos to the Blastocyst Stage

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Introduction

a) Embryo Culture Media Based on Oviduct and Uterine Fluids

Much of the early development of embryo culture media was based on simple salt solutions derived from Krebs-Ringer Bicarbonate (see Summers and Biggers 2003). An alternative approach was the formulation of media based on the measured concentrations of the components of oviduct and uterine fluids. Differences in such concentrations have led Gardner and Lane (2002) to suggest that "in order to optimize mammalian embryo development in culture, sequential media are required, each designed to meet the changing requirements of the developing embryo." Although this "back to nature" approach seems logical, it relies on several questionable assumptions. First, the measurements of the components of oviduct and uterine fluids are highly variable (Summers and Biggers 2003), and almost certainly subject to physiological inductance. Second, such measurements only reflect the overall composition of the tract fluids and not the micro-environment around the embryo. Third, as shown in Figure 1, the physical and chemical environment of the embryo *in vivo* is completely different from its environment *in vitro*. Clearly, the stresses on the embryo *in vitro* are very different from those *in vivo*, and culture media must be designed to optimize embryo development under in-vitro conditions.