ESA Investigates Cultured Meat as Novel Space Food
ESA article “Enabling & Support” (June 1, 2021) [1]

ESA was seeking proposals to investigate the application of cellular agriculture as a novel technique to produce food, in particular cultured meat, during future long-term space missions in June 2021.

Humans undertaking long-term missions on board a spacecraft or to a planetary outpost, for example on the Moon or Mars, will need to find ways of producing food in situ. This will limit the amount of long-shelf-life food that needs to be transported, provide an alternative source of nutrition, offer the possibility to produce new food (in case long-shelf-life food is degraded or lost), achieve a higher level of self-sustainability, and simply provide the option of fresh food.

“Breeding large animals in space for food purposes is unthinkable,” says ESA engineer Paolo Corradi, promoter of the initiative. “An alternative method could be to produce food from cell cultures, a process known as ‘cellular agriculture’, which has already been successfully applied on Earth to produce meat.”
Cellular agriculture makes it possible to obtain a very large amount of cultured meat from a limited number of animal muscle cells. For example, from a sample of cow muscle weighing just 0.5 grams, roughly 80 000 burgers can be produced.
“Such a novel food production system for space should be integrated into a closed-loop configuration, so that resources, in particular the culture medium, can be recycled or regenerated, minimising dependence on resupply from Earth,” continues Paolo.

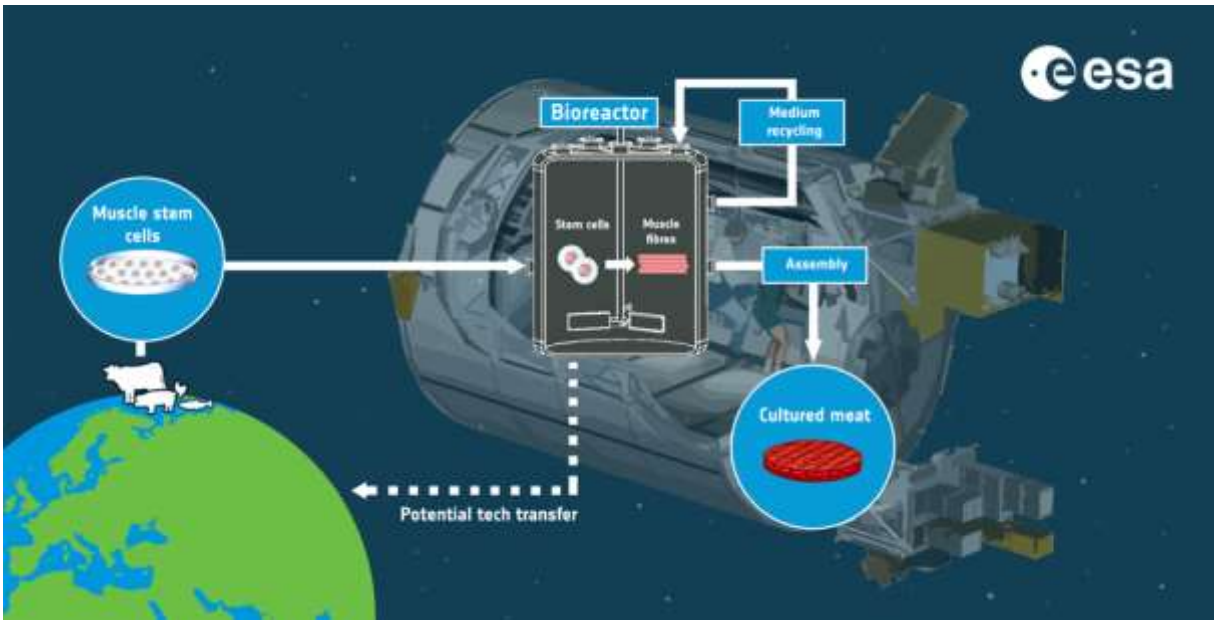
To achieve this ambition, innovative technical developments are required to increase the efficiency of cultured meat production. In the future, these developments could also be applied on Earth, helping to address urgent challenges, from environmental sustainability to food security.

"Science tells us that the current production of meat, and, in general, animal-derived food, is unsustainable," states Paolo. "Not only does it have a dramatic impact on the planet – notably in terms of water and land usage, contribution to greenhouse gas emissions, deforestation, biodiversity loss and pollution – but it also generates conditions for zoonoses to emerge (diseases that jump from animals to humans, with pandemic potential). Finally, there is the suffering and death of billions of animals every year, which is a growing ethical concern."

Major internationally recognized institutions call for a transition to a plant-based diet; research has

shown that it is probably the single most effective step that each of us could take to reduce our impact on the planet. But it seems unlikely that this paradigm shift in diet would be accepted by the entire global population in the near future. In this sense, cultured meat would represent a new opportunity, making the existing unsustainable meat production model obsolete.

Research carried out by ESA on cultured meat could be another example of how space research can contribute to solving issues of paramount importance for the planet and benefit society at large, in line with ESA's commitment to the United Nations' Sustainable Development Goals.



This initiative is supported by the Discovery Element of ESA's Basic Activities, and originated from an internal idea proposed and selected through the Open Space Innovation Platform (OSIP).

Status one Year later on June 4, 2022: Tender action completed, one or more contracts have been signed by both parties, ESA and Prime Contractor. [2]

Reference

[1] ESA Enabling & Support program.
https://www.esa.int/Enabling_Support/Preparing_for_the_Future/Discovery_and_Preparation/ESA_investigates_cultured_meat_as_novel_space_food

[2] https://esastar-publication-ext.sso.esa.int/ESATenderActions/details/13034

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https://opsjournal.org