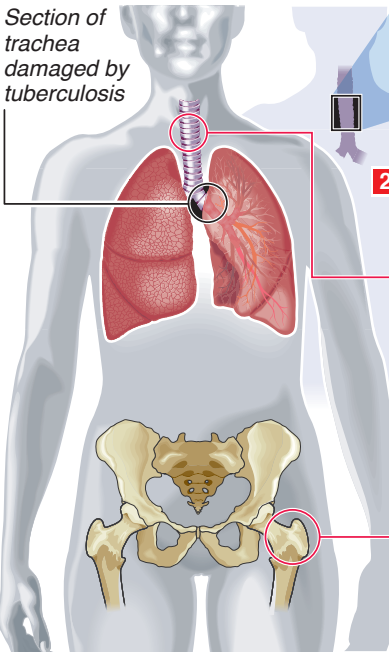


# Stem cell breakthrough for transplant surgery

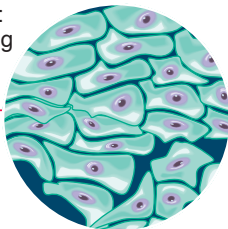
Surgeons have carried out the world's first whole organ transplant, using a trachea made with the patient's own stem cells. These "miracle" cells – which can develop into any type of human tissue – raise the possibility of transplants without anti-rejection drugs to dampen the immune system

Section of trachea damaged by tuberculosis

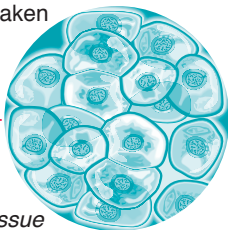


**1 Donor:** 7cm section of trachea removed from recently deceased donor – chemicals and enzymes used to wash away donor's cells to leave collagen "scaffold"

**2 Epithelial cells:** Taken from lining of patient's trachea

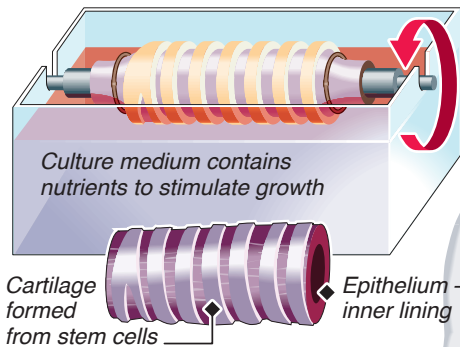


**3 Stem cells:** Taken from patient's bone marrow in hip



*Growth factor encourages cells to grow into specific tissue*

**4 Bioreactor:** Fibrous collagen scaffold rotated in culture medium – exterior seeded with stem cells, interior with epithelial cells



**5 Implant:** Cultured organ replaces damaged section of trachea

