

# In focus

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When will we be eating lab-grown meat?



Singapore's approval of cultured chicken nuggets in December 2020 could be a watershed moment for the uptake of lab-grown meat. What is the economic outlook for this market, what are the regulatory considerations, and when are we likely to see more widespread approvals? This white paper shines a light on the lab-grown meat situation.

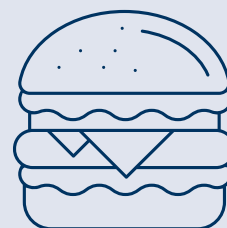


## Feeding a growing population

Global demand for meat and fish continues to grow in line with the world population, income and urbanisation. Intensive, industrial-scale agricultural and fishing practices have been developed in response. However, they are known to put a strain on natural resources such as land, fresh water and energy<sup>1,2</sup>. What's more, consumer awareness of issues such as animal welfare and the use of antibiotics in farm animals is on the up.

Consequently, the food industry is exploring new, more sustainable ways to produce meat and fish safely. One area of interest is the development of synthetic alternatives. Are 'lab-grown' products the way forward for consumers who enjoy meat and fish but are mindful of their negative impact of large-scale production? This white paper looks at the potential market for lab-grown meat as well as the associated regulatory considerations.

Lab-grown meat is a brand-new industry. The first cell cultured burger was presented on TV in August 2013 by the Dutch scientist Mark Post. It was not perfect, did not taste or look like a normal burger and cost \$300,000 to make!<sup>3</sup>



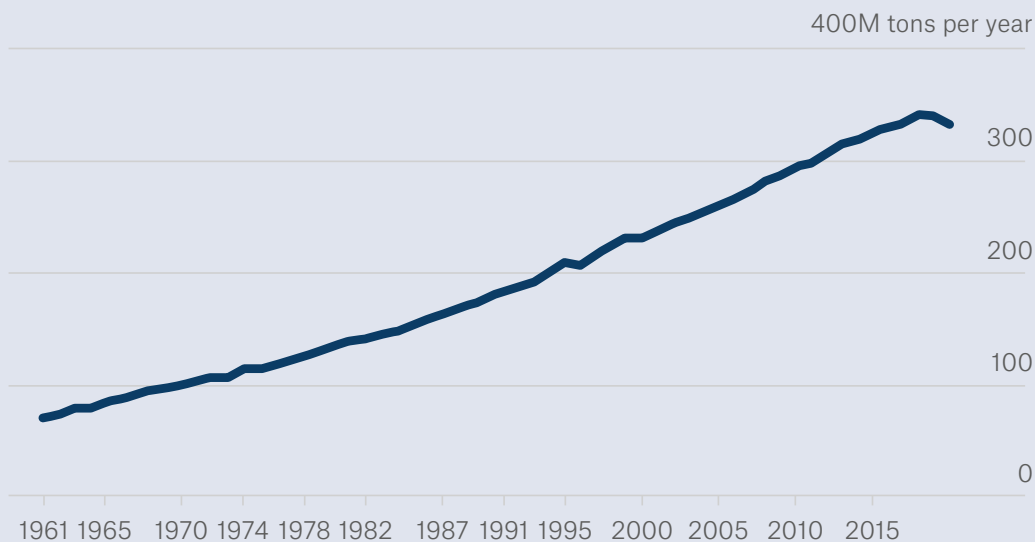
## The global market for meat and alternatives

Veganism and vegetarianism may be gaining popularity in some markets, but global meat consumption generally grows at around 1.4% per year. As developing countries become richer, there's a corresponding increase in meat consumption across their populations. It has been predicted that by 2050, global meat consumption could reach up to 570 million tons per year; double what it was in 2008<sup>4</sup>.

However, some recent reports indicate that there has been an unexpected reversal of the growth trend. The Food and Agriculture Organization says that global meat production decreased in 2019, and again in 2020 due to the COVID-19 pandemic<sup>5</sup>. There was also a 3% drop in per-capita meat consumption in 2020, which is the biggest decline in 20 years.

### Meat, Peaked?

#### Global meat production



Source: Food and Agriculture Organization  
Note: 2019 estimate. 2020 forecast.

Bloomberg Green

Meanwhile, according to Business Communications Company (BCC) Inc. research, the global synthetic (cultured) meat market could reach \$19.8 million by 2027 (up from \$16.3 million in 2022<sup>6</sup>). And according to MarketsandMarkets<sup>7</sup> estimates, the global cultured meat market will be valued at \$214 million in 2025 with a projection of \$593 million by 2032.

Cultured meat is also gaining attention at a political level. For instance, the mid- and long-term aims of the EU Green Deal<sup>8</sup> are to cut greenhouse gas emissions by 40% by 2030<sup>9</sup> and to be 'climate-neutral' by 2050. Amongst the practical measures taken to facilitate this is a consortium project called 'Meat4All'<sup>10</sup> led by the Spanish firm Bio Tech Foods. This project was launched in 2020 with the aim of understanding the market acceptance and safety of meat alternatives, in terms of lab-grown meat and plant-based proteins. What's more, in 2019, former responded to a parliamentary question concerning cultured meat by saying:

*"At the request of the Commission, a 2018 independent expert report identified the development of new meat alternatives as an important pathway to achieving the Commission's Food 2030 Initiative, to deliver a climate-smart and sustainable food system for a healthy Europe."*

### **How is meat grown in a lab?**

Cultured meat is produced using a cellular method\*. Starter cells are isolated from an animal (e.g. cow/chicken/pig) then grown in a culture media. This culture media is currently foetal calf serum, although scientists are looking for more ethical alternatives for commercial applications.

The culture is then replicated in a bioreactor, in a similar manner to yoghurt or beer fermentation. During this stage of the process, stem cells convert into strings of muscles and fully grown muscle strands come together to replicate real meat. Ultimately, this results in the creation of so-called *in vitro*, artificial, synthetic or lab-grown meat.

*\*It's important to note that this process does not include the use of genetic modification.*



## A watershed moment for regulation

From a regulatory perspective, cultured meat is considered a new type of food in most markets. It therefore requires pre-market safety assessment before it can be sold to consumers.

Singapore was the first country to approve the marketing of cultured chicken nuggets (from Eat Just Inc) under its novel food approval system<sup>11</sup> in December 2020. Now the big question is whether this will pave the way for approval of the product in other countries?

In the EU, cultured meat produced via cellular techniques would need to undergo a rigorous pre-market safety assessment. It would fall under the novel food category (vi) 'Food consisting of, isolated from or produced from cell culture or tissue culture derived from animals, plants, micro-organisms, fungi or algae'. To date, there have been no such applications submitted in the EU.

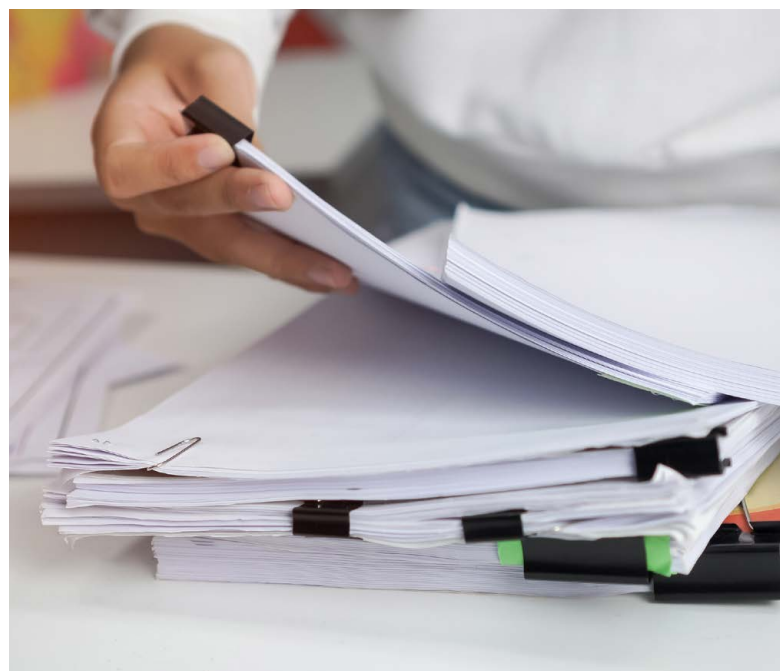
If a product of this nature were approved in the EU, it's likely that its name would have to clearly specify the production process and the true identity of the food as dictated by current food labelling provisions of Regulation (EU) No. 1169/2011. If the product contained or was produced from a genetically modified (GM) source, it would need to be approved under the EU GMO Regulation. EU labelling rules would also apply, so it would have to declare that it contains or consists of GMOs; or that it is produced from or contain ingredients produced from GMOs.

In 2019, the US Department of Agriculture (USDA) and Food and Drug Administration (FDA) agreed to jointly oversee the production of cultured meat intended for human consumption. Such products would need to be notified or self-affirmed under the Generally Recognised as Safe (GRAS) procedure. This means that a company would need to gather data showing the safety of a cultured meat product before it could be marketed in the US.

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## What does this mean for the food industry?

Any products containing or consisting of cultured meat would be subject to a pre-market food safety assessment. Currently, lab-grown meat is not approved for sale anywhere in the world except Singapore. In the EU, several companies are working on accessing the market<sup>12</sup>. However, since it takes a minimum of 1.5 years for a novel food product to be assessed for safety in the EU, we are not expecting to see products or ingredients of this type on our plates before 2023.



## Conclusion

The cultured meat industry is in its infancy and growth will be dependent on investment from large, global players in start-up companies. Its market price is not yet competitive, even when compared to premium meat products.

Recent studies show that people are ready to eat *in vitro* meat and even to pay a premium for it, due to the perceived environmental and animal welfare benefits. However, it's important to note that manufacturing these products at an industrial scale may require high energy inputs, depending on the approach used. More work is needed to determine which production processes are best for lab-grown meat, then to reduce associated greenhouse gas emissions by optimising the technologies and using clean energy.

Another factor impacting consumer acceptance is the sensory qualities and how they compare to real meat. Further research and development is needed to ensure taste and texture match that of real meat, especially for premium products.

Regulatory pre-market approvals represent another hurdle, and these differ between markets. A robust product market strategy would be needed to coordinate launch timescales for cultured meat across different markets.

It's our expectation that poultry will occupy the biggest share of the cultured meat market. For example, chicken nuggets are a popular category in many countries, due to the increasing demand for on-the-go and convenient food.

## How can Leatherhead help?

Leatherhead provides an end-to-end solution to facilitate pre-market approval of new ingredients, technologies and processes in human and pet foods in the UK, EU, US and other markets. This encompasses qualification, preparation, submission and managing queries from the authorities on the dossiers. Our team of experienced technical experts includes ex-regulators. We will work with you to qualify the investment and likelihood of success with clear stage-gates and decision points.

Our relationships with key regulatory bodies mean we can provide insight into the effective management of dossier submission and assist with any queries raised on your submission. We take a partnership approach, blending our experienced, multilingual team of regulatory advisors with your key stakeholders to ensure our recommendations are aligned with your organisational objectives.

## About Leatherhead Food Research

Leatherhead Food Research provides expertise and support to the global food and drink sector with practical solutions that cover all stages of a product's life cycle from consumer insight, ingredient innovation and sensory testing to food safety consultancy and global regulatory advice. Leatherhead operates a membership programme which represents a who's who of the global food and drinks industry. Supporting all members and clients, large or small, Leatherhead provides consultancy and advice, as well as training, market news, published reports and bespoke projects. Alongside the member support and project work, our world-renowned experts deliver cutting-edge research in areas that drive long term commercial benefit for the food and drink industry. Leatherhead Food Research is a trading name of Leatherhead Research Ltd, a Science Group Company.

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