

# THE GLOBAL TRADE OF CLONED MEAT

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## Abstract

Until now commercial animal cloning has been generally limited to breeding stock. But Xu Xiaochun of the Chinese company Boyalife Genetics plans to mass produce animal clones for direct meat consumption. The research partnership between Boyalife and South Korean firm Sooam Biotech suggests the possibility of an international market for cloned food animals.

Can cloned food imports be rejected by national governments? This Article outlines the relevant considerations, and argues that a revised understanding of the “precautionary principle” can help to reconcile disparate, and perhaps ineffable, goals like producing high-quality meat and maintaining the integrity of the human experience.

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## INTRODUCTION

Animal and transgenic cloning is making headlines. In January 2017, a team of scientists led by the Salk Institute announced that they had

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created a chimera human–pig embryo.<sup>1</sup> Supporters view this as a formative step to the production of lab-created organs for human patients. Pigs have notably similar organs to humans, and so scientists think these transgenic organs have correlatively less chance of “rejection risk.”<sup>2</sup> But perhaps you share my reaction that human–pig hybrids are also a bit dystopic and icky. The brave new world of contemporary science offers innovative ways to alleviate human suffering and extend human life, but it also prompts debate about the integrity of the human experience and limits on human experimentation. The line-drawing problem between genetic therapy and enhancement is a difficult one, but there should be at least some set of universal standards or guidelines for tinkering with our human condition. The slippery-slope argument may suggest the connections between animal and human cloning. Another relevant trope is the domino effect: If one rogue nation begins creating its genetic uber-human, other nations will be incentivized to join this eugenics race to the bottom.<sup>3</sup>

The bioethical question has shifted from what is possible to what is acceptable.<sup>4</sup> Princeton biologist Lee M. Silver posits that human cloning is inevitable: “If nuclear transplantation works in every mammalian species in which it has been seriously tried, then nuclear transplantation *will* work with human cells as well.”<sup>5</sup> Still, even if resistance to a brave new world of human cloning reflects an effete sensibility or prudishness with the unknown, one could at minimum argue this is a project that requires international deliberation. The Declaration of Helsinki governs human research ethics,<sup>6</sup> however, there is not any specific convention on human cloning or posthuman experimentation. There are proposals for international agreements, such as the Convention on the Preservation of the Human Species.<sup>7</sup> But present legal restrictions on cloning are limited

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1. Erin Blakemore, *Human–Pig Hybrid Created in the Lab—Here Are the Facts*, NAT’L GEOGRAPHIC (Jan. 26, 2017), <http://news.nationalgeographic.com/2017/01/human-pig-hybrid-embryo-chimera-organs-health-science/>.

2. *Id.*

3. *Cf.* George J. Annas et al., *Protecting the Endangered Human: Toward an International Treaty Prohibiting Cloning and Inheritable Alterations*, 28 AM. J.L. & MED. 151, 161–62 (2002) (restating the argument that cloning will inevitably lead to attempts to create not just genetic duplicates, but better and better humans).

4. Jesper Lassen et al., *After Dolly—Ethical Limits to the Use of Biotechnology on Farm Animals*, 65 THERIOGENOLOGY 992, 993 (2006).

5. Lee M. Silver, *Cloning, Ethics, and Religion*, 7 CAMBRIDGE Q. HEALTHCARE ETHICS 168, 169 (1998).

6. Jharna Mandal et al., *Ethics in Human Research*, TROPICAL PARASITOLOGY (2011), <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3593469/>.

7. Annas et al., *supra* note 3.

to national or supranational documents<sup>8</sup> and to individual state legislation within the United States.<sup>9</sup> Part of this lack of consensus goes to definitional problems inherent in separating, for example, gene treatment to cure a “defect” from possible procedures to expand human capacity.<sup>10</sup> Perhaps there is also a sense that cloning is a distant reality that only exists in science-fiction films. The “birth” of Dolly the Sheep inspired a burst of debate.<sup>11</sup> But since that event there has been relatively little public debate—or at least very few legislative moves.

Big agriculture and other defenders of the free trade of cloned-animal products have suggested a bright-line separation of animal and human experimentation.<sup>12</sup> The 1997 National Bioethics Advisory Committee had a similarly conclusory take on this (supposed) binary of animal vis-à-vis human cloning: “[R]esearch on cloning animals . . . does not raise the issues implicated in attempting to use this technique for human cloning, and its continuation should only be subject to existing regulations regarding the humane use of animals and review by institution-based animal protection committees.”<sup>13</sup> But topical stories on animal cloning bring into focus its implications for human experimentation.

A human-pig embryo can be rationalized. Lab-created organs have a decidedly utilitarian purpose and are visibly distinguishable from a proper full-size human clone. Most people do not self-identify by their internal, discrete organs—indeed many already volunteer them to others. *In vitro*, or “cultured,” meat is analogous. In August 2013, the first lab-grown burger “taste test” was celebrated in London.<sup>14</sup> Google cofounder

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8. *E.g.*, Charter of Fundamental Rights of the European Union, art. 3(2), 2000 O.J. (C 364) 1, 9.

9. *Laws and Public Policy About Cloning*, CLONING—A WEBLIOGRAPHY, <http://staff.lib.msu.edu/skendall/cloning/laws.htm> (last visited Oct. 8, 2017).

10. Faith Lagay, *Gene Therapy or Genetic Enhancement: Does it Make a Difference?*, 3 AM. MED. ASS’N J. ETHICS (Feb. 2001), <http://journalofethics.ama-assn.org/2001/02/gnth1-0102.html>.

11. Russell Blackford, *Dolly the Sheep and the Human Cloning Debate – Twenty Years Later*, CONVERSATION (Aug. 9, 2016), <http://theconversation.com/dolly-the-sheep-and-the-human-cloning-debate-twenty-years-later-63712>.

12. John F. Murphy, *Mandatory Labeling of Food Made from Cloned Animals: Grappling with Moral Objections to the Production of Safe Products*, 63 FOOD & DRUG L.J. 131, 139 (2008) (“Despite the common association [between human and animal cloning] in the public mind, researchers in the animal cloning field scoff at the possibility.”).

13. Stacy J. Ratner, Note, *Baa, Baa, Cloned Sheep, Have You Any Law? Legislative Responses to Animal Cloning in the European Union and United States*, 22 B.C. INT’L & COMP. L. REV. 141, 151 (1999) (quoting NAT’L BIOETHICS ADVISORY COMM’N, CLONING HUMAN BEINGS: REPORT AND RECOMMENDATIONS iv (1997)).

14. Trae Norton, *From the Lab to the Supermarket: In Vitro Meat as a Viable Alternative to Traditional Meat Production*, 11 J. FOOD L. & POL’Y 157, 165 (2015).

Sergey Brin is a vanguard investor in this project to create economically viable *in vitro* meat alternatives,<sup>15</sup> and since 2013 there has been significant progress in reducing costs.<sup>16</sup> The promise of *in vitro* meat is the taste and nutrition of meat without the suffering. This should trump any intuition that *in vitro* meat is alien or unseemly.<sup>17</sup> And besides, *in vitro* burgers look just like the natural kind, even if they are desiccated or bland.<sup>18</sup> They don't disturb the senses or internalized order of nature.

The assembly-line carcasses of the Boyalife factory are different. Until now animal cloning has been most associated with the boutique practice of re-producing cherished pets<sup>19</sup> or the scientific quest to recreate extinct species.<sup>20</sup> The commercial viability of cloning food animals has been deemed remote.<sup>21</sup> But Xu Xiaochun of the Chinese company Boyalife Genomics plans to bring mass production to animal cloning for direct meat consumption. The company expects to open a factory the size

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15. *Id.* at 166.

16. See, e.g., Marta Zaraska, *Lab-Grown Meat Is in Your Future, and It May Be Healthier Than the Real Stuff*, WASH. POST (May 2, 2016), [https://www.washingtonpost.com/national/health-science/lab-grown-meat-is-in-your-future-and-it-may-be-healthier-than-the-real-stuff/2016/05/02/aa893f34-e630-11e5-a6f3-21ccd5f74e\\_story.html?utm\\_term=.0b1f73aee2f3](https://www.washingtonpost.com/national/health-science/lab-grown-meat-is-in-your-future-and-it-may-be-healthier-than-the-real-stuff/2016/05/02/aa893f34-e630-11e5-a6f3-21ccd5f74e_story.html?utm_term=.0b1f73aee2f3) (noting how a Dutch company spent \$330,000 in 2013 to create a single hamburger, but an American company produced a pound of meatballs for \$18,000 in 2016).

17. More specifically, challenging the notion that fake meat will prove a panacea for the eco-catastrophes wrought by modern meat industries, these artistic and literary forerunners of emergent scientific realities come to position meat substitutes in ways that trouble the linkage of the human subject with all forms of authority, and in so doing pursue deeper inquiry into whether and how fake meat leverages more responsive and responsible environmental ethics. E.g., Susan McHugh, *Real Artificial: Tissue-Cultured Meat, Genetically Modified Farm Animals, and Fictions*, 18 CONFIGURATIONS 181, 183 (2010).

18. Norton, *supra* note 14, at 165–66.

19. E.g., AFP–JIJI, *Cost of Replicating Fido? \$100,000 a Pup, Korean Cloning Clinic Says*, JAPAN TIMES (July 4, 2016), <https://web.archive.org/web/20160714193808/http://www.japantimes.co.jp/news/2016/07/04/asia-pacific/science-health-asia-pacific/cost-of-replicating-fido-100000-a-pup-korean-cloning-clinic-says/#.WZh-WWVMmIU> (“With a client list including princes, celebrities and billionaires, the foundation offers owners protection against loss and grief with a cloning service that promises the perfect replacement for a beloved pet.”).

20. See Alejandro E. Camacho, *Going the Way of the Dodo: De-Extinction, Dualisms, and Reframing Conservation*, 92 WASH. U. L. REV. 849, 857 (2015) (“Advances in knowledge achieved through cloning efforts for extinct species could be used to engage in cloning for extant endangered species, particularly for species that have declined to only a few or single non-reproducing individuals.”).

21. See, e.g., Murphy, *supra* note 12, at 134 (explaining why cloning food animals is cost prohibitive compared to breeding food animals); see also Chris Downes, *The Rise and Fall of the New EU Novel Food Regulation: The Complex Influence of the WTO SPS Agreement*, 8 ASIAN J. WTO & INT’L HEALTH L. & POL’Y 249, 270 (2013) (“With a production cost for a single animal of around US\$20,000, economics alone rules out such animals entering the food chain.”).

of three American football fields soon in Tianjin,<sup>22</sup> a mega-facility that will include a gene storage area and museum.<sup>23</sup> The Boyalife Twitter feed has unveiled recent pictures of sleek, modern construction.<sup>24</sup> The company also has more rarefied goals. According to Xiaochun, “cloned beef is the tastiest beef [he’s] had.”<sup>25</sup> Boyalife aims to create a flavorful product to help fill a lack of high-quality beef in Mainland China.<sup>26</sup>

The company’s goal is ambitious: to produce 100,000 “top-quality” cow embryos per year, and eventually 5% of the premium cattle slaughtered in China.<sup>27</sup> The research partnership between Boyalife and South Korean firm Sooam Biotech suggests the possibility of an international market for cloned food animals.<sup>28</sup> This sci-fi play on the notion of farm-to-table is alarming.

This Article considers the implications of animal meat clones on patent and trade law. Clones fit awkwardly into current legal categories, notably whether an animal clone or its cloned meat is “novel.” This Article questions the continued utility of this construct of newness for thinking about already-living beings, specifically about whether these animal meat clones are meaningfully different from other sorts of cloned products in the global food supply chain. Can cloned-food imports be rejected by national governments? This Article outlines the available arguments and argues that a revised understanding of the “precautionary principle” can help to reconcile disparate, and perhaps ineffable, goals like producing high-quality meat and maintaining the integrity of the human experience.<sup>29</sup>

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22. John Hayward, *Chinese Scientist Plans to Clone a Million Cows Per Year*, BREITBART (Jan. 4, 2016), <http://www.breitbart.com/tech/2016/01/04/chinese-scientist-plans-clone-million-cows-per-year/>.

23. Michael Addady, *China Will Start Cloning Cattle to Meet Rising Beef Demands*, FORTUNE (Dec. 1, 2015), <http://fortune.com/2015/12/01/china-cloning-cattle/>.

24. See generally Boyalife Group (@BoyalifeGroup), TWITTER, <https://twitter.com/BoyalifeGroup> (last visited Oct. 8, 2017) (displaying pictures of Boyalife Group’s construction).

25. Tom Phillips, *Largest Animal Cloning Factory Can Save Species, Says Chinese Founder*, GUARDIAN (Nov. 24, 2015, 12:27 AM), <https://www.theguardian.com/world/2015/nov/24/worlds-largest-animal-cloning-factory-can-save-species-says-chinese-founder>.

26. Stephen M. Lepore, *Chinese Cloning Firm ‘Won’t Make Frankensteins’ With Humans*, N.Y. DAILY NEWS (Dec. 28, 2015, 5:52 PM), <http://www.nydailynews.com/news/world/cloning-firm-no-plans-clone-humans-article-1.2479074>.

27. Phillips, *supra* note 25.

28. *Id.*

29. See, e.g., Sophie M. Clavier, *Food Fight at the WTO: Can the Precautionary Principle Reconcile Liberalization and Public Fear?*, 16 CURRENTS: INT’L TRADE L.J. 3, 3 (2008).

## I. PUBLIC RESPONSES TO CLONING

This analysis is informed by a threshold claim that human and animal cloning are paired. The ethics question was hotly debated after the “birth” of Dolly, who of course “was in a radical sense fatherless.”<sup>30</sup> The main critiques of the cloning project have clustered around animal-centric problems related to the quality of life of the individual animal, as well as more deontological concerns about “playing god”<sup>31</sup> or animal autonomy.<sup>32</sup> Xu Xiaochun has soothed human-use fears by reassuring that Boyalife will not embark on human cloning: “[W]e won’t make Frankensteins.”<sup>33</sup> However, he has also opaquely referenced evolving “social values” and the possibility that his technologies could later benefit the human race.<sup>34</sup> Even more disquieting is that Boyalife’s partner firm Sooam was founded by pariah Hwang Woo Suk.<sup>35</sup> In 2004, Suk claimed to have created human embryos at the blastocyst stage,<sup>36</sup> but his research was later derided as fraudulent.<sup>37</sup> Critics rightly question his current intent in cloning pet dogs. If part of the legal justification for animal cloning is that it is cloistered from experimentation on humans, but the animal-cloning vanguard has been exposed as having broader human-centric ambitions, then the constructed bright line between human-mammal and nonhuman-mammal testing begins to erode. The legality of animal cloning seems to depend on the illegality of human cloning.

As a conditional question, one might ask: What is *really* wrong with animal cloning? After all, cloned animal products have been designated safe by the Food and Drug Administration (FDA),<sup>38</sup> and people obviously already consume plant clones and genetically modified (GM) foods in large numbers. Cloning defenders argue that our visceral distaste for

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30. Lassen et al., *supra* note 4, at 993.

31. Chris Slack, Association for Molecular Pathology v. Myriad Genetics, Inc.: *What Are the Effects on Cloning Extinct Animals and Agriculture Now That cDNA Is Patentable?*, 19 DRAKE J. AGRIC. L. 347, 358 (2014).

32. Perhaps the “deep-ecological” argument could turn either way if endangered or recently extinct keystone species were reintroduced. Cf. Chad West, *Economics and Ethics in the Genetic Engineering of Animals*, 19 HARV. J.L. & TECH. 413, 429–30 (2006).

33. Hayward, *supra* note 22.

34. *Id.*

35. Rob Stein, *Disgraced Scientist Clones Dogs, and Critics Question His Intent*, NPR (Sept. 30, 2015, 3:01 PM), <http://www.npr.org/sections/health-shots/2015/09/30/418642018/disgraced-scientist-clones-dogs-and-critics-question-his-intent>.

36. See Autumn Fiester, *Ethical Issues in Animal Cloning*, 48 PERSP. BIOLOGY & MED. 328, 336 (2005).

37. Jung Ha-Won, *Fido Forever? South Korea’s Dog Cloning Clinic*, PHYS.ORG (July 4, 2016), <http://phys.org/news/2016-07-fido-korea-dog-cloning-clinic.html>.

38. Maria Weimer, *The Regulatory Challenge of Animal Cloning for Food—The Risks of Risk Regulation in the European Union*, 1 EUR. J. RISK REG. 31, 33 (2010).

cloned foods reflects a gestalt feeling rather than reasoned analysis. The U.S. Humane Society requested a ban on products coming from cloned animals as early as 2002.<sup>39</sup> Defenders situate this skepticism of cloning within a broader lack of understanding about biotechnology. For example, in the weeks after Dolly's arrival on the scene, 56% of surveyed Americans said they would not eat the meat of cloned animals.<sup>40</sup> However, cloning defenders still lack data that goes to support their "knowledge deficit" theory. Eurobarometer surveys evidenced continued unease with animal cloning a decade after Dolly.<sup>41</sup> A 2008 Eurobarometer survey found that 61% of Europeans felt animal cloning to be morally wrong, and 77% believed it might lead to human cloning.<sup>42</sup> Interestingly, The Roslin Institute that cloned Dolly in 1996 no longer works on animal cloning.<sup>43</sup>

One might parry: Do we *really* need animal cloning? Agricultural science has already developed natural methods to mirror the benefits of genetic selection (for example, the Red Angus). Also, some of the proposed alternative benefits of animal cloning seem counterproductive. Boyalife also aims to clone sniffer dogs and champion racehorses.<sup>44</sup> But does this take away from the magic and very premise of sport?<sup>45</sup> So far the Sooam sniffer dog has been a lousy investment for the Russian police. The New York Post recently reported how these dogs, at a price tag of \$100,000 each, have mostly flunked administered skills tests.<sup>46</sup>

Defenders of animal cloning also refer to comparative levels of pain and suffering for naturally reproducing animals on factory farms.<sup>47</sup> The argument goes: Sure, most cloned animals die young or suffer awful lives, but the same is true of animals on industrial farms.<sup>48</sup> Today there is more contestation over the moral legitimacy of industrial farming.<sup>49</sup> This supposed control or foil to animal cloning is no longer considered a valid counterpoint.

39. Fiester, *supra* note 36, at 332.

40. Silver, *supra* note 5, at 168.

41. Lassen et al., *supra* note 4, at 994.

42. Weimer, *supra* note 38, at 35.

43. Gretchen Vogel, *E.U. Parliament Votes to Ban Cloning of Farm Animals*, SCIENCE (Sept. 8, 2015, 1:15 PM), <http://www.sciencemag.org/news/2015/09/eu-parliament-votes-ban-cloning-farm-animals>.

44. Phillips, *supra* note 25.

45. See generally Laura E. Peet, *One-Trick Genes? A Look at the Legality of Banning Animal Clones from Commercial Proving Grounds*, 2 U. ILL. J.L. TECH. & POL'Y 565 (2014) (discussing cloning in award-winning race and show horses).

46. Lia Eustachewich, *These Cloned Dogs Can't Do Anything Right*, N.Y. POST (Jan. 13, 2017, 2:05 PM), <http://nypost.com/2017/01/13/these-cloned-dogs-cant-do-anything-right/>.

47. Fiester, *supra* note 36, at 333.

48. *Id.*

49. *Id.*

The European Food Safety Authority (EFSA) views animal cloning as primarily an animal welfare hazard.<sup>50</sup> Viability, or “efficiency rates,” in converting cloned animal embryos to adult cloned animals is quite low. Only 6–15% of mammalian clones survive past infancy, mostly because of placenta dysfunctions and the unusually large size of cloned offspring.<sup>51</sup> Conversely, the mortality rate of those clones who do survive is quite high.<sup>52</sup> But if companies like Boyalife continue to invest in research and development, one could imagine a future where cloned animals enjoy relatively healthy lives, especially if the rubric or benchmark is common agriculture (“factory-farmed”) animals.<sup>53</sup> The temporal limitations to the animal welfare argument limit its effectiveness.

These are troubling issues, and prompt the question of why all this experimentation is necessary given the availability of naturally produced meat. Is the end goal of cloning research to make a uniformly satisfactory hamburger?

## II. INVENTING NATURE IN THE UNITED STATES

There has been scholarly buzz in response to recent high-profile cloning cases. The U.S. Court of Federal Claims in *In re Roslin Institute (Edinburgh)*<sup>54</sup> held that Dolly the Sheep was not patentable material,<sup>55</sup> but the U.S. Supreme Court in *Association for Molecular Pathology v. Myriad Genetics Inc.*<sup>56</sup> determined that synthetically (non-naturally) occurring complementary DNA (cDNA) is patentable.<sup>57</sup> This technology is distinct from the more common “embryo splitting” or “nuclear transfer” cloning methods, and it works by isolating a homogeneous genetic strain in an organism via “an enzyme reverse transcriptase which uses the information from RNA to generate complementary DNA.”<sup>58</sup> Dolly was deemed unpatentable because she did not represent a substantially changed sheep as compared to a baseline conventionally bred sheep.<sup>59</sup> However, it is still an open question whether a sufficiently “newer” kind of sheep might meet this novelty litmus, or whether a

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50. Ignacio Carreño, *European Commission Proposes to Revise the EU's Legislative Framework on Novel Foods and Animal Cloning*, 5 EUR. J. RISK REG. 362, 364 (2014).

51. *Id.* at 363–64.

52. Fiester, *supra* note 36, at 332.

53. *Cf.* Weimer, *supra* note 38, at 37.

54. 750 F.3d 1333 (Fed. Cir. 2014).

55. *Id.* at 1339.

56. 133 S. Ct. 2107 (2013).

57. *Id.* at 2111.

58. Slack, *supra* note 31, at 348–50.

59. *In re Roslin Inst. (Edinburgh)*, 750 F.3d at 1339.

company that clones a food animal via synthetic cDNA could have patent rights over the technological process.

In 1873, Louis Pasteur earned a patent for a purified yeast.<sup>60</sup> But *Diamond v. Chakrabarty*<sup>61</sup> was the first time the Supreme Court ruled a human-made, genetically engineered product (here, a bacterium) patentable, given that “the patentee has produced a new bacterium with markedly different characteristics from any found in nature and one having the potential for significant utility.”<sup>62</sup> It is unclear how “markedly different”<sup>63</sup> a Boyalife-designed cow must be to meet the patentability standard. Though an unpublished 2012 Federal Circuit opinion, *In re Ditto*,<sup>64</sup> indicated that cloned animals that do not differ in claimed aspects from naturally occurring animals generally may not be patented.<sup>65</sup> Professor Brad Sherman of the University of Queensland suggests that judicial characterization and relative framing is key to this analysis, as is whether the new product has a new use.<sup>66</sup> A cheeky bypass for the patent-seeking food clone company: to instead market the meat of extinct animals like the woolly mammoth or dodo.<sup>67</sup> Recreating the extinct animal is more likely to meet tests of novelty and nonobviousness.<sup>68</sup>

The United States is not unique in subjecting cloned animals to the same regulations as research animals.<sup>69</sup> But because cloned meat animals are meant to be consumed—and potentially on a mass scale—they should also be subject to public health and environmental regulations.<sup>70</sup> This is especially important because the current USDA definition of a protected research “animal” excludes “livestock or poultry used or intended for use for improving animal nutrition, breeding, management, or production

60. Ryan Hagglund, *Patentability of Cloned Extinct Animals*, 15 GEO. MASON L. REV. 381, 386 (2008). In April 1988, the PTO issued the first patent for an animal, a Harvard-created transgenic mouse. *Id.* at 403.

61. 447 U.S. 303 (1980).

62. *Id.* at 310.

63. *In re Roslin Inst. (Edinburgh)*, 750 F.3d at 1339.

64. 499 F. App’x 1 (Fed. Cir. 2012).

65. *Id.* at 3.

66. Brad Sherman, *What Does It Mean to Invent Nature?*, 5 U.C. IRVINE L. REV. 1193, 1210–21 (2015).

67. See generally Miriam Ricanne Swedlow, *The Woolly-Mammoth in the Room: The Patentability of Animals Brought Back from Extinction Through Cloning and Genetic Engineering*, 11 WASH. J.L. TECH. & ARTS 183 (2015) (discussing the possibility of cloning extinct animals).

68. See Hagglund, *supra* note 60, at 386 (“This article concludes that the statutory requirements of patentability of statutory subject matter, novelty, nonobviousness, and utility may be met in the cloned extinct animal context and also, patenting these animals is consistent with the goals of the patent system.”).

69. See, e.g., Lassen et al., *supra* note 4, at 1001.

70. *Id.*

efficiency.”<sup>71</sup> Here there is arguably a regulatory lacuna in the United States for cloned animal products (if the United States eventually enters this research space for a consumer market).

This seems like an archetypal context for the precautionary principle. And while it is true that the FDA has not observed that consumption of cloned animal products is deleterious, it is maybe impossible to prove in the short term that it is as *safe* as natural animal proteins.<sup>72</sup> The FDA does not “determine the safety of proposed GE foods; instead, it evaluates whether the GE product is similar to comparable non-GE products.”<sup>73</sup> A related problem is that the FDA will only describe cloned foods as “different” if they are in fact “materially” different, a potentially capacious and malleable lexical standard.<sup>74</sup> In 2008, the FDA authored an opinion that food derived from cloned animals does not provide any more risks than food from conventionally bred animals.<sup>75</sup> Still, the USDA and the food industry enacted a voluntary moratorium in 2001.<sup>76</sup> So despite the regulatory green light from the FDA, it is unlikely that U.S. food producers will market cloned foods in the near future.<sup>77</sup> It could take an additional three to five years for cloned food products to reach the consumer once the moratorium ends.<sup>78</sup> It is still in effect.<sup>79</sup>

In contrast, in 2015 the European Parliament “voted to ban the cloning of all farm animals as well as the sale of cloned livestock, their offspring, and products derived from them.”<sup>80</sup> This went beyond a proposed 2013 directive that would have implemented a provisional ban on just five species of commonly farmed animals.<sup>81</sup> This preemptive move can be interpreted as both an acknowledgment that cloned foods fit awkwardly within the EU’s novel-food paradigm, as well a recognition that the U.S. FDA’s noninterference posture could facilitate the furtive import of cloned foods into the EU.<sup>82</sup> However, this same “hands-off”

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71. 7 U.S.C. 2132(g) (2012).

72. Fiester, *supra* note 36, at 336.

73. Genna Reed, *Rubber-Stamped Regulation: The Inadequate Oversight of Genetically Engineered Plants and Animals in the United States*, 14 SUSTAINABLE DEV. L. & POL’Y 14, 17 (2014).

74. Leslie Francis et al., *FDA’s Troubling Failures to Use Its Authority to Regulate Genetically Modified Foods*, 71 FOOD & DRUG L.J. 105, 126 (2016).

75. Weimer, *supra* note 38, at 33.

76. *Id.*

77. *Id.*

78. *Id.*

79. *See, e.g.*, Reed, *supra* note 73, at 18.

80. Vogel, *supra* note 43.

81. *Id.*

82. Downes, *supra* note 21, at 271–72.

FDA attitude makes it unlikely they would try to preempt individual state action to limit or label cloned products.<sup>83</sup>

### III. THE FUTURE OF LABELING

In 2016, Vermont became the first U.S. state to require GMO labeling on food products.<sup>84</sup> Critics immediately questioned whether this move comported with a dormant commerce clause<sup>85</sup> or the First Amendment.<sup>86</sup> The agribusiness industry was also understandably wary of this GMO labeling requirement, which was certainly based on Vermonters wanting to know which foods possess cloned products so they can avoid eating them. Opponents to mandatory GMO labeling spent over \$27 million in lobbying costs in the first half of 2014 alone.<sup>87</sup> Attempting to form a compromise between the many consumers who expect transparency in where their food comes from and a food industry that wants to avoid a patchwork of disparate state labeling requirements, the Obama administration and a bipartisan Congress passed a food-labeling bill to preempt the Vermont “Right to Know” legislation.<sup>88</sup> Instead, the July 2016 bill S. 764—derided by food activists as the “DARK Act” (Denying Americans the Right to Know)—mandates that food labels contain an electronic QR code or 1-800 number that discerning buyers can scan or call to learn the full GMO history of a product.<sup>89</sup> Perhaps for the cyborg smartphone-in-hand Generation Z, it is an instinctual move to zap a cold

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83. B. George Walker, *Double Trouble: Competing Federal and State Approaches to Regulating the New Technology of Cloned Animal Foods, and Suggestions for the Future*, 14 J. TECH. L. & POL’Y 29, 46 (2009).

84. Terri Hellenbeck, *Vermont Gov Signs Law to Require Labels on GMO Foods*, USA TODAY (May 8, 2014, 4:14 PM), <https://www.usatoday.com/story/news/politics/2014/05/08/genetically-modified-foods/8860423/>.

85. See, e.g., Sabrina S. Adler et al., *You Want a Warning with That? Sugar-Sweetened Drinks, Safety Warnings, and the Constitution*, 71 FOOD & DRUG L.J. 482, 514 (2016); see also Ross H. Pifer, *Mandatory Labeling Laws: What Do Recent State Enactments Portend for the Future of GMOs?*, 118 PENN ST. L. REV. 789, 806–07 (2014) (suggesting Vermont’s GMO labeling law could be challenged as violating the U.S. Constitution’s dormant Commerce Clause).

86. Omri Ben-Shahar, *Vermont’s GMO Labeling Law Violates the First Amendment*, FORBES (June 1, 2016), <https://www.forbes.com/sites/omribenshahar/2016/06/01/gmo-science-and-the-constitution-vermonts-labeling-law-violates-the-first-amendment/#1d63024a51f1>.

87. George A. Kimbrell & Aurora L. Paulsen, *The Constitutionality of State-Mandated Labeling for Genetically Engineered Foods: A Definitive Defense*, 39 VT. L. REV. 341, 345 (2014).

88. Mark Hay, *Why Trump’s Quiet Crusade Against Regulations Matters*, VICE (June 9, 2017), [https://www.vice.com/en\\_us/article/zmezdy/why-trumps-quiet-crusade-against-regulations-matters](https://www.vice.com/en_us/article/zmezdy/why-trumps-quiet-crusade-against-regulations-matters) (“[F]ood manufacturers want a federal regulation on how and when to label products containing genetically modified elements so they won’t have to flounder in a patchwork of state regulations.”).

89. Michael Addady, *President Obama Signed This GMO Labeling Bill*, FORTUNE (July 31, 2016), <http://fortune.com/2016/07/31/gmo-labeling-bill/>.

cut or munchie with an iPhone. To older consumers, this feels like a clunky shopping experience and would likely chill them from taking the extra steps to learn the genetic provenance of a food item. Further, a QR code is not useful to those who do not own a smartphone, such as some low-income and rural persons.<sup>90</sup>

The USDA is delegated with the authority to (1) decide how visible or accessible these labels will be and (2) determine what “counts” as genetically modified or what sorts of modifications are important enough to be electronically accessible.<sup>91</sup> Interestingly, the USDA’s marketing section is managing this process, given that the department already assumes the healthfulness of genetically modified ingredients.<sup>92</sup>

However, with the new Trump administration, there is uncertainty regarding when and if the USDA will publish these new labeling regulations. In January 2017, the administration announced a “two-for-one” rule, which requires deleting two old regulations prior to making a new one.<sup>93</sup> President Trump has previously suggested he favors GMO foods in this debate, in keeping with his general *laissez-faire* attitude toward regulation.<sup>94</sup> Nevertheless, Trump has also proven to be adaptive in policy positions outside of core interests like international trade.

At a very recent food labeling conference, USDA Senior Policy Analyst Andrea Huberty confirmed that the department is still on track to publish the new labeling requirements.<sup>95</sup> In addition, it seems jurisprudentially important that this bill was passed with congressional support, rather than as a mere executive order. This procedural distinction arguably makes it harder for the bill to simply go void with the 2018 eclipse date.<sup>96</sup> For now, the Vermont Right-to-Know legislation is preempted despite the lack of movement at the federal level. If this 2018 eclipse date is passed, will Vermont—and like-minded states—be able to enact more stringent state labeling laws once again?

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90. PEW RESEARCH CTR., MOBILE FACT SHEET (Jan. 12, 2017), <http://www.pewinternet.org/fact-sheet/mobile/>.

91. Glenn S. Kerner, *Food for Thought: The Federal GMO Labeling Law*, FOOD SAFETY (Feb./Mar. 2017), <http://www.foodsafetymagazine.com/magazine-archive1/februarymarch-2017/food-for-thought-the-federal-gmo-labeling-law/>.

92. Megan Poinski, *USDA on GMO Labeling Law: ‘Still on Track, but a Little Behind,’* FOOD DIVE (June 7, 2017), <http://www.fooddive.com/news/usda-on-gmo-labeling-law-still-on-track-but-a-little-behind/444383/>.

93. Ian Kullgren, *GMO Labeling Fans, Trump Just Slowed Your Roll*, POLITICO (Jan. 31, 2017, 10:01 AM), <http://www.politico.com/tipsheets/morning-agriculture/2017/01/gmo-labeling-fans-trump-just-slowed-your-roll-218500>.

94. Kerner, *supra* note 91 (“Indeed, Trump himself answered ‘yes’ on the campaign trail in 2015 when the Iowa Farm Bureau asked him if he supported the use of biotechnology in food and opposed efforts to require mandatory labeling just because a food contains GMOs.”).

95. Poinski, *supra* note 92.

96. Kullgren, *supra* note 93.

## IV. TRACKING THE PAST

This Article argues that eating factory-to-table cloned meat is decidedly weird. But perhaps the more difficult question is how to track the descendant generations of cloned animals—what about animals that were conventionally bred to a cloned parent (or grandparent, etc.)? How to identify for the discerning consumer whether a born animal possesses the genetic inheritance of a cloned ancestor? Historically, the United States has had one of the most relaxed stances on GMO products,<sup>97</sup> and it is unclear when or if these Obama-era regulations will go into effect. However, organic retailers such as Whole Foods will still want to distinguish their product as natural in the primordial sense.<sup>98</sup> This kind of “reverse labeling”<sup>99</sup> or “private labeling”<sup>100</sup> to signify a food’s natural pedigree can put consumers on notice of the possible cloned heritage of unlabeled foods. But one damaging rejoinder: It is widely thought that milk and meat of cloned provenance have *already* furtively entered the food supply.<sup>101</sup> In countries such as the United States and Argentina, cloning is already used for commercial purposes, even in the absence of mandatory traceability.<sup>102</sup> If clones have already entered the food chain, only “a proper segregation can distinguish the clones’ offspring products from conventional products.”<sup>103</sup> There is USDA confirmation that meat animals who themselves consume feed made of GMO products, as well as the products that are disproportionately made from these foods such as chicken soup or SPAM, will not receive the GMO QR code or 1-800 number in a possible new labeling regime.<sup>104</sup> If these foods are cleared as non-GMO for USDA purposes, it seems unlikely the Obama bill would

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97. Harrison Joss, *The Rise of Frankenbeer: A Holistic Analysis on International Labeling and Beverage Laws Through the Lens of the Ongoing Controversy of Genetically Modified Organisms*, 21 ILSA J. INT’L & COMP. L. 131, 134 (2014). Joss later notes that “labels must be placed on any foodstuffs where the GM content exceeds even 0.9% of the original ingredient.” *Id.* at 148.

98. See, e.g., *Farm Animal and Meat Standards*, WHOLE FOODS MARKET, <http://www.wholefoodsmarket.com/farm-animal-meat-quality-standards> (last visited Oct. 8, 2017).

99. Francis et al., *supra* note 74, at 127.

100. Marine Friant-Perrot & Lise Rihouey, *Failure of Conciliation Talks on the Use of Animal Cloning for Food: “The Consumer’s Right to Make Informed Food Choices,”* 2 EUR. J. RISK REG. 414, 415 (2011).

101. E.g., AFP-JIJI, *Dolly’s Legacy: Are You Eating Cloned Meat?*, JAPAN TIMES (July 23, 2016), <https://web.archive.org/web/20160817191721/http://www.japantimes.co.jp/news/2016/07/23/world/science-health-world/dollys-legacy-eating-cloned-meat#.WbR9pNGQyCo> (answering “probably”).

102. Friant-Perrot & Rihouey, *supra* note 100, at 415.

103. *Id.* at 414.

104. Poiniski, *supra* note 92.

capture the difficult category of milk from a cow that is thought to descend from a cloned ancestor.

Further, it is unclear how an EU-based moratorium can prevent the diffusion of cloned progeny into the food supply.<sup>105</sup> However, similar sorts of traceability requirements have been implemented in the past, such as those imposed during the BSE (“mad cow”) crisis in the United Kingdom.<sup>106</sup> Either way, companies looking to trade in cloned animal products will face the challenge of export to Europe, Japan, and other nations whose citizens are anxious of genetically engineered foods.<sup>107</sup>

## V. TRADE CHALLENGES

The international trade of cloned animal products does not fit squarely within World Trade Organization (WTO) jurisprudence. The Appellate Panel is skeptical of process-based distinctions,<sup>108</sup> and the Sanitary and Phytosanitary Measures (SPS) Agreement is understood to constrain the autonomy of national governments. Recently, the United States, Canada, and Argentina cited to the SPS Agreement to successfully challenge the EU moratorium on GMOs.<sup>109</sup> Still, we can sketch out the various arguments the EU might make in regard to cloned animal products. A “right-to-know” challenge to learn the ingredients or provenance of a food would be very difficult to implement given the scale of things like the milk industry and the amount of science involved with determining whether a dairy cow has a cloned ancestor several generations removed. Skeptics like the Hungarian Prime Minister Sándor Fazekas have quipped whether a salami must now be packaged with a copy of its family tree.<sup>110</sup> Country of origin labeling (COOL) has also been challenged by beef-exporting nations including Canada and Mexico, who argue consumers inherently prefer local product.<sup>111</sup>

Another argument is that cloned food is “unlike” an uncloned food per GATT Article III.<sup>112</sup> Under this theory, consumer preferences are

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105. *See id.*

106. Ludivine Petetin, *The Revival of Modern Agricultural Biotechnology by the UK Government: What Role for Animal Cloning?*, 7 EUR. FOOD & FEED L. REV. 296, 303 (2012).

107. Reed, *supra* note 73, at 19.

108. Scarlett Schaefer, *Let's Stop Worrying and Learn to Love Transparency: Food and Technology in the Information Age*, 10 J. FOOD L. & POL'Y 233, 250 (2014) (“Under WTO rules, process-based measures elicit stricter scrutiny and require more justification than product-based measures.”).

109. Joss, *supra* note 97, at 144.

110. Downes, *supra* note 21, at 281.

111. Cassidy L. Woodard, *From Cattle Drives to Labeling Legislation: The Implications of Mandatory Country of Origin Labeling on the Beef Industry*, 47 TEX. TECH L. REV. 399, 412 (2015).

112. Downes, *supra* note 21, at 275.

considered to be evidence of the likeness of products. Thus, if consumers strategically avoid products of cloned provenance, this might go to the Appellate Panel's calculus of whether they are distinguishable on the international market. The recent dismissal of *US–Clove Cigarettes* could also be helpful precedent for the EU.<sup>113</sup>

A likely reference is to the GATT XX(a) chapeau on public morals. In brief, the EU could argue that animal cloning specifically, or mammalian cloning more broadly, is in conflict with EU values. The Appellate Panel is less deferential to idiosyncratic national preferences, which could be provincial, insular, or pretextual. Instead, in *US–Gambling*, the Panel “heavily relied on international expressions” of morality.<sup>114</sup> Big agriculture has generally not advertised cloning processes, and because of this there are not very well developed perspectives on cloning. And it is difficult to posit any consensus on the morality of animal cloning. Instead, this Article argues that a public morality argument should be recharacterized as *cloning living mammals*. This broader heuristic would capture humans as well as other agricultural animals that we eat, or companion or security animals that we use. However, it delimits *in vitro* meat, human–pig embryos, and other disembodied organs of this ilk. The benefits of an argument based on species integrity is that it has universal salience and does not depend on personal religion, ethics, or affinities. However, this might not extend to outlier groups like post-humanists or rogue scientists like Richard Seed.<sup>115</sup>

Our sense of core humanity depends on shared assumptions of what characterizes the human body and the possibilities of human experience. However, a singular element that makes us uniquely human is perhaps impossible to discern. The religious use the vocabulary of the soul; secularists retreat to inspiring but vague words such as *dignity* or Francis Fukuyama's multivariate “Factor X.” Trends in body modification, more enlightened perspectives of gender identity, transcendental meditation, and perhaps even psychotropic drugs have helped to refine and contour notions of what it means to be human. But these are still individual expressions. So, a potential Boyalife–Sooam genetic uber-human is distinguished. The inherent competition in a capitalist, globalized society creates the conditions of a race-to-the-bottom marketplace for human enhancement. A potential Boyalife–Sooam genetic clone brings in separate, but still profound, concerns. Here, the hypothetical is not how we will react to a cohort of genetically enhanced humans, but how we will respond to the creation of other humans produced in our mirror image.

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113. *Id.* at 275–76.

114. *Id.* at 277.

115. Annas et al., *supra* note 3, at 161–62.

The specific facts of a factory-to-table meat clone beg for a necessity challenge per GATT Article XX or TBT Article 2.2. Here, the Appellate Panel would likely employ a “relational analysis” that weighs and balances various factors.<sup>116</sup> But how would the Panel define these various factors? The goal or “pro” of cloned-meat, *in vitro*-meat, and faux-meat producers is uniformly shared: to make a product that most closely resembles the taste of natural high-quality meat. This makes cloned meat manifestly unnecessary, as the natural equivalent already exists. The balance, or “con,” has multiple layers. In the first circle are immediate problems of “low efficiency” in cloning, animal suffering, decreased genetic diversity, and a corollary increased vulnerability to animal epidemics.<sup>117</sup> In expanding concentric circles are human-experience concerns, including a revised view of our internal order of food, ecology, and self. The very apples-and-oranges nature of this orthogonal and relational analysis seems to negate the relevance of a trade necessity analysis. The slippery slope from fully-formed animal clones for direct meat consumption to human experimentation makes this both a difficult moral problem to articulate and one so immediately profound that the Panel should err on the side of caution.

## VI. PARADOXES: EQUIVALENT, NEW, OR NEITHER?

Fully-formed animal clones subvert the kinds of analyses done in patent and WTO law and the construct of “novel foods” used in EU law. To be a novel food in the EU, a food must (1) have not been used to a significant degree by humans prior to May 1997 and (2) be a food that falls within one of four categories: “food with modified primary molecular structure; food isolated from microorganisms; foods isolated from plants, food ingredients and animals; foods produced by novel processes.”<sup>118</sup> Cloned meat has never fit well within traditional definitions of novel products.<sup>119</sup> The paradox is fairly intuitive: It is “the inherent truth that something cannot be new if it existed in nature before being discovered.”<sup>120</sup> But if you are creating the same thing with a wholly novel process, does this count as new? And a corollary question: Are we sure the cloned version is the same thing as an organic, “naturally” occurring plant, animal, or animal part?

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116. Downes, *supra* note 21, at 278.

117. Petetin, *supra* note 106, at 297.

118. Downes, *supra* note 21, at 253.

119. *Id.* at 271.

120. Hagglund, *supra* note 60, at 389; *see also* Sherman, *supra* note 66, at 1210 (“[A] claim will not be patentable if the only innovation in the patent was the use of natural phenomenon.”); Slack, *supra* note 31, at 351 (discussing whether a cloned animal is something that existed in nature before being discovered).

The EU employs a substantial-equivalence test in regard to novel foods and “relies on the comparative analysis of conventional and biotech foods.”<sup>121</sup> It is criticized as subjective and as lacking standardized tests or a definition of “substantial.”<sup>122</sup> However, it is also paradigmatically cautious. It might not always produce internally coherent reasons to exclude product entry and be overbroad in excluding foods that are genuinely healthful, delicious, noncancerous, and more. But at least for foods that might mask unknown problems, such as rBST milk,<sup>123</sup> it makes sense to err on the side of caution. Alternatively, the science-driven process of the FDA takes a wait-and-see approach by permitting the entry of a novel product into the market until there is evidence of it having deleterious consequences on public health.<sup>124</sup> As cloned meat is indistinguishable from non-cloned meat by current food-analysis testing, such that a laboratory test cannot detect a difference, there is no material difference per the FDA calculus.<sup>125</sup> This contrasts with the precautionary principle associated with EU law.

## VII. RECONCILING PRECAUTION, RISK, AND THE HUMAN EXPERIENCE

The immediate American connotation of the precautionary principle is the Burkean axiom to not risk the unknown without a good reason.<sup>126</sup> However, this is an incomplete understanding of the European application, which possesses ethical content and is recognized as a “culturally framed concept.”<sup>127</sup> Professor Clavier emphasizes the emotional importance of food to many European countries. For nations such as France and Italy, “[a]ny alteration of the culinary tradition is easily perceived not only as an attack on the cultural heritage, but also as an imperialist takeover of the cultural identity, especially if it comes from the United States.”<sup>128</sup> Readers might be surprised to learn of the so-called “Pork War”<sup>129</sup> of 1881 between the United States and France. This war against American pork is evidence of the embeddedness of food production within these European cultures, and helps to explain the emotional significance of the precautionary principle and how it

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121. Petetin, *supra* note 106, at 304.

122. *Id.* at 305.

123. *Id.* at 304.

124. E.g., Lucas Bergkamp & Lawrence Kogan, *Trade, the Precautionary Principle, and Post-Modern Regulatory Process: Regulatory Convergence in the Transatlantic Trade and Investment Partnership*, 4 EUR. J. RISK REG. 493, 497–98 (2013).

125. Norton, *supra* note 14, at 170.

126. Clavier, *supra* note 29, at 8.

127. *Id.* at 9–10.

128. *Id.* at 7 (footnote omitted).

129. *Id.* at 3.

operates.<sup>130</sup> I have written elsewhere on the equation of self, identity, and food politics with France and *foie gras*, and have questioned the claim of the Israel Supreme Court that gourmet foods are mere luxury.<sup>131</sup> How we define food—and here, cloned meat—is essential to the process and production methods (PPM) legal analysis. If food is viewed exclusively as sustenance, it becomes easier to equate meat with its chemistry, caloric makeup, and nutrition profile, among other things. However, if it is conceptualized as interwoven with our social fabric, the intricacy or purity of process does not register as delicate. Rather, it is perceived as imperative to achieving a vision of cultural identity for those who partake in these foods.

The embeddedness of the European precautionary principle is directly relevant to the trade of cloned meat. I can understand why milk derived from the progeny of an ancestor clone can be reduced to the superficial physiological question of whether it is materially different from nonorganic milk or milk containing the enzyme rBST,<sup>132</sup> or even Parmalat or the notorious Carolene filled-milk product made historical by Footnote Four of that New Deal litigation.<sup>133</sup> Milk feels separate from the lactating cow, and there is enough of a spectrum of “milk” on the market from various animals, plant proteins, and processing that the cloned ancestor can be rationalized, compartmentalized, or otherwise forgotten. Meat, on the other hand, is different. Eating the cloned factory-to-table “flesh” of an engineered animal distorts our sense of self and ecology. The ineluctable weirdness of eating Dolly the Sheep is captured by this European accent to the precautionary principle. We expect eating cloned meat will affect our (social) psychology, but it is difficult to predict exactly how. Professor David Owen offers the construct of “foreseeable unforeseeability” to describe the paradox of a *laissez-faire* approach to transformative technological processes.<sup>134</sup> This Article does not articulate why consuming factory-produced animals for their meat is meaningfully different from other sorts of tech food. However, the European precautionary principle does not require precise language. Its emotional thrust can depend on the nebulous, inchoate feelings that already typify our sense of place and ritual at the dinner table.

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130. *See id.*

131. Andrew Jensen Kerr & Yu Dan, *Tradition as Precedent: Articulating Animal Law Reform in China*, 11 J. ANIMAL & NAT. RESOURCE L. 71, 84 (2015).

132. *See generally* Margaret Sova McCabe, *Got Controversy? Milk Does*, 13 DRAKE J. AGRIC. L. 475 (2008) (discussing the controversial factors behind rBST and the fears they cause consumers).

133. *United States v. Carolene Prods. Co.*, 304 U.S. 144, 152 n.4 (1938).

134. *See generally* David G. Owen, *Bending Nature, Bending Law*, 62 FLA. L. REV. 569 (2010) (explaining how technology has both helped advance, and created hardship for, the human race).

Therefore, this Article echoes Professor Clavier's notion that a revised precautionary principle can allow the WTO to move away from a strictly functionalist perspective. This move respects the nonrational elements of food and cloning and can reconcile "liberalization of agriculture and food products and consumer anxiety linked to new technology."<sup>135</sup> Importantly, the precautionary principle is already a valorized norm in other aspects of U.S. food law. The Food Quality Protection Act of 1996 "mandates a precautionary safety factor in addition to an ample margin of safety."<sup>136</sup> The precautionary principle allows courts and tribunals to work *within* the law, rather than have to create "bad law" in response to "bad facts" and concomitantly create outlier, unworkable legal categories.

It is true that a corollary to precaution is possibly limiting innovation based on excessive solicitude or outlier Lysenko-ish science. Professors Lucas Bergkamp and Lawrence Kogan describe a post-modern view of the precautionary principle in which a "policy-based science" of worst-case scenarios distorts the traditionally probabilistic nature of science-based policy.<sup>137</sup> These are fair objections. But this Article emphasizes the qualitative aspects of the precautionary principle, and does *not* argue for a lower standard of scientific authority. Rather, this Article suggests an expanded notion of risk beyond "the cold arithmetic of cost-benefit analysis" to a framework where "science, risk and society" are integrated instead.<sup>138</sup> It is not a matter of lessening the standard of science but increasing the weight attached to social disruption and the dialectical relationship between food and the social order.

## CONCLUSION

The WTO has been a fountainhead of jurisprudence on animal ethics and public morality in *Tuna-Dolphin*,<sup>139</sup> *Shrimp-Turtle*,<sup>140</sup> and the Canadian seal-hunt litigation.<sup>141</sup> Animal cloning might be the next

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135. Clavier, *supra* note 29, at 8.

136. *Id.* at 9.

137. Bergkamp & Kogan, *supra* note 124, at 501.

138. Petetin, *supra* note 106, at 297–98.

139. See generally Panel Report, *United States—Restrictions on Imports of Tuna*, DS21/R (Sept. 3, 1991), GATT BISD (39th Supp.) at 155 (1993) (discussing *Tuna-Dolphin I* GATT findings).

140. See generally Panel Report, *United States—Import Prohibition of Certain Shrimp and Shrimp Products*, WTO Doc. WT/DS58/R (May 15, 1998); Appellate Body Report, *United States—Import Prohibition of Certain Shrimp and Shrimp Products*, WTO Doc. WT/DS58/AB/R (Oct. 12, 1998) (discussing *Shrimp-Turtle* WTO findings).

141. See generally Panel Report, *European Communities—Measures Prohibiting the Importation and Marketing of Seal Products*, WTO Doc. WT/DS400/R (Nov. 25, 2013); Appellate Body Report, *European Communities—Measures Prohibiting the Importation and*

iteration in this line of cases.<sup>142</sup> For example, cloned products such as semen or embryos for artificial insemination are already traded globally.<sup>143</sup> It will be interesting to see if and how the Appellate Panel draws lines to promote agricultural innovation while maintaining core aspects of the human experience.

This Article suggests that the international community should continue to take a hard look at these cloning factories. Animals are too easily cloistered from public view, especially when they can be categorized as legal things rather than persons. So far, it seems that Boyalife wants to display their innovation, as they are planning to curate a museum in their corporate campus. Still, the more interesting study is the social experiment outside of Boyalife. If we do begin eating cloned animals for meat, how will this affect our own internalized notions of humanity, economy, and food production? Perhaps we will have to recalibrate what values are truly necessary when deciding the kinds of novel products we might soon consume.

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*Marketing of Seal Products*, WTO Doc. WT/DS400/AB/R (May 22, 2014) (discussing Canadian seal-hunt litigation).

142. Weimer, *supra* note 38, at 39 n.48 (citing James Flett, *If in Doubt, Leave It Out? EU Precaution in WTO Regulatory Space*, 1 EUR. J. RISK REG. 20 (2010)).

143. Weimer, *supra* note 38, at 33 n.14.