# **Transplantation Immunology**

## Grafts

Autologous (autograft): from one individual to the same individual

Syngenic: between two genetically identical or syngeneic individuals

Allogenic (allograft): between two genetically different individuals of the same species

**Xenogenic** (xenograft): between two genetically different individuals of different species

## **Genetics of graft rejection**



## First-set and second-set rejection



Rejection is mediated by lymphocytes

## **Rejection of skin grafts**



## **Direct and indirect presentation of MHC alloantigens**



#### **Direct alloantigen recognition**

Positive selection in the thymus allows all T lymphocytes that recognize MHC molecules to survive. Negative selection eliminates T lymphocytes with strong affinity for self-MHC molecules, but T lymhocytes with strong affinity for non-self (allo) MHC molecules survive

High frequency of allo-reactive T lymphocytes (~2%)

Each allogenic cell can activate many T lymphocyte clones

Density of alloantigens is higher than self-MHC/antigens

## **Mixed leucocyte reaction**



## Hyperacute and acute rejection



## **Chronic rejection**





## **Minor Histocompatibility Antigens (H)**



Polymorphic self proteins that differ in amino acid sequence between individuals give rise to minor H antigen differences between donor and recipient

#### **Graft-versus-host-disease (GVDH)**

Caused by the donor T lymphocytes after bone-marrow transplantation, but also after transplantation of organs that contain T lymphocytes

Acute GVHD: skin, liver, gastrointestinal tract (rash, jaundice, diarrhea)

Chronic GVDH: organ fibrosis and dysfunction