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Organ Transplantation and Rejection

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A graft is that the transplantation of an organ or tissue to a special location, with the goal of replacing a missing or damaged organ or tissue. Grafts are typically moved without their attachments to the cardiovascular system and must reestablish these, additionally to the opposite connections and interactions with their new surrounding tissues. There are differing types of grafts counting on the source of the new tissue or organ. Tissues that are transplanted from one genetically distinct individual to a different within an equivalent species are called allografts. a stimulating variant of the allograft is an isograft, during which tissue from one twin is transplanted to a different . As long because the twins are monozygotic (therefore, essentially genetically identical), the transplanted tissue is virtually never rejected. If tissues are transplanted from one area on a private to a different area on an equivalent individual (e.g., a skin on a burn patient), it's referred to as an autograft. If tissues from an animal are transplanted into a person's , this is often called a xenograft. the various sorts of grafts described above have varying risks for rejection. Rejection occurs when the recipient's system recognizes the donor tissue as foreign (non-self), triggering an immune reaction . the main histocompatibility complex markers MHC I and MHC II, more specifically identified as human leukocyte antigens (HLAs), play a task in transplant rejection.

The HLAs expressed in tissue transplanted from a genetically different individual or species could also be recognized as non-self molecules by the host's dendritic cells. If this happens , the dendritic cells will process and present the foreign HLAs to the host's helper T cells and cytotoxic T cells, thereby activating them. Cytotoxic T cells then target and kill the grafted cells through an equivalent mechanism they use to kill virus-infected cells; helper T cells can also release cytokines that activate macrophages to kill graft cells. With the three highly polymorphic MHC I genes in humans (HLA-A, HLA-B, and HLA-C) determining compatibility, each with many alleles segregating during a population, odds are extremely low that a randomly chosen donor will match a recipient's six-allele genotype (the two alleles at each locus are expressed codominantly). this is often why a parent or a sibling could also be the simplest donor in many situations—a genetic match between the MHC genes is far more likely and therefore the organ is far less likely to be rejected. Although matching all of the MHC genes can lower the danger for rejection, there are variety of additional gene products that also play a task in stimulating responses against grafted tissue. due to this, no non-self grafted tissue is probably going to completely avoid rejection. However, the more similar the MHC gene match, the more likely the graft is to be tolerated for a extended time. Most transplant recipients, even those with tissues compatible to their MHC genes, require treatment with immunosuppressant drugs for the remainder of their lives. this will make them more vulnerable than the overall population to complications from infectious diseases. It also can end in transplant-related malignancies because the body's normal defenses against cancer cells are being suppressed.

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