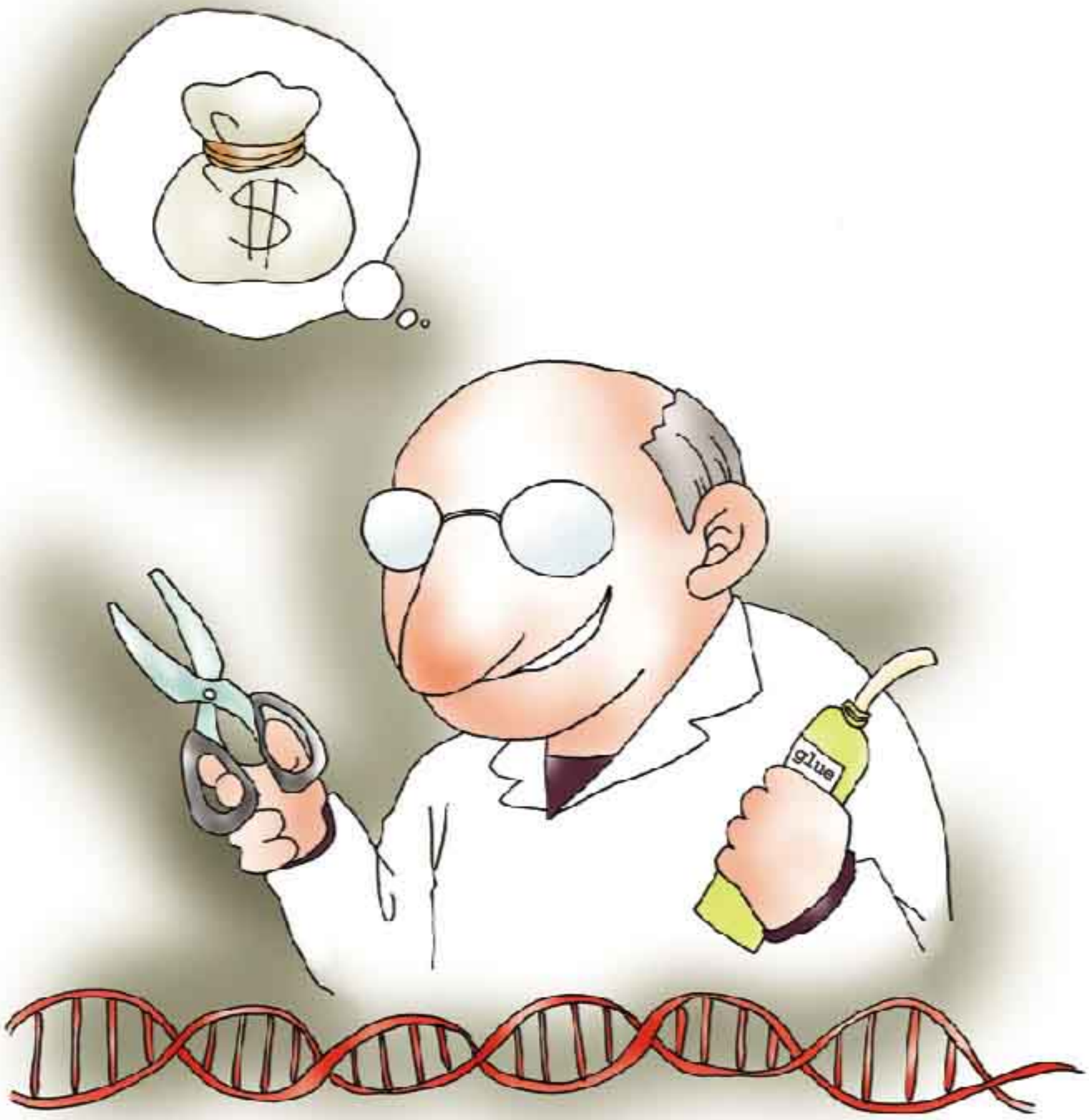


1. Genetic Engineering*

Scientists can now engineer genes. This technology offers possible benefits such as treatment for previously incurable diseases and the development of crops able to withstand pests without the use of pesticides. It also poses problems and raises questions. Because there are huge sums of money to be made from possible new treatments for disease and improved crops, there is a race on to patent genes and the new products and processes made possible by genetic engineering.

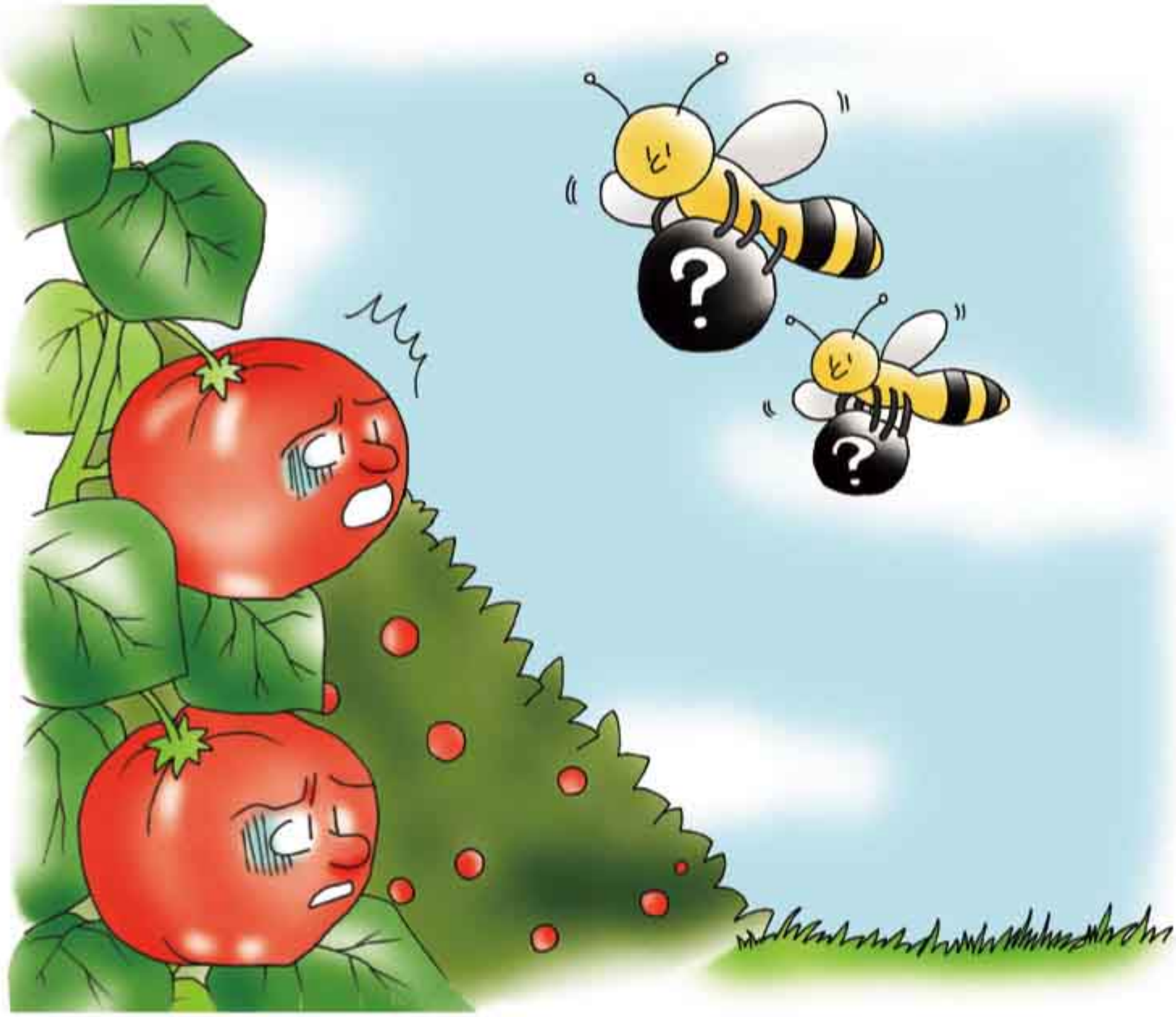
* 'Genetic engineering' (GE plants, GE food) and 'genetic modification' (GM plants, GM organism, [GMO]) mean the same thing. The biotechnology industry prefers 'genetic modification', believing that it is less likely to scare people.

2. "We invented these."

This raises many questions. As genes are widely regarded as the building blocks of Life, patenting a gene can be thought to be equivalent to patenting Life. And because to call something patentable is to say it is marketable, patenting a gene is saying Life is marketable, i.e., it is putting a price on Life, making Life a commodity. Many religious traditions say that Life is a gift from God and not a commodity to be bought and sold.

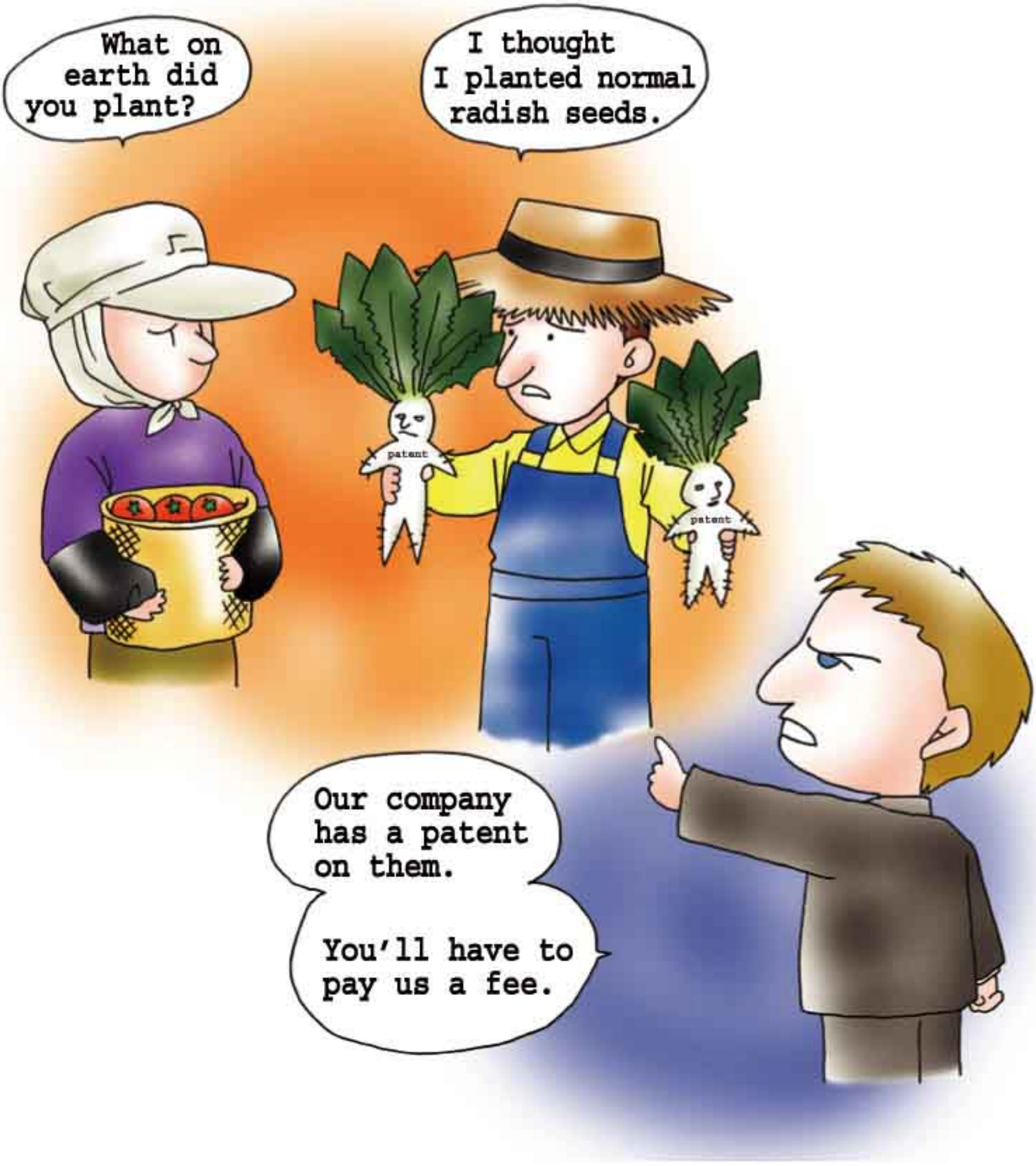
3. "I own the patents to these!"

In addition, patenting a gene (Life) means that it is owned by a scientist, a company or a university. Is it ethical for one person or one company to own Life? Many religious traditions say that Life is given freely for the benefit of all, and not to be owned by individuals or groups. This is why slavery is repugnant to most people. In 2000 the presidents of the Royal Society of London and the National Academy of Sciences in the United States stressed that "the human genome must be freely available to all humankind."



4. Genetic Pollution

Pollen from GE crops is spreading via the wind and insects and contaminating traditional crops nearby. It is possible that GE crops may one day completely replace traditional crops. If this happens, the patent owners will be able to control all the world's foods. Is it advisable to allow one company to control all the world's, e.g., corn? If it is a US company, it is conceivable that the company may refuse farmers in, say, Japan permission to use their seeds if US-Japan relations sour. Proliferation of GE crops may result in huge losses of biodiversity and all the dangers that entails.



5. Companies Sue Farmers

There have already been cases where the company owning the patent on a genetically engineered seed has sued a farmer for sowing their seed without permission, i.e., violating their intellectual property rights = stealing their product. The farmers claim that their non-genetically engineered crop was contaminated by pollen from a nearby genetically engineered crop.

6. Control of the Seed Market

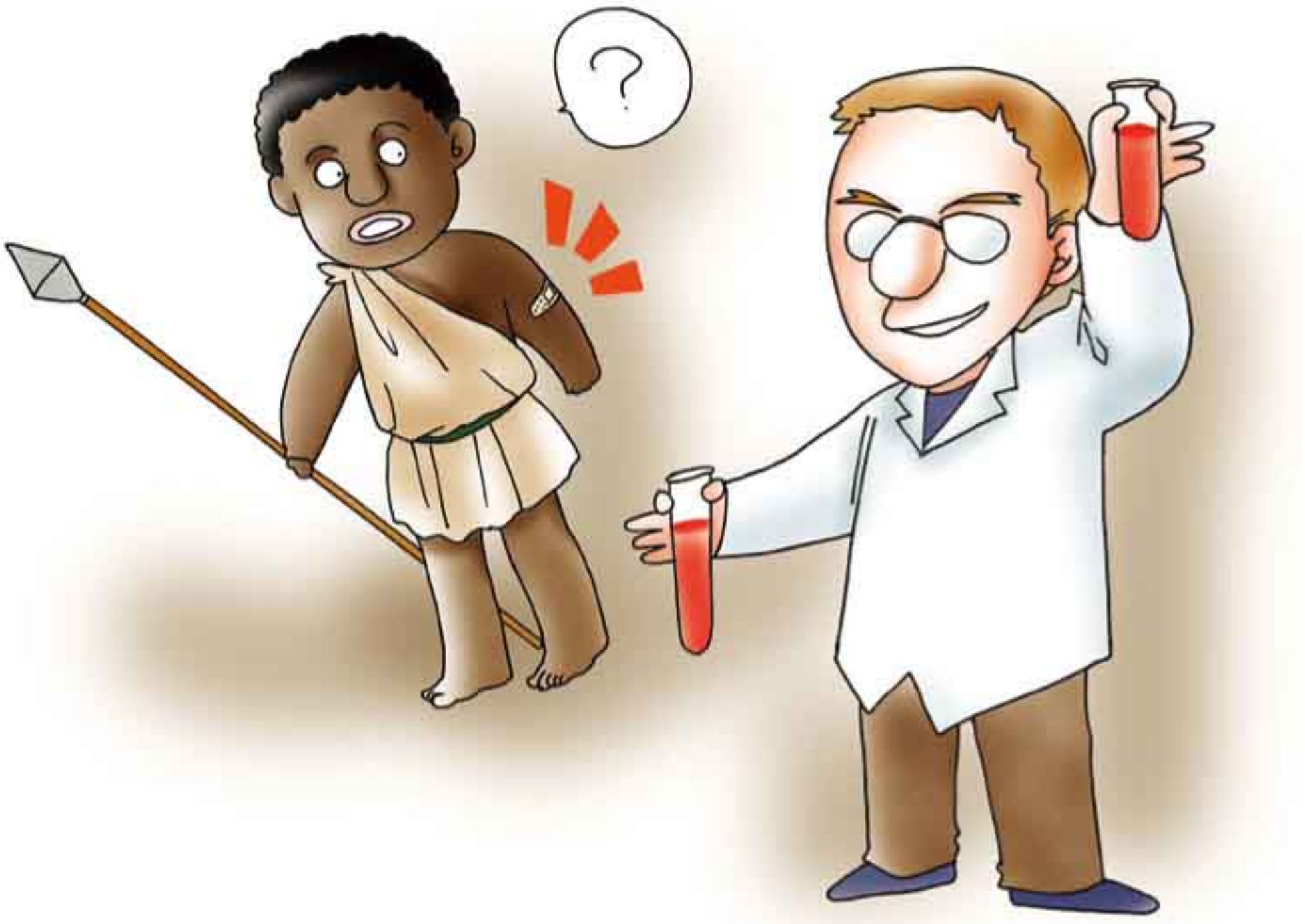
With GE seeds, farmers have to pay a user fee every year. They are not allowed to save seed from their harvest and sow it the following year—unless they pay the user fee. Many farmers in impoverished countries will not be able to afford these fees.

7. Genetically Engineered Food

There are serious questions about the safety of genetically engineered foods. Scientists have fed GE foods to rats and found that their offspring have a higher than average mortality rate and a higher than average incidence of allergies and illnesses such as cancer.

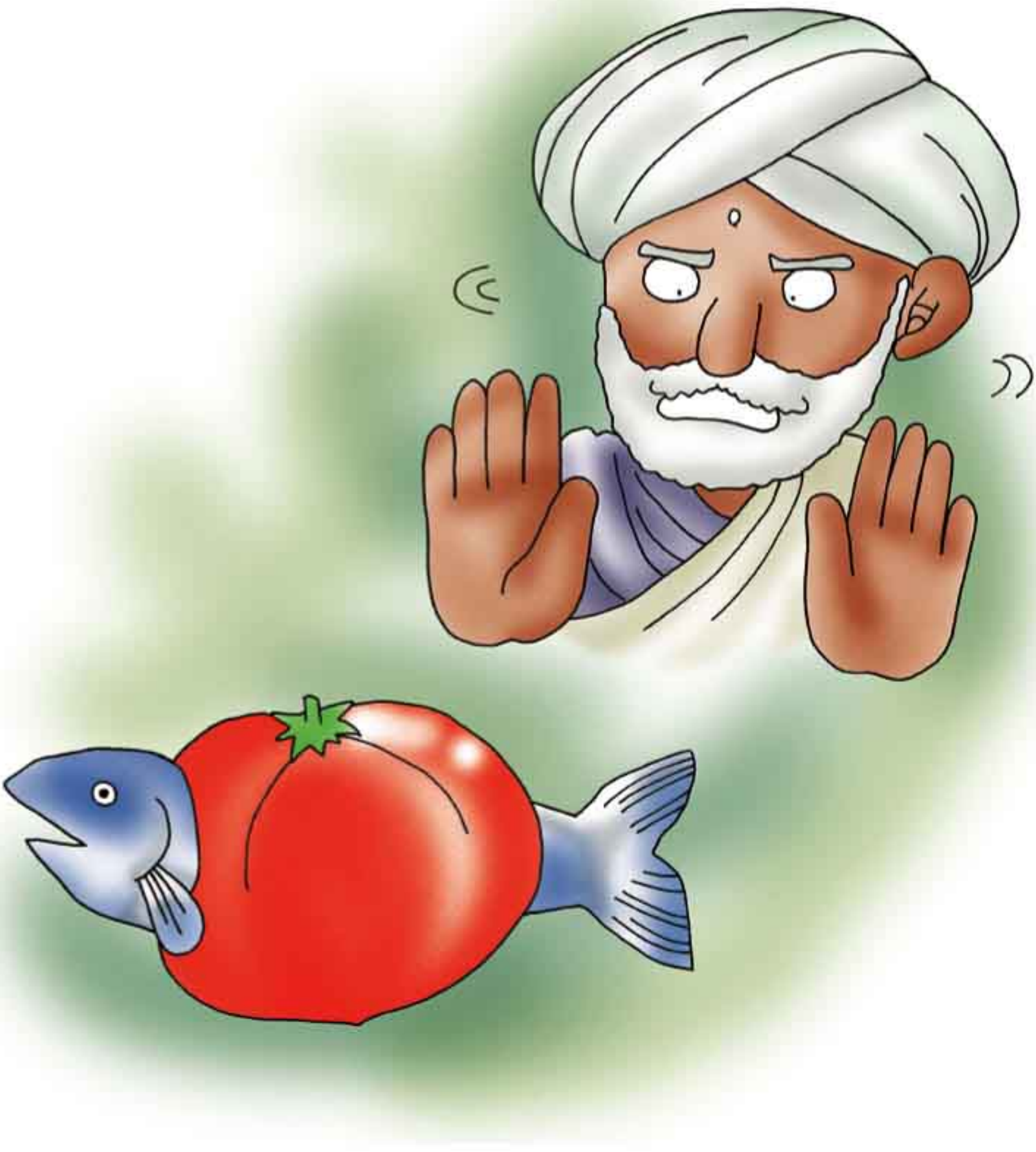
8. Biopiracy

Biotech companies are sending scientists to Third World countries to find genes that they can use to make medicine, food and other useful products. These scientists take genes from plants, animals and even indigenous people and patent them, usually without any kind of compensation to the countries and peoples from whom they were taken. Third World countries call this biopiracy.



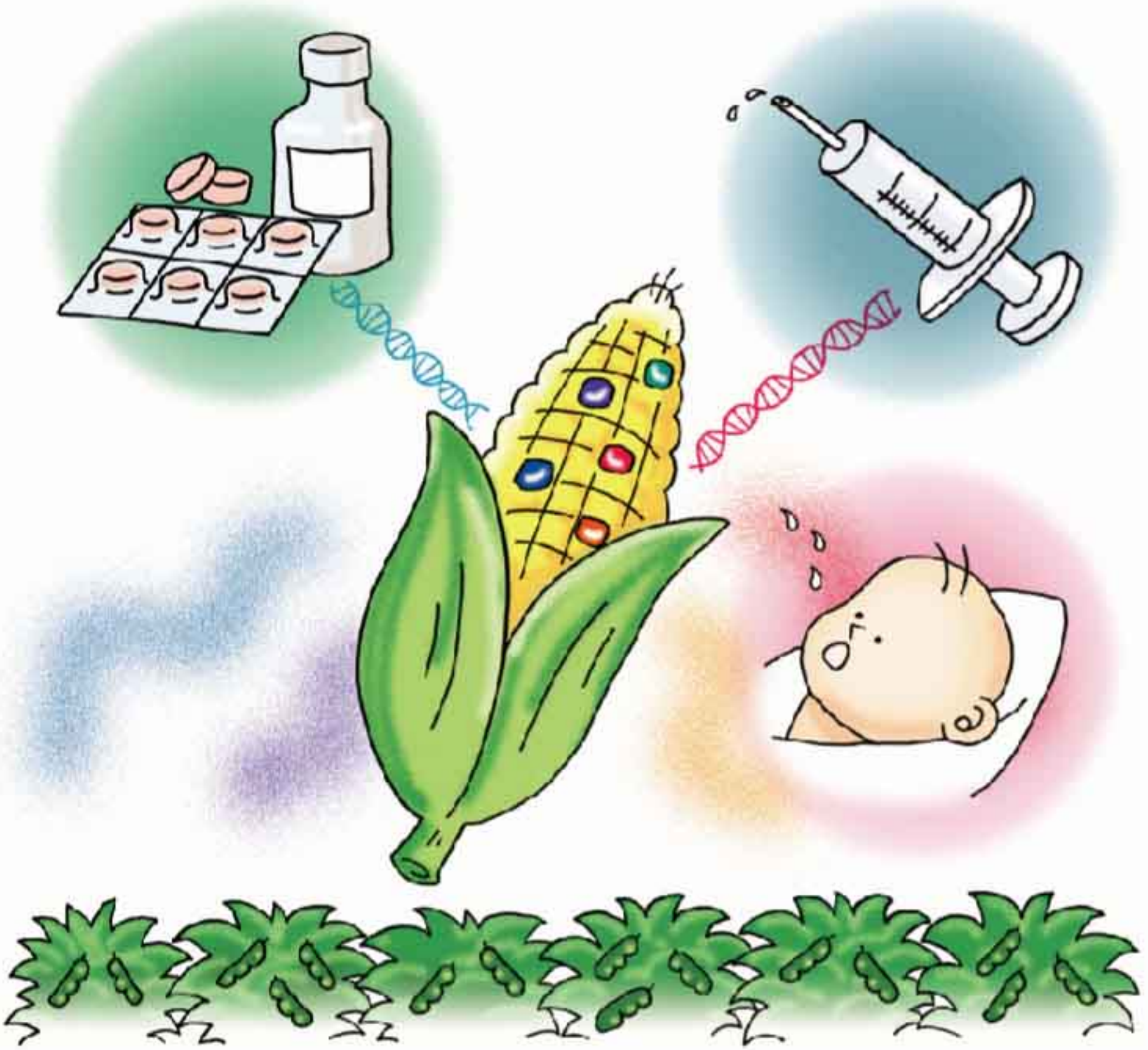
9. Stealing People's DNA

The Hagahai people of Papua New Guinea first made contact with the 'outside' world in 1984. They were exposed to many new diseases and decided to make contact with a foreign researcher who brought them vital inoculations which saved their lives. But at the same time he took samples of their DNA and shipped them to the US. On establishing that the Hagahai seemed immune to leukaemia and some other diseases, US National Institute of Health researchers took out a US patent on the genetic qualities of a Hagahai individual. The people from whom this blood was taken knew nothing about it. This patent was later rejected because of international opposition.



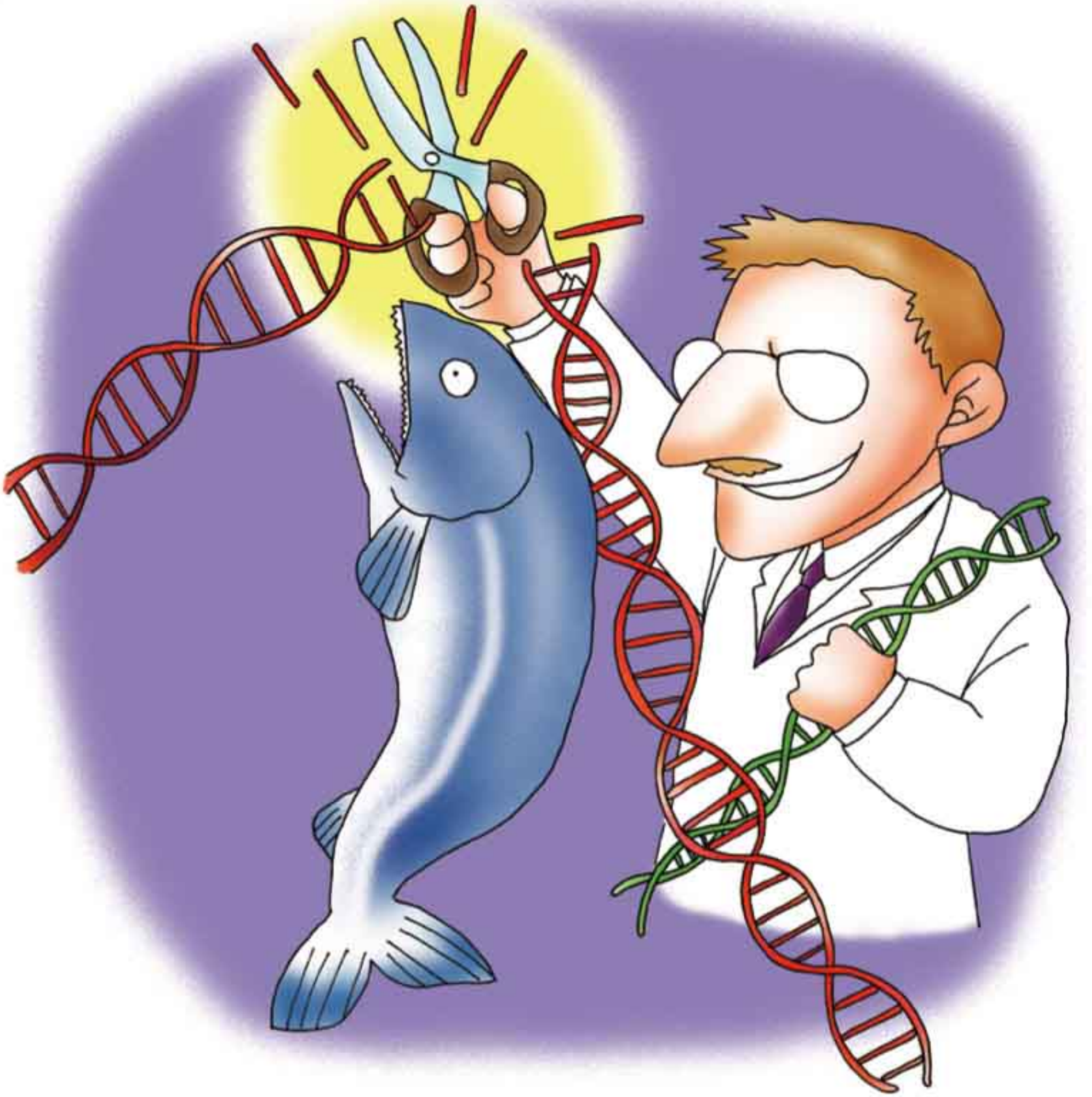
10. Problems for Vegetarians

There is now a potato with a bacteria gene and a tomato with a fish gene. Hindus and other vegetarians will not want to eat these foods.



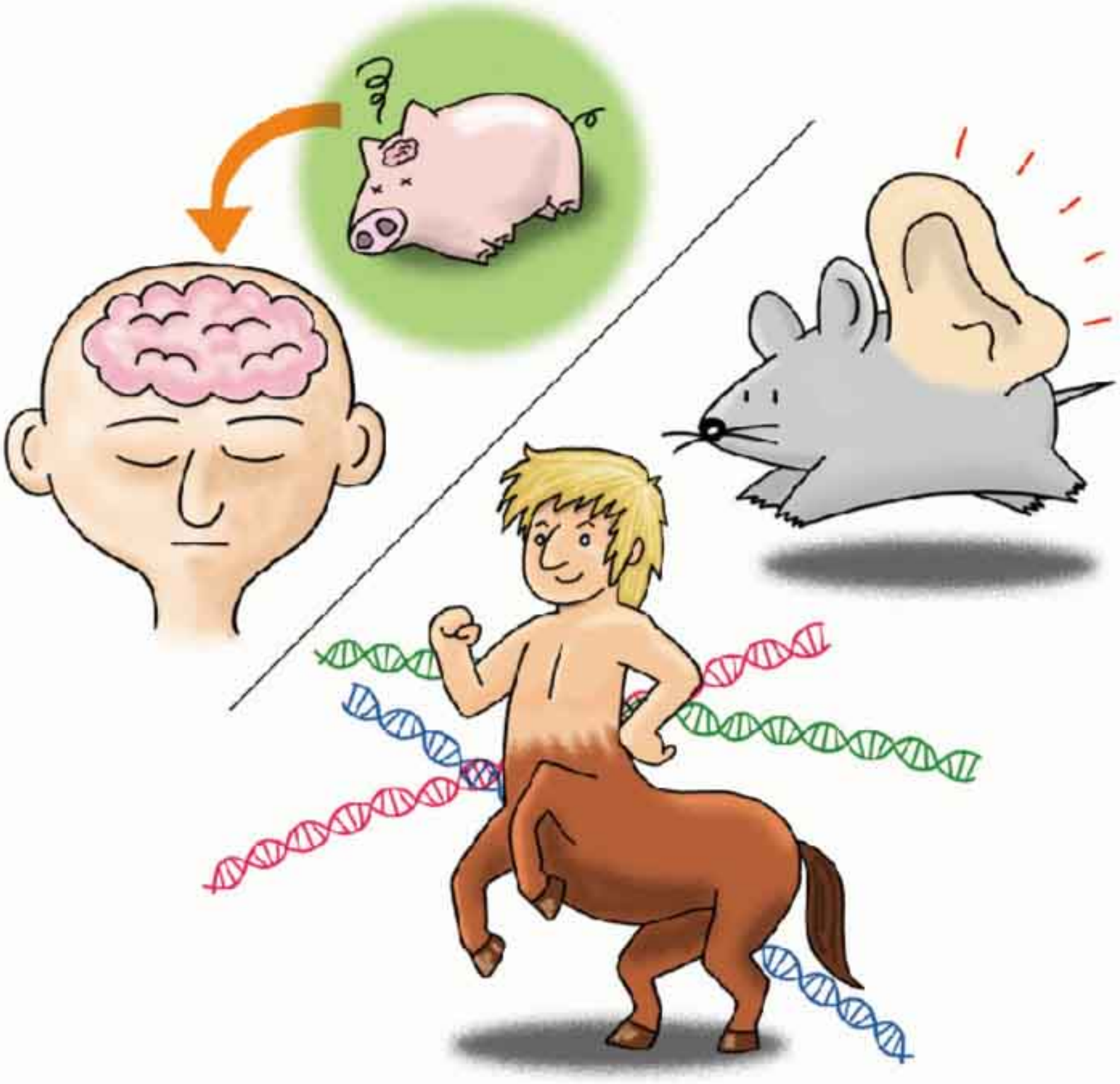
11. Biopharmaceuticals

Corporations aim to manufacture drugs, vaccines, plastics and other chemicals, including abortion-inducing chemicals, in genetically engineered crops and livestock. Axis Genetics is developing transgenic potatoes for the development of an oral hepatitis B vaccine. Contamination of the food supply by biopharmaceuticals is already happening. In 2002, biopharmed corn was found to have contaminated conventional soy grown for food (via seed left from the previous year).



12. Animal Abuse

As a result of introducing growth hormone genes into a wild North Atlantic salmon the transgenic fish grows rapidly and reaches enormous size: six times heavier than average. This makes enormous profit for the producer, but the cost to the salmon is horrific. The head grows disproportionately, leading to respiratory problems from which it dies a painful death because it cannot breathe. Is it ethical to make animals suffer in this way?

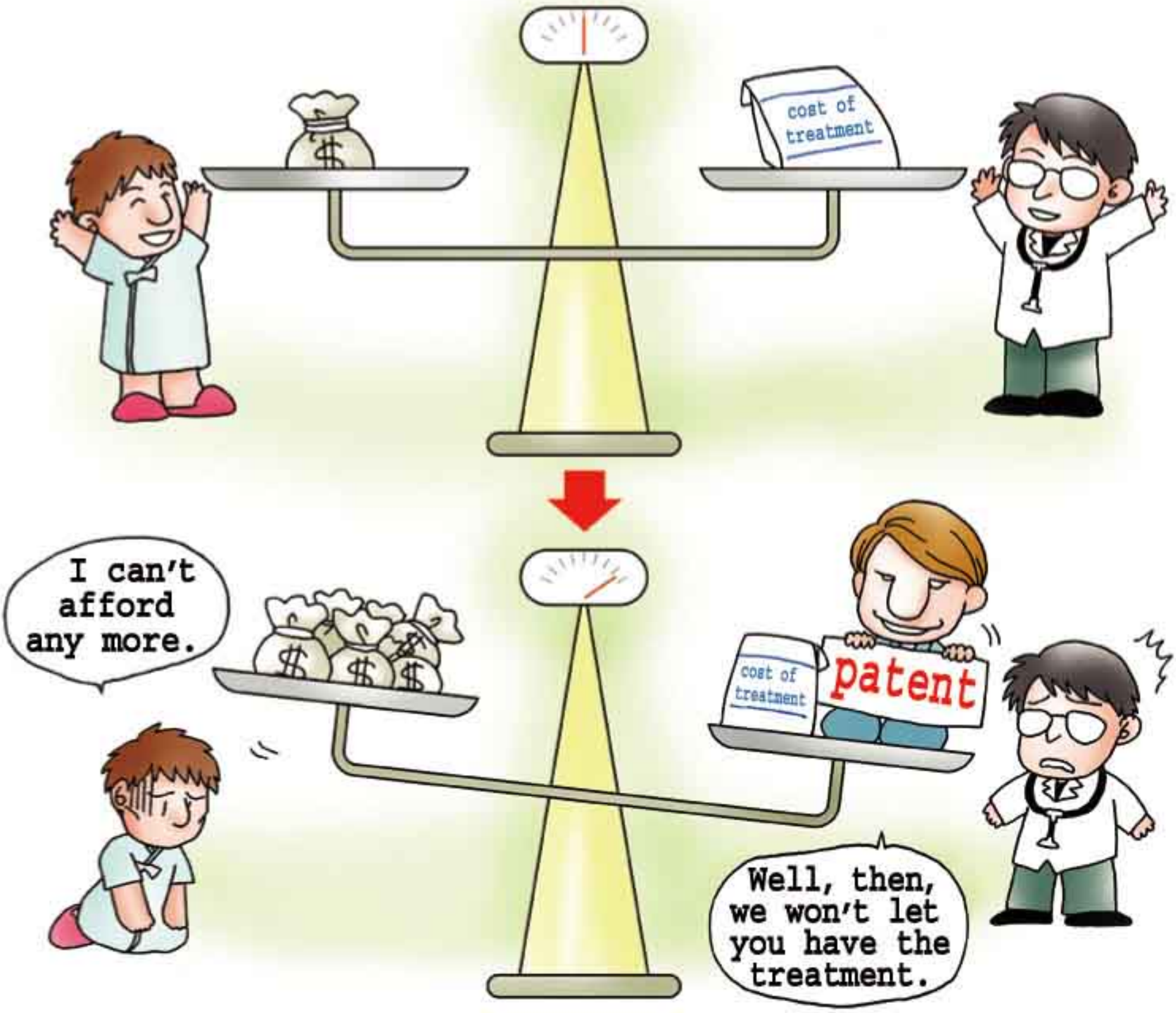


13. Xenotransplantation

Drug companies and health officials are proposing to use genetically altered animals, such as pigs and non-human primates, as 'donors' to provide organs and tissues for humans. In order to obtain pig neuronal cells to treat Parkinson's disease patients, pregnant genetically engineered sows are slaughtered, their fetuses are chopped out, their heads cut off, and their brain cells sucked out and injected into the heads of humans.

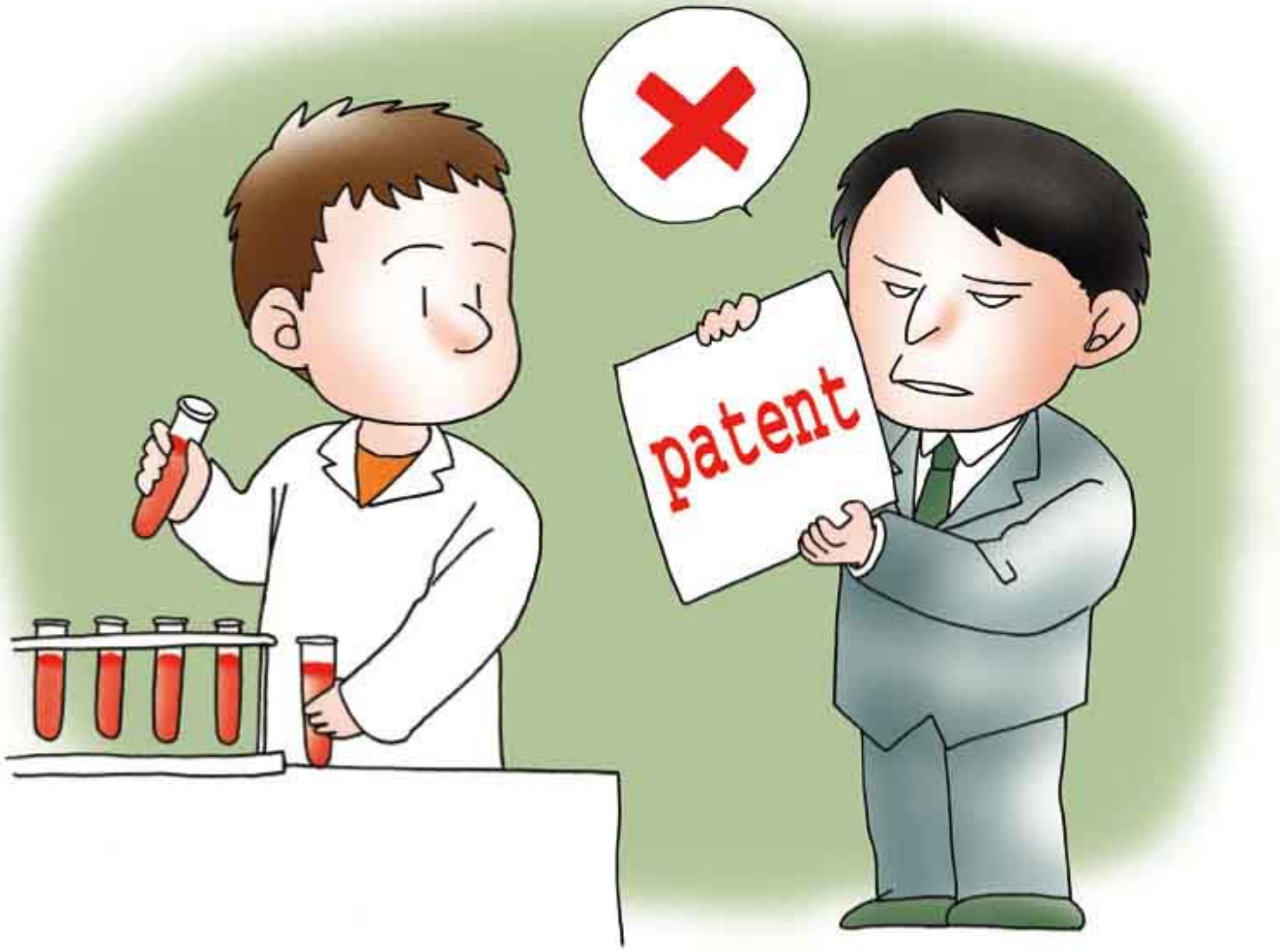
14. Patents Hinder Treatment

Patenting genes has already led to companies refusing to share crucial information with health authorities.



15. Patents Raise Cost of Treatment

People in wealthy countries will have to pay higher fees for tests in which patented genes are used. The UK National Health Service charges £600 to screen patients for two breast cancer genes: BRCA-1 and BRCA-2, and £30-35 for each subsequent test. Myriad Genetics, which has applied for a patent on BRCA-1, charges £1,500 to screen for the gene and £300 for each subsequent test.



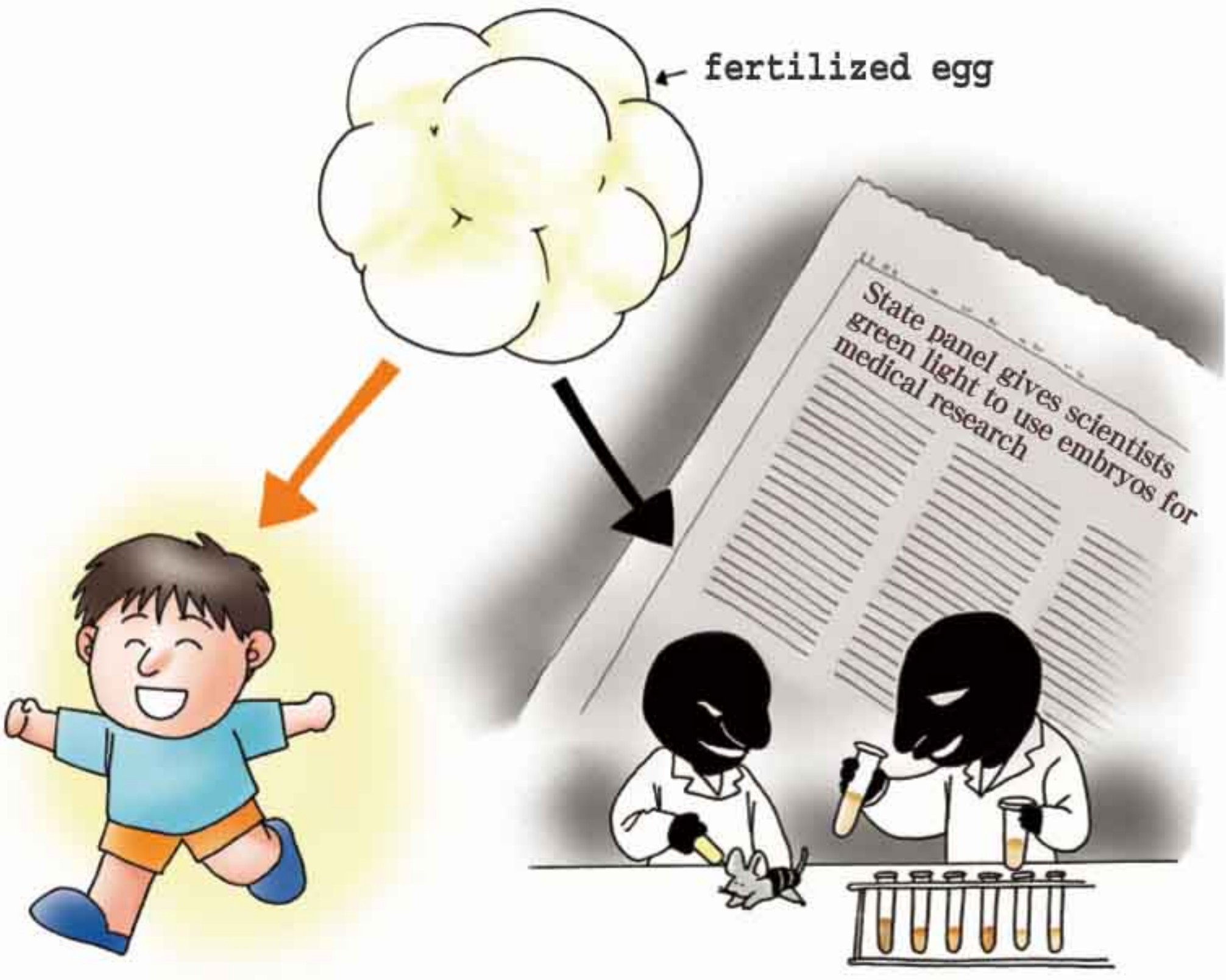
16. Patents Hinder Research

Secrecy may prevent further research on diseases. Researchers are not allowed even to do research (on a patented gene) without permission from the patent holder. A third of the agreements between academia and industry allowed the industrial sponsor to suppress research.

The World Medical Association declared patenting life forms unethical in 1998—because such patenting is aimed at maximizing profits rather than making treatment available to patients. The WMA believes that doctors have an ethical obligation to share skills and knowledge with colleagues. Patenting would undermine these obligations by limiting the dissemination of knowledge.

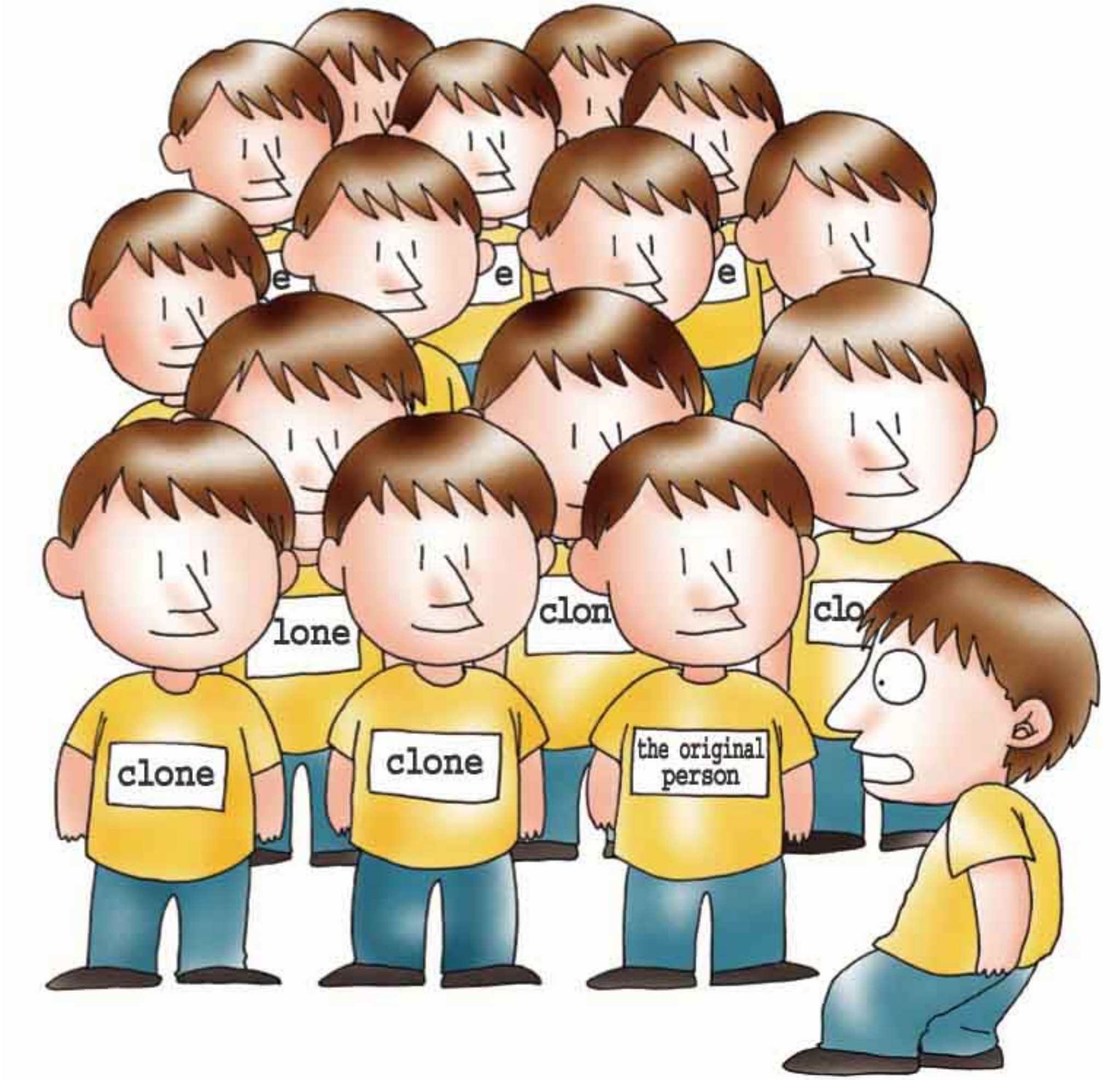
17. New Forms of Discrimination

In the United States a pregnant woman whose foetus tested positive for cystic fibrosis was told by her health maintenance organisation that it would fund an abortion but not cover future medical costs for the child if the mother refused an abortion. There are already cases of companies refusing to employ people who have certain genes.



18. ES Cells

In January 2004, Kyoto University began to provide embryonic stem cells (ES cells) for research. ES cells are taken from human embryos left over from in vitro fertilization attempts. Doctors create many embryos and choose one to implant inside the woman. The remainder is sometimes used for experiments. ES cells are desired by scientists because they can become any part of the human body. These embryos are alive. Are they human? If so, is it ethical to use them for experiments?

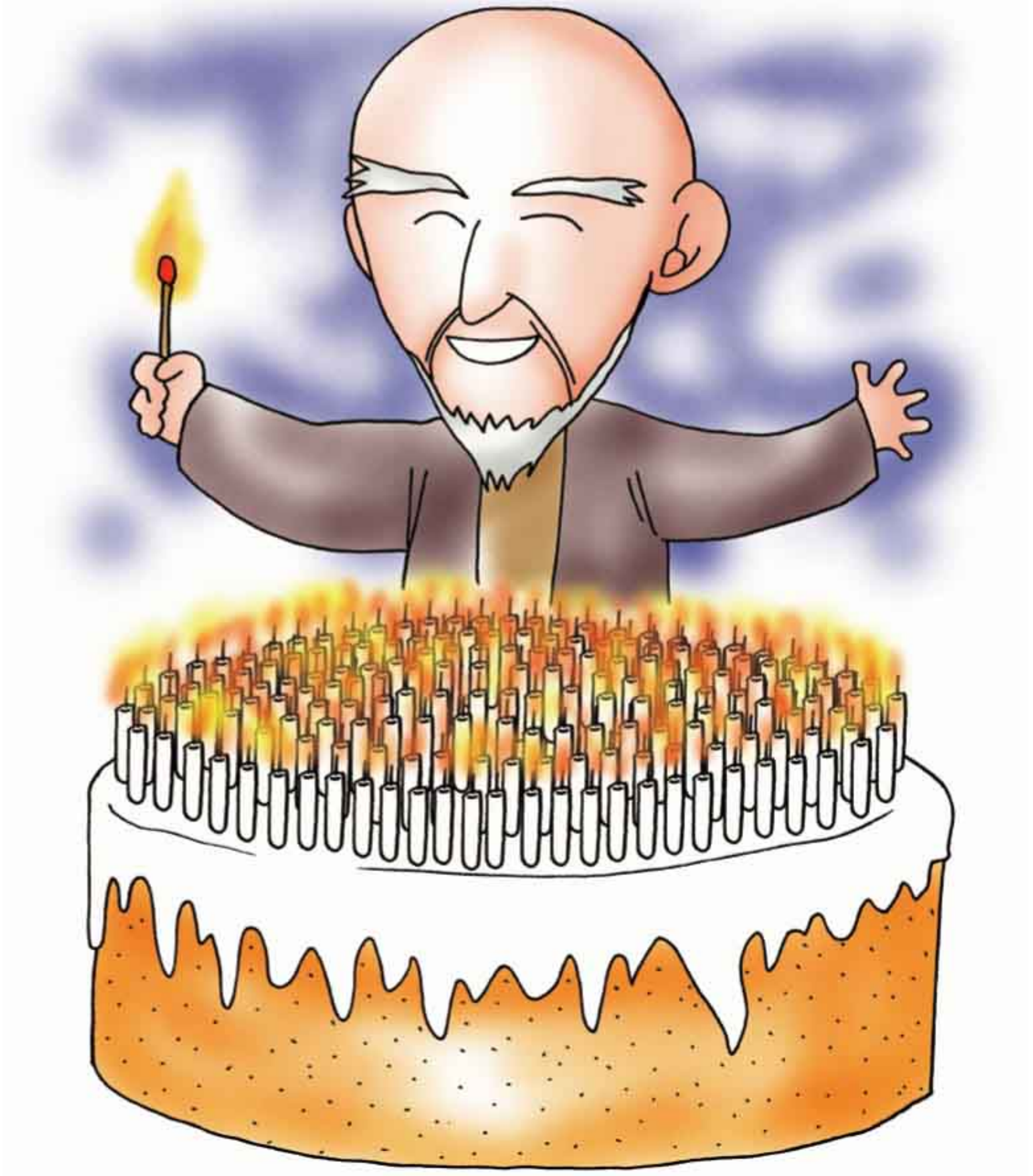


19. Clones

Human beings have already been cloned in various countries. However, the clones have died at a very early stage of development. One reason for creating clones is to get the necessary 'parts' to heal the person being cloned. Is it ethical to create a person just to get parts?

20. Order-Made Babies/Super Race

Scientists hope to soon produce designer babies. If you want a blue eyed tennis player with the ability of Roger Federer, you may soon be able to buy those genes, have them inserted into an embryo, and bear the desired child. Some parents will want an intelligent child, some a child with great sporting ability, some a tall, blue eyed, blond child. As only the wealthy will be able to afford these genes, some scientists predict that the human race will divide into a super race and the ordinary race, unable to interbreed.

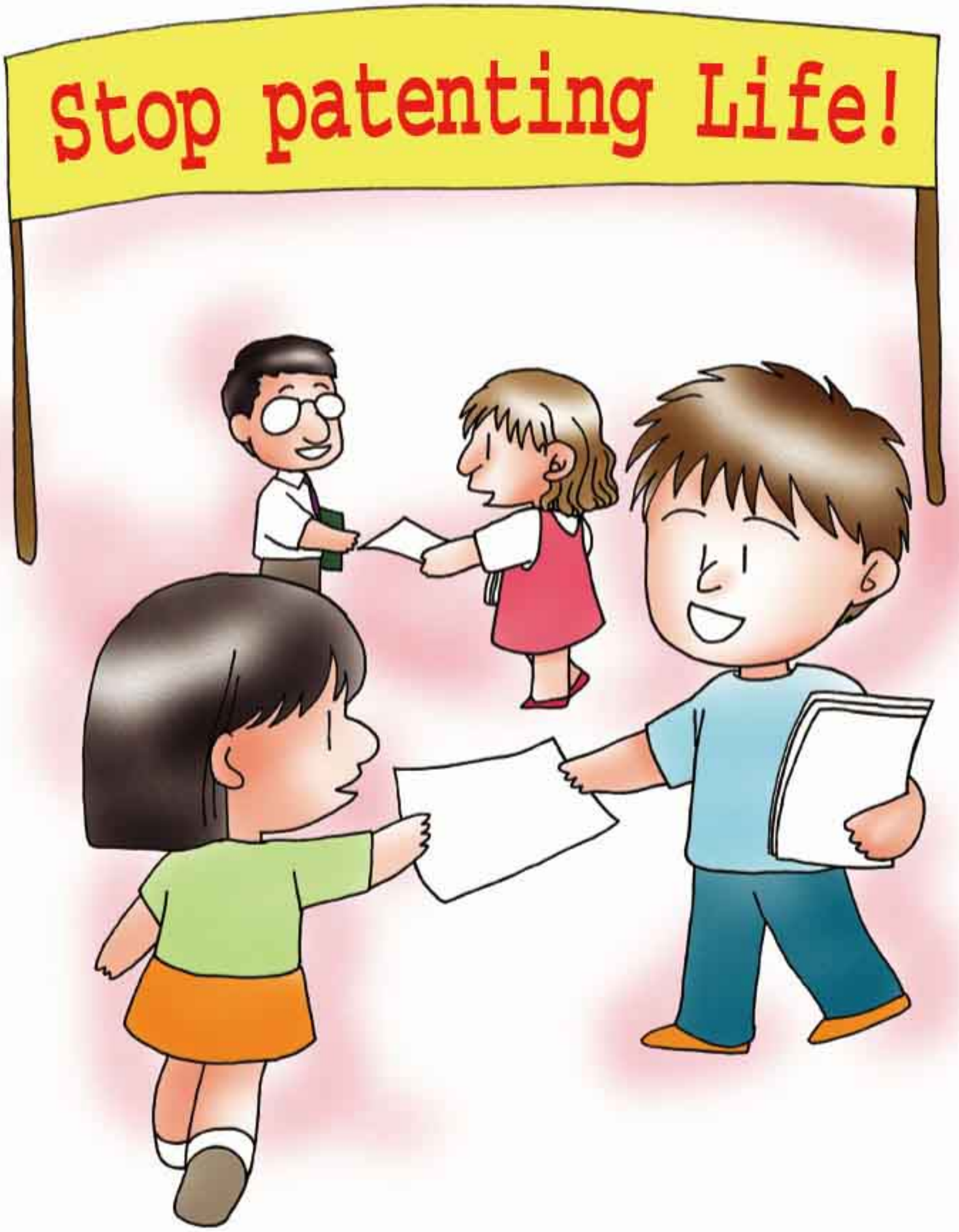


21. Increased Longevity

Some scientists are trying to use genetic engineering to extend the human lifespan. They believe it will be possible to live for 200 or even 300 years.

22. US Domination

The US promotes patents on genes. The US is using the World Trade Organization (WTO)'s agreement on Trade Related Intellectual Property Rights (TRIPS) to try to force other countries to accept its patent system. If it succeeds, US companies will control most of the world's genes.



23. Campaign Against Patenting Life

The Columbans and other NGOs are campaigning to get TRIPS rewritten. Will you join the campaign?