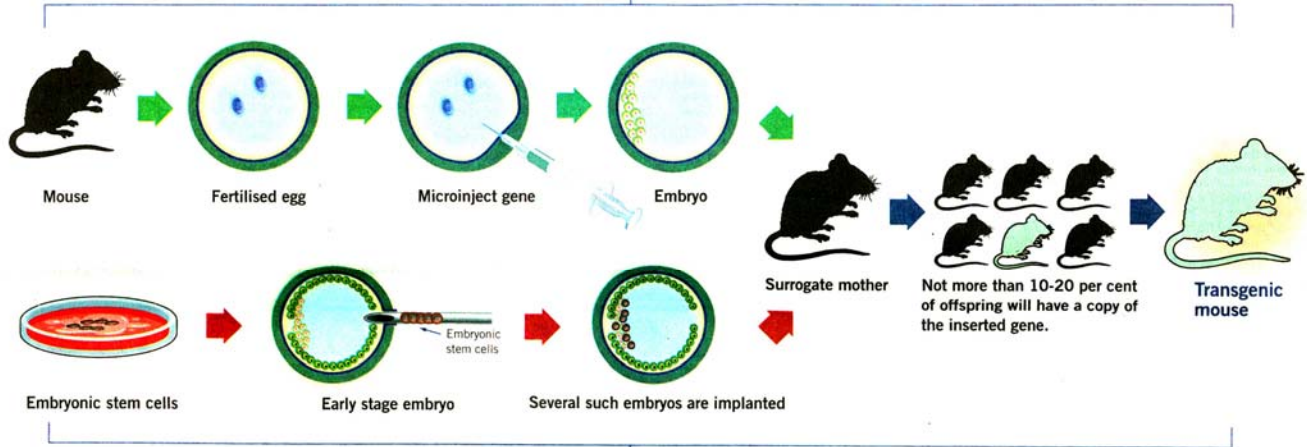


# How To Create A Transgenic Animal

Transgenic animals are organisms that have had DNA from another organism put into their genetic blueprint. These new versions can be used to test drugs or produce healthier food. **Michelle Neo, Tania Tan and Melissa Tan** decode the two most common methods.

## » Microinjection of DNA

The desired gene is injected directly into fertilised eggs using a needle with a diameter that is finer than a human hair. Where this gene ends up in the host genome is dictated by chance. If successful, the animal will be born with one copy of this new gene in every cell. A surrogate mother carries the eggs to term.



## » Embryonic Stem Cell

The desired gene is first introduced into embryonic stem cells – cells that have the ability to develop into any type of tissue. This method allows scientists to introduce new genes at a specific location in their DNA, so that they can pick particular cells which will turn into the desired cell types. The selected cells are then implanted into a surrogate. To increase the chance of producing a transgenic animal, several modified embryos are implanted into the surrogate.

## » Examples



**GloFish:** Glow-in-the-dark aquarium fish hit pet stores in 2003 and 100,000 were sold in the first month in the United States, at US\$18.60 (\$S28.50) per fish.



**Of Mice and Men:** Transgenic strains of mice are created for scientists to test the effects of certain drugs on different human diseases.



**Livestock:** Cows that produce more or healthier milk, meatier pigs and cattle, woollier sheep and giant-size salmon.



**Super-food:** Crops that can produce vitamins or even human breast milk proteins, which is currently being proposed in America.

GRAPHICS: JEFFREY LIM

## Geneticist's glowing fish work featured in best-selling thriller book

DID you know popular writer Michael Crichton's futuristic thriller *Next* has a segment on the fishy work of a real-life National University of Singapore scientist?

The soft-spoken academic is Associate Professor Gong Zhiyuan – mentioned on page 165 of the bestseller, as the creator of glowing fish with fluorescent jellyfish genes.

"I was really quite surprised," Prof Gong said of his reaction on finding out about his "literary fame".

Popularly known as GloFish, the red luminescent zebra fish hit American pet shelves in 2003 as the first transgenic pet, to wild success.

More than 100,000 fish were sold in the first month alone, at almost US\$18.60 (\$S28.40) a piece.

They are also sold in Malaysia, Taiwan and Hong Kong, but are banned here due to strict laws governing genetically modified animals.

In fact, the neon specimens serve a higher purpose than just as pretty pets.

Unlike their predecessors, subsequent generations of the fish were bred to glow in the presence of only certain chemicals.

The fish act as "canaries" – monitoring

water pollution levels. The presence of contaminants like oestrogen make the modified zebra fish glow: The more pollution, the brighter they will be.

Most chemical tests show only the presence of pollutants. But the fish biomonitors allow immediate identification of the culprit contaminant, explained Prof Gong.

The 4cm-long fish can be engineered to detect different types of substance – from hormones to chemical waste, he added.

After 11 years on a project as successful as this, Prof Gong is as keen as ever on his research.

He is heartened by the attention given to research by the Government, and the greater focus on the environment and water technologies. "There is no better time to pursue this field," he said.

Further studies include transferring zebra fish DNA onto a chip, which can be used to test for toxicity and pollution levels.

All this has left Prof Gong too busy with work, with not enough time to flip through the book which features him.

He has read only the first two chapters. "But I'll definitely make time to finish it," he said.

TANIA TAN



GLOWING WORK: Prof Gong's work on GloFish, genetically modified fish with fluorescent genes which can act as monitors for pollution, has left him so busy he has had no time to read much of the book he was featured in. He is now working on transferring the fish's DNA to a chip. PHOTO: LAU FOOK KONG