

80. EMBRYO IMPLANTATION, STEM CELLS AND SOCIETY

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The purpose of these studies (1) was to achieve an *in vitro* system to study the endocrinology of implantation in primates. Embryos were recovered non-surgically at morula and blastocyst stages from marmoset and rhesus monkeys. Successful establishment of the culture system led in turn to research on the embryonic secretion of chorionic gonadotrophin (CG) during the peri-implantation period, and to the discovery that blastocyst stage embryos secreted gonadotrophin releasing hormone (GnRH). The ability to culture embryos routinely to yolk-sac stage also enabled the early isolation and characterisation of stem cells from the inner cell mass, laying the basis for application of the same experimental protocols to the human. Over a thousand individually recovered and cultured embryos from marmoset and rhesus monkeys were studied. The successful recovery rate in latter periods of the study approached 70% on days 5-6 after ovulation. The growth rates of embryos and the profile of secretion of GnRH and CG were established. The effects of culture of embryos in the presence of agonist and antagonist to GnRH showed that agonist accelerated endocrine profiles but effectively disaggregated *in vitro* development, while antagonist slowed development. Culture with natural GnRH showed enhanced growth and development of the embryo, with a very high proportion surviving to yolk-sac stages. This result suggests potential therapeutic applications in enhancing the success of some IVF procedures. Embryonic stem cells also secreted GnRH and CG once they began differentiation. One aspect of this research was its rapid transition to the broader research, ethical and regulatory developments in international management of embryonic stem cell biology. The significant attention afforded to the stem cell debate not only engaged legislators, government departments and the public in learning about the issues and the nature of experimental research, but also translated to legislation in many countries with analysis and policy statements from several international agencies. The variations in approach between, for example, the UK and France, Germany and Ireland, the public and private sectors in the USA and in Australia, results in a continuing debate on the acceptable limits of stem cell research and the use or formation of embryos for this and other research purposes.

(1) Hearn, J.P. (2001) Embryo implantation and embryo stem cell development in primates. *Reprod. Fertil. Dev.* **13**, 517-522.