

## **Experimental aspects and considerations from the early human embryo development and attachment**

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The PhD. thesis includes a review and two manuscripts submitted for publication. The project ran at the Fertility Clinic at Herlev Hospital from 1999 to 2004.

The scope of the work was to study different developmental prospects and possibilities to influence the human pre-embryo.

The work consists of three parts. The first part is an experimental endometrial cell-culture model where the blastocyst-endometrial interactions are influenced in two separate trials: at the PR level by anti-progesterone, and by hCG. The effect of anti-progesterone and hCG are examined by comparing the blastocyst attachment rate and by showing the PR, IL1-Rt1 and  $\beta 3$  integrin immunohistochemically in control and test cultures. The influence of anti-progesterone on the secretion of LIF and glycodelin into the culture medium and the expression of pinopodes were also evaluated.

The second part is an experimental investigation of the influence of the oxygen partial pressure on the human embryo development *in vitro*. The material, cryopreserved donated human embryos, was randomized either for conventional culture in a 20 % partial pressure of oxygen, or for culture in a 5 % partial pressure environment.

The third part of the study is to examine the clinical effect of implementing the 5 % partial pressure culture condition on embryos from selected patients admitted for IVF treatment. After informed written consent, the patients are randomized to have their embryos cultured either in the conventional 20 % oxygen partial pressure or at a 5 % oxygen partial pressure.

The result of the attachment studies on the endometrial cell-culture system shows a significant inhibition of attachment of the blastocysts, compared to control cultures. This is both when anti-progesterone is added to the medium and when hCG is added. No differences in the endometrial cell-cultures were subsequently found when the cultures were examined immunohistochemically.

The results of the culture of human embryos from the 2- to 4-cell stage to the blastocyst stage in a 20 % and a 5 % oxygen partial pressure showed significant differences (more than a doubling of morula yield) in favour of culture in the 5 % oxygen partial tension. A more stable temperature and pH might have benefited/favoured the culture result in the low oxygen partial pressure culture.

The results of the randomized clinical investigation of IVF patients await further patients to be included in the study before any conclusion can be drawn. Preliminary results show no difference in

the number of living gestational sacs per transferred embryo in the two culture groups. This PhD. thesis includes a review and two manuscripts submitted for publication. The project ran at the Fertility Clinic at Herlev Hospital from 1999 to 2004.

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