



Lab-Grown Meat

For Prelims: Lab-Grown Meat, Cell-cultivated chicken

For Mains: Potential of lab-grown meat in addressing food security, Animal welfare implications of cell-cultivated meat.

Why in News?

Recently, there has been a significant development in the world of sustainable food production with the United States' **approval of lab-grown meat**, specifically **cell-cultivated chicken**, by two California-based companies.

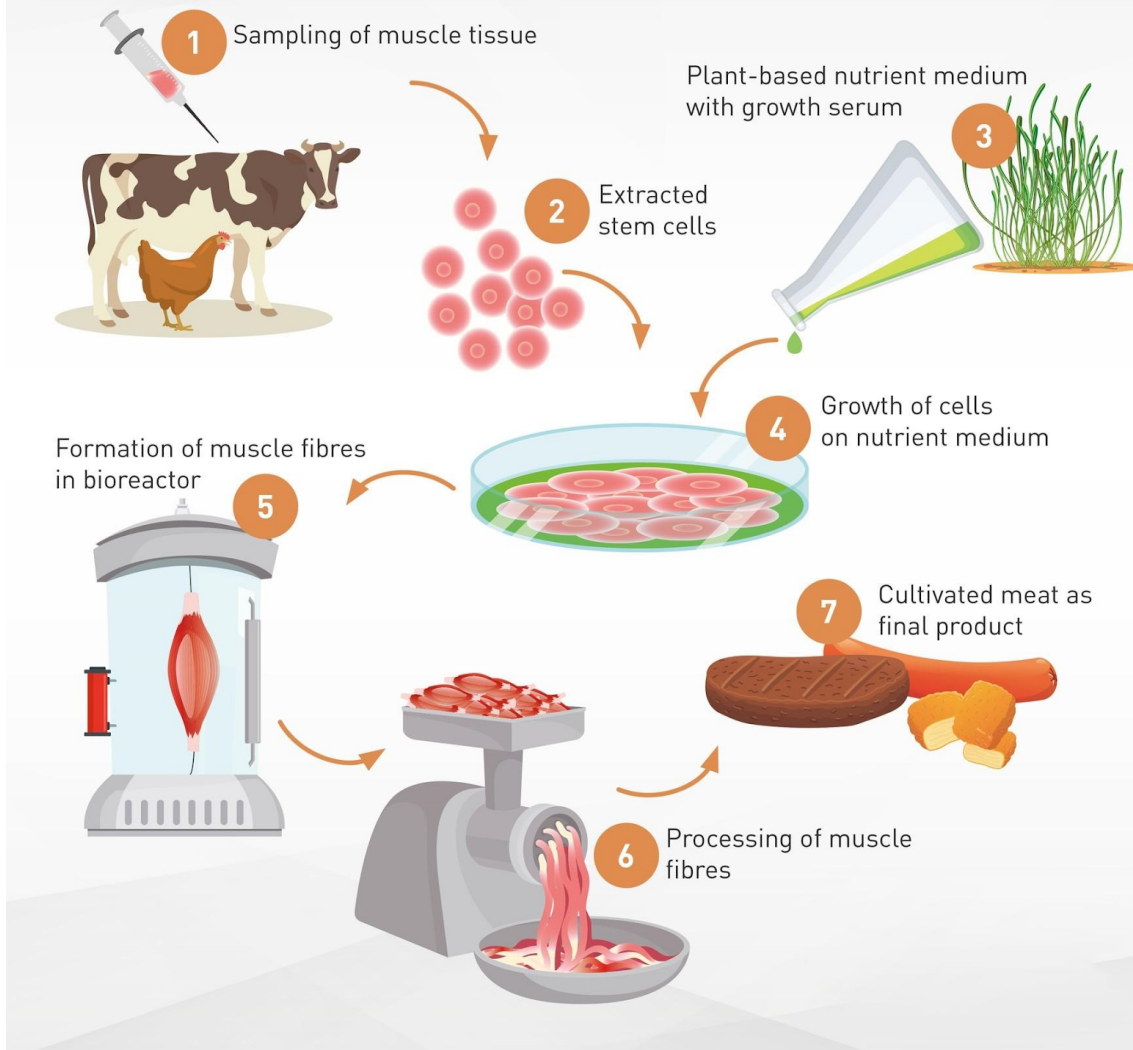
- Two California-based companies, Good Meat, and Upside Foods received U.S. government approval to produce and sell the '**cell-cultivated chicken**'.

What is Lab-Grown Meat?

- Lab-grown meat, officially known as cell-cultivated meat, refers to meat that is grown in a **laboratory setting using isolated cells derived from animals**.
- These cells are provided with the necessary resources, such as nutrients and a suitable environment, **to replicate and grow into edible meat**.
- The process typically takes place in **bioreactors**, specialized containers designed to support the cellular cultivation process.
- The **first country to approve** the sale of alternative meat was **Singapore** in 2020.

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Cultivated meat production



Cell-Cultivated Chicken:

- Cell-cultivated chicken refers to **chicken meat grown** in a laboratory setting using isolated cells that have the resources needed for growth and replication.
- Bioreactors, specialized containers designed to support a specific biological environment, are commonly used to facilitate the cultivation process.
- Once the cells reach a sufficient number, they are **processed, often with additives, to enhance texture and appearance**, and prepared for consumption.

How is Cell-Cultivation Technique Significant for Meat Production?

Climate Mitigation:

- Lab-grown meat offers a potential solution to reduce **greenhouse gas emissions** associated with **livestock production**.
 - According to the **Food and Agriculture Organization (FAO)**, livestock production contributes about **14.5% of global anthropogenic GHG emissions**, mainly in the form of **methane** and **nitrous oxide**.

Land Use Efficiency:

- Cell-cultivated meat requires significantly less land compared to traditional meat production methods.

- A 2021 report estimated that lab-cultivated meat would use **63% less land in the case of chicken and 72% in the case of pork.**

- **Animal Welfare:**

- The development of cell-cultivated meat aims to minimize the need for [animal slaughter](#).
- By producing meat directly from cells, cultivated meat offers the possibility of **reducing animal suffering** and improving animal welfare standards.

- **Food Security and Nutrition:**

- Lab-grown meat has the potential to address future [food security needs](#).
- Cell-cultivated meat can be **tailored to be healthier and meet specific dietary requirements** such as being designed to **contain less fat**.

What are the Challenges to Cell-Cultivated Meat?

- **Consumer Acceptance:**

- Achieving **taste, texture, appearance, and cost parity** with conventional meat remains a challenge for cell-cultivated alternatives. Perception of cultured meat as "**artificial**" or "**unnatural**" may impact consumer willingness to adopt these products.

- **Cost:**

- The cost of cell-cultivated meat is **expected to remain high**; primarily attributed to the complex and resource-intensive process of cell culturing. Scalability and quality control processes may impose additional costs.

- **Scalability:**

- Currently, production is limited to small quantities, and **scaling up while maintaining product quality and consistency** is a significant challenge. Developing efficient and **cost-effective bioreactor systems** and finding suitable cell culture media are critical steps in achieving scalability.

- **Resources:**

- Researchers require **high-quality cells, suitable growth mediums**, and other resources to ensure the quality of the final product.

- **Environmental Impact Concerns:**

- Some studies suggest that the environmental impact of cell-cultivated meat production could be higher than traditional meat production if highly refined growth mediums are required.

- **Intellectual Property and Patent Issues:**

- The field of cultivated meat involves numerous [Intellectual Property and Patent](#) considerations. Companies and researchers are filing patents for various techniques and technologies involved in the production of cultivated meat. Resolving **intellectual property disputes** and **ensuring fair access to technology will impact the growth and development of the industry**.

Way Forward

- Increase **consumer awareness and acceptance** through transparent communication about the benefits and safety of lab-grown meat.
- Invest in R&D to improve production processes, taste, texture, and cost efficiency of lab-grown meat.
- Focus on **technological advancements** and optimize production facilities to **reduce costs and meet market demand**.
- Encourage international collaboration, **harmonize regulations, and facilitate trade to expand the lab-grown meat market worldwide**.
- Cultivated meat is a relatively new field, and establishing a **clear regulatory framework** is essential. Governments and regulatory bodies need to determine how to classify and **regulate cultivated meat products to ensure safety, quality, and consumer confidence**.

[Source: TH](#)

