

Transgenic animals

- A transgenic animal is one whose genome has been altered by the transfer of a gene or genes from another species or breed.
- A **transgenic** organism carries in all its cells a foreign gene that was inserted by laboratory techniques.
 - The first genetically modified animal was a mouse created in 1974 by **Rudolf Jaenisch**.
 - The first genetically modified animal to be commercialised was the GloFish, a Zebrafish with a fluorescent gene added that allows it to glow in the dark under ultraviolet light.
- A **cloned** sheep like Dolly is a genetically identical copy of an existing adult sheep. ... A **transgenic animal** is not necessarily a **clone** or an identical copy of another, although it is possible to make a **clone** of a **transgenic animal**.

The photo shows two transgenic mice positioned either side of a plain mouse. The transgenic mice have been genetically modified so that they carry a green fluorescent protein which glows green under blue light.



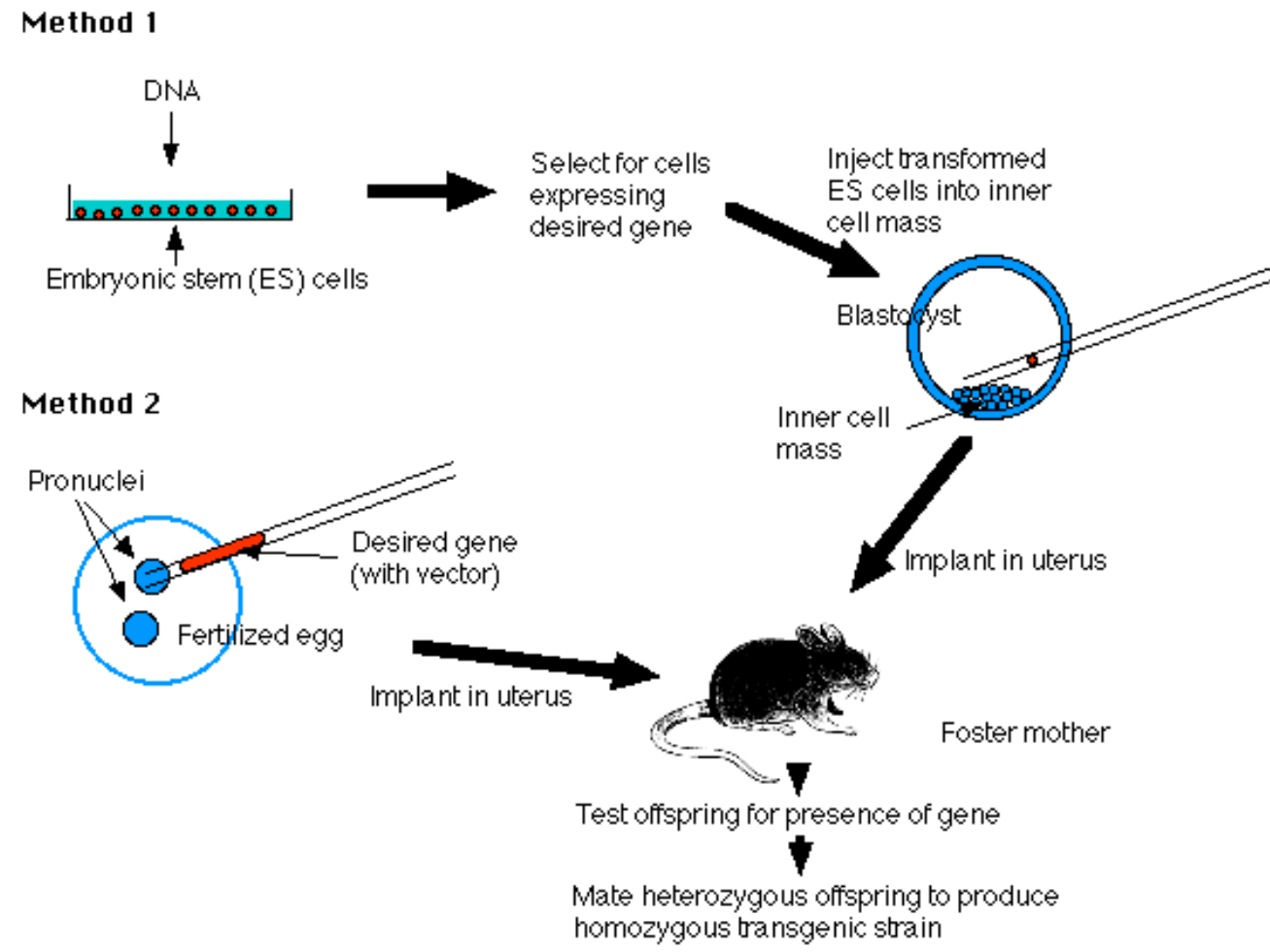
Methods of creation of transgenic animals

- DNA Microinjection
- Embryonic stem cell mediated gene transfer
- Retrovirus mediated gene transfer

I. DNA microinjection

- Also known as pronuclear microinjection method.
- A very fine glass pipette is used to inject DNA from one organism into egg of another.
- The best time for injection is early after fertilization when ova have two pronuclei.
- When two fuse to form single nucleus.
- Following DNA injection, the ovum is transferred into the oviduct of recipient female or foster mother that has been induced by mating with vasectomized male.

II. Embryonic stem cell method



EMBRYONIC STEM CELL METHOD

- ▶ Transgenic animals can be created by manipulating embryonic stem cells.
- ▶ ES cells are obtained from the inner cell mass of a blastocyst.
- ▶ Transgene is incorporated into the ES cell by
 - Microinjection
 - By a retro virus
 - By electroporation
- ▶ Transgenic stem cells are grown in vitro.
- ▶ Then they are inserted into a blastocyst and implanted into a host's uterus to grow normally.

