

What is artificial meat? | Cultured meat | A change in the nutrition industry Study time 10 minutes



In the not-too-distant future, we will be faced with two options for buying meat in supermarkets, which have exactly the same taste and content, but no animal was killed to produce one of them. What exactly is artificial meat? In this article, we will answer this question..



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The basic idea of artificial meat from Winston Churchill to Bill Gates

The idea of producing artificial meat for human consumption was first mooted 90 years ago by Winston Churchill. In an article entitled "Fifty Years Later," which was later published in 1932 in a book called "Thoughts and Adventures," he predicted the production of artificial meat. "Fifty years later, man abandons the task of raising a whole hen to use its wings and thighs, and grows these organs individually in suitable culture media," Churchill wrote in the paper. The world population in 2050 will be close to 8.9 billion people. The growing trend of population, along with the huge volume of consumption resources, such as water and land, as well as environmental pollution, including the emission of greenhouse gases as a result of animal husbandry, adds to the importance of this promising technology. Still, the investment of companies and individuals, including Bill Gates, Google co-founder Sergey Brin, and Sir Richard Branson, a well-known entrepreneur and billionaire in the field, is worth investing in. Although some of these people, including Brin, have expressed their motivation for advocating for animal rights, it seems that this technology can have a large and indescribable industry and have a wide range of effects on human life.

What is artificial meat?

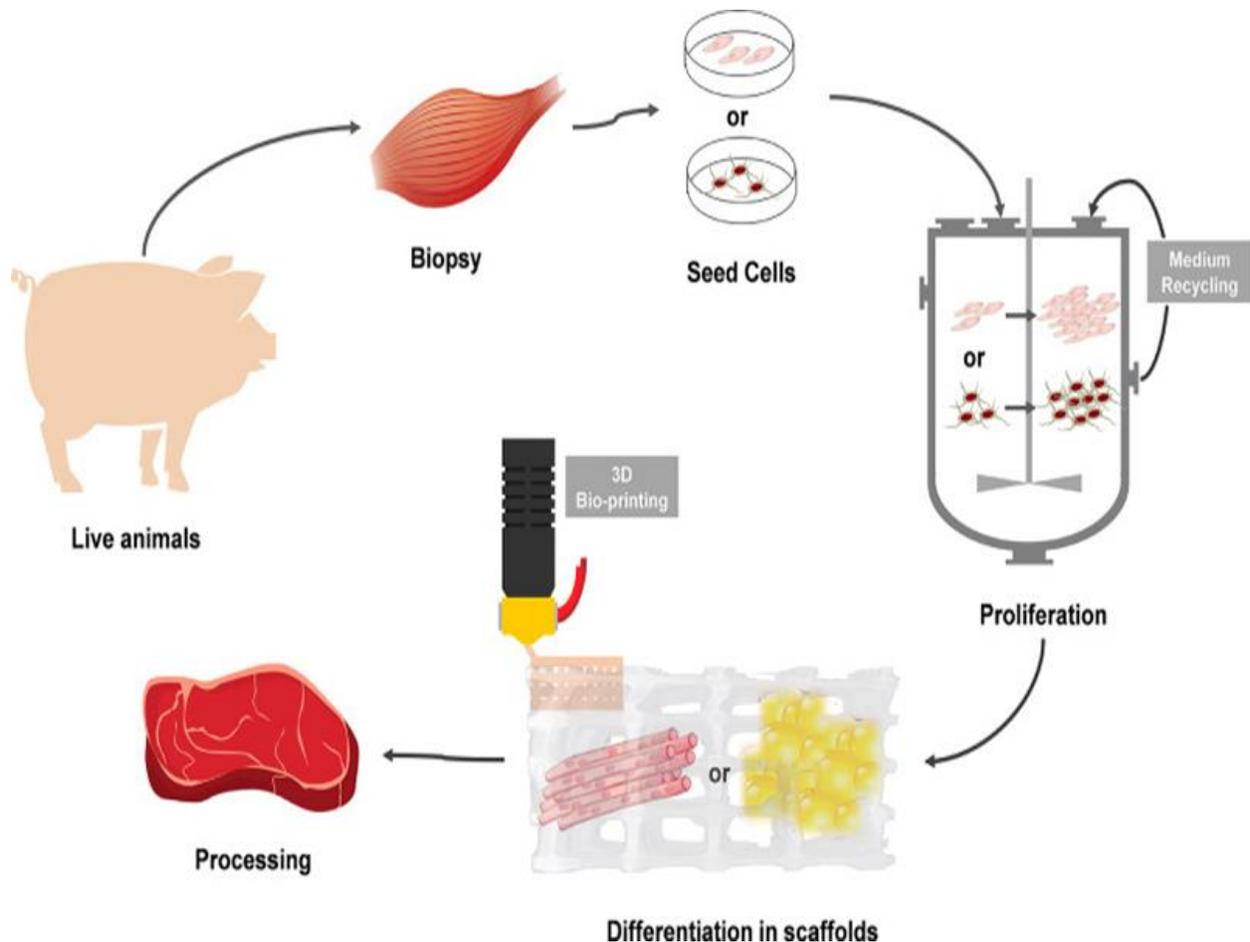
Of course, growing meat in the laboratory is not as simple as growing mushrooms. Artificial meat is a type of laboratory meat that is not yet in the widespread supply stage and its production cost is relatively high, but in terms of taste, it is no different from ordinary meat.



What is the process of cultivating artificial meat?

For meat culture in the laboratory, some bovine cells are first taken from the tissue without harming the animal. The process of growing artificial meat is quite similar to the growth of livestock meat tissue, except that in this process, the growth of cells takes place outside the animal. The first step in producing artificial meat is to obtain animal muscle stem cells. The function of these cells in the animal's body is to create muscle tissue at the time of injury, which scientists have used to produce artificial meat. These cells are located in the sheep's environment, containing nutrients and other cell growth factors, and continue to produce trillions of cells from a small sample. In order to convert these cells into muscle cells, the primary muscle fibers are first produced by controlling the feeding process, and by placing them in a gel containing 99% water, the natural shape of the muscle fibers is obtained. The natural tendency of muscle cells to contract causes them to mass and become strands of muscle tissue. Researchers at McMaster University named Ravi Selvaganapathy and Alireza Shahin Shamsabadi have developed a method that puts muscle layers and fat cells together to give more control over the taste of laboratory meat. According to researchers, this technique

can be used to buy artificial meat, such as milk, with the desired degree of fat. To date, researchers have been able to cultivate artificial meats with a taste similar to that of hamburgers and chicken nuggets, but in order for the artificial meat to take on the full taste and feel of a natural meat, more control is needed over how it is formed. This method is a modified version of the method that researchers use to grow tissues for organ transplantation into humans, and it can be used to control the exact percentage of fat and its distribution in muscle tissue or the so-called "marble" of meat. The researchers first produced artificial meat from mouse cells and then from rabbit cells, and after cooking and testing rabbit meat, described its feel and taste as real meat.



What are the three main factors in artificial meat cultivation?

1- Starter cells: To cultivate meat in the laboratory, it is necessary to first use a number of cells with high growth rate and division. Embryonic stem cells, adult stem cells, myocytes and myoblasts are suitable for this purpose. Stem cells have the fastest division rate; But since they do not yet have a specific form of muscle tissue, controlling them and moving them toward muscle tissue formation is a major challenge. In contrast, mature muscle cells have

the perfect shape of muscle tissue; But they have very low growth and division rates. To avoid these two challenges, myoblast cells are commonly used in this process.

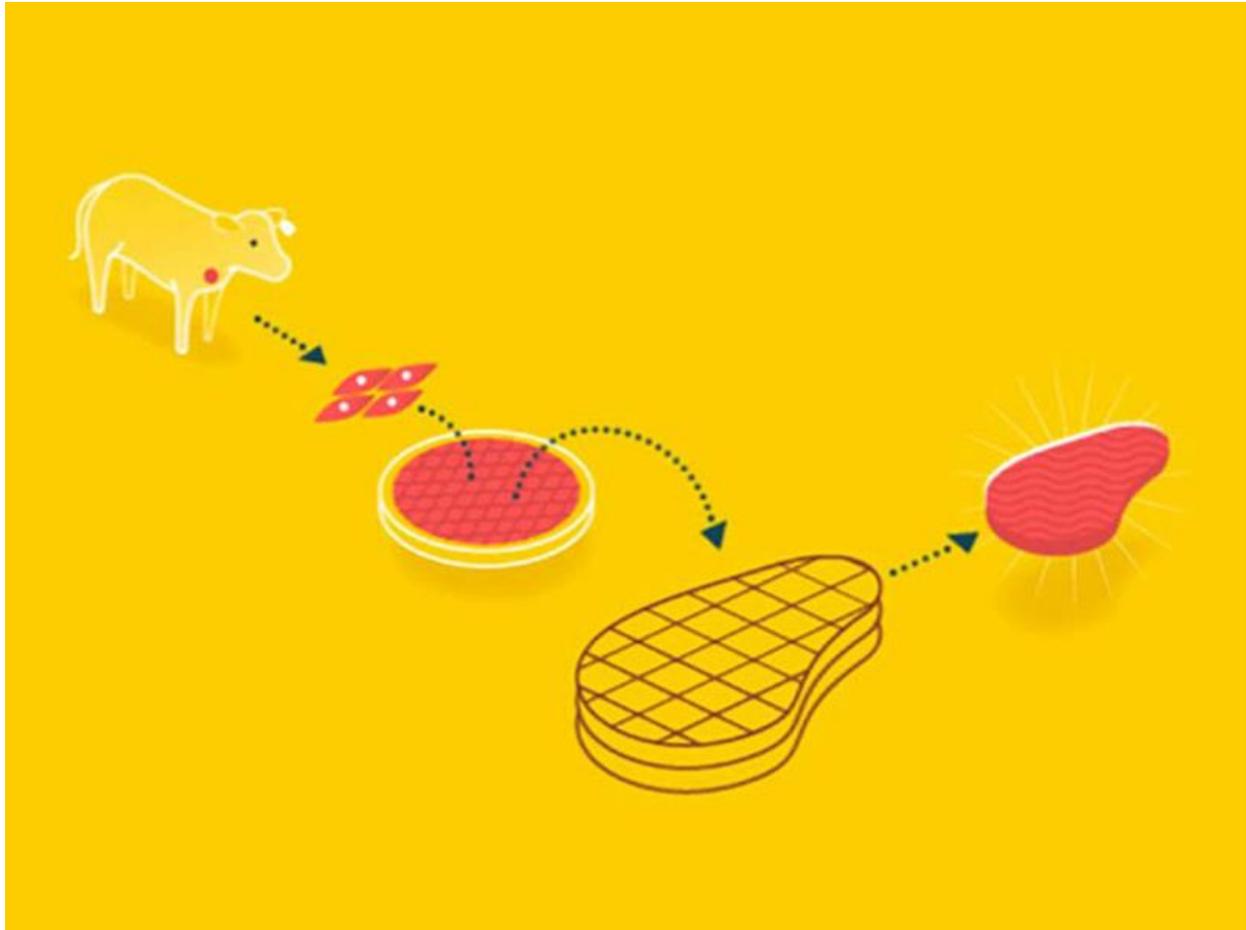
2- Culture medium: Cells need many nutrients to grow, divide and take the form of meat muscle tissue. The most important of these substances are tissue growth-promoting proteins.

3- Cellular scaffold: To grow in the form of a three-dimensional tissue, cells must grow on a framework. This framework must be biodegradable and after the formation of meat tissue, the cell itself absorbs.

What is the seventy-year evolution of artificial meat?

In 1971, an American pathologist named Russell Ross cultured muscle fibers in the laboratory and took a major step in the development of clean meat production technology. But the person who came up with the idea of cell culture for food since the 1950s was a doctor named Willem van Eelen, who finally succeeded in 1999.

In 2008, the People's Foundation for Animal Welfare (PETA) launched a \$ 1 million award for the first institution to deliver the first laboratory meat to consumers. In November 2009, Allen Tim's researchers made great strides in using live pig cells to grow laboratory meat and win a \$ 1 million prize. Ellen's team members were apparently luckier than he was, and a year later, Google co-founder Sergey Brin announced his full support for Dr. Mark Post's research on Allen's team members. He made headlines in 2013 with the production of the world's first hamburger using artificial meat. This hamburger was cooked by one of the most famous chefs in the world in a restaurant in London and was evaluated by food experts and critics. Thus, the doors of this industry were opened to dozens of startups. It is interesting to know that the production cost of this hamburger was estimated at 250,000 Euros, and the new challenge for startups entering this field was the optimal production of meat in terms of time and cost. Dr. Post, a company owned by Dr. Post that is currently one of the most prominent letters in the field, estimates that the cost of producing a hamburger with artificial meat on an industrial scale is currently around 9 euros. Of course, this price is still a long way from the one-euro price of regular burgers, but the company's vision is to achieve prices lower than regular meat.



What are the benefits of growing artificial meat?

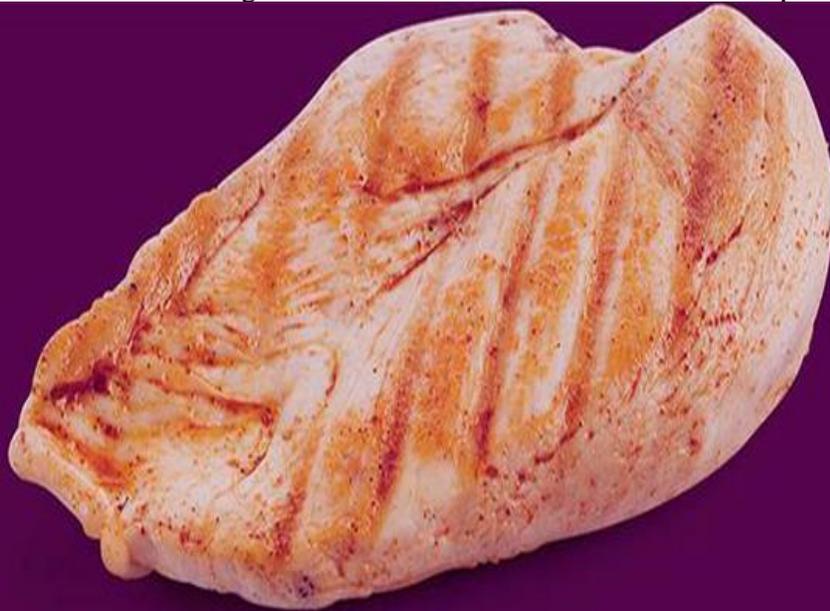
Health

There is no need to use growth hormone in laboratory meat cultivation, and this makes the final product, unlike animal meat, hormone-free and therefore healthier. In addition, 80% of the antibiotics produced in the world are used for animal health, which has increased antibiotic resistance in humans. Artificial meat is much healthier than regular meat and can be engineered to have a lower fat content, or unsaturated fats can be replaced with beneficial fats, including omega-3s. By adding factors to the culture medium, certain types of vitamins can be added to artificial meat, and at the same time, there is no limit to its taste.

Also, the possibility of hygienic quality control of these meats to be free from all kinds of parasites and common diseases between humans and livestock is much more, easier and cheaper than livestock meat. The meat life cycle shows that 75 to 95% of the feed given to livestock is consumed by metabolism or the growth of non-food tissues such as bones, digestive and respiratory systems, while in vitro production, these losses are greatly reduced.

environmental

Research by the University of Amsterdam shows that laboratory meat farming will produce the same amount of meat with only 2% of the agricultural resources consumed by conventional livestock industries. Also, the amount of greenhouse gas emissions in this process will be one-twenty-fifth of conventional industries and energy consumption will be halved. Also, the change of land use per hectare to livestock pastures endangers the average habitat of 10 native animals in that area. Given the much less resources needed to grow laboratory meat, the lives of millions of indigenous animals can be guaranteed. There is also the possibility of contamination of livestock meat by feeding on forage contaminated with various pesticides and chemicals, which is almost zero in the case of meat grown in the laboratory. Unlike livestock and poultry, laboratory meat production is highly environmentally friendly and energy efficient. It is interesting to note that livestock farming plays a significant role in the production of greenhouse gases, especially methane. If this is one of the aspects discussed in international agreements, it has been to reduce greenhouse gas emissions. Also, bioreactors for clean meat production take up very little space compared to large livestock and poultry farms.



**Same Meat
Different Way**

What are the challenges of producing artificial meat?

Tissue Engineering

In the body of living organisms, nutrients and oxygen are transported to the cells as well as their waste products are excreted by the arteries. In laboratory tissue culture, the biological reactor is responsible for this task. Sponge scaffolding is commonly used in these reactors. In this way, the cells have a support for three-dimensional growth, and also oxygen and nutrients can penetrate from the sponge-like tissue to the cells.

Prevent corruption

If the culture of meat tissue starts with only 10 primer cells, more than 50,000 tons of meat will be produced after two months of cell division. Substances such as collagen, sodium benzoate, mannitol and xanthan should be used to prevent the meat from becoming contaminated with fungi and bacteria and subsequently spoiling it. Culture medium Animal cell culture is typically performed in bovine embryonic serum (FBS) medium, which is expensive and dependent on livestock production. Researchers are looking to replace this culture medium with plant sources.

Price

The finished price of these meats should be competitive with the usual meats available in the market. The price of the first hamburger made from laboratory farmed meat was estimated at \$ 230,000. Although the price of this product has dropped by more than 99% in the last three years, it is still much more expensive than meat obtained from livestock.



A revolution for clean meat in the not too distant future

Laboratory farmed meat could revolutionize the food industry and the global environment if it can reach a reasonable final price. These meats will cause fewer organisms to suffer from being killed for human consumption and will also significantly reduce greenhouse gases. The meat industry accounts for 13.5 percent of global greenhouse gas emissions, according to the Institute for Global Resources, which is sure to grow as the current trend continues and the global population grows to 7.9 billion by 2050. will be.

To combat these problems, extensive research must be done to replace meat with healthier products. These researches fall into three main categories:

- .1 Vegetarian meat substitutes such as soy or hamburgers made from chickpea protein are included.
- .2 Less polluting meats, such as proteins derived from insects produced by Cornish Adib Insect.
- .3 Laboratory farmed meats such as Hampton Creek and Memphis Mitz.

Changing our eating habits is a step we must take to ensure our future survival. Any attempt to replace the current polluting meat industry will be a step towards the future of human beings. So we should all pray that Creek's claim comes true.

Source: CULTUREDBEEF