

ABSTRACTS

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Implantation: recent approaches to understand a cell biological paradox

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The initial events in embryo implantation involve an interaction of two epithelia, trophoblast and uterine epithelium, via their apical cell poles, resulting in adhesion, followed (in invasive types of implantation) by penetration of the trophoblast through the uterine epithelium into the endometrial stroma. Acquisition of mutual adhesiveness of apical plasma membranes of trophoblast and uterine epithelium appears to be a critical step in implantation initiation. It can be regarded as a cell biological paradox since epithelia are normally nonadhesive at their apical cell poles (Denker: Verh.Anat.Ges. 80, 93-114, 1986).

Recent results from studies based on this concept give evidence that hormonal control of endometrial "receptivity" (including its local control by blastocyst-derived signals) involves: changes in the composition of the glycocalix, partial loss of marker molecules of the apical plasma membrane domain of the uterine epithelium, changes in junctional morphology and physiology, and decrease of binding to the basement membrane. All these are characteristics of the structural and functional apico-basal polarity of epithelial cells. It is proposed, therefore, that the uterine epithelium undergoes a destabilization of its apico-basal polarity when it enters the "receptive" state. This new cell biological view of the process emphasizes changes in cell behaviour rather than cell death, and is hoped to expand the concepts available for studies on implantation physiology.