

The Ethics Of Cultivated Meat: Hypes and Hopes of a New Challenging Technology

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ABSTRACT: The ethics of cultivated meat is an emerging field of applied ethics. As the world's population increases, stakeholders, scholars, and producers have begun to devise new strategies to meet growing food needs and to prevent food production from having a deleterious environmental impact. In this paper, I will focus on the main moral arguments against the production and consumption of cultivated meat. I will then frame some arguments to show that none of the objections to the production and consumption of cultivated meat is convincing. In the concluding remarks, I will suggest that cultivated meat should be considered as one strategy in a wide array of options to embrace a new food model. Deciding not to invest on this technology prevents us from benefiting from a useful means that could improve our living conditions.

KEYWORDS: meat consumption, meat production, cultivated meat, food ethics, environmental ethics

1. INTRODUCTION

In recent decades meat production has tripled and animal protein now accounts for 40%¹ of the protein consumed all over the world.² Conventional meat production entails farming nonhuman animals up to a certain age until they are slaughtered.³ Also, the consumption of animal food represents a risk factor for heart disease, diabetes, obesity, atherosclerosis formations, cancer and much more.⁴

Although the livestock sector is a pillar of the global food system and a contributor to poverty reduction, it is also responsible for the consumption of water, soil and the release of greenhouse gases into the atmosphere⁵. Livestock takes up nearly 80% of global agricultural land and nearly 30% of global land.⁶ Annually, 4,387 km³ of water is required to produce the feed consumed by the global livestock sector and 15% of greenhouse gases emitted by human activities are from livestock farming.⁷

Demographers predict a massive demographic transition. They also predict that the population will continue to rise from its current 7.8 billion and could reach over 10 billion by 2050, so that meat consumption and the demand for animal protein would increase significantly.⁸

Against this background, sustainability and eco-food became focus topics. Novel food is a chapter in this story. The term “novel food” refers to ‘any food and food ingredient not yet used for human consumption to a significant degree within the Community before 15 May 1997’, when European Regulation 258 of 1997 came into force. This Regulation was later replaced by Regulation 2283 of 2015 which came into force in 2018. Here we find, in Article 3, an explicit reference to foods “resulting from new production processes or practices” such as cultivated meat, plant-based meat and meat obtained by fermentation. In this contribution, I will focus on cultivated meat.⁹

In the description provided by Good Food Institute Europe, we read that ‘meat cultivation is like growing plants from cuttings in a greenhouse that provides heat, fertile soil, water and nutrients. This new method of meat production allows the natural process of cell growth, but in a more efficient environment.

Cell agriculture involves taking a small sample of cells from an animal, without suffering, and growing them in a culture medium. The culture medium facilitates the same biological process inside an animal, providing the cells with heat and the basic nutrients they need to turn into meat: water, protein, carbohydrates, fats, vitamins, and minerals. The result is an abundance of cultured meat, identical to conventionally produced meat at the cellular level, but produced in a more sustainable way.¹⁰

2. ADVANTAGES OF CULTIVATED MEAT

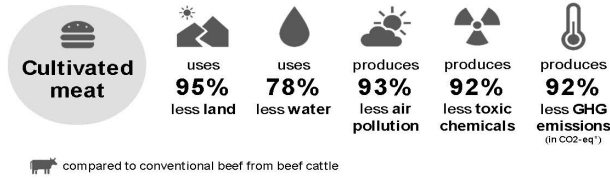
Cultivated meat can provide a major support for mitigating several significant problems (table 3). First and foremost, through biopsy one would be able to get the raw material for meat production. This means relieving the misery for billions of animals.

Then, cultivated meat could be manufactured to be nutritionally more balanced and healthier. Any ingredients are tracked, and production processes monitored. This can provide a greater quality control and hygiene. The resulting product could be infection, parasite, pathogen, and chemical contaminant-free. Vitamins, otherwise absent in meat (e.g., vitamin C), or polyunsaturated acids such as omega-3 could be added.

Virtually any type of meat can be replicated using this technique. Resources such as water and land would be preserved (tables 1, 3). Greenhouse gas emissions into the atmosphere would be reduced (table 2).¹¹ One might even imagine, in the long-term, to use cultivated meat for supporting future space exploration and the settlement on other celestial bodies.¹²

Table 1

Cultivated meat has a lower environmental impact than conventional beef.



For GHG comparison to conventional beef production, cultivated meat's global warming benefits are best viewed as short-term, as beef's impacts are driven primarily by methane. Source: GFI & CE Delft lifecycle assessment 2021



Table 2

Cultivated meat: Feed conversion ratio

Cultivated meat outperforms all conventional meat production in resource utilization, expressed as the feed conversion ratio.

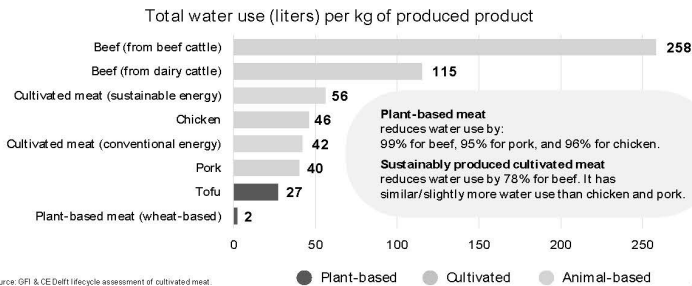
Meat type	Feed conversion ratio (kg in per kg out)	How much more efficient is cultivated meat than conventional meat?
Cultivated meat	0.8*	-
Beef (beef cattle)	5.7**	7x
Beef (dairy cattle)	12.7**	16x
Pork	4.6	6x
Chicken	2.8	3.5x

*The feed conversion ratio is < 1, because of the difference in water content between inputs and output.
 **Does not include human inedible grasses in the calculation.
 Source: GFI & CE Delft Techno-Economic Assessment

gfi.org

Table 3

Water use: lifecycle analysis



Source: GFI & CE Delft lifecycle assessment of cultivated meat. Data is for blue water use. Conventional animal product data is based on an intensive, West-European, circular agriculture with LUC-free soy.



3. ARGUMENTS AGAINST THE PRODUCTION AND/OR USE OF CULTIVATED MEAT

Despite the advantages aforementioned, numerous objections are raised against the production and use of cultivated meat. These arguments can be classified according to the main issue under consideration

3.1 The Feasibility and Technical Arguments

First, there is a set of arguments highlighting existing or even potential technical problems in producing cultivated meat, and possible negative social and economic impact.

For instance, some authors point out that currently available technologies do not allow for the complete elimination of animal suffering. The use of fetal bovine serum as culture medium, for example, requires the slaughter of pregnant cows to draw blood from the fetuses.

Also, the spread of cultivated meat could have a negative impact on developing countries that are currently only able to support the traditional production model. Thousands of jobs may be lost, and eventually, those areas making the production of animal source food a successful brand (in Italy, for example, the Florentine, the Marchigiana or the Chianina are often evoked to indicate a peculiar geo-food reality)¹³ may result impoverished.

Also, investing in cultivated meat can draw attention away from plant-based meat investment or, even better, to the adoption of a vegan dietary style that would be more effective in mitigating environmental and health problems.¹⁴ The acceptance of consumers, who are used to different dietary styles, is also a matter of controversy.¹⁵

3.2 Dignity Argument and Animal Rights Argument

Although producing cultivated meat does not involve the killing of animals, some argue, for animals such a practice would still be harmful, as it would violate their dignity.¹⁶ Cultivated meat would still be a carnist technology as it would not really challenge the idea of animals as a source of food.

“The idea is that by choosing to eat NHA [non-human animals] meat, even if we do so in a way that is consistent with their interests of not suffering and not being killed, we affirm a kind of pathos of distance between ‘us’ and ‘them’; a kind of hierarchical scale with humans above and NHAs below. Donaldson and Kymlicka [. . .] express this concern in terms of dignity, and this too can be linked to the idea of a hierarchical scale:

Those with higher status possess (a certain level of) dignity, while those with lower status do not.¹⁷

In line with the insights of authors such as Tom Regan, the topic of animal dignity could be combined with the animal rights one. Actually, harvesting cells through a biopsy remains a source of problems, despite the fact that no animals are killed, as it would infringe their right to preserve and protect bodily integrity. When this right comes to be recognized (that is, in Regan's terms, that nonhuman animals, at least some of them, are subjects of life) it is no longer permissible to proceed with actions that are, somehow, detrimental to their well-being and thus to their inherent dignity.¹⁸

3.3 The Unnaturalness and Virtue Arguments

The perceived unnaturalness of cultivated meat has been suggested as a possible cause for concern. In line with the view of Roger Scruton,¹⁹ it could be noted that replacing conventional meat with cultivated meat could result in a dangerous erosion of the perceived feeling of interdependence with nature. The feeling of interdependence would be undermined not least by the fact that animals would no longer be treated as living entities but as mere sources of cells at our disposal.

Further arguments, not so far from those just examined, are offered under the heading of virtue ethics reflection. Among the others, Carlo Alvaro argues that the current discussion on virtue ethics is centered on the question of justice.²⁰ However, Alvaro feels there is another important issue to focus on: individual character. Virtue ethics has the advantage of accounting for this issue by shifting the focus of the discussion to the character of the individual. It shows that the best approach in eating is an approach according to virtue. The relevant virtue is temperance, as shown by Aristotle [. . .] A temperate individual eats food that promotes health and eats moderately [. . .] Temperate individuals are not attracted to food just for the smell, taste or pleasure of eating it. Rather, they eat in moderation, not to satisfy pleasure, but to nourish themselves.²¹ Alvaro argues that should cultivated meat become rapidly available, be obtained without mistreating animals, be economically competitive and environmentally safe, and be as tasty as conventional meat (the desirable effect thesis), the moral problem of the motivations behind its production and consumption would remain. Alvaro writes that “(1) it is well known that foods of animal origin cause many health problems. (2) it is a sensible thing to avoid eating, even in moderation, food that is harmful to our health. For example, smoking one packet of cigarettes a month or a year may not be as deadly as, say, smoking two packs a day. But (at least to me) it seems to make sense not to smoke at all to avoid health problems. (3) Fresh fruit and vegetables are never harmful to our health, even if they are consumed in abundance. (4) A diet completely free of foods of animal origin is optimal—and desirable—at any time of life and enables us to avoid the diseases I mentioned above. (5) Foods of animal origin have a deleterious impact on the environment. (Of course, this premise would not apply to in-vitro meat if we assume the desirable effects thesis). (6) Alienation from nature is not functional to human flourishing, and producing cultivated meat alienates us from nature. And (7) Avoiding eating animal foods if we have an abundance of readily available plant foods does not constitute a sacrifice, from a taste and nutritional point of view, since plant foods are tasty, nutritious, and abundant.”²² Thus, based on these 7 arguments, Alvaro concludes that the temperate individual will (or should) renounce foods of animal origin.

3.4 The Future of Farm Animals' Argument

The future of farm animals' argument is based on the idea that eliminating factory farming (an outcome that cannot be ruled out should cultivated meat become not only safe and effective, but also competitive) would result in billions of animals not coming into the world that would have had, all things considered, lives worth

living.²³ This argument seems more plausible if, instead of industrial farms, we consider ethical farms (i.e., small farms where animal welfare is, all things considered, respected, slaughtering aside).

3.5 The Argument of Cannibalism

Some authors note that a plausible trend that would occur if cultivated meat became widespread would consist in the uncontrolled extension of replicable meat types, included human flesh. In the not-too-distant future, this might be regarded as one dietary option amongst many others.

Indeed, one could imagine a scenario in which some individuals would consume this type of meat exactly because it is not derived from a pre-existing living individual, whose body would otherwise be desecrated.²⁴ However, this would represent a kind of violation of a millenary taboo, the infringement of an intuitive social practice that prohibits using the body of a living or deceased human being in an instrumental way. In this sense, the procedure through which such flesh would have been obtained would have no relevance.

4. POSSIBLE COUNTERARGUMENTS

However, the arguments just considered do not offer cogent reasons against the production and use of cultivated meat. Effective counterarguments can, in fact, be identified for each of them.

4.1 The Feasibility and Technical Arguments Debunked

The arguments highlighting the technical problems of cultivated meat production are not objections in principle. For instance, technological advances in this field open the possibility of FSB-free (fetal bovine serum-free) culture medium²⁵ and further investment, even with public support, could help to tackle the various criticalities that the technique currently shows. Nor are objections in principle those remanding to the loss of jobs or the difficulties of an equal distribution of this technology to developing countries, or even those that warn of the possible impoverishment of some areas should a certain type of gastronomic product disappear. In fact, regarding the latter, the actual problem would be the specific type of socio-economic organization developed countries embrace and the peculiar relationship they entertain with developing countries.

Protecting jobs by introducing assistance measures for developing countries, and supporting them to implement the infrastructures needed to make new technology work is one important task to pursue. Furtherly, providing assistance to prevent changes from having a negative impact on a given territory and its workers is another important task.

4.2 The Dignity and Animal Rights' Argument Under Scrutiny

The idea of dignity conveyed by some animal advocates appears 1) untenable for the handling of current environmental issues (pragmatic argument); 2) too nar-

rowly focused on a view which sounds anthropocentric and thereby inappropriate in relation to nonhuman animals (human-based dignity argument).

The very idea that even a biopsy infringes animal rights seems to disregard the fact that 1) the current forms of violation of animal rights (we can indicate them with the acronym SIAR *Strong Infringement of Animal Rights*) are of a far greater magnitude and intensity than those that would occur, for example, by performing a biopsy (we can indicate them with the acronym MIAR *Minor Infringement of Animal Rights*,)²⁶ 2) the use of this technique would make it possible to avoid SIAR; 3) that this technique, being eco-friendly, would have a positive spin-off not only on sapiens but also on nonhuman animals (so pragmatically it would be better to adopt this technique in any case).

In addition to this, dignity shouldn't be viewed as a moral characteristic that commands unconditional protection: this may be effective for sapiens but is inadequate for nonhuman animals. Should things be like that, we would be obliged, whenever possible, to protect nonhuman animals from aggression purported by other animals, which is the norm in the state of nature.

In any case, some non-invasive procedure such as biopsies might be accepted for 'presumed consent.' Let us imagine that a prodigious entity is able to give a cow consciousness, self-awareness, and the ability to speak. Imagine again that such a prodigious animal is asked 'would you like meat to continue to be produced using conventional methods or would you like these methods to be phased out?' The animal would undoubtedly answer 'I would like them to be phased out'. Then the prodigious entity would ask 'would you be willing from time to time, say once a year, to undergo a painless biopsy in which cells are taken? This would avoid your slaughter and the slaughter of any animal.' The prodigious cow would still answer with a firm 'Yes!'²⁷

Also, non-therapeutic experiments are sometimes conducted even on children of our own species, with the express consent of parents or legal proxies and provided that the risks are minimal. Moreover, rejecting a practice because it does not fully meet our concerns can generate counter-intuitive effects. Let us imagine that we are in the years of Nazi Germany, after the outbreak of the Second World War. Many are familiar with the story of Schindler, the German industrialist made famous by Stephen Spielberg's 1993 film, who rescued thousands of Jews from the gas chambers (the exact number is unknown) under the pretext of employing them as personnel needed for the war effort at his tool factory. Let us imagine that Schindler, animated by his intention to save all the Jews from the gas chambers, realizing that he was unable to do so by his expedient, decided not to save even those one thousand or one thousand three hundred that he did in fact save. No one, I believe, would say, 'Well! At the end of the day, he was right not to save any because with his expedient he would only have been able to save a small number of Jews.' Saving only a few Jews is a lesser evil in relation to the possibility of all Jews being killed, yet it is also a good when considered as such, because saving even one life, a fortiori 1000 or 1300, is a good thing. Similarly, obtaining meat through biopsies is a lesser evil than obtaining meat without the need for biopsies. However, since such biopsies are painless and potentially not

repeated over months or years, they are a good thing because they would save the lives of billions of nonhuman animals.

4.3 The Argument of Unnaturalness and the Argument of Virtue under Scrutiny

The argument of unnaturalness and loss of the feeling of interdependence that binds us to nature is unconvincing. In fact, even now the ways in which meat is produced and consumed are conceived of as being indifferent to nature, if not openly opposed to it. The psychological processes of dulling the steps that make it possible to bring the piece of meat (a decontextualized object) to our supermarket shelves already create a distancing of nature and prevent us from paying due attention to what lies behind that decontextualized object, i.e. the suffering of a nonhuman animal and its instrumental use in view of satisfying human food desires.²⁸

In addition to this, cultivated meat would not worsen this situation. On the contrary, should we introduce it by an appropriate information campaign, opportunities could be created to improve our awareness and our ability to relate to nonhuman animals. Making people understand why we have switched from one type of dietary style to another would already generate awareness that could, in the long run, foster attitudes that are more attentive to issues of eco-sustainability and animal welfare

Moving on to Alvaro's arguments, several flaws and criticalities emerge. Indeed (1) cultivated meat could be treated in such a way that it does not have the same average chemical composition as *in vivo* meat. For example, saturated fats such as myristic, palmitic and stearic, which account for up to 48% of the total lipids could be decreased and, on the contrary, polyunsaturated fats such as omega-3, which account for 5% of the total lipids, increased. (2) While it is true that it would be desirable for everyone to stop eating red or processed meat, such an outcome seems utopian. However, conveying the idea that eating food of animal origin is always immoral, as an expression of non-tempered character, discourages investment. Incentivizing cultivated meat production is useful precisely because it is implausible that everyone will stop eating meat. (3) Everything is bad for our health if not consumed properly. To convey the idea that fresh fruit and vegetables are good in themselves is incorrect just as it is incorrect to convey the idea that meat consumption is bad in itself.²⁹ (4) A diet devoid of foods of animal origin may be optimal but this also depends on circumstances. Again, eating meat is not an evil *per se* (5) Cultivated meat is intended to avoid the environmental impact associated with *in vivo* meat production. (6) Even if we were to assume that this argument works, a) *in vivo* meat production also alienates us from nature, b) the beneficial effects that an increase in cultivated meat production would have would balance out the harmful effect of not encouraging a concrete transformation of individual character. In any case, while partly accepting the argument of alienation, this cannot be generalized because, for example, for an educated consumer, eating cultivated meat could be one way to be concerned with nature. (7) This argument could also be correct. However, faced with the plausible scenario that many people would not agree to stop eating meat, it would still be desirable

to have a tool that would enable us to respond effectively to the environmental and human health problems associated with current ways of producing and consuming meat.

4.4 The Argument of Future of Farming Animals: Critical Aspects

The argument that it would be preferable to come into the world although slaughter would be the ultimate end of that existence (minimum welfare conditions guaranteed) rather than not coming into the world rests on a misunderstanding between the concept of 'life worth beginning' and 'life worth continuing.' Once they came into the world, animals have an interest in continuing to exist if minimum conditions of wellbeing are guaranteed. However, non-animals, i.e., animals that could come into the world but have not yet come into the world, have no interest in coming into the world, a fortiori they have no interest in coming into the world in an industrial (but also in an ethical) farm in which they are generated for being slaughtered.³⁰

Also, such an argument would force us to assume the repugnant conclusion, which means that it is preferable to bring more individuals into the world with a minimal welfare status (such that their lives would still be worth living), rather than fewer individuals who on average would experience a higher welfare status.³¹

4.5 The Argument of Cannibalism Reconsidered

Several objections can be opposed to the cannibalism argument. First, cannibalism might even be a better option than eating meat from nonhuman animals.

So, although it may seem counterintuitive, maybe the production of human cultivated meat ought to be encouraged. Only humans, in fact, may give their (informed) consent, and should this food option be more widespread, the need for biopsies from nonhuman animals would also disappear.

4.6 Some Further Considerations

Somebody say that promoting cultivated meat has more negative than positive aspects and prevents us from solving the problems (environmental, health, and so on) we are facing at their root. However this claim: 1) makes inappropriate generalizations; 2) downplays the importance, for sustainability, of accepting the contribution that, pace transforming individual dietary habits, this technology is able to make.

While it is true that some individuals might decide to eat cultivated meat to avoid adopting a genuinely ethical eating style, others might do so for ethically relevant reasons. Moreover, ethical motives may be adopted at a later stage by an individual and the spread of this technology may itself progressively favor its further adoption on ethical grounds.

Secondly, while we don't espouse a techno-fix perspective, whereby via technology it is always possible to overcome the criticalities sapiens finds along its path, yet we do not espouse a perspective of techno-denialism, i.e. the idea that the use of technologies cannot contribute to or foster the resolution of certain criticalities. We adopt techno-realism, that is, a critical-problematic approach

to the use of new technologies that is able to highlight both their extraordinary potential and, if there are any, their criticalities and risks.

5. A MULTI-FIRE STRATEGY

The idea that cultivated meat is the panacea for all evils doesn't stand. This overstatement is inappropriate both in principle and considering current data. In principle, it is inappropriate to assume that a single strategy can solve a complex set of problems. Rather, we should be clear that one strategy may be able to contribute to tackling a problem. Nothing more! But also, nothing less!

Cultivated meat could contribute to the production of healthier food that needs fewer resources and respects animal welfare. However, there remain some critical issues that cannot be overlooked if we do not want to risk finding ourselves with a blunt weapon on our hands. We do not yet have conclusive data on 1) what the real environmental impact of IVM is, as it is not yet distributed in a scalar manner on the market;³² 2) it is foreseeable that the introduction of such a product could generate a backlash, especially in terms of employment. Should consumption of cultivated meat increase, the number of industrial farms would decrease, and this would lead to the loss of thousands of jobs; 3) we cannot know *ex ante* what the actual impact on the market of this product will be. Should there not be enough consumers ready to buy cultivated meat, should we *sic et simpliciter* resign ourselves to maintaining current production and consumption patterns, or should we somehow impose a change in people's diets, thereby encouraging the introduction of healthier habits?

A plausible answer to these questions would be, first, to emphasize that any new technology must be accompanied by strategies characterized by prudence. It cannot be excluded that some criticalities will emerge in the coming years. Therefore, it is advisable to carefully monitor all the steps that will enable the diffusion of this new technology. This prudence cannot, however, be a sufficient reason to hinder the diffusion of a technology that is potentially beneficial to our species and the biosphere.

The repercussions in terms of employment, should they ever exceed a certain critical threshold and not be fully compensated by the creation of new jobs, must be accompanied by measures capable of protecting workers, now no longer employed, during the entire period prior to their re-integration into work.

Finally, another key issue. The predisposition of consumers to accept (and include) new products in their diets. The best strategy to foster this process of consumer's trust would be to plan (public) information campaigns and cultural dissemination paths in schools. However, the urgency of finding solutions to mitigate the environmental impact of some of our activities should also prompt us to consider top-down approaches to accelerate the implementation of certain processes.

One could imagine attractive packaging for new products and/or packaging that discourages the purchase of conventional meat. One could gradually increase the price of traditional meat and, at the same time, lower that of cultivated meat.

One could, in an even more radical scenario, think of distributing electronic cards through which one could track citizens' food habits, to activate benefits in case of virtuous consumption and maluses in case of habits to be discouraged.

Maybe these scenarios seem radical. However, they are able to stimulate an in-depth reflection on crucial issues that cannot be swept under the carpet. Until today, how we feed ourselves has been a question of individual preferences and economic availability. From tomorrow, perhaps, it will become a question of collective choices (of health policy) in a perspective that will perhaps represent an overcoming of certain limits of the liberal model that is built around the promotion of the interests of economic actors and the satisfaction of individual preferences, no matter what of the future of the planet and its capacity for self-regulation

ENDNOTES

1. Stoll-Kleemann, O'Riordan, 2015.
2. Lynch, Mullen, O'Neill, Drummond and Alvarez, 2015.
3. Schaefer, Savulescu 2014.
4. Bouvard et al., 2015.
5. Some authors would emphasize that this is biased, because animal droppings play an important role in fertilizing the soil (the problem with large meat factories is that they do not treat the waste in order to reintroduce it into the cycle), but both organic farming and the new 'carbon sequestration' farming methods underline the importance of the 'animal compartment' (I thank for this suggestion Dr. Matteo Cresti, who is an expert in Agricultural Ethics).
6. Zuhaib et al., 2019.
7. Heinke et al., 2020; Zuhaib et al., 2019.
8. See <https://www.weforum.org/reports/innovation-with-a-purpose-the-role-of-technology-innovation-in-accelerating-food-systems-transformation>.
9. I will use both the terms 'in vitro meat' and 'cultivated meat' interchangeably. There is some debate about the term we should use to convey the idea that cultivated meat is as good as conventional meat. Some authors use "lab-grown meat," whilst others cultured meat. There is no agreement on what term should be used to encounter consumers' trust. Moreover, the term we choose also reflects our view about ontological aspects of this new object.
10. See <https://gfi.org/>.
11. Lo Sapio, 2019.
12. <https://cedelft.eu/publications/rapport-lca-of-cultivated-meat-future-projections-for-different-scenarios/>.
13. In Italy, for example, we have at least six major 'families' of animals that are destined for slaughter, namely Chianina, Marchigiana, Piemontese (which includes Fassona or Fassone), Romagnola, Maremmana, etc. As can be seen, these names refer to specific geographical areas. The Chianina owes its name to the Val di Chiana, the Piemontese to its region of origin, i.e., Piedmont, etc.

14. It should be noted that a vegan diet does not always equate to an environmentally sustainable eating style (see <https://www.bbc.com/future/article/20200211-why-the-vegan-diet-is-not-always-green>).

15. Van Loo et al., 2020.

16. Chauvet, 2018.

17. J. Milburn, 2016.

18. Donaldson, Kymlicka, 2011.

19. See Scruton, 1985.

20. Alvaro, 2019.

21. Ibid.

22. Ibid.

23. Norwood, Lusk, 2011.

24. If this topic may seem somewhat bizarre, we also suggest looking into it by viewing the website of 'EatSwede', a Swedish organisation which states that to mitigate the environmental impact of food one solution could be to eat (deceased) human beings (see <https://eataswede.com>).

25. In 2019, the company Mosa Meat announced that it had developed a new technique that avoids the use of fetal bovine serum as a culture medium. Cfr. <https://www.nature.com/articles/s43016-021-00419-1>.

26. Some uses of nonhuman animals fall into this type of violation, for example their use in cooperative activities such as assisting the blind (see Zuolo, 2018.)

27. I am not so convinced by this argument, especially the final 'yes'. Why should he consent to us taking some cells from his body? This argument is anthropocentric because it assumes that nonhuman animal thinks like us. Let us assume that he thinks like us. If the 'man in the street' were asked: 'do you want to give us some of your cells so that we can make McDonald's hamburgers out of them?' he would probably reply: 'absolutely not! you don't eat pieces of me!' Somehow those cells continue to 'belong' to the animal . . . If for him the alternative was either I die or I give the cells, then for him it would be rational to give the cells, but if the alternative was: either I die, or I give the cells, or nothing is done with my body, perhaps the rational choice for him would be the third. The animal's altruism is assumed. And somehow this argument remains within the logic of animal "exploitation" (M. Cresti, private communication). However, I believe that as we affirm that nonhuman animals, at least some of them, are worthy of moral consideration because they are capable of experiencing pleasure and pain, we would be entitled to think that should they acquire some form of self-consciousness and the ability to express their thoughts verbally, they would manifest a form of rationality quite similar to that of humans. This means adopting a certain model that we might call the 'standard of reason'. I do not believe that to do so is to bend the possible needs of the nonhuman animal to an anthropocentric and exploitative logic.

28. In this regard, it could be argued that not only cultivated meat, but also conventional meat is wrong and that we should return to hunting and rebuild a relationship with nature (this is also, at least in part, Scruton's view). However, I do not agree that this kind of reply would hit the mark or provide any practical solution to the problems we are discussing.

29. T. Brooks, 2017. Here Brooks emphasizes that it is not 'eating meat' that is unethical, but how we obtain the meat we eat. If, for example, we only ate the meat of animals that had died of natural causes or the meat of animals that would have died shortly after slaughter anyway, this would allow us to avoid numerous moral objections.

30. For the distinction between ‘lives worth beginning’ and ‘lives worth continuing’ see D. Benatar, 2017.
31. Parfit, 1984.
32. Some authors argue that the highly energy-intensive bioreactors required to produce IVM would, once a scaled-up level of production is reached, make it less sustainable than we might imagine.

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