

# Researchers report new approach to cultured meat

March 2 2021

---



Researchers at The University of Tokyo develop a method of culturing meat in the laboratory in the form of millimeter-scale contractile beef muscle that closely simulates steak meat. Credit: Institute of Industrial Science, the University of Tokyo

Humans are largely omnivores, and meat has featured in the diets of

most cultures. However, with the increasing population and pressure on the environment, traditional methods of meeting this fundamental food requirement are likely to fall short. Now, researchers at the University of Tokyo report innovative biofabrication of bovine muscle tissue in the laboratory that may help meet escalating future demands for dietary meat.

With global urbanization, the economics of animal husbandry are becoming unsustainable. From an environmental viewpoint, the land and water costs of modern mega-scale livestock farming are untenable, as are the [greenhouse gas emissions](#) and the overall toll on the planet. Additionally, there are [ethical concerns](#) against human exploitation of lower species for food.

To address future requirements, [tissue engineering](#) of cultured meat is under development at several centers worldwide. However, most biosynthetic meat products are amorphous or granular-like minced meat, lacking the grain and texture of real animal flesh. Mai Furuhashi, lead author, explains their novel process. "Using techniques developed for [regenerative medicine](#), we succeeded in culturing millimeter-sized chunks of meat wherein alignment of the myotubes help mimic the texture and mouthfeel of steak. For this, myoblasts drawn from commercial beef were cultured in hydrogel modules that could be stacked allowing fusion into larger chunks. We determined the optimal scaffolding and [electrical stimulation](#) to promote contractility and anatomical alignment of the muscle tissue to best simulate steak meat."

Lead author Yuya Morimoto describes the synthesized product. "Our morphological, functional and food feature analyses showed that the cultured muscle tissue holds promise as a credible steak substitute. Breaking force measurements showed that toughness approached that of natural beef over time. Significantly, [microbial contamination](#) was undetectable; this has implications for cleanliness, consumer

acceptability and shelf-life."

"Our method paves the way for further development of larger portions of realistic cultured meat that can supplement or replace animal sources," claims Shoji Takeuchi, senior and corresponding author.

"However, there is a long way to go before lab-grown meat is indistinguishable from the real thing, and hurdles concerning consumer acceptance and cultural sensibilities are overcome. Nevertheless, this innovation promises to be a green and ethical alternative to animal slaughter in meeting our need for dietary meat."

The article, "Formation of contractile 3-D bovine muscle tissue for construction of millimeter-thick cultured steak," was published in *Science of Food*.

**More information:** Mai Furuhashi et al. Formation of contractile 3D bovine muscle tissue for construction of millimetre-thick cultured steak, *npj Science of Food* (2021). [DOI: 10.1038/s41538-021-00090-7](https://doi.org/10.1038/s41538-021-00090-7)

Provided by University of Tokyo

Citation: Researchers report new approach to cultured meat (2021, March 2) retrieved 24 April 2024 from <https://phys.org/news/2021-03-approach-cultured-meat.html>

This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.