Gap junction formation in the uterine epithelium in response to embryo recognition

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Morphological investigations suggest that rabbit uterine epithelium responds to the presence of a blastocyst by considerable morphological transformation. We are interested in associated membrane differentiations, particularly in changes of cell-cell communication via gap junctions. Freeze-fracture replicas reveal that gap junctions between uterine epithelial cells are rare during preimplantation as well as pseudopregnancy. In contrast a considerable density of gap junctions is found on the lateral membranes of uterine epithelium in the forming implantation chamber at day 7. Two types of gap junctions are observed: intercalated gap junctions, encircled by the highly proliferated tight junctional strands, and gap junctions, larger in extent, on the lower portions of the membranes. Cell-cell communication is not initiated in the absence of a blastocyst, i.e. in comparable phases of pseudopregnancy. This is impressively demonstrated by tubal ligation experiments in which the blastocyst-bearing uterine horn is compared with the blastocyst-free horn within the same animal. We conclude that increased cell-cell communication via gap junctions is one of the first signs of embryo recognition by the uterine epithelium at implantation initiation.

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