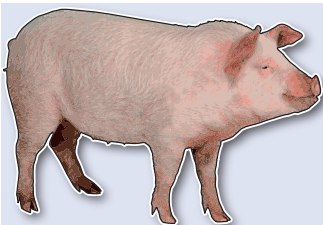


# World-first xenotransplant

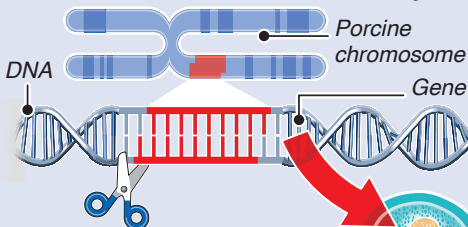
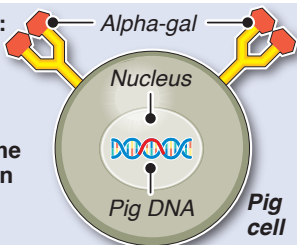
Surgeons in the U.S. have transplanted the heart of a genetically modified pig into a human, marking a step in the decades-long quest in using animal organs for life-saving transplants



## 1. GalSafe pigs:

Sugar group called **alpha-gal** occurs on pigs' cell surfaces.

**Alpha-gal enzyme** triggers rejection by human immune system



**2. Alpha-gal:** Gene blocked. Growth gene inactivated to prevent heart from continuing to grow after implantation

**3. Human genes:** Inserted into pig DNA to prevent blood coagulating in heart and make organ more tolerable to immune system.  
**DNA used to breed herd of GalSafe donor pigs**

■ **1954:** First successful human to human transplant – kidney

■ **1960:** First immunosuppressive drugs identified

■ **1963:** Baboon and chimpanzee to human kidney transplants. One patient survives nine months

■ **1964-74:** Failed attempts at chimpanzee heart, liver transplants

■ **1978:** Pig skin successfully used to treat burns patients

■ **1984:** Baboon heart transplant in baby. Infant survives 20 days

■ **1992-93:** Baboon-human liver transplants

■ **1995:** Transgenic pigs prevent transplant rejection

■ **2007-17:** Pig cell transplants to treat Type 1 diabetes and Parkinson's disease

