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An Ethical Argument for In Vitro Meat

by

Christian Vido

A Thesis  
Submitted to the Faculty of Graduate Studies  
through the Department of Philosophy  
in Partial Fulfillment of the Requirements for  
the Degree of Master of Arts at the  
University of Windsor

Windsor, Ontario, Canada

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An Ethical Argument for In Vitro Meat

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## ABSTRACT

This paper makes a moral argument for why in vitro meat should be adopted in favour of traditional forms of meat on the basis that doing so would reduce animal suffering. It argues that we ought to act compassionately towards animals who have the capacity to experience suffering (primarily in the form of physical pain) in a similar way to our own capacity to experience suffering. Given that the animals which are traditionally raised and slaughtered for meat (i.e. cows, pigs, and perhaps to a slightly lesser extent, chickens) have the capacity to experience pain in a significantly similar way to our capacity to experience pain, and the methods of factory farming which are implemented in the West to satisfy the human demand for consumable meat, this paper argues that, since the production of in vitro meat would produce little or no animal suffering, it would be ethical to choose to consume in vitro meat in favour of those traditional forms of meat. Further, it explores several objections to the adoption of in vitro meat from aesthetic, cultural, and religious grounds.

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## Introduction

With the aid of modern science and technology, in vitro meat – that is, consumable meat grown in cell cultures – has become a reality. In 2013, a hamburger, the patty of which consisted entirely of meat cells grown in a laboratory, was cooked and eaten at a news conference in London.<sup>1</sup> Such a scientific feat took 2 years to accomplish and cost \$325,000. In a 2015 interview, Mark Post - the pharmacologist who created the hamburger - estimated that the cost of producing lab grown beef had fallen to about \$80 per kilogram,<sup>2</sup> or approximately \$11 per burger.<sup>3</sup> Although, as of writing this paper, in vitro meat is not a viable alternative to meat acquired through traditional means (i.e. by means of slaughtering a sentient, non-human animal), it seems as though it may be in the near future. As such, this paper will be geared towards that future possibility, and will assume for the sake of argument that in vitro meat will one day be as available to consumers as meat acquired via traditional means. Once it is established that in vitro meat *can* be an alternative to traditional meat, a new (and in my view, more interesting) question thus emerges: *should* it be?

I believe this question to be an important one. If we are one day able to end our practice of farming and slaughtering animals for the purposes of food, I believe that we should. It seems to me that such a conclusion should be uncontroversial: if we are in a position to cease inflicting unnecessary suffering (i.e. unwanted pain and, to some extent, psychological suffering), we ought to do so. However, opinion polls show that there exist many people who are reluctant to accept in vitro meat, and many who outright oppose it. This opposition may present a very real

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<sup>1</sup> Fountain, 2013.

<sup>2</sup> Schwartz, 2015.

<sup>3</sup> Stone, 2016.

barrier to the future wide-spread acceptance of in vitro meat. My aim here is to put forth a moral argument that in vitro meat should be accepted based on the reduced animal suffering that would result from replacing our current methods of attaining meat with in vitro ones. Further, I will aim to address possible objections against in vitro meat on aesthetic, cultural, and religious grounds.

It may be the case that one day our descendents will look back to our actions and our mindset with perplexity; wondering how we would even have to have such a discussion regarding the suffering of non-human animals, just as we may look back on some of the actions and mindsets of our ancestors. It is my hope that the day will come where we can stop inflicting suffering on other creatures for the sake of consuming their corpses, but until such a day arrives, I must satisfy myself with arguing my case.



## Chapter 1: In Vitro Meat as an Ethical Alternative

The question is not, Can they *reason?* or, Can they *talk?* but, Can they *suffer?*

- Jeremy Bentham

It may be asked why one should care about the prospect of in vitro meat. I can say that I have had this asked to me while discussing the topic of this paper with family and peers. As I spoke with them, I had a feeling of excitement towards a future where animals need not be kept in inhumane conditions to eventually be slaughtered for food; however, this excitement was certainly not always shared by my conversational partner. “Why should we care about this new form of meat?” and “we have perfectly good meat already,” are some of the responses I have had. I believe dealing with these responses to be an appropriate starting point for my endeavour.

In this chapter, I will detail the reasons for which I believe that one ought to accept in vitro meat as an alternative to meat produced from the raising and eventual slaughter of animals, primarily in factory farms. I hope that readers of this work will find my arguments convincing.

### ***1.1. Empathy and Compassion***

The primary ethical motivations relevant to my argument are empathy and compassion. Each of these terms refers to a phenomenon which is incredibly complex. Consequently, to properly explain my point in detail, I shall begin by giving an appropriate framework for how the term ‘compassion’ will be used in this context. Schopenhauer, in *The Basis of Morality*, defines compassion as “the direct participation, independent of all ulterior considerations, in the

sufferings of another, leading to sympathetic assistance in the effort to prevent or remove them.”<sup>4</sup>

He goes on to write that:

It is... compassion alone which is the real basis of all voluntary justice and all genuine loving-kindness. Only so far as an action springs therefrom, has it moral value; and all conduct that proceeds from any other motive whatever has none.<sup>5</sup>

Whether or not one agrees with Schopenhauer that compassion is the *only* basis of acting morally, this much can be said: compassion as a basis for moral action is not a new concept, and empathy for others and the desire to eliminate the suffering that others experience is a legitimate motivation for moral action.<sup>6</sup> It can be found, for example, in the writings of Aristotle. In her book, *Upheavals of Thought*, Martha Nussbaum describes the three cognitive requirements of compassion laid out by Aristotle:

The first... is a belief or appraisal that the suffering is serious rather than trivial. The second is the belief that the person does not deserve the suffering. The third is the belief that the possibilities of the person who experiences the emotion are similar to those of the sufferer.<sup>7</sup>

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<sup>4</sup> Schopenhauer, 1903. Chapter V.

<sup>5</sup> Schopenhauer, 1903. Chapter V.

<sup>6</sup> I do not want to eliminate the possibility of moral action on other grounds by taking the stance that Schopenhauer did that *only* actions done on the grounds of compassion can be moral.

<sup>7</sup> Nussbaum, 2001. p. 306.

I would argue that the suffering experienced by animals due to our meat production is serious, undeserved, and significantly similar to our own experience of suffering, at least, when it comes to the sensation of pain. If this is the case, and if we are to be compassionate to them - that is to say, if we are to recognize that they endure serious, undeserved, suffering in a similar way that we are capable of experiencing suffering, and if we are to act in a way which prevents or removes the suffering that others experience - then, we ought to take action to prevent, remove, or at the very least reduce the suffering that animals experience. If this suffering were somehow necessary, or if the object of our empathy was incapable of experiencing suffering (e.g. a fictional character) then perhaps it could be argued that empathy towards it would be a misplaced emotion. However, I believe it can be reasonably demonstrated that certain animals do suffer, and if in vitro meat were to be as readily available as meat attained via traditional methods, then I would argue that the infliction of such suffering would become unnecessary for our meat production. Further, I would note that the reasons we inflict the animal suffering in question are largely due to selfish in nature. One of the primary reasons we inflict suffering upon non-human animals is so that we, ultimately, can consume them. I accept that eliminating all animal suffering may be considered a rather unrealistic goal.<sup>8</sup> However, although it may take some time before in vitro meat is a feasible alternative for the entirety of the world's population, eliminating the suffering that we cause animals in order to provide ourselves with meat seems, to me, within

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<sup>8</sup> One might also speculate that, in acting on our compassion to rescue farm animals from unnecessary suffering and early death, we could inadvertently cause their demise. Since farm animals have lost their adaptive instincts for life in the wild, those animals that have been domesticated as livestock for thousands of years might die out if farming them ended. I admit that this possibility cannot be ruled out, but it is speculative, unlike the suffering of present day farm animals. Moreover, if we are aware of the problem, we could take measures to obviate the extinction of farm animals. They could be kept in something like game preserves, or gradually reintroduced into the wild. Although it is possible that we may cause the extinction of farm animals, if we are conscious of this possibility, then we can take steps to avoid it as in vitro meat is phased in.

the realm of possibility. I believe that it is unquestionable that the systems which have been created in the Western world to supply its human population with meat cause animal suffering. If the primary motivation for implementing such systems in the first place (i.e. to supply us with meat) is made redundant by the ability to culture in vitro meat, then I believe the possibility of dismantling such systems and ending the animal suffering caused by them seems much more attainable. Acting compassionately, therefore, with regard to the animal suffering which exists due to our demand for meat, means acting to eliminate it. However, a fundamental question remains yet unanswered: why act compassionately?

In order to answer this question, I believe that we must understand what it is that motivates us to act compassionately. Schopenhauer holds that it is our ability to empathize: to identify oneself with another and feel the emotions they do. It is important here to distinguish empathy from compassion. Empathy, as Nussbaum writes, is “an imaginative reconstruction of another person’s experience, whether that experience is happy or sad, pleasant or painful or neutral, and whether the imaginer thinks the other person’s situation good, bad, or indifferent.”<sup>9</sup> Empirical research seems to corroborate this. A study by researcher Mark Davis found that “greater perspective-taking ability is associated with greater feelings of empathic concern for others.”<sup>10</sup> As such, the ability to understand the perspective of another seems essential to the conception of empathy, which, in Schopenhauer’s view, allows us to feel the suffering of others in the same way as we would feel our own suffering. However, although empathy involves, in Nussbaum’s words, “a participatory enactment of the situation of the sufferer... it is always

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<sup>9</sup> Nussbaum, 2001. p. 302.

<sup>10</sup> Davis, 1980. p. 17.

combined with the awareness that one is not oneself the sufferer.”<sup>11</sup> She goes on to describe the incredible importance of this aspect of empathy as it relates to compassion:

for if [the feeling of empathy] is to be for *another*, and not for oneself, that one feels compassion, one must be aware both of the bad lot of the sufferer and of the fact that it is, right now, not one’s own. If one really had the experience of feeling the pain in one’s own body, then one would precisely have failed to comprehend the pain of another *as other*.<sup>12</sup>

To this I would add that if one did in fact experience the suffering of another as one’s own, then I do not see how acting to remove such suffering would be considered compassionate. Rather, such action would seem to be based on self-interest. I believe the notion of relieving the pain of another to be an important part of compassion, and although through empathy we are able to identify with, imagine, and perhaps to some extent, feel the pain of another, the idea that the suffering of another is a phenomenon distinct and separate than the suffering of oneself is what elevates acting compassionately towards others above merely acting out of one’s own self interest. It is important to note here that Schopenhauer seems to take the view that compassion requires that one does indeed feel the pain of another, and that one should identify oneself with another so much so that the distinction between oneself and another should be, to some extent, removed. Nussbaum notes this<sup>13</sup> as being distinct from her understanding of empathy, wherein she emphasizes the importance of the separation between one’s own experience and the experience of others. I believe that these two notions could be taken together in an understanding that although in order to be empathetic, one must, to some extent, be able to identify with others

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<sup>11</sup> Nussbaum, 2001. p. 327.

<sup>12</sup> Nussbaum, 2001. p. 327.

<sup>13</sup> Nussbaum, 2001. p. 327, footnote 46.

and recognize that the suffering they experience is just as real to them as the suffering one experiences is real to oneself. Although the realization that others are suffering may cause one anguish, one must also recognize that one is able to alleviate one's anguish in this respect by ceasing to be aware of the suffering of others, or by some means ceasing to be empathetic, and that the suffering one imagines is not, in fact, being inflicted upon oneself. However, those with whom one is empathizing are offered no such recourse - they cannot become aware that the suffering they are experiencing is being inflicted upon someone else, and that the suffering is not their own, since that is simply not the case. As such, although in order to be empathetic, it is important to identify the suffering that others experience as real, and to some extent identify that one has the capacity to experience similar, if not the same, suffering, it is also important to realize that it is not oneself upon whom the suffering is being inflicted, and that in order to act compassionately, one must act out of a desire to bring about good for another - not merely out of a desire to bring about good for oneself. Although that with which we empathize may differ across time, culture, and even between individuals, empathy can serve as a guide to action, one which has the advantage of not relying on questionable philosophical premises, but rather, which is affirmed by experience - namely, our aversion to suffering. It is the recognition, via empathy, that others feel suffering much like oneself, coupled with one's aversion to suffering (and by extension, the inference that others are averse to suffering as well) which can motivate one to act compassionately. I would argue that in this way, the suffering of others can be a cause for our action in just as legitimate a way as our own suffering can be a cause for our action.

Before proceeding, I would like to acknowledge that it could be argued that certain forms of suffering are beneficial (or at the very least, do not constitute grounds for the ceasing of an action), in so far as they exist for some greater good. To this I would respond that given the

choice between two scenarios, one in which I must experience suffering to attain a greater good and one in which I can attain that same greater good without undergoing suffering, I cannot conceive of a reason as to why I would not choose the latter. It is not the suffering itself which is beneficial, it is the good that is attained because of it. As such, it doesn't seem as though this can be an argument against using our aversion to suffering as a general guide for behaving beneficially. Further, although a case can certainly be made that some people find some forms of pain pleasurable, I would note that such receptions to suffering are in the minority. That is to say, that if a large amount of individuals were administered a specific type of pain against their will, only a select few would enjoy the experience.

In any case, there seems to be a significant difference between the suffering inflicted upon willing, well-informed, consenting human beings and the suffering which is inflicted upon creatures who do not consent. In most cases where one derives pleasure from experiencing pain, one consents to the pain to which one is subjugated, and if the experience ceases to be pleasurable and begins to cause anguish, one is usually able to stop oneself (by some means or another) from being subjugated to it. This is very different than the non-consensual, anguish inducing pain to which I refer as being an object of our aversion. The recognition that suffering is undesirable is enough to motivate us to eliminate or reduce it when it affects us, and the acknowledgement that others experience unwanted suffering in much the same way that we do should be enough to serve as a motivation for us to act to eliminate, or at least reduce, the suffering of others. If we are to coexist with others, then it would seem beneficial to all if each individual acted so as to reduce the suffering that others experience. Further, I would note that we, as a society, generally view a lack of empathy as, at best, a deficiency and at worst a failing

in the socialization of the person who lacks it.<sup>14</sup> Thus, if we are to coexist with others and live harmoniously, then people ought to recognize this near universal aversion to suffering and take it into account when deliberating how to act towards others. Being empathetic in this way does not only allow one to curtail one's own actions such that they do not cause suffering to others, but also to act in such a way so as to prevent or remove the suffering of others. In other words, and to answer the aforementioned questions, one ought to be empathetic because it is empathy which enables us to identify the experiences of others as being as real to them as our own experiences are to ourselves, and it is this understanding which, in part, allows us to harmoniously coexist with others. Further, one ought to act compassionately because doing so serves to reduce or eliminate suffering, and given that aversion to suffering seems so universal, the elimination or reduction of suffering certainly seems a worthy justification for action in and of itself.

I admit that such a motivation may be based on emotion; however, emotion seems to be an inescapable part of the human condition, and such a core part of humanity shouldn't be dismissed. I further recognize that the idea of empathy as a suitable cause for taking action may not be convincing to those who are unable to be empathetic others. In response to this, I turn to Peter Singer's *Practical Ethics* where he writes:

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<sup>14</sup> Lack of empathy is associated with various personality disorders and psychological conditions, such as narcissism and psychopathy. Although I have several reservations about using our definitions of 'normal' and 'abnormal' to categorize people in order to justify treating certain individuals by standards different to those by which we treat others, I think it is important to note that we have arrived at somewhat of a consensus that empathy is a characteristic which a properly socialized person should have in order to live harmoniously with others. For more info, see American Psychiatric Association, DSM-5.



The notion of living according to ethical standards is tied up with the notion of defending the way one is living, of giving a reason for it, of justifying it... If we are to accept that a person is living according to ethical standards, the justification must be of a certain kind. For instance, a justification in terms of self-interest alone will not do... for the notion of ethics carries with it the idea of something bigger than the individual.<sup>15</sup>

If ethics deals with trying to persuade others to adopt one's attitudes by justifying them, and if this justification cannot merely rest on self-interest, but rather, must extend beyond the individual, then simply not caring about the suffering of animals is no objection to the acceptance of in vitro meat. If one simply isn't interested in defending or justifying one's beliefs, or if one justifies one's way of living only with reference to one's own self interest, then according to my understanding of Singer, one isn't in the business of living ethically. If one simply does not care at all about the suffering of animals, then I am afraid that the motivation of acting compassionately will do little to persuade one of my position. I would refer such a person to the previous paragraphs wherein I provide the justification for why one ought to be empathetic and act compassionately, and to the upcoming paragraphs wherein I explain why animals are worthy subjects of our empathy and compassion. If, however, one remains apathetic to the suffering of animals, then there is not much more I believe I can do by means of deliberation. However, I do not believe that the fact that some may be apathetic is, in itself, enough to show that my position should not be adopted by those who are not.

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<sup>15</sup> Singer, 1993. p. 10.

## 1.2. *Animals as Morally Significant Beings*

Once one accepts that compassion for others is a legitimate basis for acting morally, it may still remain to be established that this compassion should be extended to other non-human animals. It can be said that one has a *sphere of compassion* – a group consisting of members towards whom empathy and compassion is felt. This sphere may normally contain family members, friends, and even other people with whom one does not share any direct relation. A core element of my argument is that it is reasonable to extend such a sphere of compassion so as to include certain animals. This isn't a novel contention, by any means, as evidenced by the many people who already feel empathy for animals who suffer and who try to act compassionately towards animals. Schopenhauer writes that "compassion for animals is intimately connected with goodness of character, and it may be confidently asserted that he, who is cruel to living creatures, cannot be a good man."<sup>16</sup> This is a sentiment which, in my view, may still be felt by many today. Speaking only for myself, I certainly could not assign the labels 'good' or 'compassionate' to a man who, for example, on his spare time, takes delight in the methodological torture of puppies. Regardless of how much he may give to charity, or how many compliments he may speak of others, if there is no part of him which feels even remotely concerned with the pain he is causing other living beings to endure, purely for his own satisfaction; if there is no consideration on his part of the experiences of other beings when deliberating his actions, or if he views the pain and suffering of others as secondary or less

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<sup>16</sup> Schopenhauer, 1903. Chapter VIII. He also notes that countries in the West (specifically, England and America) have societies and groups which advocate for the rights of animals - a phenomenon that is still seen today.

important overall than the joy that inflicting such suffering would bring to him, then I would find myself incapable of calling him ‘good’.

This is in line with the epigraph with which this chapter was introduced, and such sentiment is echoed in the work of Singer, where he writes that since “many non-human animals can experience pain and pleasure... they are morally significant entities. They have a moral standing. In this respect they are like humans and unlike rocks.”<sup>17</sup> In other words, the fact that these non-human animals can experience pain and pleasure is sufficient to include them and their experience when deliberating our actions if we are to act morally. He goes on to write that “If a being suffers, there can be no moral justification for refusing to take that suffering into consideration.”<sup>18</sup> I take it to be rather uncontroversial to assert that certain animals can feel pain, but in order to put to the question to rest, I will reference Richard Serjeant who, in his book *The Spectrum of Pain*, writes:

Every particle of factual evidence supports the contention that the higher mammalian vertebrates experience pain sensations at least as acute as our own. To say that they feel less because they are lower animals is an absurdity; it can easily be shown that many of their senses are far more acute than ours--visual acuity in certain birds, hearing in most wild animals, and touch in others; these animals depend more than we do today on the sharpest possible awareness of a hostile environment. Apart from the complexity of the cerebral cortex (which does not directly perceive pain) their nervous systems are almost identical to ours and their reactions to pain remarkably similar, though lacking (so far as we know) the philosophical and moral overtones.<sup>19</sup>

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<sup>17</sup> Singer, 1980. p 328.

<sup>18</sup> Singer, 1999. p. 57.

<sup>19</sup> Serjeant, 1969. p 72.

Although research suggests that we are more easily able to empathize with people who we perceive to be similar to ourselves,<sup>20</sup> the capacity of certain animals to experience pain and to suffer constitutes, in my view, sufficient grounds for us to reasonably expand our sphere of compassion to include such animals regardless of how naturally such feelings of compassion may come. As such, if we are to act ethically, then we should take into consideration the effects our actions have on such animals. I will note here that, from my experience, most people seem to have an aversion to taking pleasure in the suffering of animals, and would have a hard time remaining indifferent towards animal suffering if they opened themselves up to the expressions of suffering that animals clearly produce. I would certainly say that many people do have an inclination to be compassionate towards animals, but it may be difficult to persuade even them that they should have as much compassion for an animal as they do their own child, since having compassion for the latter would seem to come much more naturally. It does not seem as though we must have an *equal* amount of compassion for non-human animals as we do for humans in order to have a morally sufficient amount needed to change our beliefs and behaviours. However, perhaps we should give their interests equal consideration.

Singer coined the principle of *equal consideration of interests*. He writes:

The essence of the principle of equal consideration of interests is that we give equal weight in our moral deliberations to the like interests of all those affected by our actions. This means that if only X and Y would be affected by a possible act, and if X stands to lose more than Y stands to gain, it is better not to do the act. We cannot, if we accept the principle of equal consideration of interests, say that doing the act is better, despite the facts described, because we are more concerned about Y than we are about X. What the principle really amounts to is this: an interest is an interest, whoever's interest it may be.<sup>21</sup>

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<sup>20</sup> Jenkins, Macrae, & Mitchell, 2008.

<sup>21</sup> Singer, 1993. p 21.

This principle demands that we give equal consideration to similar interests of those affected by our actions, regardless of to whom those interests belong. Thus, it may be the case that if one were in a situation wherein one must act in order to save either the life of one's child or the life of one's dog, one would choose the child, since it has more to lose than the dog has to gain, for example, with respect to the richness of future possibilities. However, if one were in a situation to choose to eat a steak, then one must consider one's own interests (e.g. to eat something one finds delicious) and the interests of the cow from whom one's steak was derived (e.g. the interest not to suffer). It would seem as though the cow in that scenario stands to lose much more than one would gain, and, according to the principle of equal consideration of interests, one should choose not to inflict suffering upon the cow in order to eat its flesh, despite the fact that one may be more concerned about how appetizing such a prospect may be than the suffering that the cow must endure.

When dealing with instances of animal suffering, if the capacity of certain animals to suffer is roughly similar to the capacity that humans possess, then the compassionate thing to do would be to give the interests of those animals not to suffer an similarly equal amount of consideration as would be given to the interests of other humans not to suffer. Further, the gains (e.g. pleasure, nutritional value, the ability to make money by raising and slaughtering animals, etc.) that humans may attain by eating animals should be weighed against the losses that animals must incur for that to happen (i.e. the suffering they must endure and their death). If in vitro meat is as accessible as meat attained via our current methods, rendering our current meat production methods redundant, then I can see no way in which the human gain could outweigh the animal loss. I can further see no ethical reason why one should limit one's sphere of compassion to exclude the suffering of such animals. Indeed, as Bentham noted, and as Singer explains, to take

into account the suffering of other humans and to disregard the similar suffering of animals makes the arbitrary criterion of species the deciding factor when considering whose suffering should matter. Such a distinction, made on such a purely arbitrary basis, results in nothing more than what Singer calls *speciesism* - that is, “a prejudice of attitude of bias toward the interests of members of one’s own species and against those of members of other species.”<sup>22</sup> He likens this form of prejudice to racism and notes that if one is to reject the notion of racism on the basis that race is not a sufficient criterion to exclude a being’s interests when considering the effects one’s actions may have on such a being, due to the fact that such a distinction is arbitrary, then one must also reject the notion that species is a sufficient criterion for the same reason.

Thus far, this paper has argued that if animals have the capacity to suffer, we ought to take their interest not to suffer into consideration when deliberating our actions, insofar as our actions will affect those animals. If this is accepted, then it seems as though a new question needs to be answered: do our current methods of acquiring meat cause suffering?

### ***1.3. The Suffering Caused by Current Methods of Farming***

I believe the answer to the preceding question to be, undoubtedly, yes. With the increase in the global population and the increasing development of developing countries, comes an increased demand for meat.<sup>23</sup> In order to meet these demands, methods of industrial farming

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<sup>22</sup> Singer, 1975. p 7.

<sup>23</sup> See Nierenberg, 2005.

(also known as factory farms, confined animal feeding operations [CAFOs], or intensive livestock operations [ILOs]) are becoming more prevalent as sources of meat production. “Industrial systems today generate 74 percent of the world’s poultry products, 50 percent of all pork, 43 percent of beef, and 68 percent of eggs.”<sup>24</sup> As Nancy Williams notes, “factory farming practices result in some of the lowest prices in the world for meat, eggs, and dairy products, but at a huge cost to the animals (as well as to the environment and human health).”<sup>25</sup> Such costs to the animals, as she explains, includes the suffering of broiler chickens by means of “dehydration, respiratory diseases, bacterial infections, heart attacks, crippled legs, and other serious injuries.”<sup>26</sup> Further, the chickens are bred specifically to yield more meat per bird. Although this leads to the intended effect of producing more meat at a lower cost, it also leads to many of them growing so big, so quickly, that their legs aren’t structurally strong enough to support them. One study, conducted by Knowles et al., assessed the walking ability of 51,000 broiler chickens and found that “at a mean age of 40 days, over 27.6% of birds in [the] study showed poor locomotion and 3.3% were almost unable to walk”<sup>27</sup> and that “the high prevalence of poor locomotion occurred despite culling policies designed to remove severely lame birds from flocks.”<sup>28</sup> With regards to this, Singer notes that “sometimes [the chickens’] legs collapse under them, causing them to starve to death because they cannot reach their food.”<sup>29</sup>

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<sup>24</sup> Nierenberg, 2005. pp. 11 - 12.

<sup>25</sup> Williams, 2008. p 375.

<sup>26</sup> Williams, 2008. p 375.

<sup>27</sup> Knowles et al., 2008. p 1.

<sup>28</sup> Knowles et al., 2008. p 1.

<sup>29</sup> Singer, 2006.

Suffering experienced by pigs raised for pork includes confinement in sow stalls, which “are an intensive housing system used in the pork industry for the confinement of breeding sows during pregnancy. They consist of narrow cages commonly 0.6-0.7 m wide and 2.0-2.1 m long allowing a space of 1.2 to 1.5 square meters per sow. They normally have no bedding or rooting material and confine the sow to the degree that she cannot turn round.”<sup>30</sup>

The animal suffering caused by factory farming does not seem to be limited to physical suffering, however. Researchers Weaver and Morris note that although it is generally accepted that animals such as pigs can feel sensations such as pleasure and pain,

The presence of higher psychological states in animals is more controversial than the presence of physical pain. However, as our awareness of animal behaviour increases it has become apparent that mammals and birds, and possibly other animals are capable of advanced thought process. If this is the case, then it is reasonable to assume that these animals can suffer from emotional disorders such as boredom, stress, and frustration if they cannot meet their behavioural needs, and that this suffering is detrimental to their welfare.<sup>31</sup>

To know the mind of another no doubt poses an incredible barrier; one which may very well be unsurpassable. Consequently, determining whether or not animals such as pigs experience psychological suffering seems to be no easy task. However, I (along with Weaver and Morris) believe that reasonable inferences can be made as to the psychological state of such animals based on their behaviours. Weaver and Morris note that:

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<sup>30</sup> Weaver & Morris, 2004. p 51. Weaver & Morris note that such stalls are outlawed completely in the United Kingdom and Sweden, and that the European Union allows confinement in such stalls for only the first 4 weeks of pregnancy. Further, laws in Australia would (if followed) result in the usage of such stalls to be impermissible. In my view, this is - at least in part - the result of an acknowledgement that such systems cause suffering for the animals involved.

<sup>31</sup> Weaver & Morris, 2004. p. 54.



Animals in a barren environment show repetitive and often destructive behavior, which is also associated with mentally disturbed humans... In sows, repetitive behaviour such as chewing bars of their cages has been associated with a lack of oral satisfaction, and with keeping pigs in barren environments. Commercially reared sows are often given restricted diets that fail to satisfy them. They are also unable to forage as a means of satisfying their feeding motivation.<sup>32</sup>

If it is the case that sows subjected to these conditions experience psychological suffering, as the evidence suggests, then that suffering too should be given consideration when deliberating how to act ethically. Proponents of factory farming could argue that restricting the movement of animals (i.e. by using sow stalls) is necessary under certain conditions. To this, Weaver and Morris write that they “can find no reason why the behavioural needs of the animal must be restricted to such an extent that their physical and mental health suffers as a result, particularly when economically viable alternatives exist.”<sup>33</sup>

Cattle too are subjected to suffering at the hands of the factory farming process. In her article *Happier Meals: Rethinking the Global Meat Industry*, Danielle Nierenberg writes:

Confinement of veal calves may be one of the most well-known and egregious examples of cruelty in the livestock industry. Taken from their mothers just days after birth, the calves are confined in tiny crates that prevent them from moving more than a few steps. Calves thrive on interaction, but these crates prevent them from being with other animals. For the entire 16 weeks of their lives, they are alone, unable to stretch or lie down comfortably or groom themselves. Fed from buckets, the calves also cannot suckle normally, resulting in neurotic behaviors such as sucking and chewing their crates.<sup>34</sup>

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<sup>32</sup> Weaver & Morris, 2004. p. 54.

<sup>33</sup> Weaver & Morris, 2004. p. 55.

<sup>34</sup> Nierenberg, 2005. p. 20.

Facts such as these are what lead people such as Williams to believe that “factory farming causes more harm to animals than does any other human institution or practice.”<sup>35</sup> The current methods of factory farming produce vast amounts of animal suffering; suffering which could potentially be eliminated by replacing our current methods of meat production with in vitro methods. However, it could be pointed out that not all meat comes from these factory farming systems. For example, some meat is attained via ethical farming, or some similar means, in which precautions are taken to reduce (as much as possible) the amount of physical pain inflicted upon the animals being raised. Although I agree that ethical farming is morally superior to factory farming, it seems morally inferior to substituting meat with in vitro meat, since, despite reducing animal suffering, ethical farming still requires that an animal be killed before it would otherwise perish due to its natural lifespan. To me, it seems as though depriving a being of a very plausible pleasurable future is worse than letting it live out its natural life. Although one might take precautions to avoid inflicting suffering, one would still be robbing an animal of pleasurable future possibilities if one were to slaughter it. As such, I would argue that if in vitro meat was as available as ethically farmed meat, one ought to choose the former in favour of the latter.

I think it is important to note at this point that there may be some animal welfare concerns regarding the production of in vitro meat. For example, the original cells are usually taken from an animal via biopsy. Although this procedure is claimed to be painless,<sup>36</sup> as Schaefer & Savulescu note, efforts should be made to ensure that the biopsy procedure “is indeed safe, painless and leaves minimal scarring.”<sup>37</sup> Further, the need for such biopsies can be eliminated

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<sup>35</sup> Williams, 2008. p 376.

<sup>36</sup> Cheng, Maria. 2013.

<sup>37</sup> Schaefer & Savulescu, 2014.

altogether by instead culturing embryonic stem cells.<sup>38</sup> As such, I don't see how the procurement of cells could be used as reasonable grounds for an ethical objection to in vitro meat on the basis of animal suffering.<sup>39</sup>

Another concern may arise from the use of fetal bovine serum (FBS) as a substrate in which cells used in the production of in vitro meat are cultured. Some argue that the collection of FBS via cardiac puncture and exsanguination of unanaesthetised post-natal bovines causes suffering to the animal in question.<sup>40</sup> It could be argued that since the production of in vitro meat causes some animal suffering, it should be abandoned in favour of food sources which cause no animal suffering (i.e. plants and other vegetation). This would certainly be in line with Singer's principle of equal consideration of interests, as the interest of the post-natal bovine to not suffer should be given just as much consideration as the interests of other animals to not suffer. However, with the global demand for beef "projected to grow by 95 percent between 2006 and 2050,"<sup>41</sup> in vitro meat provides a realistic option to our current methods to satisfactorily meet that demand with real meat (not meat alternatives), and to adopt such an option in favour of our current methods would drastically reduce the overall amount of animal suffering worldwide. I grant that this isn't the strongest argument, since the production of in vitro meat in this way still involves some animal suffering (although it can certainly be said that the production of in vitro meat involves significantly less animal suffering than our current methods of meat production). If this is an unavoidable fact of producing in vitro meat, then it may seem as though - if we want

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<sup>38</sup> See Bhat, Kumar & Fayaz, 2015.

<sup>39</sup> There are, however, other possible objections which can be laid against this practice which will be addressed later on.

<sup>40</sup> Jochems et al., 2002.

<sup>41</sup> Ranganathan et al., 2016. p. 14.

to continue the practice of consuming meat - that we are in a position where we must choose the lesser of two evils, so to speak. However, I think this can be addressed by a humane, mechanical means of euthanization to euthanize the post-natal bovine before collection of FBS begins, or preferably, in my view, the abandonment of FBS altogether in favour of alternative substrates. Jochems et al. suggest using chemically defined (synthetic) media as an alternative to FBS.<sup>42</sup> Some forms of serum substrates specifically designed to replace FBS are currently commercially available, and some scientists have had success “using a serum-free medium made from maitake mushroom extract that achieved higher rates of growth than fetal bovine serum”<sup>43</sup> to culture stem cells. As such, the adoption of in vitro meat production using substrates such as these has the potential to eliminate animal suffering caused by our meat consumption altogether.

Thus far, my argument has focused on animals which are raised and slaughtered within the factory farming system and the suffering inflicted upon them. It could be asked, what of the meat that is acquired via slaughtering animals that are not part of the industrial system? To this, I would say that unless the method by which such animals are raised and slaughtered produces less suffering than the production of in vitro meat, then in vitro meat would still be the more ethical alternative. Further, I would note that in vitro meat - if produced on a large enough scale - could render the killing of sentient animals for food unnecessary. Some may argue that such killing is justified, or not morally wrong. Since my argument relies on the suffering of animals, it could be argued that it provides no reason to favour in vitro meat over meat acquired via methods of killing animals which produce no suffering. To this I would respond: if put in the position of

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<sup>42</sup> Jochems et al., 2002. pp. 12-13. It is also important to note that different cells have different requirements for media. Thus, the type of media used to culture cells would have to be specific to that type of cell.

<sup>43</sup> Bhat & Fayaz, 2011. p. 133.

having to decide whether or not to kill an animal, and if the killing of that animal was unnecessary, then (as far as a rough comparison can be made) we should act compassionately to that animal, and the compassionate thing to do would be to refrain from killing it. I see no moral justification for the killing of such animals for the purposes of attaining their meat for food in a situation where such killing is rendered unnecessary by the availability of in vitro meat.<sup>44</sup>

One may argue that some amount of animal suffering is necessary in order to feed people, or to ensure the livelihoods of people who depend on traditional methods of producing meat (i.e. within certain Inuit communities, or farmers who depend on raising livestock). I limit my argument here to instances where in vitro meat is a viable alternative to other forms of meat. If in vitro meat is a viable option for a given group of people, then slaughtering animals in order to feed those people would not be necessary. I will evoke the adage ‘ought implies can’. In cases where slaughtering animals is necessary to feed people, then it would follow that in vitro meat is not a viable alternative for them. If it were, then it would make the slaughter of animals unnecessary. This is by no means a necessarily permanent condition, as it is possible that at a future time, circumstances may change such that in vitro meat is a viable option. However, if, at certain places and at certain times the slaughter of animals is necessary in order to feed people, and those people cannot adopt in vitro meat as an alternative, then it would seem as though my argument in favour of in vitro meat would not extend to those cases. If the raising and slaughtering of animals is necessary in order for an individual to ensure his or her livelihood, then it seems as though we must ask ourselves if the interests of those who wish to ensure their

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<sup>44</sup> Note that this does not pertain to all forms of killing; rather, it deals specifically with the killing of animals for the purpose of meat in a world where such killing is not required in order to attain it.

livelihoods outweigh the interests of the animals not to suffer.<sup>45</sup> If a person who currently depends on traditional methods has the option of getting food and making a living in some other way that is not dependant on farming animals for slaughter, then I would be inclined to say that the interests of the animals should take precedence. If, however, certain people are not able to survive without raising animals for slaughter and/or eating them, then it would seem to me that the interests of those people to survive could outweigh the interests of the animals not to suffer. If the raising and slaughtering animals is necessary in order for people to survive, then I would argue that it should be done in the most humane and pain-free way possible. It does not seem as though the current methods of factory farming meet these criteria. As such, this objection doesn't seem to be able to defend factory farming.

#### ***1.4. An Ethical Argument for In Vitro Meat***

Thus far, I have been laying out the groundwork on which I will base my argument. I will use this section to explain my argument in detail, which is comprised of the following propositions:

(1) Compassion in relation to real, living, sentient beings constitutes sufficient grounds for making an action ethical.

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<sup>45</sup> I am tempted also to include the interests of the animals not to die. However, this would raise more issues than it would be possible for me to solve here (i.e. do non-human animals understand what death is, do they have an interest not to die, and even if they did, a detailed explanation of what it is that is wrong with the act of killing should be given in support). As such, I shall restrict my argument to animal suffering.

(2) Our compassion ought to be reasonably extended to animals that have the capacity to experience certain forms of suffering in similar ways as we do. The forms of suffering hereto referred are most notably constituted of unwanted, physical pain, but may also include other forms of suffering (i.e. psychological suffering).

(3) Our current methods of attaining meat cause animal suffering.

(4) The production of in vitro meat causes significantly less (and in some cases, no) animal suffering.

(5) In a world where in vitro meat is a viable alternative to meat gained from our current methods - that is to say, there is no extra significant cost to adopting in vitro meat over meat gained from our current means - the suffering caused by our current methods would be unnecessary.

(6) If in the position to choose between two options, wherein one option involves the unnecessary infliction of suffering upon animals and the other does not, then, all else being equal, the compassionate thing to do would be to choose the option which does not involve unnecessary animal suffering.

From these propositions, I conclude that if in vitro meat becomes a viable alternative to meat gained from our current methods, we ought to accept in vitro meat in favour of meat gained from our current methods. I see no other ethical option - other than the abstinence from eating meat altogether - that one can take when put in such a position. As such, if one wants to eat meat and is put in the position of choosing between meat acquired by our current methods and meat produced by in vitro means, the only ethical option is to choose the latter in favour of the former.

This argument, in my view, provides a reasonable justification for the acceptance of in vitro meat on ethical grounds. This is certainly not to say that there aren't other arguments for in vitro meat;<sup>46</sup> however, my interest here lays primarily in providing an ethical justification for it on the basis of reducing animal suffering. With that done, the following chapters will address some possible objections to the acceptance of in vitro meat.

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<sup>46</sup> For example, one study concluded that the production of in vitro meat requires 7-45% less energy (for poultry only), creates 78-96% fewer GHG emissions, uses 99% less land, and 82-96% less water (see Tuomisto & Teixeira de Mattos, 2011). As such, the production of meat via in vitro means can be argued to be a more efficient, less environmentally impactful means of producing meat than our current methods. Again, I don't think this represents an exhaustive list of arguments for in vitro meat, but I do think that these arguments (especially when taken together) provide reasonable grounds to accept it.



## Chapter 2: Aesthetic Considerations

While researching for this paper and while discussing the prospect of in vitro meat with peers, one of the most common reactions I received refers to what some have called the ‘yuck’ factor: disgust towards the prospect of eating meat that has been cultured in a lab and concerns dealing with the possible taste of such meat. I will take the time in this chapter to describe some objections to in vitro meat on these grounds and explain why I do not find them particularly compelling.

### 2.1. *Disgust*

I believe that a significant obstacle to the widespread acceptance of in vitro meat is people’s feeling of disgust towards it.<sup>47</sup> I will use a definition of disgust outlined by Rozin and Fallon in their article *A Perspective on Disgust* as “revulsion at the prospect of (oral) incorporation of an offensive object.”<sup>48</sup> It is tempting to dismiss concerns regarding disgust entirely, as disgust does not seem *prima facie* to constitute a good enough reason to reject in vitro meat as an alternative to traditional meat on an ethical basis, or to morally justify the continuation of eating meat acquired via traditional means if in vitro meat is a viable option. I would argue that the interests of animals not to suffer outweigh the interests of people to continue eating them because the thought of eating in vitro meat seems unappealing to them. However, I believe that such a blatant dismissal would be dogmatic and intellectually indolent. It

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<sup>47</sup> For a more detailed look at public response in vitro meat, see Laestadius & Caldwell, 2015 and Verbeke et al., 2015.

<sup>48</sup> Rozin & Fallon, 1987. p 23.

is simple to declare that one must act in a particular manner, despite one finding that act disgusting, because it is the moral thing to do. However, when faced with performing an act which seems so repulsive, so revolting, and so repugnant that one feels ill at the mere thought of it, such disgust may become a considerable barrier to ethical action. This view is predicated on the idea that one believes in vitro meat to be a moral alternative to traditional meat, yet one has apprehensions accepting it because of a feeling of disgust towards it. However, an argument can be made that on the basis of disgust, in vitro meat is indeed unethical.

Before continuing, I believe it is important to note that the disgust to which I refer here is entirely independent of the actual taste, texture, or any other physical property of in vitro meat. Rather, it concerns the origin and/or production, or a subject's imagined origin/production, of in vitro meat. With regards to this objection, it is not necessarily the meat itself which one may find disgusting - it is the fact that it was manufactured in an artificial setting. Although I do not hold such feelings myself, I do find myself able to sympathize somewhat with those who do. In vitro meat may be a somewhat alien idea to many people, and the idea of scientists working in a lab to produce something which one is to consume may carry negative connotations to some, and may even seem 'unnatural'.

As previously mentioned, it is possible that opponents may use disgust in order to argue that in vitro meat is unethical. To construct such an argument, I shall use ideas from Leon Kass, who coined the term "the wisdom of repugnance"<sup>49</sup> in a 1997 article of the same name regarding human cloning. Although he admits that "revulsion is not an argument; and some of yesterday's

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<sup>49</sup> Kass, 1997. p. 19.

repugnances are today calmly accepted,”<sup>50</sup> he argues that in some cases, “repugnance is the emotional expression of deep wisdom, beyond reason’s power fully to articulate it.”<sup>51</sup> He applies this argument to incest, bestiality, mutilating corpses, cannibalism, rape, murder, and, (as is the topic of his paper) human cloning. In response to the fact that people often have difficulty explaining why they view such practices as repulsive, he argues that somebody’s “failure to give full rational justification for his or her revulsion at [the above] practices [does not] make that revulsion ethically suspect.”<sup>52</sup> Further, he notes, we are usually suspicious of those who try to rationalize away the horror we feel regarding the aforementioned acts. He concludes that “we are repelled by the prospect of”<sup>53</sup> certain things, such as human cloning, “not because of the strangeness or novelty of the undertaking, but because we intuit and feel, immediately and without argument, the violation of things that we rightfully hold dear.”<sup>54</sup>

Given that many people’s initial reaction to in vitro meat is disgust,<sup>55</sup> it seems to me that Kass’ argument could be extended to include in vitro meat. One could argue that the disgust that many people experience towards in vitro meat is due to some underlying moral intuition for rejecting it - one which is beyond explanation through the power of reason. As such, we ought not accept in vitro meat.

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<sup>50</sup> Kass, 1997. p. 20.

<sup>51</sup> Kass, 1997. p. 20.

<sup>52</sup> Kass, 1997. p. 20.

<sup>53</sup> Kass, 1997. p. 20.

<sup>54</sup> Kass, 1997. p. 20.

<sup>55</sup> Verbeke et al., 2015. p. 52.

One way to handle this objection would be to determine the source of this disgust. If it could be shown that the source of repugnance towards in vitro meat is not some underlying moral intuition, but rather, caused by some explainable process, then the argument that repugnance constitutes moral justification for rejecting in vitro meat would be defeated. In fact, I do not believe one need even go that far. If one could show that there were other plausible causes of disgust, then that alone would call into question the idea that this disgust must necessarily come from an underlying moral intuition. Once it has been shown that disgust could plausibly be caused by other sources, the burden of proof would fall on proponents of ‘the wisdom of repugnance’ to show that the disgust felt towards in vitro meat indeed does stem from an underlying moral intuition; only then do I believe we would be justified in accepting such a position. To be clear, merely pointing out plausible alternative causes would not defeat the objection from repugnance, as doing so would not establish a causal connection between the alternative cause and the disgust felt towards in vitro meat. However, I believe it may give us reason not to take it seriously until proponents of the wisdom of repugnance demonstrate the claim that this disgust is caused by a moral intuition.

As it so happens, researchers Hopkins and Dacey note that there may be several relevant sources of disgust, suggesting that the disgust people feel towards in vitro meat may stem from evolutionary causes, cultural forces, and/or neophobia (the fear or dislike of something new or unfamiliar).<sup>56</sup> They maintain that reactions of disgust should not be dismissed outright, but rather that they “should be modified by rational analysis.”<sup>57</sup> In other words, we ought to take feelings of

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<sup>56</sup> Hopkins & Dacey, 2008. This isn’t meant to be an exhaustive list of all possible sources of disgust, but I believe these are very plausible candidates for explaining various forms of disgust in certain contexts.

<sup>57</sup> Hopkins & Dacey, 2008. p. 588.

disgust seriously; however, such feelings must be able to be rationally explained and defended if they are to be used as a basis for rejecting in vitro meat as an ethical alternative to traditional meat. I certainly grant that disgust may be a reason that individuals will choose not to eat in vitro meat. However, this, in my view, does not constitute a rational basis for arguing that in vitro meat is unethical. I would argue that one who still chooses to eat traditional meat when in vitro meat is a viable option due to one's disgust of in vitro meat is not acting in an ethical manner, insofar as the notion of living according to ethical standards earlier given is concerned, as such a position seems to me entirely based on self-interest. I would further note that, on a personal level, I find the means of factory farming that are currently employed to produce our meat supplies far more disgusting than the prospect of in vitro meat.

I shall now take a moment to investigate the proposed sources of disgust in further detail. The first possibility that Hopkins and Dacey note is that the cause of disgust may be evolutionary in nature. It may be the case that we, as humans, are evolutionarily predisposed to being disgusted by the ingestion - either actual or imagined - of certain things. There are several hypotheses as to how this could have evolved, one of which - described by Rozin and Fallon - is that it serves as a mechanism by which humans avoided orally ingesting harmful substances.<sup>58</sup>

Since microbes and parasites have been killing or weakening human beings for the most part of human history, it is at least plausible that disgust evolved through natural selection. Disgust may have conferred an advantage on those individuals who were concerned with the contact history of things they touched and ate, rather than simply with the sensory properties of those things.<sup>59</sup>

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<sup>58</sup> Rozin & Fallon, 1987. For more, see Rozin, Haidt, & McCauley, 2008.

<sup>59</sup> Haidt, Rozin, McCauley & Imada, 1997. p. 110.

Although some question the hypothesis that disgust has evolutionary causes,<sup>60</sup> it seems to be a plausible explanation for the phenomenon of disgust in this context.

If we take this to be the case, then a new possible objection related to disgust arises: if disgust evolved as a mechanism to avoid the ingestion of potentially dangerous substances, and many people are disgusted at the thought of ingesting in vitro meat, then could it be that disgust is an indicator that in vitro meat is dangerous? In response to this, I would differ to an explanation of the relationship between disgust and danger given by Nussbaum. In her article *Danger to Human Dignity: The Revival Of Disgust and Shame in the Law*, she notes that disgust is distinct from perceived danger. She writes that:

Dangerous items (for instance, poisonous mushrooms) are tolerated in the environment, as long as they will not be ingested; disgusting items are not. When danger is removed, the dangerous item will be ingested: Detoxified poisonous mushrooms are acceptable. But disgusting items remain disgusting even when all danger is removed. People refuse to eat sterilized cockroaches; many, Rozin has shown, object even to swallowing a cockroach inside an indigestible plastic capsule.<sup>61</sup>

In other words, disgust and danger - whether real or perceived - are distinct phenomena, and although disgust could have provided a rudimentary mechanism for our ancestors to avoid ingesting dangerous substances, it should by no means be used as an indicator to determine whether or not a substance is dangerous. There are many things which are dangerous, yet which one may not find disgusting (i.e. inhaling large amounts of carbon monoxide), and similarly, there are many things which one may find disgusting which are not dangerous (as a child I would

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<sup>60</sup> Rottman, 2014.

<sup>61</sup> Nussbaum, 2004.

have certainly believed this point be exemplified by brussels sprouts). Thus, it would be unreasonable to dismiss in vitro meat outright as unsafe due to people's feeling of disgust towards it. This is by no means to say that in vitro meat should not be rigorously scrutinized to ensure it is safe for consumption. Safety is a legitimate concern, and indeed, we should make certain that any product intended for consumption is safe; however, the way to do so is not by deferring to our feelings of disgust. I believe this to be in line with the sentiment of Hopkins and Dacey: feelings of disgust should not be ignored; however, we must rely on reason to analyze what the reaction of disgust might indicate. Moving forward, I will continue under the assumption that, for the sake of argument, consuming a conglomeration of cells produced by in vitro methods is just as safe as consuming a conglomeration of cells produced by the raising, slaughtering, and butchering of an animal.

The other possible sources of disgust that Hopkins and Dacey mention are culture and neophobia. With regard to culture, they note that, "different cultures consider different things disgusting."<sup>62</sup> Although a North American, for example, may feel disgusted at the thought of eating crickets (as is done around the world, notably in parts of Africa, Asia, and Latin America), I would suggest that our hypothetical North American subject wouldn't say that eating crickets was unethical *because* it seemed disgusting.<sup>63</sup> I would implore the reader to think of different

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<sup>62</sup> Hopkins & Dacey, 2008, p. 588.

<sup>63</sup> Given the increased demand for consumable meat, and the comfort of many North Americans with the notion of eating other animals, I would be inclined to say that the average North American wouldn't say that eating crickets was unethical at all. However, some may argue that eating any animal (including insects) is unethical. As it pertains to the argument in support of in vitro meat thus far, this raises the interesting idea of whether or not the interests of insects should be included within the principle of equal consideration of interests. If it could be demonstrated that they experience suffering in a way similar to our own, then it could be argued that their interest to not experience suffering should be given equally similar value. However, given that the subject of this work is in vitro meat, and is therefore focused on animals which make up the bulk of North American meat supplies, this question, however interesting it may be, will be left unanswered here.

foods which may evoke feelings of disgust, but that are, or were, eaten by human beings around the world and throughout history. Further, examples can be given of things which in our own culture were met with repulsion when they came to light due to neophobia.<sup>64</sup> However, as time progresses and people become accustomed to new phenomena, attitudes often change towards acceptance. Kass himself admits that some things which were considered repugnant in the past are accepted today, so I don't believe this to be a point of contention.

It seems to me that disgust stemming from culture and neophobia could be remedied as in vitro meat becomes more commonplace. Such disgust may be an issue at the outset; however, as time goes on and as vitro meat gains popularity, it seems reasonable to think that it will eventually become as accepted as traditional meat and the processes that are included in producing it. In pursuit of this goal, some have suggested that negative connotations associated with terms such as 'in vitro meat', 'cultured meat', 'synthetic meat' or 'lab-grown meat' could be curbed by a form of re-branding; adopting terms such as 'clean meat'<sup>65</sup> or 'cruelty-free meat' instead. I freely admit that merely calling something by a different name does nothing - in my mind - to change its moral status; however, such a re-branding could definitely be a useful psychological tool that could be employed to help overcome the negative connotations associated with in vitro meat.

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<sup>64</sup> I consider the legal acknowledgement in North America of marriages between couples of the same sex to be an example of this. Although homosexuality is nothing new, the recognition of marriages between same sex partners by governments in North American culture is a recent phenomenon, and seems to me to be an illustrative example of the increased acceptance of such relationships in broader society, and how cultural attitudes towards a phenomenon are able to shift over time. Granted, the 'disgust' felt by some towards such a phenomenon does not meet Rozin and Fallon's definition, as it doesn't pertain to consuming something; however, it certainly seems reasonable to me to call such negative feelings 'revulsion' or 'repugnance'.

<sup>65</sup> Friedrich, 2017.



The wisdom of repugnance hinges on the idea that the disgust felt towards certain things - in this case, in vitro meat - is due to some underlying moral intuition. Kass writes that “the burden of moral argument must fall entirely on those who want to declare the widespread repugnances of humankind to be mere timidity or superstition.”<sup>66</sup> I would argue that in light of the work done by researchers such as Rozin and Fallon, such a burden has been met. However, I do not believe this shows that such repugnance is due to timidity or superstition, but rather, that it could plausibly be due to evolutionary causes, cultural causes, or neophobia. Since there are several plausible sources of disgust other than the moral wisdom proposed by Kass, I think the burden of the moral argument should be placed back on the shoulders of those who support the wisdom of repugnance to give some rational basis for why we ought to accept ‘moral wisdom’ as a source of disgust over any other plausible alternative. If the cause of disgust is cultural, neophobic or evolutionary in nature - as demonstrably seems to be the case with forms of disgust with regards to other phenomena, and which (at the very least) is plausible with regards to in vitro meat - then it would seem that such disgust certainly does not constitute sufficient grounds for rejecting in vitro meat. As such, I believe the burden lays on those who accept the wisdom of repugnance to rule out these possible sources of disgust, or to somehow demonstrate (using some rational basis) that the cause is indeed some moral intuition. Until such time, it seems unreasonable to me to assume that the wisdom of repugnance accurately represents the genesis of the disgust that some people feel towards in vitro meat.

Further, I would ask whose repugnances should be taken into consideration when discussing morality. Kass certainly feels repugnance towards acts such as incest, bestiality,

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<sup>66</sup> Kass, 1997. p. 21.

mutilating corpses, etc. However, not everyone shares his view. I shall grant that perhaps most people do indeed find rape, murder, bestiality, etc. repulsive; however, I would argue that we should not dictate our moral code on the basis of popularity of opinion. Further, there may be a very significant portion of the population (and perhaps, even the majority) who view phenomena such as human cloning, for example, without such feelings of repugnance. In my submission, Kass gives no reason as to why we should accept his feelings of repugnance as the basis of determining the moral value of a given act over the feelings of anyone else. He mentions that many people feel repugnance towards certain things and that such repugnance is due to an underlying moral intuition, and yet gives us no means by which we can identify repugnances which are indeed caused by a moral intuition and repugnances which are caused by other factors (such as neophobia, for example). Without a method by which we can make these determinations, we are left with a guessing game when it comes to identifying the source of repugnance towards a certain phenomenon. It seems to me that his article suggests that his way of dealing with this is to appeal to what the majority feel - the fact that "people are repelled by many aspects of human cloning"<sup>67</sup> is an indication, in Kass' view, that his belief is shared by a number of others, and it seems as though he takes this to provide him grounds for asserting that human cloning is immoral. As mentioned before, an appeal to popularity is not a proper way to form a moral code, and if one day the prospect of eating in vitro meat does not arouse feelings of disgust in people's minds, or even, if it gains support from the majority of people, then what are we to make of the wisdom of repugnance when it comes to in vitro meat?

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<sup>67</sup> Kass, 1997. p. 19.

Another form of disgust which I think it is important to note is the disgust of eating animal flesh altogether - whether it be produced by in vitro methods or not. I think the response to this is the same as above: disgust alone does not constitute grounds for an ethical objection - it must be accompanied by a reasonable argument. Although in this case I believe there to be merit to some arguments made in support of the position that eating meat attained via the slaughter of animals is unethical, I do not believe it to be unethical *because* some people find it disgusting. As such, if someone is so inclined as to refrain from eating any form of meat because he or she simply finds the prospect of eating meat disgusting, then so be it. The argument I am putting forward in support of in vitro meat is directed primarily towards those who currently eat meat attained via the slaughter of animals (and who, by extension, contribute to animal suffering). As such, I don't think that one should reject in vitro meat as an ethical alternative to traditional meat in those cases simply because one finds the prospect of eating meat itself disgusting. I certainly think that it is ethical for vegetarians, vegans, and whoever else does not currently eat meat to consume in vitro meat, as there is no animal suffering or death involved. However, I also think that it is perfectly acceptable for such people to abstain from eating meat altogether - in vitro or otherwise. In vitro meat seems to have the potential to eliminate (or at the very least, significantly decrease) the animal suffering produced by our meat consumption, and although removing oneself from the cycle of animal suffering caused by meat consumption can be achieved by means of adopting vegetarianism or veganism, it can also be achieved by replacing one's current source of meat with in vitro meat. The important aspect here, I believe, is the reduction or elimination of animal suffering, and insofar as I'm concerned, both options given above are legitimate ways of attaining that goal.

## 2.2. *Taste*

I would never even buy [in vitro meat] for myself at home, so if I don't consume it then why should I serve it to my guests? I want my guests to eat meat that is tender with wonderful texture and taste. I don't see the point in using [lab] meat just because it's cheaper. I would prefer to stick to authentic methods of meat production and consumption. There is no pride in having cheap lab-produced meat.<sup>68</sup>

The above quote is from a chef at a hotel in Dubai, given in an interview regarding in vitro meat. I include it here because it illustrates another objection that exists regarding the widespread acceptance of in vitro meat which I now intend to explore. It could be argued that in vitro meat will not taste the same as traditional meat, or may perhaps taste foul altogether. If this is the case, then it may cause some to ask why one should force oneself to consume something unpleasant for the sake of reducing animal suffering. To be clear, I do not believe that this objection does anything to argue against the ethical status of in vitro meat with regards to the reduction of animal suffering. However, it may certainly present a very real obstacle to people trying to accept in vitro meat.

According to a study by Hoek et al., people who frequently eat meat do care quite a bit about the aesthetics of meat substitutes. More specifically, they “prefer a product with meat sensory properties: meat-like texture, taste, smell and appearance.”<sup>69</sup> Further, in a survey done by Glanz et al. regarding what factors influence food choice, “respondents reported that taste is the

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<sup>68</sup> Billinghamurst, 2013.

<sup>69</sup> Hoek et al., 2011.

most important influence on their food choices, followed by cost.”<sup>70</sup> Although it may be tempting to dismiss such concerns with the response that the interests of animals not to suffer outweigh the interests of individuals to consume animals because it is pleasing to their palate, taste seems to be a significant factor in an individual’s choice of food, and so seems to pose a very plausible barrier to the acceptance of in vitro meat. I think it important to note that the incredibly complex and subjective nature of the phenomenon of taste exacerbates the difficulties of dealing with this objection. Given the subjectivity of taste, it seems to me that there will not be one particular ‘flavour’ of in vitro meat that would act as panacea for all criticisms, present and future, regarding taste. Nonetheless, I shall take a moment to explore this objection in a bit more detail, providing some reasons why I don’t find it particularly compelling.

With regards to the ability of in vitro meat to accurately mimic the properties of traditional meat, Post notes that out of texture, taste, smell and appearance, “taste is arguably the most difficult” property to mimic, since “more than 1000 water soluble and fat derived components may make up the species and perhaps strain specific taste of meat.”<sup>71</sup> With that being said, the testimonies of people who have eaten in vitro meat products rate the taste as being, at worst, bland, and at best, “remarkably flavorful... [and] delicious.”<sup>72</sup> It is important to note that some people may be biased or have a conflict of interest in reporting their experience. Emily Byrd, for example, from whom the previous quote is taken, is the Senior Communications Specialist for The Good Food Institute, a company which is currently developing in vitro meat

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<sup>70</sup> Glanz et al., 1998.

<sup>71</sup> Post, 2012. See Calkins & Hodgen, 2007 for more information on meat flavour and some of the components that make it up.

<sup>72</sup> Byrd, 2017. Also see Fountain, 2013.

products. So although there may be testimonies backing the notion that in vitro meat doesn't taste as foul as some may think, they are still just that - testimonies - and they should be treated accordingly. With that said, however, I don't think it reasonable to believe that if an experienced chef substituted meat from a slaughtered animal with in vitro meat for one of his or her recipes, the resulting dish would taste so utterly repulsive as to repel people from accepting in vitro meat altogether. Further, I find it unreasonable to think that a company would knowingly mass produce in vitro meat products that tasted foul, as the sales of such products would probably be very poor. After all, if taste is the most important factor in consumers' purchasing decisions, then mass producing a product that tastes foul would be a financial disaster waiting to happen.

On an individual basis, if one does find the taste to be bland, then it seems as though there are numerous methods by which one could season the meat in order to remedy that issue. On a larger scale, it seems reasonable to think that flavour engineering would be able to produce an in vitro meat product that was pleasing to the palate. Although it may be difficult to reach a point at which the difference in taste between in vitro meat and comparable traditional meat is indistinguishable, such a feat should not be regarded as impossible. Advancements in technology and scientific understanding have allowed researchers to synthesize a myriad of substances in labs in attempts to re-create natural flavours. A prime example of this is the artificial production of vanillin – the main component of vanilla flavour. Granted, pure, natural vanilla contains many other components, meaning that synthetic vanillin itself will not taste identical to natural vanilla. However, with “less than 1% of [the world's] vanilla flavor [coming] from actual vanilla orchids”<sup>73</sup>, synthetic vanillin seems to be established as a rather well-accepted vanilla substitute

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<sup>73</sup> Bomgardner, 2016.

across the world. In the same vein, although in vitro meat may not taste identical to the meat it aims to replace, it seems reasonable to think that it too may one day become as well-accepted.

Given the nature of flavour engineering and the ability for individuals to prepare meals in ways they find appetizing, I do not believe that one need worry about the prospect of foul tasting in vitro meat. However, an objection could still be made regarding the taste of in vitro meat compared to the taste of the meat which it aims to replace. Although It seems entirely possible that flavour engineering could produce in vitro meat which, although may not taste exactly like its traditional counterpart, may taste better. What if it produces a product which does not taste as good? Should one sacrifice one's own gastronomic pleasure and consume a product which is, by one's own account, inferior with regards to taste instead of consuming a product which one finds delectable, yet involves the suffering of other beings? Beings which, I might add, have the capacity to suffer in very much the same way as we do. I consider making the decision to continue consuming traditional meat when in vitro meat is just as readily available to be a paragon of selfishness, as it is rooted entirely in self-interest. The belief that one's own pleasure should not only take precedence over the well-being of another creature, but more specifically, come at the cost of another creature's suffering does not strike me as a valid ethical position - most certainly if we are to take Singer's conception of ethics seriously. He writes that "an ethical principle cannot be justified in relation to any partial or sectional group. Ethics takes a universal point of view."<sup>74</sup> That is to say, we must extend our ethical principles to involve beings beyond ourselves and beyond the groups with which we identify. To treat the needs and interests of humans - whether it be at an individual level (e.g. I enjoy the taste of meat, therefore I shall

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<sup>74</sup> Singer, 1993. p. 11.

continue to eat meat) or at a societal level (e.g. Much of human culture is based on consuming meat, human culture is important, therefore to preserve it, traditional forms of meat should continue to be eaten) seems to put the human point of view - the human experience - at the forefront of what matters. Such positions, based entirely on the self interests of human beings and with little to no regard to the well-being of others (namely, the animals affected by our meat consumption) stands in complete opposition to the notion of ethics and position of compassion based on empathy outlined in Chapter 1. The only reason I can imagine why one would dismiss the interests of the animals in question, or somehow value their interests as being less significant than one's own is either because one outright does not include the affected animals in one's sphere of compassion, or for some reason or another, puts the interests of humans above the interests of the affected animals. Thus, it seems to me that in many cases, it is not the taste itself which stands as a true barrier to the acceptance of in vitro meat, but rather, apathy (whether complete or to a certain degree) towards the suffering of the animals otherwise affected by the consumption of traditional meat. The notion that one's own ability to indulge in experiences one finds pleasurable pitted against the notion of acting in a way which, although may perhaps be less pleasurable, is ethical. In light of this, I find myself asking why it is that some people cling so tightly to this objection. I find myself asking why it is that some people would continue to eat traditional meat if in vitro meat was available, given that the production of traditional meat involves the infliction of suffering upon animals. Is it because the animal suffering is so far detached from one's immediate awareness that one is able to, with a clear conscience, make the choice to consume meat? Is it because the phenomenon of eating meat is so normalized to us that questions revolving around its ethical status seem mundane or frivolous? Is it because the bias of speciesism is so strong in some that they are able to remain apathetic towards the suffering of



other beings not categorized as being within the same species as themselves? Is it perhaps due to some means of compartmentalization that one is able to continue a practice which one may otherwise find immoral? I do not have the answer to these questions, and thus I cannot draw conclusions as to how the culture of apathy towards animal suffering that seems to facilitate the acceptance - whether implicit or explicit - of factory farming could be so pervasive in our society. Who, I wonder, would make the choice to continue eating a product when doing so would involve the infliction of suffering not upon a distant, nameless animal, but instead upon a beloved family member or even a pet? Especially if an alternative is available which, if taken, would not entail such suffering. I doubt I would call a decision ethical. Ultimately, when it comes to objections of in vitro meat regarding taste, one should ask oneself, 'is my interest to eat something which I find pleasurable more important than the interests of animals affected by that decision?' I would argue that if one is to seriously consider the notion of acting compassionately towards nonhuman animals, and most certainly if one is to consider the principle of equal consideration of interests seriously, then it seems to me that the conclusion to which one could arrive is *no*.

### **Chapter 3: Cultural and Religious Considerations**

This chapter will aim to address concerns that may arise from religious and cultural bases. With regards to religion, I would like to make it clear at the outset that given the multitude of religious texts and dogmas - to which religious individuals may subscribe in varying degrees - attempting to show that accepting in vitro meat is compatible with an entire set of a particular interpretations of a religion's tenets seems a task far too broad for my purposes. I certainly don't think it realistic to expect that all members of a particular religion will agree with each other on every point of doctrine, since the beliefs of those who claim to be followers of a particular religion may differ quite considerably from one individual to the next. This being the case, instead of trying to make the concept of in vitro meat fit harmoniously with all the tenants and ideas of a specific religion, I shall instead focus on particular arguments that can be made on the basis of specific understandings of certain religious texts or dogmas in order to persuade individuals who have reservations to accepting in vitro meat because of those understandings. The choice to accept in vitro meat as a substitute to traditional meat is one which individuals must make for themselves, and the process of adjusting one's religious beliefs in order to accept something new is, likewise, an individual process. Since beliefs pertaining to religion play a large role in the decision making process of many people, it seems as though responding to possible objections that may arise from such beliefs is a suitable endeavour. With this qualification in mind, I aim not to show that in vitro meat is compatible with Islam, Christianity, Judaism, Hinduism, etc.; rather, I aim merely to show how in vitro meat could be compatible with certain interpretations of certain religious tenants, with hope that this can give individuals a

metaphorical stepping stone towards beginning (if they have not already yet begun) the process of making the personal decision to accept in vitro meat.

### ***3.1. Food, Humanity, and Culture***

The food we eat plays an integral role in our identity. It is an unavoidable fact that we must eat in order to survive, but it is also true that human beings eat food for more than just essential nutrition. Our food, our relationship with it, our cultivation and procurement of it, our preparation of meals, and the customs and rituals regarding how those meals are eaten, play an integral role in our cultures and customs, and perhaps too our very identity as human beings. Our species has shaped, and in turn, has been shaped by our relationship with our food: from our hunter-gatherer ancestors to the dawn of domestication and agriculture; from the spice trade, the historical inter-cultural exchange of information that came with it and the battles fought across civilizations to control it, to the methods of factory farming which we, in the West, use to supply our demand for meat today. Given the intimate relationship between human beings and our sources of food, and since food (specifically in this context, the consumption of meat) plays important roles in certain cultures and customs it could be argued that, for the sake of keeping true to cultural norms and heritage, in vitro meat should not be adopted.

Concerns for animals and how they are affected by cultural practices have been expressed by various groups regarding some of the practices of some indigenous Inuit peoples in my native country of Canada. There have been movements by animal rights activists to ban certain forms of seal hunting, and to ban the sale of certain seal furs. However, some Inuit people rely on the

hunting of seals for necessities such as meat for food, and furs, which are important for the manufacture of clothing and the commercial sale of which is a sustainable (and in some cases, primary or only) form of income for some Inuit people. Arguments for the continuation of traditional seal hunts often mention these objections, arguing that due to the environment in which some Inuit communities live, hunting seals has become one of their crucial means of self-sufficiency. If such cultural practices were stopped, the negative effects on the communities which depend upon such practices would be devastating. This devastation could include the extinction of the communities themselves, or the disappearance of their cultural identity. It can be seen throughout history that the trauma caused by cultural disruption and destruction can extend forward to affect individuals across generations. It may be very difficult to say what aspect of a culture is and is not significant, and it seems as though that problem can only be addressed by members of the cultures themselves. For these reasons (partially, if not fully), some wish that Inuit people, and the traditional forms of seal hunting in which they engage, to be exempted from bans regarding the hunting of seals and the trading of their furs.

I take it as absolutely crucial that we note that we cannot save animals at the expense of human beings. In general, I would argue that human beings have richer future possibilities than non-human animals, and as such, the survival of a human should take precedence over the survival of an animal. Thus, if various Inuit communities depend upon the hunting of seals to ensure their survival, then would I disagree with those who say that the Inuit should stop hunting for the sake of the well-being of animals. Here I find myself repeating the point that I made in Chapter 1; the interests of human beings to survive may very well outweigh the interests of animals not to suffer. If the infliction of suffering upon animals is *necessary* in order for the continued existence of human beings to be maintained, then it seems that, so long as we are to

take the notion of self-preservation to be a deciding factor in the deliberation of our actions, then it is not possible to eliminate such suffering. However, if these people had the option of in vitro meat as readily available to them as the option of traditionally hunted meat (an idea upon which my argument is predicated), and if they had alternatives to using animal hides for the manufacturing of clothing and for commercial sale to ensure they are economically stable, then the argument of self-preservation would no longer apply, since there would be viable ways in which those people could maintain their existence. The suffering inflicted upon animals would no longer be necessary in that regard.

However, arguments such as these seem to rely on the idea that such cultural practices are necessary for the continued existence of a particular group of people. Some have argued that such cultural practices should be maintained not because they are necessary to survival, but because they are incredibly significant, in a cultural sense, to the people who practice them. Although this argument is here in reference to Inuit cultures and the practice of traditional seal hunts, I believe it could be made in defence of various practices from a myriad of cultural backgrounds, and, more importantly to my endeavour here, could be made to argue against the acceptance of in vitro meat in favour of meat attained via some culturally significant method.

Again, I would like to make clear that I am not suggesting that we should aim to eliminate or assimilate certain cultural identities. Rather, I would argue that we should be able to have an open and honest dialogue about what our values are, as people from all different backgrounds, and how we can work together to make a the world a better place for all. As such, I would note that my position does not rely upon external forces forcefully extinguishing the hunting cultures of Inuit or other indigenous peoples. Rather, it consists of making an argument which people of those cultures can assess for themselves. I believe the case of whether or not

human beings should continue cultural practices which inflict suffering upon animals is, in essence, a question of whether or not the interests of human beings to such cultural practices outweigh the interests of the animals affected by such cultural practices not to suffer. When framed in this way, and if we are to apply Singer's principle of equal consideration of interests, it seems that the answer to this question is very clearly 'no'. This is certainly not to say that cultural practices are meaningless, or that they are insignificant in the lives of certain people; however, I think the salient point here is to recognize that the interests of the animals affected by these cultural practices not to suffer should be viewed as similarly significant. In my view, the interest of beings to be free from suffering should supersede any interests of others who wish to continue certain cultural practices which would inflict otherwise unnecessary suffering upon those beings. To illustrate this, I shall use an example of certain ancient Maya cultural practices of human sacrifice. Suppose an individual of Maya descent was today to argue that she or he should practice ritualistic human sacrifice using unwilling participants because he or she considers this aspect of Maya culture incredibly important. I believe one could rather clearly argue that such a practice should not be performed since the interest of the sacrificial victim not to be subjected to such suffering outweighs the interest of the individual who wishes to carry out a cultural tradition which she or he deems significant. If we are to grant that the interests of a human victim of cultural practices outweighs the interests of those who wish to continue practicing a cultural tradition, and if we are to apply Singer's principle of equal consideration of interests to animals who can suffer in ways significantly similar to human beings, then we must conclude that the interests of the animals upon whom suffering is inflicted outweigh the interests of those human beings who wish to continue eating them due to cultural tradition.

Like all analogies, this one is imperfect. For example, human sacrifice has not been practiced for some time, and as such, there can be a reasonable argument that trying to revive such a practice in today's day and age is not the same as people living today maintaining cultural practices which are currently practiced. However, I believe that the important aspect of this analogy is the idea that a cultural practice, no matter what it is or when it was practiced, should be inspected in the most unbiased and objective manner as possible when trying to determine its moral status, and whether or not it is currently prominent seems irrelevant in such an investigation. In my view, it can be said without cultural bias that the practice of human sacrifice here presented as an example causes suffering. Thus, if we are aiming to reduce or eliminate suffering, we ought to do away with such cultural practices. Likewise, if it can be shown that certain cultural practices cause suffering to animals, and if we are to act compassionately towards them and aim to reduce or eliminate the suffering they experience, I believe that it can reasonably be argued that such cultural practices should, if possible, be stopped.

Culture is not static - it changes and evolves over time. This characteristic of culture is, I believe, incredibly important to note if one is to argue that cultural practices should be continued for the mere sake of tradition. Cultural changes can be propelled by internal or external forces, or a combination of both, and I acknowledge that some may raise concerns regarding the genesis of such changes, namely, concerns regarding powers external to the affected culture influencing cultural change. Such concerns may very well be reasonable considering the role that, for example, colonialism and imperialism have played in the propagation, evolution, and extinction of various cultures throughout history. However, arguments which propose that one ought not take action against or even concern oneself with the affairs of those who engage in cultural practices different to one's own do not seem to be very persuasive when it comes to the subject

of involuntary suffering.<sup>75</sup> If involuntary suffering exists in the world, then attempts to alleviate or eliminate such suffering are seemingly in line with the position of compassion earlier mentioned. If one is to consider oneself compassionate, and if one truly believed that another being was experiencing suffering at the hand of a third party, would one not be compelled to take action to eliminate that suffering, or at the very least, express one's concerns regarding such a situation? Should one sit idly by, wallowing in one's own sentiments of impotency while others experience non-consensual suffering for the sake of cultural tradition? Surely, many would consider the involuntary genital mutilation of young boys and girls to be an example of involuntary suffering, and would describe such practices as barbaric, despite the fact that the practice of circumcision may be very culturally significant to some people. Would it not be to the benefit of the victims of practices like these if there was an interventionist movement that insisted that suffering should not be inflicted upon the unwilling for the sake of adherence to cultural norms or traditions? The cause of the intervening force seems irrelevant to the ethical status of the elimination of suffering. This is certainly not to say that there are not benign or

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<sup>75</sup> I make the distinction here that I am referring to involuntary suffering. It could be argued that if a well-informed, reasonable, member of a certain culture knowingly consents to undertake an action which would inflict some degree of suffering upon him/herself, then the wishes of such an individual should be respected, and she or he should be free to undertake such an action. However, it does not seem to me that such an argument could be made regarding involuntary suffering inflicted upon an individual by another. In cases of animal suffering, I would argue that such suffering is indeed involuntary. This may be contested, however. For example, members of certain indigenous North American cultures may claim that, according to their understanding of the relationship between humanity and nature, that animals willingly give themselves to humans so that they may be respectfully used for food, clothing, and other necessities. I do not claim to be an expert in such belief systems, but it seems to me that such a claim can be discredited by the fact that when subjected to suffering, or even when sensing the mere suggestion of danger, most animals, if able, will flee or fight, or otherwise try to free themselves from such discomfort rather than act in a way which suggests a conscious sense of self-sacrifice. It seems to me that to know the mind, and in this case, the intentions, of another is a rather ambitious claim to make, and that the claims of anyone who that certain beings subject themselves to the suffering inflicted upon them by the claimant, and that the claimant somehow has some sort of moral permission to inflict suffering, should be scepticism, with serious consideration being given to discovering the actual interests of the suffering party. If it cannot be demonstrated that a being willingly subjects themselves to a form of suffering, and therefore, that being is involuntarily or non-consensually being subjected to suffering, then I would argue that the infliction of such suffering should be stopped.



valuable practices or beliefs in other cultures; however, if certain practices can be shown to be harmful, which, in my submission, would include practices which involve the infliction of unnecessary suffering upon unwilling victims who have a capacity to experience pain in much the same way we do, then I do not see an ethical reason for why one should abstain from certain forms of activism to end such practices.<sup>76</sup> If one is to make the concession that it is permissible to act in order to alleviate the suffering of others for the sake of adherence to cultural norms with regards to human victims, and if one is to take the principle of equal consideration of interests seriously, then one ought to accept that it is permissible to act in order to reduce or eliminate certain forms of animal suffering in the same way. The phenomenon of culture is incredibly complex and undoubtedly includes change over time, and to insist that a certain cultural practice remain forever unchanging and unchallenged seems to be rather unrealistic. Changing an aspect of a culture does not mean having to abandon the culture as a whole; but rather, can be seen as adapting to better reflect the changing values and beliefs of the people within that culture. I would argue that a movement which embraces in vitro meat could be seen as a sort of evolutionary step from a culture which requires the infliction of suffering upon (and the killing of) animals towards one which such suffering, rendered unnecessary for meat production due to the availability of in vitro meat, is not inflicted upon animals.

This view, however, is predicated upon the idea that the consumption of meat is the culturally significant factor which one wants to maintain. It could be argued that the cultural significance of a particular custom or practice does not exist in the actual consumption of meat

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<sup>76</sup> I believe the nature of the activism in question is important, and I would be very hesitate to say that *any* action is justified in the name of achieving certain moral goals. However, rational discourse and argumentation certainly seem to me to fall within the scope of acceptable forms of activism.

itself, but rather, in the manner in which the meat is attained (e.g. the rituals which must be followed when slaughtering animals, or the killing of animals acting as a rite of passage for people of a particular culture). To properly address each consideration from every possible cultural view would be a task too ambitious for me to undertake here; however, the same general argument would apply to each case.

Let us revisit the hypothetical Maya individual who could claim that the cultural significance of human sacrifice does not exist in the actual death of the victim, but rather, in the act of executing the victim (whether it be by decapitation, the removal of the heart from a live victim, or any other form of ritualistic sacrifice historically employed). That does not seem to lend any bit of credence to the idea that the interest of that individual to take part in a cultural practice should take precedence over the interests of the involuntary victim of that cultural practice. Although a scenario where one ceases a ritual in which suffering is inflicted upon unwilling victims and yet still receives the desired end product of such a ritual seems more favourable than a scenario where one ceases the practice of such a ritual and does not receive its end product. What is morally relevant, in my view, is the ceasing of a ritual in which suffering is inflicted upon unwilling participants. As such, I am inclined to maintain my position that in vitro meat should be accepted in favour of traditional forms of meat if it is as accessible, regardless of the cultural significant that traditional meat (its procurement, or its consumption) may have if one is to act in accordance with the notion of compassion earlier laid out.

### 3.2. *In Vitro Meat and Islamic Doctrines Regarding Permissible Foods*

A consideration that has been brought to my attention when discussing the prospect of in vitro meat is how it would coincide with certain religious traditions concerning permissible foods and the slaughter of animals. Specifically, how the notion of in vitro meat would be considered by certain proponents of Islam.

The religion of Islam has certain doctrines pertaining to food, particularly which foods are permissible for its followers to eat, and the means by which animals are to be slaughtered. The Halal Food Authority (HFA), lays out several rules which must be adhered to in order for meat to be considered halal (permissible)<sup>77</sup>:

1) The animal must “be alive and healthy at the time of slaughter, since carrion is forbidden and, jugular vein, carotid artery and windpipe have to be severed by a razor sharp knife by a single swipe,” at which point “a Muslim will recite *tasmiya* or *shahada*, which fulfills the requirement of dedication.”<sup>78</sup>

2) “All the flowing blood must be drained out of the carcass.”<sup>79</sup>

3) Swine flesh is forbidden.

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<sup>77</sup> As mentioned, for the purposes of this work, I will be using a particular understanding of Islamic doctrines regarding permissible food; in this case, one given by the Halal Food Authority. The Quranic verses which the HFA gives as the justification for their interpretation are al-Maida 5:3 and al- An`am 6:145. See Quran.com.

<sup>78</sup> Halal Food Authority, 2016.

<sup>79</sup> Halal Food Authority, 2016.

4) Animals that have been “killed by strangling or by a violent blow, or by a headlong fall”<sup>80</sup> are also forbidden.

One possible way to reconcile in vitro meat with such Islamic doctrines regarding food is to treat in vitro meat as being more akin to vegetation rather than conventional meat. In an interview with Gulf News, Abdul Qahir Qamar, Director of Fatwa and Sharia rulings at the International Islamic Fiqh Academy, said, “If scientists produce in vitro meat in the laboratory, it will not be considered meat from live animals.”<sup>81</sup> The reasoning behind this is that because there is no slaughter required to get the meat, the life of the cultured cells can be viewed as vegetative. If in vitro meat is viewed in this way, then it would not be subject to rules regarding how animals are to be killed. Qamar goes on to say that, in order for in vitro meat to be permissible according to Islamic doctrine, “the myoblasts must be taken from animals considered halal; products from pigs, dogs or wild animals with fangs or any other animals considered haram [unlawful] in Islamic law should not be used in any stage of the production process and neither should substances such as blood; and such products should not be detrimental or cause any harm to humans or the environment in any way.”<sup>82</sup>

In vitro meat does not require blood in order to be cultured, which would make bloodless meat exempt from doctrines regarding the draining of blood. Further, although in vitro meat derived from pig cells would be considered forbidden under such Islamic doctrines, such a prohibition does not seem, in my view, to be a major obstacle. Not only because there are other possible forms of in vitro meat (e.g. meat cultured from the cells of cows or chickens) which

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<sup>80</sup> Halal Food Authority, 2016.

<sup>81</sup> Billinghamurst, 2013.

<sup>82</sup> Billinghamurst, 2013.

could be consumed instead of in vitro pork, but also because those who ascribe to the tenets which would prohibit the consumption of such forms of in vitro meat already abstain from eating pork to begin with. As such, the argument of whether the conventional pork in their diet should be replaced with in vitro pork is moot. Although this view may not be accepted by all those who consider themselves followers of Islam, I believe it is, at least, a reasonable interpretation of the religious text.

In my view, the same line of reasoning can extend to other religious traditions which prohibit the consumption of meat - either altogether, or of certain forms (e.g. the abstinence of consuming beef by many followers of Hinduism). This may, however, raise some interesting concerns. For example, if a follower of Islam abstained from eating pork because of Islamic doctrine, and was in a position to have to choose between eating beef from a slaughtered cow or in vitro pork, I would be inclined to say that the ethical choice would still be the in vitro meat, despite it originating from a pig. Using the principle of equal consideration of interests, it seems that, in much the same way as argued in the previous section, the interest of the cow not to suffer in that scenario outweighs the interest of the person to practice their religion in a particular way (i.e. a way which includes the imposition of suffering on another being). In my view, the fact that an interest is religiously motivated does not give it any greater bearing when considering it against the interests of others.

Before continuing, I would like to address a possible objection to the above statements. Proponents of Islamic ritual slaughter may object that the method by which they slaughter animals does not inflict any pain upon the animal in question. However, as researchers Gibson et

al. note, “there is little neurophysiological evidence to support this suggestion.”<sup>83</sup> They note that “the phylogenetic similarities in structure and function of the central nervous systems between humans and other mammals leave little doubt that farm animals can indeed experience pain,”<sup>84</sup> which is in line with the observations given by Serjeant in Chapter 1. Gibson et al. go on to write that “there is also little doubt that [farm animals who are conscious when slaughtered] are aware prior to, during, and for a period after, slaughter by neck incision without prior stunning. It is therefore possible that slaughter by neck incision alone represents a noxious stimulus which is perceived by the animal as painful prior to the onset of insensibility.”<sup>85</sup> In order to test this hypothesis, they used electroencephalographic (EEG) methods to measure brain activity of anaesthetised calves and found that “EEG responses seen following neck tissue and blood-vessel transection were qualitatively distinct,”<sup>86</sup> and concluded that their findings “support the conclusion that the acute EEG response seen after slaughter of calves by ventral-neck incision was due primarily to noxious sensory input caused by incision of ventral-neck tissues, and not to loss of cerebral perfusion following severance of the carotid arteries and jugular veins.”<sup>87</sup> In other words, had the animals been conscious while they were slaughtered by means of having their neck cut - as is proscribed by Islamic doctrine, as explained by the HFA - it would be reasonable to conclude that they would have felt pain. Given the evidence suggesting that such slaughter would cause suffering, I find the objection that Islamic ritual slaughter is painless to be unconvincing.

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<sup>83</sup> Gibson et al., 2009. p. 84.

<sup>84</sup> Gibson et al., 2009. p. 84.

<sup>85</sup> Gibson et al., 2009. p. 84.

<sup>86</sup> Gibson et al., 2009. p. 84.

<sup>87</sup> Gibson et al., 2009. p. 88.

With that addressed, another consideration presents itself: does the interest of a deity outweigh the interest of a mortal? To continue with the example given above, where a person who follows Islamic doctrines regarding permissible food is in a position wherein he or she must choose to eat either beef from a slaughtered cow or in vitro pork, one could very well ask whether the interest of the cow not to suffer outweighs the interest of a deity that commands its followers to abstain from eating pork (and, by extension, in vitro pork). The main idea of the principle of equal consideration of interests with regard to the question at hand, as far as I am able to discern, is that an agent ought to give similar consideration to the interests of beings affected by the agent's actions to be free from pain to the consideration that the agent would give to their own interest to be free from pain, so long as the affected beings can feel pain in a similar way to the agent. It doesn't seem that a deity would be capable of feeling such pain, and thus, the principle of equal consideration of interests would not seem to apply to such a deity. If, however, the deity was able to feel pain in a similar way to us, then it would seem as though the principle of equal consideration of interests would apply, and in that case, it would seem as though that deity should give the interests of animals (both human and relevantly similar non-human) to be free from suffering the same consideration as its own interest to be free from suffering. Returning to the first scenario, wherein the deity in question cannot be said to be capable of experiencing suffering; I grant that the notion of equal consideration of interests may not apply to a deity that cannot feel pain. However, I do not think that commands to continue slaughtering animals in a way which has been reasonably demonstrated to cause pain when alternatives such as in vitro meat exist are in line with the position of compassion which I outline in Chapter 1. What can be said of a deity who, when put in the position to alleviate suffering by allowing the consumption of in vitro meat, commands that we instead hold to antiquated traditions which

cause animals to suffer? What can be said of a being who forbids the consumption of in vitro meat that has been verified as safe for us to eat<sup>88</sup>, insisting that we instead continue to cause suffering and death for the sake of producing our food? Words such as ‘loving’, ‘caring’, ‘omnibenevolent’, and ‘compassionate’ certainly do not spring to mind when thinking of appropriate labels to place on such a being. If I am to say that I have moral autonomy, and if I am to call myself a moral being, capable of evaluating ethical scenarios and making decisions to either act morally or immorally, then I would find it impossible for me to obey the commands of such a being when they conflict so obviously with what I have reason to believe is morally right. As such, I would argue that even if the interests of a deity outweigh the interests of a mortal, we ought not act in ways which we deem immoral simply because it is commanded that we do by some authority - be it a deity or otherwise.

### ***3.3. Objections Regarding Human Dominion Over Non-Human Animals***

An objection to the adoption of in vitro meat can be made on the grounds that human beings have dominion over non-human animals. Religious justification for this view can be found in sources such as the Bible (Genesis 1:26, 1:28 & 9:1-2, and Psalm 8:6) and the Quran (Al-Haj 22:36-37). Once the idea of human dominion over animals is established, I have encountered two ways for arguments against adopting in vitro meat to proceed:

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<sup>88</sup> I am, of course, still operating here under the assumption given earlier - that in vitro meat is just as safe for human consumption as traditional forms of meat.



1) Since human beings have dominion over animals, we are permitted to use animals as we see fit. This includes slaughtering animals for food. As such, the slaughtering of animals for food isn't a moral problem, and there is no moral reason to accept in vitro meat over the current methods.

2) God gave human beings dominion over animals, and as such, animals can be seen as a gift to humans from God. In this way, animals are meant to serve purposes for humans - one of which is the purpose of food. On this view, one could argue not only that in vitro meat is unnecessary - since there already exist animals whose purpose it is to be consumed by us - but also that adopting in vitro meat in favour of meat from slaughtered animals is a sign of disrespect towards God and his gift to us, as we would no longer be using the gift as intended (i.e. slaughtering animals in order to feed ourselves).

With regard to the first argument, Singer mentions it with respect to the issue of factory farming in an online article entitled *Factory Farming: A Moral Issue*. He notes that according to Matthew Scully, author of *Dominion: The Power of Man, The Suffering of Animals, and the Call to Mercy*, “even though God has given us ‘dominion’ over the animals, we should exercise that dominion with mercy.”<sup>89</sup> This sentiment is echoed by people like Robert Osei-Bonsu and Norbert Lohfink, who argue that the biblical interpretation of ‘dominion’ “does not sanction human dominion and exploitation over nature... [but rather,] implies shepherding,”<sup>90</sup> or stewardship. Thus, it could be argued that the biblical passages asserting the dominion of humans over non-human animals can be viewed as bestowing responsibility for the well-being of animals

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<sup>89</sup> Singer, 2006.

<sup>90</sup> Osei-Bonsu, 2012.

unto humanity by God. This view seems to be in line with the position of compassion outlined in Chapter 1; if we were given the responsibility of maintaining the well-being of animals, then we ought to take steps to reduce or eliminate suffering they experience - especially if it is suffering which we inflict upon them. Although this interpretation is put forward by people examining doctrines within Christianity, I see no reason why such interpretation can't be argued for other religious texts which claim human dominion. Armed with this interpretation, it is reasonable to argue that if we are charged with the well-being of non-human animals, and if the adopting of in vitro meat would significantly increase the well-being of animals, then we should adopt in vitro meat.

The second argument is one I encountered when speaking with an Imam at one of the local mosques in my home city. At face value, it may seem rather compelling to believers - if the omnipotent creator of the universe intends animals to be eaten, then we should honour his intentions and eat them. I believe that, with respect to the argument concerning in vitro meat, such an objection can be viewed in at least 2 ways: 1) a god intended the flesh of certain animals to be eaten by us, or 2) a god intended certain animals to be slaughtered in order for their flesh to be eaten. The difference between these two interpretations is slight, yet very important. If we are to accept the first iteration, then the argument does not seem to go against the notion of in vitro meat, since the product of in vitro methods is animal flesh intended for our consumption. In this way, the intentions of the deity are not being subverted or ignored, but rather followed (in what I would argue is a more ethical manner), as we are still consuming the flesh of certain animals as intended. The difference now being that this is occurring with significantly reduced amounts of animal suffering being involved.

The second iteration of this argument; however, presents more of a challenge (albeit, still not a very big one, in my view). In response to such an objection, I would say that the intentions of a gift giver can be superseded by the demand to use that gift in a certain way in order to achieve a significant moral purpose. I will use the analogy of a necktie to illustrate my point. Suppose that I was given a necktie as a gift by my mother. The purpose of a necktie is clear, and it is obvious that her intention is for me to wear it. However, if I were in a situation where I was able to use that necktie as a tourniquet to save someone's life, I would argue that doing so isn't immoral, despite that not being the purpose intended for it by my mother. Further, I would find the argument that 'my mother's intention was for me to wear it' to be unconvincing if used to try to persuade me that I should not use it to save someone's life if the situation arises. Even if doing so renders the tie unusable (or at the very least, unfit to be used as originally intended, as it would probably be quite the faux pas to go to a fancy dress party wearing a blood-stained tie), it seems to me that using it to save someone's life is acceptable, since doing so achieves a significant moral purpose.

In the same way, I would argue that if we are in the position to eliminate the pain that certain animals face while being slaughtered, then we should - even if the intention of a deity is that those animals should face pain and death in order for their flesh to be consumed. If we are able to acquire animal flesh via a process that produces minimal or no animal suffering instead of via a process which causes significant amounts of animal suffering, then anyone who demands that we use the latter process - not someone who merely rejects in vitro meat themselves, but rather, demands that everyone reject it merely on the basis that we ought to honour a being's intention that we slaughter animals - is acting in an incredibly uncompassionate manner towards

those animals, and I would argue that obeying such a being, be it a deity or otherwise, would be immoral.

Further, if one is not swayed by the secular reasons for which I give to refute the objection given above, then perhaps a religious argument may be more persuasive. One could argue that God made us rational, capable of problem-solving and transforming the world in ways that are unparalleled by other, non-human animals.<sup>91</sup> As such, we ought to use the faculties of reason bestowed upon us to find new solutions to old problems. Ensuring that we have a consistent food supply is a problem which much be solved, and as such, an argument could be made that the invention of in vitro meat in order to secure a source of food stands as another example of human beings using their capabilities bestowed upon them by God. Further, it has the added benefit of not requiring animal suffering in order to be implemented, and has the potential to eliminate the suffering human beings inflict upon animals for the purposes of attaining meat. Not using our abilities to their fullest potential - abilities which one could consider a gift from God - could be considered far more disrespectful than the continuation of the infliction of suffering and eventual slaughter of animals.

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<sup>91</sup> I would like to be clear here that this in no way is meant to say that other animals are incapable of such actions. However, as it stands now, human cognitive ability and the effect humans have had on the world with regards to shaping it to our will seem to be unmatched by other species of which we are aware.

### 3.4. *The Objection of 'Playing God'*

There may be those who object to the concept of in vitro meat on the grounds that producing it would be, in some sense, 'playing god'. Although some would dismiss such an objection as an empty cliché,<sup>92</sup> there may be some merit to it. Alexandre Erler, of the Oxford Uehiro Centre for Practical Ethics, describes how this objection could be interpreted. Firstly, he notes the literal religious interpretation that there is a certain plan for the world set by a deity and that to go against that plan would be immoral. This is echoed in concerns given by people such as Daniel Durning, the Managing Director of a Dubai-based restaurant consultancy.

Is it ethical to emulate God and create meat? We have been born hunters and carnivores and we remain as such, so is it unethical to not be what we have been created as?<sup>93</sup>

I believe that this objection can be addressed in very much the same way as the second objection regarding human dominion. If we can determine that there is an action we deem is ethical, then, if we are to consider ourselves moral agents at all, we ought to act in that way regardless of the wishes or plans of any deity. I believe there is sufficient reason to accept that compassion can be a legitimate basis for ethical action, and as such, I would argue that we ought to act compassionately regardless of whether or not we have done so historically, or whether or

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<sup>92</sup> See Ball, 2010.

<sup>93</sup> Billingham, 2013.

not it is a deity's plan for us to do so. However, Erler notes two possible *secular* ways that this objection could be interpreted:

One possible way would be to interpret the charge as an accusation of hubris; humans, supposedly, are claiming powers beyond their proper station in the world... The objection could also be interpreted as meaning that by using biotechnology for the purpose of improving human life and well-being, we are threatening human autonomy by assuming a role heretofore reserved to nature (a religious version of the objection would refer to God instead).<sup>94</sup>

In response to the first interpretation of this objection, Erler deals with it in regards to the possible negative consequences that may entail from following such a hubris attitude. In short, his interpretation of this version of the objection is that we ought not act in such a hubris manner so as to use biotechnology to improve our conditions as there may be “unforeseen negative consequences that might follow from our use of biotechnology, given our insufficient knowledge of the natural world.” However, to counter this proposition he points out that “everything we do might in principle have unforeseen negative consequences, and taking this as a reason to refrain from acting would seem to purely and simply proscribe human action altogether.” As such, he notes that proponents of this argument should suggest what the negative consequences may be. With this, I agree; before we can seriously consider forbidding a certain technological undertaking, it seems as though we should at least have some idea of what the ill effects of such an undertaking may be. To be clear, I certainly do not think that this would justify reckless abandon of scepticism towards new forms of technology and what proponents of it claim it may offer us. Nor, do I believe, does it mean there need not be carefully planned safety precautions and considerations for what the effects of widespread implementation of a new technology may

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<sup>94</sup> Erler, 2010.

be. However, to merely state that adopting a technology may have negative consequences of which we may not be currently aware, and then to argue that, on that basis, we should refrain from doing so seems to be letting our fear of the unknown impede any possibility for future technological advancement. If we were to adopt such a stance, then technological advancement of any kind would grind to a halt.

However, there seems to be another interpretation for this version of this objection. It could be argued that in saying that human beings have a “proper station in the world,”<sup>95</sup> perhaps what is meant is that human beings have a specific place in the universe, or a particular role to play; we ‘belong’ in some existential category or on some appropriate course of existence away from which we must not deviate.

To this I would respond that what exactly the ‘proper station’ is for humans in the world doesn’t seem to be as concrete as it need be for proponents of this idea. For example, it would be entirely reasonable for this argument to be applied, say, to the phenomenon of human flight 2000 years ago. Certainly the inception and implementation of the principles of flight have allowed us, as humans, to claim powers that were beyond the limitations that hindered our ancestors, and yet, not once have I heard it put to me that I am doing something immoral while I clamber into seat 21J before takeoff. Similarly, if someone seriously holds to this objection while unironically grabbing for their phone - which is connected to a vast human-made communication network spanning the Earth and even reaching out into its orbit, then I am sorry to say that they either

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<sup>95</sup> Erler, 2010.

don't understand the argument or they are being hypocritical.<sup>96</sup> If our ancestors were to refrain from making advances that propelled them beyond their limitations in the world, then modern life in the technological era in which we find ourselves would be impossible. It seems to me that before such an objection can be taken seriously, a clear definition of what the 'proper station' for humans in the world actually is must be presented by proponents of this argument, and very good reasons must be given for why we must abandon current technologies (perhaps including the implementation of life-saving modern medicine, or the harnessing of electricity) and/or stifle new discoveries (such as the research being done into quantum computing) which would otherwise propel us out of it.

With regards to the latter interpretation of the objection (the one regarding assuming a role otherwise reserved to nature), although the context in which Erler describes it is one in which it is being levied towards scientists who created a microorganism with a "wholly synthetic, designed genome,"<sup>97</sup> could very well apply to in vitro meat. I don't find this objection persuasive, as I believe there are many examples of roles historically reserved by nature (or, to the religious, by God) with which human beings have interfered immensely, but in ways in which I believe many people would not argue are unethical. Consider the following example. There was a point in history where our ancestors were unable to illuminate their surroundings with means such as harnessing fire (or until relatively recently, by means of harnessing electricity). Until they were able to control fire and use it in such a way as to provide visibility (among other things), the role of illumination was reserved by nature, by means of the sun, the

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<sup>96</sup> This is, of course, assuming that one believes that creating devices which allow us to communicate with each other and creating the infrastructure to enable such communication (including launching satellites into orbit) by means of manipulating the natural world are activities which are outside the limits of humanity's proper place.

<sup>97</sup> Ball, 2010.



moon, the stars, etc. Whether one wants to claim that it was nature or a deity which influenced these events, this much is clear: once our ancestors were able to light up their surroundings, they assumed a role which was otherwise reserved and which they previously did not assume. Doing so allowed them to accomplish things which were previously impossible, and to extend the period of time in which they were able to be active and productive. No longer constrained by the limitations of the cycle of day and night, or by the limitations of where natural light was able to shine, they were able to create light for themselves when they desired, and use it to expand the realm of possibilities available to them. As mentioned earlier, human history is littered with instances of human beings pushing the limits imposed upon them by nature, expanding their abilities to manipulate the natural world in ways in which improve our quality of life. I would argue that the development of in vitro meat is another step forward along this path, a step which could not only improve life for human beings, but which would definitely improve the quality of life of animals that would otherwise be raised and slaughtered for meat. As such, if one is to argue that we ought not accept in vitro meat, since doing so would be 'unnatural' or would otherwise be assuming a role otherwise reserved to nature, then I would respond that proponents of that argument need only momentarily consider the role that technological advancement has played in the advancement of our species to realize that had our ancestors had the same mindset. If they did not assume roles which went above and beyond the limitations imposed upon them by nature, then we would still be as ignorant and helpless to the vagaries of nature as the ancient mammals from which we evolved.

## **Conclusion**

In the preceding chapters, I have, to the best of my ability, expressed why I believe individuals ought to accept in vitro meat as an alternative to meat attained via traditional methods. Through empathy, we are able to recognize that the suffering of others is as real to them as ours is to ourselves, and as such, in just the same way as we would have legitimate ethical grounds to act to alleviate or eliminate the suffering we experience, we have a legitimate moral basis for acting compassionately to reduce or eliminate the suffering experienced by non-human animals. Given that certain animals have the capacity to suffer (i.e. by means of experiencing pain or even to some extent, forms of psychological anguish) in much the same way as we do, when it comes to interests of being free from suffering, we ought to offer similar consideration to the interests of those animals as we would offer to the interests of other human beings. If we are to act compassionately towards the animals we affect by consuming meat, and since the production of in vitro meat produces little or no animal suffering, then, all else being equal, we should adopt in vitro meat as a means of satisfying the massive demand for consumable meat over traditional methods (most notably, factory farming) which produce vastly greater amounts of animal suffering.

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