

# Creation of a Human Immune System in a SCID Mouse Model Using Artificial Bone Marrow

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# Background Information

## Stem cells and Tissue Engineering

- ◆ Tissue engineering is the design and growth of cell tissues and organs outside of the human body.
- ◆ Stem cells are the primitive cells present in all organisms that can give rise to more stem cells and are the progenitors of all specialized cells in the body.
- ◆ Adult stem cells
  - found in infants, umbilical cords, placentas, teeth, and adult tissue
  - can renew themselves and have limited ability to differentiate into other types of cells, usually only the cell types found in their tissue of origin.
  - Little is known about adult stem cell identities, how they differentiate and mature, and their complete level of plasticity.
- ◆ Regenerative tissue engineering has many potential impacts on medicine and science.

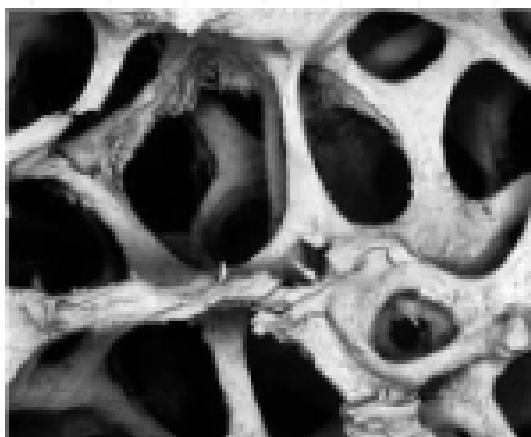
# SCID Mice

- ◆ SCID: severe combined immune deficiency
- ◆ mice are unable to make T cells or B cells
- ◆ rare and spontaneous mutation on chromosome 16.

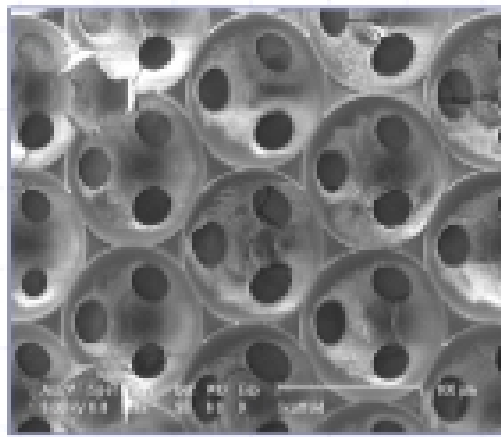
# Bone Marrow

- ◆ the inner mass of a large bone
- ◆ contains two types of stem cells: hematopoietic and stromal
- ◆ matrix used was designed to be like human bone

Human bone marrow



SEM ICC Scaffold



Stromal Cells on ICC Scaffold

