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ABSTRACTS

Evaluation of an in vitro model for embryo implantation: Selective receptivity of rabbit endometrium for trophoblast attachment

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Embryo implantation involves trophoblast attachment to and invasion into the endometrium. The initiation is assumed to depend on the coincidence of the invasive phase of the trophoblast with a "receptive state" of endometrium. We have attempted to test in vitro whether this receptivity is selective for the invasive trophoblast only or whether it is of a general type for any invasive cell.

Rabbit endometrial fragments were obtained at day 4 of pseudopregnancy and precultured in order to restore a complete epithelial lining and to induce "receptivity" by progesterone (Eur.J.Cell Biol. 33, Suppl. 5, 17, 1984). They were confronted with day 6.5 blastocysts and kept in co-culture for 2 or 3 days (Eur.J.Cell Biol. 36,Suppl.7,28,1985). It was found essential to successful trophoblast attachment and invasion in vitro that 1) both are kept in a close contact, 2) blastocysts remain expanded, and 3) syncytiotrophoblast differentiates.

Further confrontations were performed with aggregates of mouse fibrosarcoma cells (MO_4) and precultured endometrial fragments. These cells are highly invasive in conventional invasion assays (Mareel et al., Invasion and Metastasis 1, 105-204, 1981). In our studies, however, MO_4 cells were able to invade into "receptive" endometrium only if stromal surface was exposed. Attachment to the epithelium was rather weak and there was no invasion through the epithelial lining. These findings were confirmed by in vivo experiments.

Our results are not consistent with experiments where xenogenic tumor cells invaded into the endometrium of pregnant rats and mice in vivo (Short & Yoshinaga, 1967; Wilson & Potts, 1970). These differences underline the existence of different mechanisms for implantation in rabbits vs. mouse and rat. Our results suggest a selectivity in the interaction between rabbit endometrium and trophoblast which is not lost in our organ culture model.

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