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EMBRYO IMPLANTATION AND TROPHOBLAST INVASION

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Abstract

The trophoblast of the implanting mammalian embryo receives interest for being a highly invasive non-tumor tissue. Even in such species in which regular implantation in the uterus is only superficial shows the trophoblast invasive and destructive growth when transplanted to ectopic sites.

The physiological sequence of events during implantation of the embryo in the uterus involves apposition, dissolution of extracellular blastocyst coverings, physicochemical changes in the cell surface coats of trophoblast and uterine epithelium, adhesion, and, in most species, penetration of the trophoblast through the uterine epithelium towards subepithelial blood vessels. Various modes of penetration (intrusion, displacement, cell fusion) are described. Many observations give evidence that the relation between invasiveness of the trophoblast and readiness of the uterine epithelium to degenerate varies from one species to the other.

The mechanisms of the interaction between trophoblast und uterine epithelium which leads to implantation initiation is not clear yet in spite of intensive research efforts. Recently evidence has been found for an important role played by certain proteinases of these tissues. In the rabbit, a peculiar proteinase of the implanting trophoblast seems to be essential for implantation initiation. Preliminary biochemical characterization has been achieved. Specific proteinase inhibitors when applied in vivo interfere with implantation. The possible role of this and other enzymes in attachment and/or invasion will be discussed.