

## COMMENTS

### CHIMERA AND THE CONTINUUM OF HUMANITY: ERASING THE LINE OF CONSTITUTIONAL PERSONHOOD

In Minnesota, pigs are being born with human blood in their veins.  
In Nevada, there are sheep whose livers and hearts are largely human.  
In California, mice peer from their cages with human brain cells  
firing inside their skulls.<sup>1</sup>

#### INTRODUCTION

The above quotation may sound like an excerpt from a science fiction novel, but it refers to real creatures known as “chimera,” which scientists are creating with increasing frequency.<sup>2</sup> The term chimera has its origins in Greek mythology. The mythological chimera was a fire-breathing monster—with the head of a lion, the body of a goat, and the tail of a dragon—that terrorized the kingdom of Lycia.<sup>3</sup> In contemporary times, chimera have been the subject of science fiction novels, including H.G. Wells’s *The Island of Doctor Moreau*, in which a renegade doctor surgically creates part-human and part-animal creatures.<sup>4</sup>

In modern biotechnology,<sup>5</sup> the term chimera describes an organism comprised of at least two genetically distinct populations of cells originating

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<sup>1</sup> Rick Weiss, *Of Mice, Men and In-Between: Scientists Debate Blending of Human, Animal Forms*, WASH. POST, Nov. 20, 2004, at A1.

<sup>2</sup> Human-animal chimera have been raised to adulthood in recent years. See, e.g., Brenda M. Ogle et al., *Spontaneous Fusion of Cells Between Species Yields Transdifferentiation and Retroviral Transfer in Vivo*, 18 FED’N AM. SOCIETIES FOR EXPERIMENTAL BIOLOGY J. 548, 548–50 (2004) (describing the production of human-pig chimera).

<sup>3</sup> THOMAS BULFINCH, *BULFINCH’S MYTHOLOGY* 117 (1993).

<sup>4</sup> H.G. WELLS, *THE ISLAND OF DOCTOR MOREAU* (1896). A recent science fiction book features human-animal chimera that are bred to serve humans. WILL SHETTERLY, *CHIMERA* (2000).

<sup>5</sup> Biotechnology is defined as “any technique that uses living organisms or substances from those organisms to make or modify a product, to improve plants or animals, or to develop microorganisms for specific uses.” Jasemine Chambers, *Patent Eligibility of Biotechnological Inventions in the United States, Europe, and Japan: How Much Patent Policy Is Public Policy?*, 34 GEO. WASH. INT’L L. REV. 223, 223 (2002).

from independent embryos.<sup>6</sup> Under this biotechnological definition, any particular cell in the chimera derives from one of the parent organisms but is not a mix of the two parents as in sexual reproduction.<sup>7</sup> Thus, each cell in a human-mouse chimera would be either completely human or completely mouse. Chimera technology has rapidly left the realm of the hypothetical, and this technology opens up a Pandora's Box of legal and ethical questions by intimately mixing human and animal.

As an example of the types of creatures being produced by chimera technology, in early 2004 researchers at the Mayo Clinic produced chimera by injecting human stem cells<sup>8</sup> into forty-day-old fetal pigs.<sup>9</sup> Because the human cells were introduced well into fetal development, the organisms outwardly look like pigs.<sup>10</sup> However, closer examination reveals that these creatures have porcine cells and human cells mixed throughout their bodies.<sup>11</sup> Unlike a human receiving a transplanted piece of animal tissue or an animal with a few human genes inserted into its genome, these chimera represent a genetic and structural mix of human and animal.<sup>12</sup>

Presently, Irving Weissman, the director of Stanford University's Institute of Cancer/Stem Cell Biology and Medicine, is contemplating pushing the envelope of chimera research even further by producing human-mouse chimera whose brains would be composed of one hundred percent human cells.<sup>13</sup>

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<sup>6</sup> Nicole E. Kopinski, *Human-Nonhuman Chimeras: A Regulatory Proposal on the Blurring of Species Lines*, 45 B.C. L. REV. 619, 624–25 (2004). In accordance with most commentators, the term chimera will be used as both the singular and plural in this Comment.

<sup>7</sup> *Id.* at 625.

<sup>8</sup> Stem cells are undifferentiated cells that have the potential to develop into specialized cells. Consuelo G. Erwin, *Embryonic Stem Cell Research: One Small Step for Science or One Giant Leap Back for Mankind?*, 2003 U. ILL. L. REV. 211, 213.

<sup>9</sup> Ogle et al., *supra* note 2, at 548–50.

<sup>10</sup> See Gaia Vince, *Pig-Human Chimeras Contain Cell Surprise*, NEWSIDENTIST.COM, Jan. 13, 2004, <http://www.newscientist.com/news/news.jsp?id=ns99994558> (“The injections must be given after the body plan of the fetus has developed, but before the immune system is active. The former ensures the animals look like normal pigs and sheep. The latter prevents the human stem cells being rejected.”).

<sup>11</sup> *Id.* Surprisingly, these chimera also contain hybrid cells with a mixture of human and porcine genetic material. This was the first time researchers witnessed such hybrid cells in a chimera. *Id.*

<sup>12</sup> Researchers discovered human cell lines integrated into the tissue structures in the thymus, kidney, and skin of the chimeric animals. Ogle et al., *supra* note 2, at 548–50. These particular pig-human chimera are much more pig than human because the total percentage of human cells present at one year and beyond was approximately .1%. *Id.* As a result, it is difficult to imagine granting these *particular* chimera being viewed as persons. However, there does not seem to be a scientific barrier to creating a human-animal chimera with a much higher percentage of human cells by, for example, injecting the human stem cells at a much earlier time. See Vince, *supra* note 10.

<sup>13</sup> Weiss, *supra* note 1.

Weissman notes that the mice would be carefully watched: if they developed a mouse brain architecture, they would be used for research, but if they developed a human brain architecture or any hint of humanness, they would be killed.<sup>14</sup> This solution hardly resolves all moral and legal issues. These biotechnology creations highlight a significant and unresolved question: Do human-animal chimera deserve constitutional protection as “persons”?

This Comment does not take a stance on whether chimera research is inherently morally, ethically, or constitutionally wrong. Instead, this Comment provides a framework for determining if and when the U.S. Constitution and the rights it confers should even be applicable to chimera and chimera research. While Congress may ban the production of constitutionally uncertain chimera in the future, it has not done so yet, and such creatures may be created in the interim.<sup>15</sup>

Personhood is the necessary threshold requirement to the application of specific constitutional rights and therefore the personhood of various types of chimera is crucial.<sup>16</sup> Given the current state of chimera technology, the division between human and animal has become a continuum, not a bright line.<sup>17</sup> Scientists can create chimera with just a few human cells, chimera with primarily human cells, and everything in between.<sup>18</sup> At some point along the spectrum between human and animal, chimera must be afforded protection under the Constitution as constitutional persons.<sup>19</sup> To do this properly, a fundamental change in the interpretation of the seemingly unambiguous constitutional term “person” is required.

Since chimera potentially erase the line between human and animal, it is doctrinally unsound to rely on a strict person/nonperson dichotomous approach to constitutional personhood.<sup>20</sup> Therefore, to adequately reflect the realities of

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<sup>14</sup> *Id.*

<sup>15</sup> In 2005, Senator Brownback of Kansas introduced a bill that would prohibit any person from creating or attempting to create a “human chimera.” The Human Chimera Prohibition Act of 2005, S. 659, 109th Cong. According to the Library of Congress’ website, the Bill has been referred to the Committee on the Judiciary. Library of Congress, Bill Summary of S. 659, <http://thomas.loc.gov/cgi-bin/bdquery/z?d109:s.00659>: (last visited Jan. 21, 2006). Canada already bans chimera research via the Assisted Human Reproduction Act. Maryann Mott, *Animal-Human Hybrids Spark Controversy*, NAT’L GEOGRAPHIC NEWS, Jan. 25, 2005, [http://news.nationalgeographic.com/news/2005/01/0125\\_050125\\_chimeras.html](http://news.nationalgeographic.com/news/2005/01/0125_050125_chimeras.html).

<sup>16</sup> See *infra* notes 128–33 and accompanying text.

<sup>17</sup> See *infra* notes 24–43 and accompanying text.

<sup>18</sup> See Rick Weiss, *U.S. Denies Patent for a Too-Human Hybrid*, WASH. POST, Feb. 13, 2005, at A3.

<sup>19</sup> See *infra* Part V.

<sup>20</sup> See *infra* Part V.B.

the new personhood continuum, varying levels of constitutional protection should be afforded to chimera based on a sliding scale approach to personhood.<sup>21</sup> The application of these varying levels of protection should be guided by the fundamental characteristics of personhood: (1) higher-level human cognitive traits and (2) the possession of crucial human biological tissues.<sup>22</sup> Moral and ethical questions remain even under this approach; however, if human-animal chimera are to be produced, a more adaptive legal framework is needed.

Part I of this Comment provides the scientific background of chimera necessary to understand the legal and ethical issues surrounding chimera research.<sup>23</sup> Part II describes the current state of the law on chimera, which, problematically, has thus far been largely confined to the patent arena. Part III examines what it means to be a legal and constitutional “person” at the ends of the human life span. Part IV analyzes and coalesces the various moral and ethical theories that are applicable to chimera. Part V argues that it is possible to create chimeric “persons” and proposes a more flexible and inclusive approach to constitutional personhood.

## I. THE SCIENCE OF CHIMERA

To appreciate the issues surrounding human-animal chimera, it is important to understand the biotechnology that creates them. While differentiating what is and what is not a chimera can be complicated,<sup>24</sup> the scientific definition is relatively straightforward: a chimera is an organism with two or more distinct populations of cells derived from separately fertilized embryos.<sup>25</sup> The resulting creature can be a truly unpredictable mixture of species.<sup>26</sup> Chimera are distinct from hybrids,<sup>27</sup> clones,<sup>28</sup> and organisms created by recombinant

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<sup>21</sup> See *infra* Part V.B–C.

<sup>22</sup> See *infra* Part V.

<sup>23</sup> Other controversial areas of biotechnology, such as cloning and human stem cell research, are beyond the scope of this Comment.

<sup>24</sup> Henry T. Greely, *Defining Chimera . . . and Chimeric Concerns*, AM. J. BIOETHICS, Summer 2003, at 17, 18 (noting that under a loose definition of chimera, all humans might be considered human-bacteria chimera due to the huge numbers of bacteria living within our intestines).

<sup>25</sup> Kopinski, *supra* note 6, at 624.

<sup>26</sup> See Carole B. Fehilly et al., *Interspecific Chimaerism Between Sheep and Goat*, 307 NATURE 634 (1984) (describing a goat-sheep chimera).

<sup>27</sup> Hybrids result from the sexual reproduction of different species. For example, a mule is a hybrid of a male donkey and a female horse. Kopinski, *supra* note 6, at 623 n.32.

<sup>28</sup> Clones are organisms produced with identical genetic material to the “parent” organism. The best

DNA technology.<sup>29</sup> Although it is possible to create animal-animal chimera, human-human chimera, or even chimera of more than two species,<sup>30</sup> this Comment will focus on human-animal chimera.

### A. *Chimera Production*

Presently, the most common method of producing human-animal chimera is to inject stem cells from one species into an early embryo of another species.<sup>31</sup> Because stem cells are able to differentiate inside the embryo and integrate themselves into all tissue types, the resulting organism is a hodge-podge of the two species.<sup>32</sup> In recent years, experimenters have used the stem cell method to produce, for example, human-sheep and human-pig chimera.<sup>33</sup> So far, scientists conducting these experiments have used only animal embryos, not human ones, and have delayed the injection of the human stem cells in order to assure the chimera is essentially still a sheep or pig.<sup>34</sup> There are no guarantees, however, that researchers will not cross these boundaries in the future.

While most of the recent chimera research involves the stem-cell injection method, other methods of producing chimera are available. A technique that has proved quite successful in producing animal-animal chimera involves mixing embryos of two organisms at a very early stage.<sup>35</sup> In 1984, this embryonic mixing technique was used to create goat-sheep chimera, which

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known example of a clone is Dolly the sheep. See Ian Wilmut, *Cloning for Medicine*, SCI. AM., Dec. 1998, at 58, 58.

<sup>29</sup> While chimera technology mixes cells of two different species into one organism, recombinant DNA technology is used to transfer isolated genes from one organism to another. Recombinant technology is frequently used to insert specific human genes into the genome of another organism for research or to produce human biological products. Eileen Morin, *Of Mice and Men: The Ethics of Patenting Animals*, 5 HEALTH L.J. 147, 149 (1997).

<sup>30</sup> Greely, *supra* note 24, at 17.

<sup>31</sup> Kopinski, *supra* note 6, at 624–25.

<sup>32</sup> *Id.* at 625. For a description of the production of such an organism, see *infra* notes 36–37 and accompanying text.

<sup>33</sup> Weiss, *supra* note 1.

<sup>34</sup> See Vince, *supra* note 10. There may be substantial public opposition to even this limited chimera research if any part of the chimera's brain cells were found to be human. Sylvia Pagán Westphal, *Growing Human Organs on the Farm*, NEWS SCIENTIST, Dec. 20, 2003–Jan. 9, 2004, at 4, 4–5, available at <http://newscientist.com/news/news.jsp?id=ns99994492>. A lead scientist conducting human-sheep chimera research, Esmail Zanjani of the University of Nevada, stated that “[t]here is no way for us to know” if human cells might enter into the chimera's brain tissue, “[b]ut at the level we're working with the animal, it's still a sheep.” *Id.* at 5.

<sup>35</sup> Thomas A. Magnani, *The Patentability of Human-Animal Chimeras*, 14 BERKLEY TECH. L.J. 443, 445–46 (1999).

were fittingly named “geep.”<sup>36</sup> The geep were successfully raised to adulthood and possessed traits of both species. The legs and skull of the geep were goat-like, the frame was that of a sheep, and the skin was covered in both the curly wool of a sheep and patches of the short, coarse hair of a goat.<sup>37</sup> Given the relative ease with which the geep were produced, it should be comparatively simple to use this method to produce a human-ape chimera given the vast advances in biotechnology since 1984 and the fact that apes are more closely related to humans than sheep are to goats.<sup>38</sup> Technically, chimera can also be produced by transplanting or engrafting tissues, such as an organ or heart valve, from one organism into another.<sup>39</sup>

A biotechnology technique that raises many of the same issues as chimera technology is human-nonhuman nuclear transfer.<sup>40</sup> Nuclear transfer utilizes cloning technology to transfer the cell nuclei from one species into the denucleated cells of another species.<sup>41</sup> The denucleated cells act as biological shells for the introduced nuclei, which take over control of the cells. In 2003, scientists in China used the nuclear transfer method to insert human DNA into denucleated rabbit eggs and allowed the embryos to develop for fourteen days.<sup>42</sup> These organisms, like chimera, are morally, ethically, and legally troubling because they have a very similar biological makeup to humans.<sup>43</sup>

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<sup>36</sup> See Fehilly et al., *supra* note 26, at 634–36. For a startling picture of a geep, see Colo. State Univ., Cytogenetics and Chromosomal Disorders: Mosaicism and Chimerism, <http://arbl.cvmbs.colostate.edu/hbooks/genetics/medgen/chromo/mosaics.html> (last visited Jan. 21, 2006).

<sup>37</sup> Fehilly et al., *supra* note 26, at 635–36.

<sup>38</sup> Magnani, *supra* note 35, at 446.

<sup>39</sup> Hilary Bok, *What’s Wrong with Confusion?*, AM. J. BIOETHICS, Summer 2003, at 25, 25.

<sup>40</sup> See Kopinski, *supra* note 6, at 626–27. Although some authors have described human-nonhuman nuclear transfer as a chimeric technology, it does not technically produce chimera because each cell of the resulting organism is a mixture of the parent organisms at the cellular level. TRANSCRIPT, NAT’L BIOETHICS ADVISORY COMM’N, 25TH MEETING 102–03 (Nov. 17, 1998).

<sup>41</sup> Nuclear transfer involves “[t]ransferring the nucleus with its chromosomal DNA from one (donor) cell to another (recipient) cell. In cloning, the recipient is a human egg cell and the donor cell can be any one of a number of different adult tissue cells.” President’s Council on Bioethics, *Scientific Aspects of Human and Animal Cloning* (2002) (staff working paper), <http://www.bioethics.gov/background/workpaper2.html>.

<sup>42</sup> See, e.g., Ying Chen et al., *Embryonic Stem Cells Generated by Nuclear Transfer of Human Somatic Nuclei into Rabbit Oocytes*, 13 CELL RES. 251 (2003). These cells developed into embryos that contained both the nuclear human DNA and mitochondrial rabbit DNA. Rick Weiss, *Cloning Yields Human-Rabbit Hybrid Embryo*, WASH. POST, Aug. 14, 2003, at A4.

<sup>43</sup> The DNA is not completely human because while human chromosomal DNA is transferred in the animal cell, mitochondrial DNA is not. Jason Scott Robert & Francoise Baylis, *Crossing Species Boundaries*, AM. J. BIOETHICS, Summer 2003, at 1, 2, 8.

### B. *The Use and Misuse of Chimera*

Scientists are examining several medical and pharmaceutical uses of human-animal chimera. Because biotechnology is a rapidly changing field, the following list of three major uses is meant to be illustrative, not exhaustive. First, chimera may allow for improved testing of the benefits, side effects, and interactions of pharmaceutical drugs.<sup>44</sup> This is because entire human cells, tissues, and organs can be present in a fully-formed organism, allowing for more direct and effective testing than can be achieved in animal studies or cell-line research.<sup>45</sup> For example, a human-animal chimera with a fully human liver could be more effective at testing a drug's effect on the human liver than traditional testing using cultured human liver cells. Second, it may be possible to use chimera to grow organs for transplantation into humans.<sup>46</sup> Organs with all or nearly all human cells grown in a human-animal chimera are less likely to be rejected by the recipient's immune system than traditional xenotransplants,<sup>47</sup> and scientists have already produced chimeric sheep whose livers are eighty percent human.<sup>48</sup> Third, chimera are useful in studies of human development.<sup>49</sup> This is because developmental studies that are not possible with human embryos could be carried out on living chimera embryos.<sup>50</sup>

Despite these promising uses of chimera, there are worries of other, much less benevolent uses. Chimera might be created for artistic purposes, out of simple curiosity, or for commercial exploitation as servants or even as "freaks."<sup>51</sup> One colorful description of the possible, and troubling, uses of human-animal chimera was provided by environmental journalist Mark Dowie:

[T]he technology could be used to manufacture soldiers with armadillo-like shielding, quasi-human astronauts engineered for long-range space travel, and altered primates with enough cognitive ability

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<sup>44</sup> Magnani, *supra* note 35, at 456.

<sup>45</sup> *Id.*

<sup>46</sup> Weiss, *supra* note 1.

<sup>47</sup> See Margaret A. Clark, *This Little Piggy Went to Market: The Xenotransplantation and Xenozoonose Debate*, 27 J.L. MED. & ETHICS 137, 139 (1999). Xenotransplantation is the term for interspecies transplantation, such as transplanting a baboon heart into a human. *Id.* at 138.

<sup>48</sup> Weiss, *supra* note 1.

<sup>49</sup> Magnani, *supra* note 35, at 456.

<sup>50</sup> Weiss, *supra* note 1.

<sup>51</sup> Julian Savulescu, *Human-Animal Transgenesis and Chimeras Might Be an Expression of Our Humanity*, AM. J. BIOETHICS, Summer 2003, at 22, 22; see Greely, *supra* note 24, at 19 (stating that "[m]aking a chimera of a human and a nonhuman is much less controversial when done for medical purposes than if such a creature were made for entertainment or 'art'").

to ride a bus, follow basic instructions, pick crops in 119 degrees, or descend into a mine shaft without worrying their silly little heads about inalienable human rights and the resulting laws and customs that demand safe working conditions.<sup>52</sup>

Even when chimera technology is used for legitimate research purposes, serious concerns remain.<sup>53</sup> Outspoken biotechnology critic Jeremy Rifkin believes that the production of chimera violates the sanctity of “species integrity.”<sup>54</sup> Religious attacks on chimera research cite the inviolability of the human form<sup>55</sup> and inappropriateness of “playing God” by manipulating life.<sup>56</sup> Others argue that the manipulation of life diminishes its “significance and mystery.”<sup>57</sup> Still, others criticize the research for its potentially harmful effects on the environment and its exploitation of animals.<sup>58</sup> In addition, the mixing of human and animal cells may make it easier for animal diseases to cross over into humans.<sup>59</sup>

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<sup>52</sup> Mark Dowie, *Gods and Monsters*, MOTHER JONES, Jan.–Feb. 2004, at 48, 50, available at <http://online.sfsu.edu/~rone/GEessays/chimerapatent.htm>.

<sup>53</sup> In April of 2005, the National Academies of Sciences—a private, nonprofit group that advises the federal government—issued guidelines for human embryonic stem cell research that address some of the ethical issues related to chimera. COMM. ON GUIDELINES FOR HUMAN EMBRYONIC STEM CELL RES., NAT’L RES. COUNCIL, GUIDELINES FOR HUMAN EMBRYONIC STEM CELL RESEARCH (2005) [hereinafter GUIDELINES], available at <http://www.nap.edu/books/0309096537/html/>. Of particular note here are the nonbinding guidelines: (1) recognize the importance of chimera research, (2) restrain the use of human embryonic stem cells to “circumstances where no other experiment can provide the information needed,” (3) provide that human embryonic stem cells should not be inserted into nonhuman primates, (4) state that animals into which human embryonic stem cells have been inserted should not be allowed to breed, and (5) caution that no animal embryonic stem cells should ever be inserted into a human blastocyst. *New Federal Guidelines Will Allow Creation of Human-Animals Chimeras*, ENV’T NEWS SERVICE (Apr. 27, 2005), available at <http://www.organicconsumers.org/patent/chimeras042805.cfm>.

<sup>54</sup> Robert P. Merges, *Intellectual Property in Higher Life Forms: The Patent System and Controversial Technologies*, 47 MD. L. REV. 1051, 1060 (1988). In Rifkin’s view, each species should be allowed to have its genetic composition unaltered and so biotechnology should never be used to cross species lines. Morin, *supra* note 29, at 170.

<sup>55</sup> Tara Seyfer, *The Ethics of Chimeras and Hybrids*, 29 ETHICS & MEDICS 8 (Aug. 2004) (“Jesus Christ did not come as an animal, but specifically as a human being, in a human body. This bespeaks the dignity which God accords human beings and their bodies. . . . It thus seems to lead towards the blasphemous to purposefully combine the genetic or bodily material of a human being and an animal.”), available at [http://www.lifeissues.net/writers/sef/sef\\_02ethicschimeras.html](http://www.lifeissues.net/writers/sef/sef_02ethicschimeras.html).

<sup>56</sup> Dan L. Burk, *Patenting Transgenic Human Embryos: A Nonuse Cost Perspective*, 30 HOUS. L. REV. 1597, 1637 (1993).

<sup>57</sup> Rebecca Dresser, *Ethical and Legal Issues in Patenting New Animal Life*, 28 JURIMETRICS J. 399, 410–11 (1988).

<sup>58</sup> Burk, *supra* note 56, at 1637–38.

<sup>59</sup> John Rennie, *Human-Animal Chimeras: Some Experiments Can Disquietly Blur the Line Between Species*, SCI. AM.COM (June 27, 2005), <http://www.sciam.com/article.cfm?articleID=000BCF6C-7AF0-12B8-BAF083414B7FFE9F>.

Unfortunately, the best way to increase the scientific utility of human-animal chimera is to increase the amount of human tissue in the chimera.<sup>60</sup> This leads to a corresponding increase in the legal and moral concern about allowing this research.<sup>61</sup> Therefore, chimera technology offers both great promise and peril, and the surrounding legal issues are of substantial importance.

## II. CHIMERA AND THE PTO: ATTEMPTING TO PATENT MONSTERS

This Part will explain how the United States Patent and Trademark Office (PTO), rather than the courts or the legislature, has made the most noteworthy attempts to define chimera personhood. Because there is a substantial chance that chimera research will lead to economically valuable inventions, it is not surprising that the majority of the legal discourse on chimera has taken place in the patent law arena.<sup>62</sup> Due to the economic incentives patents provide, the resolution of chimera patentability is of considerable importance.<sup>63</sup> The applicability of the Constitution, which is dependant on the initial resolution of chimera personhood, will be vital in resolving chimera patentability. While the PTO is not the proper body to ultimately decide this constitutional issue, the PTO's positions on chimera are important because they have led to much of the current chimera discourse.<sup>64</sup> This Part will therefore introduce and contextualize the battles that have been fought over chimera patents, including whether chimera are entitled to constitutional protection.

### A. *The Chakrabarty Revolution*

Prior to 1980, the PTO generally did not issue patents on any living organisms.<sup>65</sup> While patents had been granted on cell lines, it was PTO policy that living organisms themselves, even those selectively bred or scientifically

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<sup>60</sup> Jenna Greene, *He's Not Just Monkeying Around*, LEGAL TIMES, Aug. 16, 1999, at 16 (quoting Jeremy Rifkin, who stated that "[t]he more humanized you make your animal models, the better").

<sup>61</sup> *Id.* Perhaps the initial discomfort felt by many at thought of human-animal chimera should not be completely disregarded. It has been stated that "repugnance is the emotional expression of deep wisdom, beyond reason's power fully to articulate it." Leon R. Kass, *The Wisdom of Repugnance*, in LEON R. KASS & JAMES Q. WILSON, *THE ETHICS OF HUMAN CLONING* 3, 18 (1998).

<sup>62</sup> See *supra* notes 44–50 and accompanying text.

<sup>63</sup> Margo A. Bagley, *Patent First, Ask Questions Later: Morality and Biotechnology in Patent Law*, 45 WM. & MARY L. REV. 469, 534–45 (2003).

<sup>64</sup> See *infra* Part II.C.

<sup>65</sup> See James P. Daniel, *Of Mice and 'Manimal': The Patent & Trademark Office's Latest Stance Against Patent Protection for Human-Based Inventions*, 7 J. INTELL. PROP. L. 99, 104 (1999).

altered, would not be afforded protection under the Patent Act.<sup>66</sup> The reason typically given to justify the blanket rejection of such applications was that “products of nature” are not patentable subject matter.<sup>67</sup>

Fortunately for the biotechnology industry, the U.S. Supreme Court soundly rejected the PTO’s stance against patenting life in *Diamond v. Chakrabarty* in 1980.<sup>68</sup> The *Chakrabarty* Court held that a modified oil-digesting bacterium qualified as patentable subject matter.<sup>69</sup> In the key language of the opinion, the Court concluded that Congress intended patentable subject matter to “include anything under the sun that is made by man.”<sup>70</sup> The *Chakrabarty* decision does not allow for the patenting of all living things; rather, it applies only to those created or significantly modified by the hand of man.<sup>71</sup> This represents the distinction between generally patentable inventions and generally nonpatentable discoveries.<sup>72</sup> Still, the language of *Chakrabarty* is very broad and puts no explicit restrictions on the patentability of living organisms, human or otherwise, provided the patent is for a “human-made invention[.]”<sup>73</sup>

In 1987, the patentability of multicellular organisms under *Chakrabarty* was tested in *Ex parte Allen*, which involved a disputed application for a polyploid oyster.<sup>74</sup> The Board of Patent Appeals and Interferences determined that the oyster represented patentable subject matter under the Patent Act, although the patent was ultimately rejected on other grounds.<sup>75</sup> Thus, *Ex parte Allen* interpreted *Chakrabarty* as applicable to both single and multicellular

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<sup>66</sup> *Id.* at 104–05.

<sup>67</sup> Magnani, *supra* note 35, at 447.

<sup>68</sup> *Diamond v. Chakrabarty*, 447 U.S. 303 (1980).

<sup>69</sup> *Id.* at 310.

<sup>70</sup> *Id.* at 309. However, this was not a forgone conclusion: Section 101 permits patents on machines, manufactures, or compositions of matter. A living organism is, properly speaking, none of these. Thus, *Chakrabarty* is particularly controversial and important because the Court read into the Patent Act and its legislative history support for extending patents to living organisms. Linda J. Demaine & Aaron Xavier Fellmeth, *Reinventing the Double Helix: A Novel and Nonobvious Reconceptualization of the Biotechnology Patent*, 55 STAN. L. REV. 303, 317 (2002).

<sup>71</sup> *Chakrabarty*, 447 U.S. at 310 (“Here . . . the patentee has produced a new bacterium with markedly different characteristics from any found in nature. . . . His discovery is not nature’s handiwork, but his own; accordingly it is patentable subject matter under § 101.”).

<sup>72</sup> See *Chakrabarty*, 447 U.S. at 309 (noting that “[t]he laws of nature, physical phenomena, and abstract ideas have been held not patentable”); Daniel, *supra* note 65, at 105.

<sup>73</sup> *Chakrabarty*, 447 U.S. at 313.

<sup>74</sup> *Ex parte Allen*, 2 U.S.P.Q.2d (BNA) 1425 (PTO B.P.A.I. 1987). A polyploid organism has one or more extra sets of chromosomes. *Id.*

<sup>75</sup> See *id.* at 1425–27. The patent failed the requirement that an application be non-obvious. *Id.* at 1428–29.

organisms.<sup>76</sup> Soon after *Ex parte Allen*, the first patent on an animal, the Harvard Onco-Mouse, was issued.<sup>77</sup> The Onco-Mouse was also significant because it was the first patent on an animal with an introduced human gene.<sup>78</sup>

### *B. The PTO's Attempts to Limit the Patentability of "Human Beings"*

In response to *Ex parte Allen*, the PTO issued a notice regarding its stance on the patentability of life on April 21, 1987.<sup>79</sup> The notice stated that the PTO considered "nonnaturally occurring non-human multicellular living organisms, including animals, to be patentable subject matter" under § 35 U.S.C. 101 of the Patent Act.<sup>80</sup> However, the PTO limited its position by stating that a "claim directed to or including within its scope a human being" would not be considered patentable subject matter under the Act because "the grant of a limited, but exclusive property right in a human being is prohibited by the Constitution."<sup>81</sup> It is widely believed by legal commentators that the PTO was invoking the Thirteenth Amendment ban on slavery and indentured servitude as the constitutional provision precluding patentability of "human beings."<sup>82</sup> The apparent rationale is that the grant of a property right in a human being would be a form of slavery or indentured servitude.<sup>83</sup> It was not clear, however, whether the 1987 notice's ban on claims directed to or including "human beings" would affect the patentability of human-animal chimera.

### *C. The Rejection of the Newman Application*

On December 18, 1997, Jeremy Rifkin and Dr. Stuart Newman filed a patent application (Newman Application) seeking protection for both a method

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<sup>76</sup> Michael B. Landau, *Multicellular Vertebrate Mammals as "Patentable Subject Matter" Under 35 U.S.C. § 101: Promotion of Science and the Useful Arts or an Open Invitation for Abuse?*, 97 DICK. L. REV. 203, 213 (1993).

<sup>77</sup> U.S. Pat. No. 4,736,866 (filed Apr. 12, 1988). The Onco-Mouse was a strain of mice that had been genetically altered to be highly susceptible to cancer when exposed to cancer-causing agents. Mark Jagels, Notes and Comments, *Dr. Moreau Has Left the Island: Dealing with Human-Animal Patents in the 21st Century*, 23 T. JEFFERSON L. REV. 115, 132 (2000).

<sup>78</sup> Jagels, *supra* note 77, at 132.

<sup>79</sup> 'Morality' Aspect of Utility Requirement Can Bar Patent for Part-Human Inventions, 55 PAT. TRADEMARK & COPYRIGHT J. (BNA) 556 (1998).

<sup>80</sup> Patent and Trademark Office Notice: *Animals-Patentability*, 1077 OFFICIAL GAZETTE U.S. PAT. & TRADEMARK OFF. 24 (1987).

<sup>81</sup> *Id.*

<sup>82</sup> Cynthia M. Ho, *Splicing Morality and Patent Law: Issues Arising from Mixing Mice and Men*, 2 WASH. U. J.L. & POL'Y 247, 251 (2000); Magnani, *supra* note 35, at 448.

<sup>83</sup> Bagley, *supra* note 63, at 502.

of producing human-animal chimera and for the chimera themselves.<sup>84</sup> The Newman Application does not cover all controversial human-animal chimera; it covers only chimera containing less than fifty percent human DNA.<sup>85</sup> Newman and Rifkin did not intend to actually produce chimera if a patent was granted to them.<sup>86</sup> Instead, they had a no-lose plan to discourage chimera research. First, if the patent were granted, they intended to prevent anyone else from producing chimera for the term of the patent.<sup>87</sup> Second, even if the patent was denied, Newman and Rifkin hoped to take away some of the economic incentives of engaging in chimera research by setting a precedent that chimera are unpatentable.<sup>88</sup> Regardless of the result, they sought to spark a public debate on the commercialization and commodification of life.<sup>89</sup>

While the PTO has rejected the Newman Application several times, its reasoning is ambiguous and may ultimately be driven more by emotion than sound legal principles.<sup>90</sup> It initially appeared that the PTO would invoke the April 21, 1987 notice and reject the Newman Application as a “claim[] directed to, or including within [its] scope, a human being,” presumably barred by the Thirteenth Amendment.<sup>91</sup> However, in an April 2, 1998 media advisory, the PTO invoked a new rationale in apparent opposition to the Newman Application.<sup>92</sup> The media advisory stated that it was the PTO’s position that “inventions directed to human/non-human chimera could, under certain circumstances, not be patentable because, among other things, they

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<sup>84</sup> Rick Weiss, *Patent Sought on Making of Part-Human Creatures*, WASH. POST, Apr. 2, 1998, at A12. Newman is a cellular biologist at New York Medical College and Rifkin is a prominent opponent of biotechnology. *Id.*

<sup>85</sup> Magnani, *supra* note 35, at 450.

<sup>86</sup> Weiss, *supra* note 84.

<sup>87</sup> Greene, *supra* note 60.

<sup>88</sup> *Id.*

<sup>89</sup> Weiss, *supra* note 84.

<sup>90</sup> On April fools’ day 1998, within hours of reading U.S. patent application No. 08/993,564, the Honorable Bruce Lehman did something no other commissioner of patents had done in the 200-year history of America’s oldest government agency. He stepped before a cluster of microphones and announced that the patent would never be approved. No half-human “monsters” would be patented, Lehman declared angrily, or any other “immoral inventions.”

Dowie, *supra* note 52, at 49.

<sup>91</sup> Daniel, *supra* note 65, at 117–20.

<sup>92</sup> *Id.* at 118–19. Due to confidentiality concerns, the PTO was not commenting directly on the Newman Application but it was clearly the impetus for the media advisory. See Media Advisory, U.S. Patent & Trademark Office, *Facts on Patenting Life Forms Having a Relationship to Humans* (Apr. 1, 1998), <http://www.uspto.gov/web/offices/com/speeches/98-06.htm> [hereinafter Media Advisory].

would fail to meet the public policy and morality aspects of the utility requirement” of the Patent Act.<sup>93</sup>

To further add to the confusion, the PTO ultimately did not rely on the moral utility argument of the media advisory in rejecting the Newman Application.<sup>94</sup> Instead, in March 1999, the PTO first rejected the Newman Application on more traditional patent law grounds including insufficient disclosures and for failing the nonobviousness requirement.<sup>95</sup> Newman and Rifkin continued to fight the rejection for seven years.<sup>96</sup> In rejecting later reapplications, the PTO has offered additional rationales in opposition to chimera patentability such as the constitutional rights to privacy and procreative liberty.<sup>97</sup> It now appears that the Newman Application has been rejected for the final time, but the precise legal basis of that rejection remains unclear.<sup>98</sup>

As legal commentators have noted, several of the arguments invoked by the PTO against patenting humans or chimera have serious doctrinal flaws.<sup>99</sup> The 1987 notice stated that a “claim directed to or including within its scope a human being” would not be considered patentable subject matter under the Patent Act because “the grant of a limited, but exclusive property right in a human being is prohibited by the Constitution.”<sup>100</sup> This subject matter argument appears to depend on an implicit exclusion of human beings for patentability under the Patent Act.<sup>101</sup> However, this is in conflict with *Chakrabarty*, in which the Supreme Court strongly discouraged implying subject matter limitations in the Patent Act.<sup>102</sup> After *Chakrabarty*, the law

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<sup>93</sup> Media Advisory, *supra* note 92. In attempting to reinvigorate the moral utility doctrine in reference to chimera, the PTO went on to state that:

[t]he PTO will not, therefore, issue a patent for an invention of incredible or specious utility or for inventions whose utilization is not adequately disclosed in the application. Additionally, the courts have interpreted the utility requirement to exclude inventions deemed to be “injurious to the well being, good policy, or good morals of society.”

*Id.* (citations omitted).

<sup>94</sup> Jagels, *supra* note 77, at 133.

<sup>95</sup> *Id.*

<sup>96</sup> Weiss, *supra* note 18.

<sup>97</sup> *Id.*

<sup>98</sup> *Id.*

<sup>99</sup> *Id.*

<sup>100</sup> *Patent and Trademark Office Notice*, *supra* note 80.

<sup>101</sup> Daniel, *supra* note 65, at 118–19.

<sup>102</sup> The Patent Act is to be construed without implied restrictions. *Diamond v. Chakrabarty*, 447 U.S. 303, 315–16 (1980); Ho, *supra* note 82, at 252. The *Chakrabarty* Court noted that “a statute is not to be confined to

seems to impose no subject matter restriction on the patentability of human beings under the Patent Act, and the PTO cannot unilaterally insert one.<sup>103</sup> In addition, the PTO's more recent reliance on the moral utility doctrine in its 1998 media advisory to attack the usefulness of a chimera patent is legally unsound because the doctrine has been largely rejected in recent years.<sup>104</sup> If asserted by the PTO as a limitation on patentability, any application of the moral utility doctrine "is bound to be overturned in court."<sup>105</sup> Even if there were still an established moral utility test in U.S. patent law,<sup>106</sup> there is a strong argument that the moral utility would favor allowing patents on chimera because of the possible benefits to medical research.<sup>107</sup>

Given the expansive scope of the Patent Act, the most substantial arguments against chimera patentability rest on other constitutional provisions that may independently bar chimera patentability.<sup>108</sup> These arguments require an interpretation of the Constitution to determine first if the Constitution and its protections even apply to human-animal chimera and second, if the threshold question is satisfied, if other constitutional provisions do in fact bar chimera patents.<sup>109</sup> The PTO, however, is not the proper body to make these ultimate determinations. The role of the PTO is to administer the law, not to

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the 'particular application[s] . . . contemplated by the legislators.' This is especially true in the field of patent law. . . . Congress employed broad general language in drafting § 101 precisely because such inventions are often unforeseeable." *Chakrabarty*, 447 U.S. at 315–16 (citations omitted).

<sup>103</sup> See Bagley, *supra* note 63, at 498 (stating that "[s]ection 101 of the Patent Act, as interpreted, encompasses 'anything under the sun that is made by man,' including, apparently, animals and even other men").

<sup>104</sup> No court has relied on the moral utility doctrine in rejecting a patent since the PTO Board of Appeals held that a gambling device was patentable in 1977. *Ho*, *supra* note 82, at 249; see Lauren Cirlin, Comment, *Human or Animal: A Resolution to the Biotechnological Blurring of the Lines*, 32 SW. U. L. REV. 501, 514–15 (2003) (noting that moral questions are highly subjective and allowing the PTO to make such judgments would inject damaging uncertainty into patent law). *But see* *Tol-O-Matic, Inc. v. Proma Produkt-und Mktg. Gesellschaft*, 945 F.2d 1546, 1553 (Fed. Cir. 1991).

<sup>105</sup> Bagley, *supra* note 63, at 492. Professor Bagley goes on to note that "it would be difficult in the extreme to resurrect a rule which . . . does not exist under the current patent statute." *Id.* at 493.

<sup>106</sup> Europe does have a moral utility requirement in patent law. Young-Gyoo Shim, *Intellectual Property Protection of Biotechnology and Sustainable Development in International Law*, 29 N.C. J. INT'L L. & COM. REG. 157, 220–21 (2003).

<sup>107</sup> Kopinski, *supra* note 6, at 657 (stating that "the moral utility test in patent law is not particularly useful in a patent application for human-nonhuman chimeras, because the utilitarian arguments would inevitably outweigh the deontological arguments"); see Magnani, *supra* note 35, at 456.

<sup>108</sup> See Weiss, *supra* note 18 (listing constitutional privacy rights, the Thirteenth Amendment, and the right to travel as barriers asserted by the PTO against chimera patentability).

<sup>109</sup> While several commentators have addressed the patentability of chimera, the threshold question of the constitutional personhood of chimera has not been well addressed in the current literature and is therefore the focus of this Comment.

create the law.<sup>110</sup> It may even be a violation of the separation of powers doctrine for the PTO to make such constitutional interpretations.<sup>111</sup> In deciding if constitutional protections apply to chimera, it is “emphatically the province and duty of the judicial department to say what the law is.”<sup>112</sup>

#### *D. Why Chimera Patents Are Unique*

In recent years, the PTO has routinely granted patents on organisms that contain human genetic material while rejecting chimera patents.<sup>113</sup> Many patents have been granted for claims to recombinant organisms in which human genes have been inserted into the genome of another organism.<sup>114</sup> The reason for the PTO’s differential treatment of these recombinant organisms and human-animal chimera seems to relate to the very nature of chimera: they contain entire, unaltered human cells, and by changing the method of production, the percentage of human tissue could be very high. In describing the difference between chimera and recombinant animals, Thomas Murray, the director of the Center for Biomedical Ethics at Case Western Reserve University, stated:

If we put one human gene in an animal, or two or three, some people may get nervous but you’re clearly not making a person yet. But when you talk about a hefty percentage of the cells being human . . . this really is problematic. Then you have to ask these very hard questions about what it means to be human.<sup>115</sup>

Thus, chimera toe the line of humanity more conspicuously than traditional recombinant organisms.<sup>116</sup>

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<sup>110</sup> Article I of the Constitution gives Congress the power to legislate “[t]o promote the Progress of . . . useful Arts, by securing for limited Times to . . . Inventors the exclusive Right to their . . . Discoveries.” U.S. CONST. art. I, § 8, cl. 8. In contrast, the PTO has only the statutory authority to apply the legislative scheme that Congress has enacted. *Graham v. John Deere Co.*, 383 U.S. 1, 6 (1966).

<sup>111</sup> Daniel, *supra* note 65, at 117.

<sup>112</sup> *Marbury v. Madison*, 5 U.S. 137, 177 (1803). Further, if the PTO’s constitutional proclamations against chimera patentability are in fact wrong and overturned by the courts, it will have needlessly stifled valuable medical research by eliminating the economic incentives of patentability.

<sup>113</sup> Jagels, *supra* note 77, at 117.

<sup>114</sup> *Id.*

<sup>115</sup> Weiss, *supra* note 84.

<sup>116</sup> One author has remarked that the reason the Newman Application was rejected is that it caught the attention of the PTO by being explicit about the potential scope and applications of its claims: “Newman and Rifkin’s application is different only in that it calls a pig a pig, so to speak.” Clark, *supra* note 47, at 143.

*E. Has Congress Taken a Stance on the Patentability of Chimera?*

In 2004, Congress passed and President Bush signed into law a provision of the federal budget that prohibits the PTO from issuing patents on “human organisms.”<sup>117</sup> The provision has become widely known as the “Weldon Amendment,” after its author, Representative Dave Weldon of Florida.<sup>118</sup> The Weldon Amendment states that “none of the funds appropriated or otherwise made available under this Act may be used to issue patents on claims directed to or encompassing a human organism.”<sup>119</sup> The Amendment does not directly alter the scope of the Patent Act, however, since it is only a temporary budget provision.<sup>120</sup> According to Representative Weldon, the intent of the provision is, on one hand, to codify the PTO’s policy that genetically-engineered adult, fetal, and embryonic human organisms are not patentable, but on the other hand, not to affect the patentability of human DNA sequences, cell lines, stem cells, and other biological products.<sup>121</sup> Commenting specifically on chimera, Representative Weldon made it clear that in his view the provision does not affect the PTO’s policy on the patentability of human-animal chimera:

What about an animal that is modified to include a few human genes so it can produce a human protein or antibody? What about a human/animal “chimera” (an embryo that is half human, half animal)? . . . The USPTO has already granted patents on the former. It has also thus far rejected patents on the latter, the half-human embryo, because the latter can broadly but reasonably be construed as a human organism. The Weldon amendment does nothing to change this, but leaves the USPTO free to address new or borderline issues on the same case-by-case basis as it already does.<sup>122</sup>

While Representative Weldon has stated that the provision does not directly affect the present status of chimera patentability, the American Bar Association has argued that the language of the enacted provision “confuses the situation”

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<sup>117</sup> Consolidated Appropriations Act of 2004, Pub. L. No. 108-199, § 634, 118 Stat. 101; SECTION OF INTELLECTUAL PROP. LAW, AM. BAR ASS’N, REPORT TO THE HOUSE OF DELEGATES 2 (2004) [hereinafter ABA REPORT], <http://www.abanet.org/leadership/2004/annual/104.doc>.

<sup>118</sup> See generally ABA REPORT, *supra* note 117.

<sup>119</sup> § 634, 118 Stat. 101. The language of the provision may not prohibit patents on the *methods* used to create human organisms, just the organisms themselves. On August 24, 2004, the PTO issued a methods patent for cloning mammals that did not exclude human beings from its claims. See U.S. Patent No. 6,781,030 (filed Nov. 2, 1999).

<sup>120</sup> See generally ABA REPORT, *supra* note 117.

<sup>121</sup> Kopinski, *supra* note 6, at 635; Rick Weiss, *Hill Negotiators Agree to Bar Patents for Human Organisms*, WASH. POST, Nov. 25, 2003, at A19.

<sup>122</sup> 149 CONG. REC. E2235 (daily ed. Nov. 5, 2003) (statement of Rep. Weldon).

because it is unclear how broadly the term “human organism” in the provision will be interpreted.<sup>123</sup>

The Weldon Amendment arguably prohibits the patentability of chimera produced by injecting animal stem cells into human embryos or by using human embryos in an embryonic mixing technique. This is because a chimera produced in this way would utilize a human embryo and therefore may “encompass[] a human organism” under the provision. This line of reasoning would not apply to chimera produced by injecting human stem cells into animal embryos because human stem cells do not appear to be covered by the provision.<sup>124</sup> The Amendment may also provide implicit congressional support for current PTO policies in opposition to human-animal chimera patents.<sup>125</sup>

Regardless of the Weldon Amendment’s effect on chimera patentability, broader constitutional issues remain. The Weldon Amendment does not attempt to ban the production of human-animal chimera altogether because it is limited to PTO funding. While patents offer an important economic incentive to pursue questionable research,<sup>126</sup> the major objections to chimera technology focus on preventing this type of research entirely, and this cannot be done through patent law.<sup>127</sup> Assuming certain chimera are entitled to legal protection from exploitation and abuse, patent law cannot fully shelter them, so a broader constitutional answer is needed. Therefore, the remainder of this Comment will address an unresolved and underdeveloped question: Is it possible for chimera to be “persons” under the U.S. Constitution?

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<sup>123</sup> ABA REPORT, *supra* note 117, at 4. The ABA also expressed concern that, despite Weldon’s statements, the “human organism” language of the provision “could be interpreted as broadening the current USPTO prohibition to prescribe also the patenting of human cells or human cell lines, such as embryonic stem cell lines.” *Id.*

<sup>124</sup> Kopinski, *supra* note 6, at 635; Weiss, *supra* note 121.

<sup>125</sup> Mikyung Kim, *An Overview of the Regulation and Patentability of Human Cloning and Embryonic Stem Cell Research in the United States and Anti-Cloning Legislation in South Korea*, 21 SANTA CLARA COMPUTER & HIGH TECH. L.J. 645, 665 (2005). PTO Director James Rogan has stated that the provision gives “unequivocal congressional backing” for the USPTO’s refusal “to grant any patent containing a claim that encompasses any member of the species *Homo sapiens* at any stage of development.” Letter from James E. Rogan, Dir., U.S. Patent and Trademark Office, to Sen. Ted Stevens, Chairman, Comm. on Appropriations (Nov. 20, 2003), available at [http://www.nrlc.org/Killing\\_Embryos/Human\\_Patenting/WeldonamendUSPTO.pdf](http://www.nrlc.org/Killing_Embryos/Human_Patenting/WeldonamendUSPTO.pdf).

<sup>126</sup> Bagley, *supra* note 63, at 474; Magnani, *supra* note 35, at 459.

<sup>127</sup> Kopinski, *supra* note 6, at 656; see Leon R. Kass, *Patenting Life*, 63 J. PAT. & TRADEMARK OFF. SOC’Y 571, 583 (1981) (“Denial of individual patent applications seems a poor way for society to decide questions about allegedly dangerous research and technology.”).

### III. LEGAL AND CONSTITUTIONAL PERSONHOOD ON THE MARGINS OF LIFE

Constitutional rights and protections are afforded only to “persons.”<sup>128</sup> Constitutional personhood has been described as “a magic incantation that opens the door to the powerful spirit of the U.S. Constitution.”<sup>129</sup> The crucial term “person,” however, is not explicitly defined in the Constitution.<sup>130</sup> While there may be no one unifying concept of constitutional personhood,<sup>131</sup> personhood has generally been synonymous with humanness: any and all humans are constitutional persons.<sup>132</sup> While some nonhuman legal entities such as corporations do qualify as persons, animals clearly do not.<sup>133</sup>

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<sup>128</sup> *Roe v. Wade*, 410 U.S. 113, 156–57 (1973); Magnani, *supra* note 35, 449–50. The term “person” is quite different from “citizen.” Under the Fourteenth Amendment, for example, “citizen” is a subcategory of “person,” one “born or naturalized in the United States, and subject to the jurisdiction thereof.” U.S. CONST. amend. XIV, § 1. Thus, noncitizen persons are protected by most constitutional rights but could still be denied some constitutional protections that are reserved only for citizens, such as the privileges and immunities clause of the Fourteenth Amendment. *Id.*

<sup>129</sup> Richard M. Lebovitz, *The Accordion of the Thirteenth Amendment: Quasi-Persons and the Right of Self-Interest*, 14 ST. THOMAS L. REV. 561, 563 (2002).

<sup>130</sup> *Roe*, 410 U.S. at 157. After noting the lack of specific definition, the *Roe* Court then described the various places in which the term “person” is used in the document:

Section 1 of the Fourteenth Amendment contains three references to “person.” The first, in defining “citizens,” speaks of “persons born or naturalized in the United States.” The word also appears both in the Due Process Clause and in the Equal Protection Clause. “Person” is used in other places in the Constitution: in the listing of qualifications for Representatives and Senators, Art. I, § 2, cl. 2, and § 3, cl. 3; in the Apportionment Clause, Art. I, § 2, cl. 3; in the Migration and Importation provision, Art. I, § 9, cl. 1; in the Emolument Clause, Art. I, § 9, cl. 8; in the Electors provisions, Art. II, § 1, cl. 2, and the superseded cl. 3; in the provision outlining qualifications for the office of President, Art. II, § 1, cl. 5; in the Extradition provisions, Art. IV, § 2, cl. 2, and the superseded Fugitive Slave Clause 3; and in the Fifth, Twelfth, and Twenty-second Amendments, as well as in §§ 2 and 3 of the Fourteenth Amendment.

*Id.*

<sup>131</sup> The Supreme Court has used only pragmatic concerns to derive a legal conclusion of constitutional personhood. . . . [T]his lack of theory plagues the law of personhood for both natural persons and corporations. . . . Such decisions appear to be made on a case-by-case basis, probably with an eye toward practical effects, without consideration for developing a coherent doctrine.

Michael D. Rivard, Comment, *Toward a General Theory of Constitutional Personhood: A Theory of Constitutional Personhood for Transgenic Humanoid Species*, 39 UCLA L. REV. 1425, 1465–66 (1992).

<sup>132</sup> Note, *What We Talk About When We Talk About Persons: The Language of a Legal Fiction*, 114 HARV. L. REV. 1745, 1747 (2001).

<sup>133</sup> David Favre, *Integrating Animal Interests into Our Legal System*, 10 ANIMAL L. 87, 92 (2004). For a description of the “schizophrenic” corporate personhood doctrine, see generally Note, *supra* note 132.

Therefore, chimera exist within the fissure between human persons and animal nonpersons.

Determining when, if ever, a human-animal chimera should be treated as a constitutional person is a difficult task.<sup>134</sup> This determination is significantly more complex in the chimera context than other areas of biotechnology. A human clone would be as much a person as an identical twin,<sup>135</sup> and most recombinant animals have only a few human genes and, typically, are unmistakably nonhuman.<sup>136</sup> Chimera represent the murky middle ground that pushes the limits of humanity.<sup>137</sup> If the constitutional term “person” is defined too narrowly, there is a risk of subjecting very human-like, intelligent creatures to suffering and servitude, violating fundamental constitutional ideals. Yet, if person is defined too broadly, it may deliver a deathblow to a valuable field of medical research.<sup>138</sup> Thus, declaring chimera persons potentially trades life-saving research in favor of respect for human dignity and freedom.<sup>139</sup>

#### A. *The Vocabulary*

To reduce uncertainty caused by imprecise terminology, the remainder of this Comment will utilize a defined set of terms. The term “human” will be used quasi-technically to refer to those organisms that are composed of one hundred percent *Homo sapiens* cells. “Humanity” and “humanness” will refer to the set of cognitive and biological characteristics that are the hallmarks of “humans.” The slightly more ambiguous term “human being” will be avoided.<sup>140</sup> The terms “person,” “personhood,” “constitutional person,” and “constitutional personhood” will all refer to the legal and constitutional

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<sup>134</sup> See generally Greely, *supra* note 24 (recommending an exhaustive taxonomy to aid in analyzing the ethical concerns presented by different types of chimera); Weiss, *supra* note 84 (noting that Congress failed in its attempt to pass a law restricting patents on humans in 1989, in part because of the difficulty in defining “human”).

<sup>135</sup> Jagels, *supra* note 77, at 122.

<sup>136</sup> However, it is possible to transfer a large portion of the human genome into host animals by recombinant technology or by nuclear transfer. *Id.* at 124–25.

<sup>137</sup> See Weiss, *supra* note 84 (statement of Thomas Murray).

<sup>138</sup> See *supra* notes 44–50 and accompanying text.

<sup>139</sup> In describing human biotechnology patents, Jagels notes that “[t]he greatest challenge lies in limiting the transfer of human character without overly restricting beneficial uses of human gene products.” Jagels, *supra* note 77, at 126.

<sup>140</sup> This term that has been used frequently by the PTO and its precise legal meaning is not clear. See *supra* Part II.C.

construct of who or what is and should be entitled to constitutional protections.<sup>141</sup>

*B. Legal Personhood on the Boundaries of Life: A Doctrine Frayed at the Ends*

This Comment seeks to reinterpret constitutional personhood in a way that reconciles traditional constitutional concepts of personhood with the modern reality of chimera biotechnology. As an interpretive matter, the Framers of the Constitution could not have anticipated or addressed the blurring of the lines of personhood caused by chimera technology, so an originalist approach to constitutional interpretation is likely futile.<sup>142</sup> There are also presently no cases or statutes addressing the personhood of human-animal chimera under the Constitution. The one place where the personhood of chimera has arisen thus far is in patent law via the Newman Application.<sup>143</sup> However, the PTO has little authority or competency to make constitutional proclamations on the personhood of chimera, so positions taken by the PTO are of limited legal significance.<sup>144</sup>

Thus, traditional legal sources are of reduced value, and important guidance in resolving chimera personhood will be derived from the moral and ethical discourse presented in Part IV of this Comment. Nevertheless, some insight into the fundamental elements of personhood can be gleaned by examining the history of what it means to be a legal person in other contexts. The personhood debate has had the greatest, and most controversial, legal significance on the edges of the human life cycle: fetal personhood and brain death.<sup>145</sup>

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<sup>141</sup> As John Chipman Gray stated, “the technical legal meaning of ‘person’ is a subject of legal rights and duties.” Lawrence B. Solum, *Legal Personhood for Artificial Intelligences*, 70 N.C. L. REV. 1231, 1238–39 (1992) (citing JOHN CHIPMAN GRAY, *THE NATURE AND SOURCES OF THE LAW* 27 (1909)). A similar taxonomic distinction between “human” and “person” is mentioned by Robert & Baylis, *supra* note 43, at 9.

<sup>142</sup> In addition, this country’s history of slavery cautions strongly against an originalist approach to personhood in many contexts. Kayhan Parsi, *Metaphorical Imagination: The Moral and Legal Status of Fetuses and Embryos*, 2 DEPAUL J. HEALTH CARE L. 703, 779 (1999). For general discussions of originalist debate, see generally Daniel A. Farber, *The Originalism Debate: A Guide for the Perplexed*, 49 OHIO ST. L.J. 1085 (1989), and Paul Finkelman, *The Constitution and the Intentions of the Framers: The Limits of Historical Analysis*, 50 U. PITT. L. REV. 349 (1989).

<sup>143</sup> See *supra* Part II.C.

<sup>144</sup> See *supra* notes 99–112 and accompanying text.

<sup>145</sup> Douglas O. Linder, *The Other Right-to-Life Debate: When Does Fourteenth Amendment “Life” End?*, 37 ARIZ. L. REV. 1183, 1183 n.1 (1995) (“Interestingly, the slavery, abortion, and end-of-life debates all relate to the meaning of constitutional personhood.”); Solum, *supra* note 141, at 1285.

### 1. *Abortion and Human Embryos*

In upholding the constitutionality of abortion, the U.S. Supreme Court in *Roe v. Wade* noted that if the personhood of a fetus “is established, the appellant’s case, of course, collapses, for the fetus’ right to life would then be guaranteed specifically by the [Fourteenth] Amendment.”<sup>146</sup> After examining the legal history of the Constitution and abortion, the Court decided that “the word ‘person’ . . . does not include the unborn.”<sup>147</sup> The Court came to this conclusion because the use of “person” in various constitutional provisions did not presuppose prenatal application.<sup>148</sup> The controversial analysis of personhood from *Roe v. Wade* provides support for the proposition that no organism, be it a human fetus or a developing human-animal chimera embryo, can qualify for personhood prior to viability.<sup>149</sup>

Despite a superficial similarity, personhood in the abortion context is quite different from human-animal chimera personhood. This is principally because the privacy and reproductive autonomy rights of the mother play a fundamental role in the abortion calculus while this concern is absent in laboratory-based chimera research.<sup>150</sup> Maternal rights may render fetal personhood in the context of abortion *sui generis*.<sup>151</sup> The *Roe* Court’s examination of constitutional personhood might therefore be “cabined” to abortion and largely inapplicable to the problems of chimera.<sup>152</sup>

While the legal status of human embryos produced or stored outside of the uterus—and thus outside the maternal interest—might provide a more fitting

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<sup>146</sup> *Roe*, 410 U.S. at 156–57.

<sup>147</sup> *Id.* at 158.

<sup>148</sup> *Id.* But see Gerard V. Bradley, *Life’s Dominion: A Review Essay*, 69 NOTRE DAME L. REV. 329, 338–47 (1993) (arguing for fetal personhood); Charles I. Lugosi, *Respecting Human Life in the 21st Century: A Model Perspective to Extend Civil Rights to the Unborn from Creation to Natural Death*, 48 ST. LOUIS U. L.J. 425, 447 (2004) (arguing that legal personhood should attach at the moment of conception).

<sup>149</sup> Bagley, *supra* note 63, at 503. Nevertheless, *Roe* does not cut off all rights possessed by nonperson fetuses since “the decision postulates a sliding scale that allows the state to recognize powerful fetal rights that, at viability, even trump maternal rights.” John B. Attanasio, *The Constitutionality of Regulating Human Genetic Engineering: Where Procreative Liberty and Equal Opportunity Collide*, 53 U. CHI. L. REV. 1274, 1294 (1986).

<sup>150</sup> Burk, *supra* note 56, at 1652–53.

<sup>151</sup> See *id.*

<sup>152</sup> William L. Saunders, Jr., *The Current State of Abortion Law and Reproductive Rights: Lethal Experimentation on Human Beings: Roe’s Effect on Bioethics*, 31 FORDHAM URB. L.J. 817, 829 (2004). However, Saunders argues that the cabining argument has proven to be false because the *Roe* “principle” has been extended to the debates over stem cell research and cloning. *Id.* at 830.

analogy to chimera, the legal status of such embryos is presently unresolved.<sup>153</sup> In addition, it is unquestioned that fetuses and embryos achieve personhood upon full gestation, so the personhood of fetuses and embryos is fundamentally a question of development and timing, whereas the personhood of chimera relates to their inherent nature. In order to separate the chimera debate, the focus of this Comment is on the personhood of fully gestated human-animal chimera.

## 2. *Defining Legal Death*

Knowing when the law has deemed a person no longer legally living provides some insight into those attributes that are necessary for legal personhood. This is because “[w]hen the crucial aspects of ‘personhood’ are irretrievably lost, we feel that an individual has died.”<sup>154</sup> The common law definition of death was an “absence of spontaneous respiratory and cardiac functions.”<sup>155</sup> This approach did not look to brain activity as the defining characteristic of legal life but due to advances in modern technology and medicine, the common law rule is outdated.<sup>156</sup> This common law definition of death would include individuals whose brains are still active but whose respiratory and cardiac systems require life support and exclude individuals with total, irreparable loss of higher-level brain function but with some continuing respiratory and cardiac functions.<sup>157</sup>

As a result, the medical community and most state legislatures have attempted to redefine the meaning of legal death.<sup>158</sup> Modern statutes and proposals typically add to the common law definition and provide that a human with irreversible, total, or whole “brain death” will be considered legally dead.<sup>159</sup> The Uniform Determination of Death Act states that “[a]n individual who has sustained . . . irreversible cessation of all functions of the entire brain,

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<sup>153</sup> See Nathan A. Adams, *Creating Clones, Kids & Chimera: Liberal Democratic Compromise at the Crossroads*, 17 NOTRE DAME J.L. ETHICS & PUB. POL’Y 71, 106–08 (2003); Erwin, *supra* note 8, at 221–37.

<sup>154</sup> Steven Goldberg, *The Changing Face of Death: Computers, Consciousness, and Nancy Cruzan*, 43 STAN. L. REV. 659, 659 (1991) (arguing that self-awareness should be the central issue in defining death).

<sup>155</sup> Joseph N. Harden, *The “Gift” of Life: Should Anencephalic Infants Die to Serve Noble Goals?*, 27 CUMB. L. REV. 1279, 1290 (1997); see Kathleen L. Paliokas, *Anencephalic Newborn as Organ Donors: An Assessment of “Death” and Legislative Policy*, 31 WM. & MARY L. REV. 197, 201–03 (1989).

<sup>156</sup> Harden, *supra* note 155, at 1290.

<sup>157</sup> *Id.* at 1291–92.

<sup>158</sup> Goldberg, *supra* note 154, at 667–68.

<sup>159</sup> See UNIF. DETERMINATION OF DEATH ACT, § 1, 12A U.L.A. 386 (1980 & Supp. 1994); Alexander Morgan Capron & Leon R. Kass, *A Statutory Definition of the Standards for Determining Human Death: An Appraisal and a Proposal*, 121 U. PA. L. REV. 87, 118 (1972) (proposing an early model brain death statute).

including the brain stem, is dead.”<sup>160</sup> The ability of other parts of the body to function via life support is not relevant if the brain has completely failed.

Still, commentators argue that the now widely accepted total or whole brain death definition remains inadequate.<sup>161</sup> This is because “a person may suffer an irreversible loss of consciousness and cognition, the earmarks of higher brain activity, without losing brain stem functions.”<sup>162</sup> The capacity for higher-level brain activity is central to legal life, not the vegetative function of the lower brain.<sup>163</sup> The difficulty of defining brain death also arises with respect to anencephalic<sup>164</sup> newborns lacking the physical capability to ever achieve higher brain function.<sup>165</sup> Because these newborns can never display human intellectual traits, several authors have argued that they should not be considered legal “persons.”<sup>166</sup> This tragic condition is more analogous to chimera than other humans who have suffered higher brain death because, like a human-animal chimera without human brain tissue, anencephalic newborns are incapable from inception of ever achieving higher-level human brain function.<sup>167</sup>

Humans who lack the capacity for brain function, either because of congenital defect or subsequent brain death, illustrate that a capacity for brain function is necessary for legal life and therefore legal personhood.<sup>168</sup> Further, in line with the modern trend criticizing a strict whole brain approach, the relevant brain functions for defining life are higher-level consciousness and

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<sup>160</sup> 12A U.L.A. 386, § 1(2); see PRESIDENT’S COMM’N FOR THE STUDY OF ETHICAL PROBLEMS IN MEDICINE AND BIOMEDICAL AND BEHAVIORAL RES., *DEFINING DEATH* 109–34 (1981) (compiling statutes and showing that most states recognize some form of “brain death”).

<sup>161</sup> David Randolph Smith, *Legal Recognition of Neocortical Death*, 71 CORNELL L. REV. 850, 857 (1986).

<sup>162</sup> *Id.*

<sup>163</sup> Goldberg, *supra* note 154, at 667–69.

<sup>164</sup> Anencephaly is a congenital defect where brain development is incomplete resulting in an absence of the major brain structures responsible for cognition. Paliokas, *supra* note 155, at 197. The brain death statutes generally do not apply to this condition because the residual lower brain stem often remains and still operates after birth. *Id.*

<sup>165</sup> *Id.* at 226–29.

<sup>166</sup> Gary B. Gertler, *Brain Birth: A Proposal for Defining When a Fetus is Entitled to Human Life Status*, 59 S. CAL. L. REV. 1061, 1069–70 (1986) (proposing that fetal personhood begin when neocortical brain activity begins because higher-level intellectual functioning characterizes personhood); Paliokas, *supra* note 155, at 226–29. These newborns should still be treated with a high level of moral respect and need not be left to die simply because they qualify as brain dead or are not defined as legal “persons.” See Paliokas, *supra* note 155, at 228.

<sup>167</sup> Paliokas, *supra* note 155, at 226–27.

<sup>168</sup> Ronald E. Cranford & David Randolph Smith, *Consciousness: The Most Critical Moral (Constitutional) Standard For Human Personhood*, 13 AM. J.L. & MED. 233, 247 (1987).

cognition. Consequently, these higher-level brain functions are crucial in defining constitutional personhood.<sup>169</sup> Some commentators argue that “[a]ll rights enumerated in the Constitution and the Bill of Rights are predicated on consciousness, or the capacity for consciousness, except for the right to life itself, which becomes meaningless when consciousness can never exist.”<sup>170</sup> While analogies to the legal definition of death can help clarify what is necessary for chimera personhood, namely a continuing capacity for higher-level cognitive function, it cannot fully resolve what is sufficient for personhood in a creature that is not entirely human.

#### IV. THE MORALITY AND BIOETHICS OF CHIMERA

Traditional legal sources alone are insufficient to resolve the thorny question of human-animal chimera personhood.<sup>171</sup> Therefore, the constitutional proposal presented in Part V must also make use of the moral and bioethical sources presented in this Part.<sup>172</sup> This reliance on non-legal sources is not an analytical deficiency because defining “personhood” should be an exercise in morality and natural law,<sup>173</sup> as opposed to a sterile syllogistic analysis.<sup>174</sup> Moral and ethical considerations, a bedrock of natural law, play a vital role in analyzing this type of constitutional issue.<sup>175</sup>

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<sup>169</sup> See *id.* (“Personhood encompass an inner-directed and an outer-directed will. An individual who is permanently unconscious has no will. In the absence of will, thought, expression, or consciousness, legal rights and liberties have no reference and thus no meaning.”).

<sup>170</sup> *Id.*

<sup>171</sup> See *supra* Part III.

<sup>172</sup> See Attanasio, *supra* note 149, at 1328 (noting that moral theory can help overcome inadequacies in constitutional theory in the biotechnology field).

<sup>173</sup> Natural law is defined as: “[a] philosophical system of legal and moral principles purportedly deriving from a universalized conception of human nature or divine justice rather than from legislative or judicial action; moral law embodied in principles of right and wrong.” BLACK’S LAW DICTIONARY 1049 (7th ed. 1999).

<sup>174</sup> PAUL E. SIGMUND, NATURAL LAW IN POLITICAL THOUGHT 109 (1971) (discussing the use of natural law to interpret the Fifth and Fourteenth Amendments).

<sup>175</sup> As Justice Cardozo stated, a form of natural law provides “the main rule of judgment to the judge when precedent and custom fail.” *Id.* at 169 (citing BENJAMIN CARDOZO, THE NATURE OF THE JUDICIAL PROCESS 142 (1921)). Unfortunately, “[j]udges not only fail to invoke philosophical support for their ideas of personality, but also inconsistently apply jurisprudential theory in resolving problems of legal personhood, approaching it more as a legal conclusion than as an open question.” Note, *supra* note 132, at 1747.

### A. *Moral and Ethical Attempts to Crystallize Humanity*<sup>176</sup>

Traditional moral philosophies generally operate on the assumption that only humans are entitled to moral rights. Owing to that initial position, they then attempt to crystallize either the biological or the cognitive factors that define humanness in order to separate and morally elevate humans over all other beings.<sup>177</sup> Even accepting the legitimacy of such an anthropocentric view,<sup>178</sup> these moral approaches based on separating humans from nonhumans break down when applied to human-animal chimera.<sup>179</sup>

#### 1. *The Biological Approach to Applying Human Morality*

The traditional view of human morality is simple: biological humans are moral people and biological nonhumans are not.<sup>180</sup> Thus, under this view, membership in the *Homo sapiens* species alone leads directly to moral humanness and its corollary, personhood: “that possession of the genetic material of [H]omo sapiens is a necessary and sufficient condition for personhood.”<sup>181</sup> Therefore, moral rights theory collapses into the biological question of humanness.<sup>182</sup> However, this purely biological analysis takes insufficient account of cognition in determining morality and personhood.<sup>183</sup> The commentary surrounding the legal death of clearly biological humans presented in Part III.B.2 demonstrates that cognition has a major role to play in the human moral framework. A biological approach may elevate the form of humanness over the moral substance of humanness.<sup>184</sup> This simple human–

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<sup>176</sup> These sources do not generally attempt to define constitutional personhood. Instead, they seek to find the traits that separate humans from animals on moral and ethical grounds and the insights from these discussions are useful in resolving the ultimate constitutional issue.

<sup>177</sup> See *infra* Part IV.A.1–2.

<sup>178</sup> Anthropocentrism is defined as “1. Regarding humans as the central element of the universe; 2. Interpreting reality exclusively in terms of human values and experience.” THE AMERICAN HERITAGE COLLEGE DICTIONARY 60 (4th ed. 2002).

<sup>179</sup> See *infra* Part IV.A.1–2.

<sup>180</sup> See Lugosi, *supra* note 148, at 447 (arguing in the abortion context that personhood should be granted to all biological *Homo sapiens* from the moment of conception forward).

<sup>181</sup> Solum, *supra* note 141, at 1284.

<sup>182</sup> *Id.*

<sup>183</sup> Charles M. Kester, *Is There a Person in That Body? An Argument for the Priority of Persons and the Need for a New Legal Paradigm*, 82 GEO. L.J. 1643, 1652–58 (1994) (arguing that a purely biological approach to legal standing (used by Kester as a substitute for personhood) creates doctrinal anomalies when applied to fetuses and patients in a persistent-vegetative-state); Solum, *supra* note 141, at 1284.

<sup>184</sup> See Bok, *supra* note 39, at 26 (stating that “it is not at all obvious why membership in a species (as opposed to possession of properties that members of that species commonly have) should entail radically different moral status”).

animal moral distinction based on biology is greatly complicated when the biological material is both human and animal, as in a chimera.

Still, the biological approach, if applied as a guide rather than a rule, has an important contribution to the personhood debate.<sup>185</sup> Contemporary commentators recognize that the defining traits of humanity are inseparably connected with the organ responsible for producing them, the human brain.<sup>186</sup> Therefore, chimera that present the most difficult moral and ethical problems are those that contain human brain cells.<sup>187</sup> Chimera do not necessarily become morally uncertain simply because they contain a trivial number of human brain cells; this “would have to involve the introduction of substantial numbers of human neural cells into a nonhuman embryo.”<sup>188</sup> Taking guidance from the brain death debate presented in Part III.B.2, a further distinction can be made between the neural tissues of the higher brain, responsible for consciousness and cognition, and the lower brain, responsible for vegetative function.<sup>189</sup> It is the higher brain functions, and therefore the higher brain cells and tissues, that factor most heavily into the personhood question.<sup>190</sup> Regardless, while this biological approach alerts us that a moral danger might arise when human neural cells are incorporated into the higher brain structures of chimera, it does not provide a firm rule for defining chimera as either human or animal.<sup>191</sup>

## 2. *The Cognitive Approaches: Separating Humanity Via Intellect*

Many modern theorists argue that the defining characteristics of humanity are intellectual attributes not physical human form, as is the case for biologically-based theories.<sup>192</sup> Modern bioethicists note that all creatures share

<sup>185</sup> Greely notes that “[t]he ‘importance’ of the parts—brains and gametes—are more important than heart valves or skin—and the number of parts moved—transplanting five visceral organs would be more troubling than transplanting one—seem significant” to determining the humanity of human-animal chimera. Greely, *supra* note 24, at 19.

<sup>186</sup> Gertler, *supra* note 166, at 1069–70; Paliokas, *supra* note 155, at 226–29.

<sup>187</sup> Westphal, *supra* note 34.

<sup>188</sup> Bok, *supra* note 39, at 26.

<sup>189</sup> See *supra* notes 161–67 and accompanying text.

<sup>190</sup> See Smith, *supra* note 161, at 860 (arguing that “[i]f neocortical functions—the capacity to think, feel, communicate, or experience our environment—are the key to human life, then the loss of neocortical functions should be the key to human death”).

<sup>191</sup> The “moral threshold of human neural development we might set as the limit” on chimera research is presently undefined. Mott, *supra* note 15 (quoting William Cheshire, associate professor of neurology at the Mayo Clinic).

<sup>192</sup> Savulescu, *supra* note 51, at 23 (“Any attempt to base moral status on biology is fundamentally flawed. Genes, cells, organs, or bodies are not what matter intrinsically. . . . What is special about *Homo*

similar genetic components and that biology alone may provide insufficient grounds for the moral uniqueness of humanity.<sup>193</sup> These theorists adopt more fluid tests for humanity that look to the psychological properties that differentiate humans from animals.<sup>194</sup> Among the properties that have been proposed as quintessentially human by modern theorists are the capacities to: reason; act for normative, including moral, reasons; act autonomously; engage in complex social relationships; display empathy and sympathy; and have faith in a higher being.<sup>195</sup>

Even before the biological bases of human cognition were understood, philosophers and theorists searched for the essential intellectual attributes that define humanity in order to apply moral rights. These theories tend to be inflexible as they draw sharp distinctions between human and nonhuman based intellectual traits once thought to be unique to the human species but now shown to be possessed to various degrees by other animal species.<sup>196</sup> For example, natural law theorists focus on the ability to reason as the defining characteristic of humanity.<sup>197</sup> Moral rights are only applied after defining and separating humans from other creatures based on this ability to reason.<sup>198</sup> Prior to modern animal research, the ability to communicate was also often given as a distinguishing factor of humans.<sup>199</sup>

Immanuel Kant's influential moral theory also attempts to separate man from beast based on a particular cognitive trait: rationality. According to Kant,

*sapiens* compared to all other animals? The answer is not to be found in biology but in certain psychological characteristics.”); see Joseph Fletcher, *Humanness in Humanhood: Essays in Biomedical Ethics*, in BARRY R. FURROW ET AL., *BIOETHICS: HEALTH CARE LAW AND ETHICS* 37, 37 (3d ed. 1997).

<sup>193</sup> See Robert & Baylis, *supra* note 43, at 4 (noting that when a large portion of human DNA is shared with other animals, “there is little (if any) uniquely human DNA”).

<sup>194</sup> Savulescu, *supra* note 51, at 23–24.

<sup>195</sup> *Id.* at 23. Savulescu asserts that the hallmark of humanity may lie in our “practical rationality,” the “capacity to make normative judgments, including moral judgments, and act on these” judgments. *Id.* at 24.

<sup>196</sup> Notions that humans are the sole possessors of many intellectual traits has been proven wrong by modern animal research. Eugene Linden, *Can Animals Think?*, *TIME*, Mar. 22, 1993, at 54, 56. Linden notes:

Since antiquity, philosophers have argued that higher mental abilities—in short, thinking and language—are the great divide separating humans from other species. The lesser creatures, Rene Descartes contended in 1637, are little more than automatons, sleepwalking through life without a mote of self-awareness. . . . Darwinism raised a series of tantalizing questions for future generations: If other vertebrates are similar to humans in blood and bone, should they not share other characteristics, including intelligence?

*Id.*

<sup>197</sup> SIGMUND, *supra* note 174, at 206.

<sup>198</sup> See *id.*

<sup>199</sup> Linden, *supra* note 196.

a being has full moral standing if and only if it is rational.<sup>200</sup> Kant believed that only humans are rational and, therefore, rationality was the morally defining characteristic of humanity.<sup>201</sup> Animals, which lack the capacity to reason, are thus not morally relevant.<sup>202</sup> The most familiar application of Kant's moral theory is his categorical imperative, which states that a human should "act in such a way that you always treat humanity, whether in your own person or in the person of any other, never simply as a means, but always at the same time as an end."<sup>203</sup> According to the categorical imperative, the killing of a human is always morally prohibited, regardless of any countervailing considerations.<sup>204</sup> It is not clear, however, if and how Kant's moral theory applies to chimera that are part human (and thus owed total, inviolable moral respect) and part animal (and thus owed none).

Despite numerous attempts over several centuries, no one has established one fixed set of characteristics such as communicative ability or rationality that includes all humans and excludes all nonhuman organisms.<sup>205</sup> Modern research has demonstrated that animals can communicate, exhibit intelligence, and experience emotion.<sup>206</sup> Some intelligent animals exhibit these traits more strongly than certain humans, such as the very young, the severally mentally handicapped, or the comatose.<sup>207</sup> Similar to Justice Stewart's famous statement on defining pornography,<sup>208</sup> maybe in the era of biotechnology we cannot define humanity, but we know it when we see it.<sup>209</sup> Nevertheless, the

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<sup>200</sup> Andrew W. Siegel, *The Moral Insignificance of Crossing Species Boundaries*, AM. J. BIOETHICS, Summer 2003, at 33, 34.

<sup>201</sup> Margaret MacDonald, *Natural Rights*, in THEORIES OF RIGHTS 21, 28 (Jeremy Waldon ed., 1984) (for Kant, "[m]en share all other characteristics with the brutes . . . but reason was alike in all men, it was man's defining characteristic").

<sup>202</sup> Margit Livingston, *Desecrating the Ark: Animal Abuse and the Law's Role in Prevention*, 87 IOWA L. REV. 1, 15 (2001). Under this view, the value of any nonhuman things resides only in its value to humans. Gregory Vlastos, *Justice and Equality*, in THEORIES OF RIGHTS, *supra* note 201, at 41, 55–56.

<sup>203</sup> ROBERT NOZICK, ANARCHY, STATE, AND UTOPIA 32 (1974) (quoting IMMANUEL KANT, GROUNDWORK OF THE METAPHYSICS OF MORALS 96 (H.J. Paton trans., 1956)).

<sup>204</sup> Emanuel Gross, *Thwarting Terrorist Acts by Attacking the Perpetrators or Their Commanders as an Act of Self-Defense: Human Rights Versus the State's Duty to Protect Its Citizens*, 15 TEMP. INT'L & COMP. L.J. 195, 230 (2001).

<sup>205</sup> Robert & Baylis, *supra* note 43, at 5.

<sup>206</sup> See generally Linden, *supra* note 196.

<sup>207</sup> Robert & Baylis, *supra* note 43, at 5.

<sup>208</sup> *Jacobellis v. Ohio*, 378 U.S. 184, 197 (1964) (Stewart, J., concurring) ("I shall not today attempt further to define the kinds of material I understand to be embraced within that shorthand description [of hardcore pornography]; and perhaps I could never succeed in intelligibly doing so. But I know it when I see it.").

<sup>209</sup> See Robert & Baylis, *supra* note 43, at 5 (stating that "[w]e all know a human when we see one, but really, that is all that is known about our identity as a species").

possession of the cluster of high-level cognitive traits recognized as characteristically human by ethicists and philosophers is of vital importance to the application of moral rights.<sup>210</sup>

### *B. Weakening the Moral Divisions between Humans, Animals, and Chimera*

Despite being too restrictive by only applying moral rights to a rigid concept of humanity, the biological and cognitive moral approaches presented above demonstrate the importance of human neural cells and certain cognitive traits. The following analysis first examines additional problems that may be caused by relying on a restrictive, definitional, humans-only approach to moral rights and then examines the possible application of a more flexible moral framework.

#### *1. The Species Construct and Speciesism*

The traditional view is that humans are superior and distinct from other species and that it is inappropriate to mix biological humans and animals.<sup>211</sup> This notion that humans are inherently superior to animals has been compared to racism and labeled “speciesism”<sup>212</sup> by animal rights activists.<sup>213</sup> While a certain degree of speciesism is accepted in our society, this type of thinking could be dangerous if applied to human-animal chimera that are not simply animals.<sup>214</sup> Much as early notions of racial superiority lead to subjugation and oppression in the United States, a distinction between “pure” humans and chimera that are very closely aligned to humanity could lead to morally troubling results.<sup>215</sup>

<sup>210</sup> See Savulescu, *supra* note 51, at 23–24.

<sup>211</sup> See *supra* Part IV.A. See generally Robert & Baylis, *supra* note 43, at 5.

<sup>212</sup> The term speciesism refers to discrimination between species. TOM REGAN, THE CASE FOR ANIMAL RIGHTS 155 n.3 (1983).

<sup>213</sup> Robert & Baylis, *supra* note 43, at 9. In describing the parallels between speciesism and racism, philosopher Rosalind Hursthouse states:

Racists think that, for instance, the death or enslavement of someone of their own race matters . . . . Similarly, it is said, a speciesist would be one who thought that the death or enslavement of a member of their own species mattered, but that the death or enslavement of a member of a different species, say an extraterrestrial *person*, did not, despite the (imagined) fact that the difference in species does not make for a difference in how much the two beings want to live or be free, or how worthwhile their lives might be.

ROSALIND HURSTHOUSE, BEGINNING LIVES 102–03 (1987).

<sup>214</sup> Clearly, humans routinely use animals in ways that would not be conscionable if animals possessed the same moral standing as humans. Robert & Baylis, *supra* note 43, at 6.

<sup>215</sup> See *Dred Scott v. Sandford*, 60 U.S. (19 How.) 393, 404–05 (1856) (noting that African slaves were

Beyond speciesism, the “species” concept itself has been criticized as being inherently flawed as a scientific distinction.<sup>216</sup> Even putting aside modern biotechnology, the species concept is merely a convenient mechanism by which to group life forms that are evolutionarily related to varying degrees.<sup>217</sup> Nevertheless, the line between humans and animals has importance as a moral and social construct; “we rely on the notion of fixed species identities and boundaries in the way we live our lives and treat other creatures, whether in decisions about what we eat or what we patent.”<sup>218</sup> Chimera technology strongly challenges these notions of “fixed species identities.”<sup>219</sup> The gap between our moral concept of a fixed, unique human species and the modern scientific reality of chimera technology has left us with an inadequate moral framework.<sup>220</sup> This decoupling of the moral concept of personhood from the biological concept of humanness will, according to some commentators, lead to moral ambiguity.<sup>221</sup> Thus, we must be open to a more flexible moral framework, one that does not rely only on drawing sharp distinctions between humans and nonhumans.

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considered a “subordinate and inferior class of beings” at the time that the Constitution was framed); RICHARD KLUGER, *SIMPLE JUSTICE* 38 (1975) (stating that “north and south, he [the black man] was classified as a lower form of human life and therefore fair game for continual debasement”); Rachel E. Fishman, *Patenting Human Beings: Do Sub-Human Creatures Deserve Constitutional Protection?*, 15 *AM. J.L. & MED.* 461, 468–69 (1989) (stating that “[e]arly geneticists believed that qualities such as intelligence, industry and righteousness were linked to genetic endowment and would predict race, ethnicity, physical handicap and social class. The risks of racism have thus long been associated with genetic research”). *But see* David Wasserman, *Species and Races, Chimeras, and Multiracial People*, *AM. J. BIOETHICS*, Summer 2003, at 13, 13 (distinguishing racial classifications and arguing that moral lines between humans and chimera should be maintained).

<sup>216</sup> David Castle, *Hopes Against Hopeful Monsters*, *AM. J. BIOETHICS*, Summer 2003, at 28, 28; *see* Robert & Baylis, *supra* note 43, at 3 (“[A]t present, there are somewhere between nine and twenty-two definitions of species in the biological literature. Of these, there is no one species concept that is universally compelling.”).

<sup>217</sup> Robert & Baylis, *supra* note 43, at 2–4.

<sup>218</sup> *Id.* at 6. While animals are not afforded constitutional rights, society has recognized the special moral status of certain intelligent animals. For instance, there are strict limitations and requirements for primate research. Castle, *supra* note 216, at 29.

<sup>219</sup> Robert & Baylis, *supra* note 43, at 2.

<sup>220</sup> *Id.*

<sup>221</sup> *Id.* However, it is not clear that Robert and Baylis believe that this threat of moral ambiguity is sufficient to make it immoral or unethical to produce chimera. In response to Robert and Baylis, others have argued that affording special moral standing to certain chimera would not actually threaten society’s moral structure. Siegel, *supra* note 200, at 34. This is because in the “extraordinary instance” where a chimera might exhibit high-level cognitive abilities, we would be able to accord it special respect without changing the firmly entrenched idea that human life is sacred and distinct from other animals. *Id.* The extent of this “special respect,” however, is undetermined because while humans do possess a framework for understanding our moral obligations to chimera, society still needs to determine which “properties are relevant to moral status” and “whether chimeras possess the relevant moral properties.” *Id.*

## 2. *More Flexible Approaches to Morality*

An initially promising approach to morality in the age of biotechnology is utilitarianism. A moral utilitarian approach asserts that an action is morally proper if it will produce the best overall societal result relative to all other possible actions, thereby maximizing the overall good or utility of society.<sup>222</sup> Utilitarianism rejects the concept of inherent rights, natural law, and the Kantian categorical imperative.<sup>223</sup> While many theories attempt to establish the scope of morality by defining and separating *humans*, utilitarianism can take into account the interests of *any being* that has capacity to recognize and appreciate those interests.<sup>224</sup> Utilitarianism can draw distinctions between creatures, including nonhumans, with different levels of cognitive ability by using cognitive interests as the utility interest or “good” to be maximized.<sup>225</sup> This type of moral flexibility is important in a world where the dichotomy between human and animal is falling away. For example, Jeremy Bentham would classify the rights of a being based on whether it could suffer and feel pain regardless of species.<sup>226</sup> Therefore, it could be immoral to subject nonhuman beings, such as chimera, to pain and suffering if it reduces overall utility.<sup>227</sup>

Moral utilitarianism, however, has significant shortcomings in the real world. Under a strict utilitarian model, moral and legal rights need only be granted to creatures that can recognize and appreciate them.<sup>228</sup> This is because “[w]ith respect to . . . unperceived, unrecognized interests, a species is not morally considerable and, as to these interests, its members may be ignored.”<sup>229</sup> Yet it is often imperative that society be inclusive in granting rights, even when those rights and interests might not be fully recognized. For example, our society does not limit the moral and legal status of young children, the mentally handicapped, or the infirm simply because they are not able to fully recognize certain interests.<sup>230</sup> Therefore, society attaches extra

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<sup>222</sup> Gross, *supra* note 204, at 229.

<sup>223</sup> According to Kant, the morality of actions derives from an inherent moral duty, not a calculation of alternative consequences. SIGMUND, *supra* note 174, at 161–62. Jeremy Bentham, a strict utilitarian, stated that the concept of “natural and imprescriptible rights” is “nonsense on stilts.” *Id.* at 146.

<sup>224</sup> Siegel, *supra* note 200, at 34.

<sup>225</sup> Rivard, *supra* note 131, at 1477.

<sup>226</sup> NOZICK, *supra* note 203, at 337 n.9 (citing JEREMY BENTHAM, AN INTRODUCTION TO THE PRINCIPLES OF MORALS AND LEGISLATION ch. 17, § 1 n.1 (Haffner 1948) (1789)).

<sup>227</sup> Livingston, *supra* note 202, at 17.

<sup>228</sup> Rivard, *supra* note 131, at 1473–74.

<sup>229</sup> *Id.* at 1478–79.

<sup>230</sup> Robert & Baylis, *supra* note 43, at 5.

significance and sanctity to human life beyond what a strict interest based form of utilitarianism would predict.<sup>231</sup> Likewise, society should not simply apply a pure moral utilitarian calculus to human-animal chimera because this may not afford sufficient respect and protection to chimera with substantial human characteristics.<sup>232</sup>

### 3. *A Moral Resolution*

Two interesting approaches limit and hybridize utilitarianism in order to reflect the inviolability of certain moral principles. The first, as discussed by Robert Nozick, combines utilitarianism and Kantianism.<sup>233</sup> Under this approach, the utilitarian concept of utility maximization applies to all moral questions involving the use of living beings, human and animal alike.<sup>234</sup> However, in the case of humans, the stricter Kantian moral imperative is also applied so that it is never morally proper to do certain things to humans, such as murder or sacrifice.<sup>235</sup> A similar approach, rule-utilitarianism, limits the applicability of the utilitarian calculus by requiring compliance with certain fundamental moral and behavioral rules of society.<sup>236</sup>

While these two approaches do not contemplate the morally murky territory of human-animal chimera, they recognize that moral utility, while useful, should also take into account the sanctity of certain long established moral principles, such as the inherent value of human life and Kant's categorical imperative.<sup>237</sup> When this hybrid moral utility approach is combined with the biological and cognitive moral theories presented in Part IV, a flexible, a two-part approach to applying moral rights to chimera takes shape. This approach first looks for the capacity for higher-level cognitive abilities that are recognized as crucial by both cognition based moral theories and interest maximizing utilitarianism. The second part of this approach requires the presences of crucial human tissues, in accordance with the biological moral

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<sup>231</sup> It has been argued that a major problem with the utilitarian calculus is that it relies on a "too narrow conception of good," downplaying the importance of fundamental rights. NOZICK, *supra* note 203, at 28.

<sup>232</sup> For illustration, since human-animal chimera have the potential to be quite useful in medical research, there is a high utility in exploiting them in research. This increase in overall utility may swamp any utility loss suffered by individual chimera. This could thereby justify exploitation of these chimera from a strict utilitarian standpoint.

<sup>233</sup> NOZICK, *supra* note 203, at 39.

<sup>234</sup> *Id.*

<sup>235</sup> *Id.*

<sup>236</sup> David Lyons, *Utility and Rights*, in *THEORY OF RIGHTS*, *supra* note 201, at 110, 128.

<sup>237</sup> See NOZICK, *supra* note 203, at 28.

theories and in recognition of the inherent value of human life.<sup>238</sup> A chimera's moral status can thus be determined by examining (1) its cognitive capacity and (2) how much crucial human tissue it possesses. This approach guides the following examination of the constitutional personhood of chimera.

#### V. A PROPOSAL FOR DETERMINING WHEN A HUMAN-ANIMAL CHIMERA IS A CONSTITUTIONAL PERSON

The production of morally questionable human-animal chimera is becoming a reality, and a legal framework is needed that could grant constitutional protections to chimera by overcoming the personhood obstacle.<sup>239</sup> While several legal commentators have flatly rejected the concept that chimera could qualify as persons under the Constitution, this view is overly formalistic and shortsighted.<sup>240</sup> It is now scientifically possible to create chimera in which the majority of the cells, including the brain cells, are human rather than animal.<sup>241</sup> It is also possible to create chimera in which the vast majority of the nervous tissue is human, even when the total number of human cells is less than fifty percent.<sup>242</sup> Researchers could also create chimera by combining humans with closely related, intelligent apes such as chimpanzees.<sup>243</sup> Fears that such chimera will exhibit human cognitive abilities are not unfounded; previous animal-animal chimera research has shown that complex behaviors can be transferred across species lines.<sup>244</sup> Thus, a chimera with a significant amount of human nervous cells may well exhibit human intellectual and behavioral traits.<sup>245</sup>

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<sup>238</sup> This second part of this approach uses the crucial tissues presented in Part IV.A.1 as a proxy for the inherent moral value of human life.

<sup>239</sup> See *supra* notes 128–39 and accompanying text.

<sup>240</sup> See Cirlin, *supra* note 104, at 508 (stating that “[n]otwithstanding the controversy over the classification of chimera, the prospect of Constitutional protection for them is absurd. Chimera are not humans”); see also Alan R. Gerald, Comment, *In His Image: On Patenting Human-Based Bioproducts*, 25 U.S.F. L. REV. 583, 597 (1991) (“Because products of genetic research are changed from natural human tissue, then logically they can not be considered to be ‘human’ for the purposes of the thirteenth amendment.”). The hesitancy of commentators to accept the personhood of chimera may stem from the fact that “[a]ll of the persons we have met have been humans, and the overwhelming majority have been normal humans.” Solum, *supra* note 141, at 1285.

<sup>241</sup> See *supra* notes 8–14 and accompanying text.

<sup>242</sup> See *id.*

<sup>243</sup> Magnani, *supra* note 35, at 446. Chimpanzees are the closest relative of humans. See, e.g., Roger Lewin, *My Close Cousin the Chimpanzee*, 238 SCI. 273 (1987).

<sup>244</sup> Weiss, *supra* note 1 (describing quail-chicken chimera research).

<sup>245</sup> The National Academies of Sciences report notes that the “idea that human neuronal cells might participate in ‘higher-order’ brain functions in a nonhuman animal, however unlikely that may be, raises

As an extreme example of the error in totally rejecting chimera personhood, the technical definition of chimera includes humans who have received medical implants derived from animals, such as pig heart valves.<sup>246</sup> Regardless of their opinions of his politics, most people would unquestionably consider Senator Jesse Helms a “person,” but strictly speaking Helms is a human-animal chimera because he has a surgically implanted pig heart valve.<sup>247</sup> A drop of animal does not an animal make.<sup>248</sup> At some point, chimera must qualify as persons under the Constitution.<sup>249</sup> To conclude otherwise would necessitate an overly formalistic definition of person. Therefore, it is important to have a flexible analytical framework based on essential human biological and cognitive traits in order to decipher the personhood of questionable human-animal chimera.<sup>250</sup> The development of such a framework is desirable so that courts will not be wholly unprepared to address the issues of chimera.<sup>251</sup>

### A. *The Essential Factors of Constitutional Personhood*

Paralleling the moral rights discussion in Part IV, two distinct but interrelated approaches to chimera personhood have been suggested. The first approach to chimera personhood focuses on biological material because “[i]t cannot reasonably be disputed that an essential part of the definition of Homo

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concerns that need to be considered.” GUIDELINES, *supra* note 53, at 40.

<sup>246</sup> See *supra* note 39 and accompanying text.

<sup>247</sup> See Bok, *supra* note 39, at 25.

<sup>248</sup> See Wasserman, *supra* note 215, at 13 (discussing the one drop concept of human-animal chimera in comparison to racial classifications).

<sup>249</sup> See Rivard, *supra* note 131, at 1468 (arguing that “if members of another species are like humans in relevant ways, then it would be wrong to deny them constitutional personhood on the basis of irrelevant criteria such as genetic composition or appearance”).

<sup>250</sup> It maybe irresponsible to leave this research unexamined and unchecked by the legal system, solely to whims of individual researchers. While human-animal chimera research certainly has promise, “[e]ndorsing scientific research simply because it is interesting and it might prove useful is a dangerous path . . . . Much ‘useful’ information can be derived from experiments that are objectively evil. The ends, no matter how noble, cannot justify any and all possible means.” Maureen L. Condit & Samuel B. Condit, *The Appropriate Limits of Science in the Formation of Public Policy*, 17 NOTRE DAME J.L. ETHICS & PUB. POL’Y 157, 167–68 (2003) (emphasis removed).

<sup>251</sup> See Elizabeth L. DeCoux, *In the Valley of the Dry Bones: Reuniting the Word “Standing” with Its Meaning in Animal Cases*, 29 WM. & MARY ENVTL. L. & POL’Y REV. 681, 761 (2005) (“Courts could suddenly find themselves having to scramble, unprepared, to weigh a scientist’s assertion of the right to ‘head off’ any pesky claims an human/animal chimera might make, against the claims of the chimera himself. In such a situation, courts would also have to contend with the multitude of *amici* that may ask to express their views, while the court tries to avoid such embarrassing computations as those that were used many decades ago to determine who was mulatto and who was not.”).

[s]apiens is genetically determined.”<sup>252</sup> This approach might lead to a definition of personhood based on percentages; for example, a chimera with more than fifty percent human cells qualifies as a person.<sup>253</sup> However, this approach overlooks the moral and legal significance of cognitive factors and runs the risk of being overly formalistic.<sup>254</sup> The second approach is based on cognitive traits such as intelligence, rationality, and emotional capacity.<sup>255</sup> From the discussion of legal death in Part III.B.2 and cognitive morality in Part IV.A.2, it is clear that cognitive function is critical in defining legal personhood. The major theoretical difficulty with such a cognitive approach to personhood is that, if this were the sole test for constitutional personhood, it might exclude newborns, certain mentally handicapped individuals, and the comatose, while including intelligent animals or computers.<sup>256</sup> The cognitive approach also has practical difficulties when applied to chimera because it may not be clear how sentient or intelligent a human-animal chimera will be until it has been produced and raised.

By combining cognitive approaches with a human biological requirement, it becomes much easier to include all humans, exclude animals and artificial intelligence, and focus the inquiry on chimera.<sup>257</sup> The foremost indicators of constitutional personhood should be the capacity for higher-level human cognition combined with a significant percentage of human tissue. Human neural cells represent the most crucial human tissue because they affect cognitive capacity; thus the percentage of these cells is of primary importance.<sup>258</sup> Addressing moral rights theories, the focus on cognitive ability responds to cognitive rights philosophies and utilitarian principles of interest

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<sup>252</sup> Demaine & Fellmeth, *supra* note 70, at 441 n.598.

<sup>253</sup> Magnani, *supra* note 35, at 443–45.

<sup>254</sup> See *supra* Part IV.A.1.

<sup>255</sup> See *supra* Part IV.A.2.

<sup>256</sup> Robert & Baylis, *supra* note 43, at 5.

<sup>257</sup> This Comment does not address whether animals or artificial intelligence computers should be granted constitutional personhood. At present they are not, and therefore the analytical framework for chimera personhood presented here attempts to maintain this status quo. For a discussion of computers and artificial intelligence, see Solum, *supra* note 141, and Goldberg, *supra* note 154. A purely cognitive approach does have the advantage of being able to better address future technology that might allow scientists to enhance the intelligence of animals or create artificial intelligence computers. Presently, however, higher-level human cognitive ability is only produced by the human brain tissue.

<sup>258</sup> The inclusion of human reproductive cells in human-animal chimera also raises serious moral and ethical concern. In a human-animal chimera, every cell is either human or animal. Therefore, the sperm or eggs produced by such an organism might be human. If two human-animal chimera were to breed, they might both produce human gametes and therefore potentially a fertilized human embryo. Weiss, *supra* note 1.

maximization,<sup>259</sup> while the biological requirement recognizes biological morality and the Kantian principle that there is inherent value in human life.<sup>260</sup>

### *B. The Flaw in a Dichotomous Approach to Constitutional Personhood*

While it is incorrect to assert that chimera are never persons under the Constitution, it is also incorrect to claim, as most commentators do, that there is a distinct, identifiable point at which a chimera shifts from being a nonperson to being a person.<sup>261</sup> Regardless of their view on chimera personhood, most commentators presume that personhood must be an either/or proposition.<sup>262</sup> As an example of a dichotomous approach to personhood in the context of biotechnology, it has been proposed that “all and only species that are characterized by a capacity for [self-awareness] must be considered constitutional persons.”<sup>263</sup> This is an example of a reasonably flexible, cognitive approach to personhood that could include chimera exhibiting a fundamental trait of human cognition, self-awareness, or sentience.<sup>264</sup> However, this analysis presupposes an identifiable point at which constitutional personhood kicks in.<sup>265</sup>

The line of demarcation between human and animal is being erased by chimera technology; what remains is a continuum with pure humans on one end, pure animals on the other, and various forms of chimera in between. Scientists can alter where their creations fall.<sup>266</sup> Thus, a bright line rule of personhood is no longer appropriate.<sup>267</sup> The goal should not be to draw an

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<sup>259</sup> See *supra* Part IV.

<sup>260</sup> See *supra* Part IV.

<sup>261</sup> See Fishman, *supra* note 215, at 478 (“To prevent the loss of legal rights of an altered human being who may no longer be found to be a member of the human species, it is imperative that the definition of ‘human being’ be expanded . . . it is better to err on the side of generosity rather than parsimony when depriving a being of his or her legal rights.”); Rivard, *supra* note 131, at 1509 (“[I]f the average, mature member of a species has the capacity for self-awareness, then all members of that species are entitled to a rebuttable presumption of personhood. This theory may be used to solve the problem of constitutional personhood for nonhuman species.”).

<sup>262</sup> A human-animal chimera is clearly partially biologically human. This highlights the fact that the personhood question has been divorced from biological reality. Robert & Baylis, *supra* note 43, at 7–9.

<sup>263</sup> Rivard, *supra* note 131, at 1488.

<sup>264</sup> *Id.*

<sup>265</sup> This analysis also presupposes identifiable species lines, a concept that loses meaning when different species are combined in a chimera. This problem could be avoided however by replacing a species by species approach with a chimera by chimera approach.

<sup>266</sup> Weiss, *supra* note 18.

<sup>267</sup> See Magnani, *supra* note 35, at 449–50 (“[I]t is probably safe to say that any organism composed of over 50% human genetic material would be considered human. From a common sense standpoint, this standard seems reasonable enough, but it is somewhat simplistic and artificial.”).

arbitrary line between person and nonperson, but instead to grant constitutional protections proportionate to the critical human characteristics of a human-animal chimera. Therefore, this Comment proposes a reconceptualization of personhood that more accurately reflects the realities of modern biotechnology: a sliding scale of constitutional personhood. Under this approach, chimera with different critical human characteristics will qualify for different categories of constitutional protection. The fundamental characteristics of personhood are the higher-level human cognitive traits and the possession of crucial human biological tissue.<sup>268</sup>

The granting of partial constitutional rights is not unheard of; the Supreme Court already grants less than full constitutional protection to certain types of humans, including children,<sup>269</sup> prisoners,<sup>270</sup> and noncitizen aliens.<sup>271</sup> An analogous break from the traditionally rigid concept of constitutional personhood has also been alluded to in the human embryo context.<sup>272</sup>

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<sup>268</sup> See *supra* Part V.A.

<sup>269</sup> The Court has held that children are entitled to due process rights in juvenile proceedings, but implied that children are not offered the full panoply of due process protections. *In re Gault*, 387 U.S. 1, 13 (1967).

<sup>270</sup> In deciding that prisoners are not stripped of all constitutional protection by virtue of imprisonment, the Court stated:

Lawful imprisonment necessarily makes unavailable many rights and privileges of the ordinary citizen, a retraction justified by the considerations underlying our penal system. But though his rights may be diminished by the needs and exigencies of the institutional environment, a prisoner is not wholly stripped of constitutional protections when he is imprisoned for crime.

*Wolff v. McDonnell*, 418 U.S. 539, 555 (1974) (citations and internal quotations omitted).

<sup>271</sup> See *Mathews v. Diaz*, 426 U.S. 67, 78 (1976) (stating that “[t]he fact that all persons, aliens and citizens alike, are protected by the due process clause does not mean that all aliens are entitled to enjoy all the advantages of citizenship or that all aliens must be placed in a single homogenous legal classification . . . a legitimate distinction between citizens and aliens may justify attributes and benefits for one class not accorded to the other”); *Johnson v. Eisentrager*, 339 U.S. 763, 770 (1950) (stating that “[m]ere lawful presence in the country creates an implied assurance of safe conduct and gives [the alien] certain rights; they become more extensive and secure when he makes [a] preliminary declaration of intention to become a citizen, and they expand to those of full citizenship upon naturalization”).

<sup>272</sup> *Burk*, *supra* note 56, at 1655 (“Perhaps the most sensible observation that has been made . . . is that the dichotomy . . . that embryos are either property or persons, is a false choice. Embryos fit neither of these categories, but are something quite new, entitled to a category of their own. . . . [N]either our present evaluation of biology nor our present categories should determine the status the law assigns to embryos.”).

### C. *The Categories of Human-Animal Chimera*

This section will suggest four loose categories of chimera personhood to guide in the application of chimera personhood.<sup>273</sup> A sliding scale approach should not limit the constitutional rights of chimera that are fundamentally human simply because they have a “drop of animal” in them.<sup>274</sup> Therefore, the first category of chimera includes nominal chimera that are so clearly human that no further inquiry is warranted. Persons with xenotransplants, such as Senator Helms, exemplify this category.<sup>275</sup>

The second category falls at the other end of the human-animal chimera continuum and includes chimera with only small percentages of human cells and no human nervous tissue.<sup>276</sup> Such chimera should not be defined as constitutional persons. An example of this category would be a chimera in which the only human cells are limited to one organ, such as a kidney or liver, or tissue to be used for human transplantation or research. The utility of using chimera with small amounts of human cells and no potential for human cognitive traits such as intelligence, sentience, or emotions in research substantially outweighs any moral arguments in favor of granting them constitutional rights.<sup>277</sup> This second category of chimera may still be protected by legislative action, but they should not be covered by the Constitution.

The third category of chimera includes those with a substantial percentage of human neural cells that have the capacity for higher-level human cognition. Chimera in this category should initially be granted full constitutional rights as persons, and the category should be interpreted broadly.<sup>278</sup> Examples of a category three organism would be a human-pig chimera with a significant amount of pig tissue but a one hundred percent human nervous system or a human-chimpanzee chimera. These differ from category one in that the protections offered these chimera may be limited if it becomes clear that they

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<sup>273</sup> This Comment acknowledges that any type of rights classification is suspect. However, the first and third categories, which grant full rights, collectively are broad enough to encompass all intelligent, sentient beings that have a substantial amount of crucial human tissue. The classifications are not based on superficial traits like skin color or the presence of a few animal cells; they derive from fundamental differences in cognitive capacity and the presence of human neural tissue. See Wasserman, *supra* note 215, at 13–14.

<sup>274</sup> See *supra* notes 246–51 and accompanying text.

<sup>275</sup> See *id.*

<sup>276</sup> It is assumed that such chimera cannot exhibit human cognitive traits.

<sup>277</sup> See *supra* Part IV.B.2 (discussing moral utility theory).

<sup>278</sup> See Fishman, *supra* note 215, at 478 (“It is preferable that the definition [of human being] be broad rather than narrow, as it is better to err on the side of generosity rather than parsimony when depriving a being of his or her legal rights.”).

do not and will not actually exhibit significant human cognitive traits.<sup>279</sup> A limitation based on such a showing could place such chimera in category four.

The fourth category includes two types of constitutionally ambiguous chimera: (1) chimera with a non-insignificant percentage of human neural cells that may demonstrate limited human cognitive ability and (2) chimera with insignificant human neural cells but a high total percentage of human cells.<sup>280</sup> Because a bright line of personhood is inadequate, this category of chimera should be afforded limited constitutional personhood in proportion to their place along the human-animal continuum.<sup>281</sup> This category includes creatures that do not have a significant potential for human intelligence, sentience, or emotions but are too biologically similar to humanity to be written off as mere animals.<sup>282</sup> These creatures would have only a limited capacity to appreciate constitutional rights so, taking guidance from the hybrid moral utility theories presented in Part IV.B.3, the extent of the rights afforded them may be limited but not eliminated.<sup>283</sup> If chimera in this category were to exhibit higher-level human cognitive traits, they could be moved into the third category and granted full constitutional protection.

The goal of this Comment is to address the threshold question of personhood in order to open the door for the application of the Constitution to chimera. This Comment does not attempt to analyze exactly how various constitutional provisions apply to the patentability, production, or research use

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<sup>279</sup> Some commentators would strip a chimera of any constitutional protection if they “cannot perceive the interests underlying the Constitution.” Rivard, *supra* note 131, at 1477. Such an approach does not give sufficient respect to creatures that are biologically very closely aligned to humans and deserve some degree of constitutional protection.

<sup>280</sup> This middle ground avoids a troubling application of a pure intelligence/sentience based cognitive definition of person under which scientists could create chimera with no human brain or nervous cells but with a very high total percentage of human cells without those creatures qualifying as persons. The fear that such creatures might be produced has led to calls to ban chimera research outright. See Cirlin, *supra* note 104, at 509–10.

<sup>281</sup> Such chimera might be referred to as “quasi-persons” or “organisms of special constitutional concern.” Lebovitz applies the term “quasi-person” to frozen embryos and animals that cannot be properly classified as either persons or property. Lebovitz, *supra* note 129, at 563–64.

<sup>282</sup> See *supra* notes 228–32 and accompanying text discussing the shortcomings of pure moral utilitarianism. Animal rights theorists have argued for an analogous intermediate position in which animals would no longer be viewed as mere property. See Gary Francione, *Animal Rights Theory and Utilitarianism: Relative Normative Guidance*, 3 ANIMAL L. 75, 100–01 (1997).

<sup>283</sup> See Harrison, *The Anencephalic Newborn as Organ Donor*, HASTINGS CENTER REP., Apr. 1986, at 22 (“[T]he possession of rights exists along a spectrum; while the comatose person may experience pain or even hunger, and may have rights based on such capacities, he may not have other capacities necessary to having other rights.”).

of chimera.<sup>284</sup> This is left to the courts and Congress to determine.<sup>285</sup> As a cursory overview, however, it is clear that the Reconstruction amendments would play a central role. Various levels of protection against undue pain and frivolous use of chimera in research seem likely under both the Thirteenth<sup>286</sup> and Fourteenth Amendments.<sup>287</sup> The Constitution may also bar the patenting of chimera.<sup>288</sup> In addition, it has been argued that the mere act of producing chimera may be unconstitutional.<sup>289</sup>

## CONCLUSION

For the protections of the Constitution to apply, an organism must be a “constitutional person.” However, human-animal chimera technology is straining the dichotomous constitutional personhood construct beyond the breaking point. This is because the line between humans and nonhumans, the bedrock of constitutional personhood, is being rendered obsolete. Scientists will soon be able to create chimera possessing any ratio of human to animal they please, leaving only a continuum of humanity. We must be open to some form of chimera personhood. Because it is too arbitrary to simply draw a line in the sand dividing chimeric persons from nonperson chimera, the traditional dichotomous concept of constitutional personhood should be replaced with a more flexible approach, bringing more beings under the constitutional

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<sup>284</sup> For a partial listing of the possible constitutional issues, see generally Adams, *supra* note 153.

<sup>285</sup> Due to the nature of such chimera, it is highly unlikely that they would have the ability to lobby Congress or bring suit to enforce their constitutional rights. However, the same guardian mechanisms that protect young children and the mentally handicap could provide these chimera legal redress. Further, to avoid standing problems, Congress and the courts could allow private citizens to bring suits on behalf of such chimera to enforce their constitutional rights as has been done in other areas of the law. *See, e.g., Am. Soc’y. for Prevention of Cruelty to Animals v. Ringling Bros. & Barnum & Bailey Circus*, 317 F.3d 334, 335 (D.C. Cir. 2003) (holding that the plaintiff had standing due to his concern for the well-being of an elephant that he had seen abused by the defendant, and therefore could bring suit under the Endangered Species Act).

<sup>286</sup> *See* Cirlin, *supra* note 104, at 507 (noting that forcing human chimera to undergo a life of experimentation would be a form of slavery or indentured servitude in violation of the Thirteenth Amendment).

<sup>287</sup> As James P. Daniel stated, “[t]he use of a person, in the form of a hybrid human, for medical research or any other use not voluntarily chosen by the person could violate that person’s rights under substantive due process and the Equal Protection clause of the Constitution.” Daniel, *supra* note 65, at 123.

<sup>288</sup> Weiss, *supra* note 18.

<sup>289</sup> Arguments have been made the mere production of genetically engineered persons might subject them to unconstitutional “genetic bondage.” Kevin D. DeBré, *Patents on People and the U.S. Constitution: Creating Slaves or Enslaving Science*, 16 HASTINGS CONST. L.Q. 221, 233 (1989). This is because the genetic engineer could preprogram the altered person and this would represent a type of subjection that would violate the Thirteenth Amendment. *Id.*; *see also* Andrea Wang, *Regulating Human Cloning Within an Environmental Human Rights Framework*, 12 COLO. J. INT’L ENVTL. L. & POL’Y 165, 166–67 (2001).

umbrella. To do this, different categories of chimera should be afforded differing levels of protection in relation to the fundamental characteristics of humanity that they possess. Those fundamental characteristics are higher-level human cognitive traits and the possession of crucial human biological tissues.

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