CHAPTER 13

MATERNAL IMMUNE RECOGNITION OF PREGNANCY

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Why does not the endometrium reject the fetus?

After performing skin transplants to treat skin burns during World War II, Peter Medawar published a paper in 1953 that explained how skin-graft rejection was an immunological phenomenon (1,2). Since this information was published, the question arose in the field of reproductive immunology of why a fetus is not also rejected as an immunological response. One possible explanation for not rejecting the fetus is that the maternal immune system does not recognize the concealed or masked fetal antigens. Anti-placental and anti-paternal antibodies have been observed in the sera of women who have previously given birth, but this has not proved that maternal immune system not harm the fetus (3).

Where does fetal- maternal interaction occur?

The fetal blastocyst comprises an outer layer (trophectoderm), an inner cell mass (the embryo blast), and a fluid-filled cavity called the blastocoels. All true embryonic stem cells arise from the embryo blast, and these are then capable of forming all cell types within the embryo. The trophectoderm layer develops into the villous placenta, and the extravillous trophoblast cells (EVT) subsequently invade the uterus to form a connection with the maternal blood supply and remains in contact with that blood supply throughout the pregnancy. A "syncytium" is a multinucleated cell formed from several cell fusions and that often forms "syncytial knots" that can travel through the circulation system and to the lung capillaries, where they remain. This arrangement, which includes the placental trophoblast barriers, serves to completely separate the fetal somatic cells from the mother's immune system (4).

Which immune cells will be active during early implantation?

It is possible for fetal cells may invade the mother's circulation system. Early in the first-known transplantation procedures, physicians observed that multiparous women had antibodies to allogenic leukocytes (allo-antibodies), which are specific to paternal human leukocyte antigens (HLAs). Women with anti-D antibodies can produce antibodies against fetal allo-antigens, which would not immunosuppressive the fetus (5).

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