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The Clone Wars: The Right to Embryonic Gene Editing Under German Law

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THE CLONE WARS: THE RIGHT TO EMBRYONIC GENE EDITING UNDER GERMAN LAW

INTRODUCTION

More than thirty years ago, George Brand[1] cautioned governments about the potential consequences of embryonic gene manipulation, stating that many would find it easy to dismiss possibilities like "artificial inovulation; in vitro fertilization; parthenogenesis; choice of sex of offspring; [and] creation of human beings by an asexual process called cloning."[2] Today, the scientific complexities and possibilities in this area make it hard to establish international norms.[3] Before 2012, Brand's prediction may have been considered a fantasy because editing genes required researchers to create a molecule from scratch and then program it to make specific types of edits.[4] In 2012, however, researchers discovered that they could remove the Clustered Regularly Interspaced Short Palindromic Repeats (CRISPR) - Cas9[5] system from bacteria and introduce it into Eukaryotic Cells.[6] This way, scientists no longer need to create a molecule to target genes; rather, they can harness the capability of a bacteria's immune system to recognize and fight

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1. George Brand is a lawyer and an author. Some of his publications include *Human Rights and Scientific and Technological Developments*, 4 HUM. RTS. J. 351, 354 (1971). Stephen P. Marks, *Tying Prometheus Down: The International Law of Human Genetic Manipulation*, 3 CHI. J. INT'L L. 3, 115, 121 (2002).

2. Marks, *supra* note 1, (quoting Brand, *supra* note 1).

3. *Id.*

4. Clara Rodríguez Fernández, *CRISPR Cas-9: How is the Gene Editing Tool Changing the World?*, LABIOTECH (Feb. 27, 2018), https://labiotech.eu/features/crispr-cas9-review-gene-editing-tool/.

5. CRISPR refers to a "series of repetitive patterns in the DNA of a bacteria" which form a "primitive immune system that bacteria use to 'remember' the DNA of viral invaders." *Id.* "Cas9 is a protein that can recognize the sequence stored within CRISPR patterns and cut all DNA with a matching sequence." *Id.*

6. Rodríguez Fernández, *supra* note 4. Eukaryotic Cells are cells that contain a nucleus, other organelles, and are enclosed in a membrane. *Eukaryote*, ENCYCLOPEDIA BRITANNICA, https://www.britannica.com/science/eukaryote (last updated Sept. 19, 2019). These cells are those found in the human body. *Id.*

off viruses by using the molecule Cas9, which is already programmed to recognize and edit certain patterns.[7] In doing so, scientists created what has been called "molecular scissors."[8]

Indeed, this revolutionary technology has rendered Brand's warning prophetic. In April 2015, Chinese scientists altered the genes of non-viable[9] human embryos by targeting the gene that causes the blood disorder beta-thalassemia.[10] Of the eighty-six embryos used in the study, twenty-eight embryos were successfully spliced,[11] but only a few contained the changed genetic material.[12] The number of embryos successfully spliced would have to be close to one hundred percent in order to use this technology on viable human embryos.[13] In July 2017, researchers at the Massachusetts Institute of Technology (MIT) edited

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7. *See* Megan Molteni, *The Wired Guide to CRISPR*, WIRED (Apr. 27, 2018), https://www.wired.com/story/wired-guide-to-crispr/; *see also* Rodríguez Fernández, *supra* note 4.

8. Ariana Eunjung Cha, *First Human Embryo Editing Experiment in U.S. 'Corrects' gene for Heart Condition*, WASH. POST (Aug. 2, 2017), https://www.washingtonpost.com/news/to-your-health/wp/2017/08/02/first-human-embryo-editing-experiment-in-u-s-corrects-gene-for-heart-condition/?utm_term=.2f22b4298b9f.

9. Non-viable embryos cannot develop into babies. Ellie Zolfagharifard et al., *Scientists Genetically Modify Human Embryos for the First Time: Controversial Technique Could Lead to Designer Babies*, DAILY MAIL (Apr. 22, 2015), http://www.dailymail.co.uk/sciencetech/article-3051365/Scientists-tweak-genes-human-embryos-time-Controversial-technique-lead-designer-babies.html.

10. *Id*. "Beta thalassemia is a blood disorder that reduces the production of hemoglobin." *Beta Thalassemia*, NIH (Sept. 10, 2019), https://ghr.nlm.nih.gov/condition/beta-thalassemia [hereinafter "beta NIH"]. A reduced amount of hemoglobin can lead to a lack of oxygen in parts of the body, which can cause "pale skin, weakness, fatigue and can increase the risk of abnormal blood clots." *Id.* Beta thalassemia is caused by mutations in the HBB gene "that provides instructions" to create a protein that is a subunit of hemoglobin. *Id.* Beta thalassemia is not Mendelian, however, because it is inherited in an autosomal recessive fashion, which means that two of the mutated genes must be present in order for the disease to manifest. *Autosomal Recessive*, MEDLINEPLUS, https://medlineplus.gov/ency/article/002052.htm (last visited Sept. 26, 2019).

11. Gene splicing refers "to the process by which the DNA of an organism is cut and a gene, perhaps from another organism, is inserted." *Gene Splicing*, DICTIONARY.COM, https://www.dictionary.com/browse/gene—splicing (last visited Sept. 29, 2019).

12. Zolfagharifard et al., *supra* note 9.

13. *Id.*

the first human embryo in the United States (US).[14] US researcher, Shoukhrat Mitalipov,[15] demonstrated the possibility of curing genetic diseases by using CRISPR to change the DNA in a large number of one-cell embryos. Mitalipov improved on the previous Chinese studies by successfully changing the DNA in all of the embryos in the study and avoiding "off target" effects in other genes.[16]

Proponents of CRISPR hope for a future where scientists can use the technology to correct genes that cause inherited diseases, while opponents fear that it will be a gateway for scientists to manipulate cosmetic traits in embryos, making designer babies[17] a reality.[18] Opponents also impugn this type of genetic manipulation because it allows for a germline edit, which is an edit of a hereditary gene that changes that gene in that person as well as the genes in their future generations.[19]

Today, many countries have heeded Brand's warning by placing bans on certain embryonic gene editing technologies.[20] Of

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14. Steve Connor, *First Human Embryos Edited in the US*, MIT TECH. REV. (July 26, 2017), https://www.technologyreview.com/s/608350/first-human-embryos-edited-in-us/.

15. Shoukhrat Mitalipov, Ph.D. is the director at Oregon Health and Sciences University Center for Embryonic Cell and Gene Therapy. *See Shoukhrat Mitalipov, Ph.D.*, OSHU, https://www.ohsu.edu/people/shoukhrat-mitalipov/2D760207FF014335B07EC30F3818652F (last visited Sept. 26, 2019).

16. Connor, *supra* note 14.

17. Phillip Ball, *Designer Babies: An Ethical Horror Waiting to Happen?*, GUARDIAN (Jan. 8, 2017), https://www.theguardian.com/science/2017/jan/08/designer-babies-ethical-horror-waiting-to-happen (discussing the inception of the designer baby, or a baby that is created in a test tube made up of chosen characteristics, reminiscent of the babies in the dystopian novel, *A Brave New World* by Aldous Huxley).

18. Connor, *supra* note 14.

19. *Id.*

20. *See* Tandice Ossareh, *Would You Like Blue Eyes with That? A Fundamental Right to Genetic Modification of Embryos*, 117 COLUM. L. REV. 729, 736 (2017):

> Germany's Embryo Protection Law of 1991 mandates a five-year prison sentence for any use of germ-line manipulations. Austria and Italy have also banned the use of PGD. Countries such as Hungary, Costa Rica, and Ecuador have deemed that embryos have a right to life, which limits parents' ability to select among embryos and discard the re-

these countries, Germany, through its Embryo Protection Law of 1991 (GEP), has the most restrictive set of regulations in the world.[21] For example, the GEP[22] mandates a five-year prison sentence[23] for any use of germline manipulations.[24] It also curtails in vitro fertilization (IVF) procedures by restricting the production of embryos.[25] For instance, the GEP mandates, "[n]o more than three embryos can be created per cycle of IVF, and all three, regardless of their quality, must be transferred to the patient's womb at one time and cannot be frozen or discarded."[26]

Germany's strict regulations on reproductive procedures can be attributed to its intense opposition to any procedure with potential to produce the type of eugenic[27] changes pursued by

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> maining embryos. Other countries have allowed PGD under narrowly defined circumstances. The United Kingdom, for example, established the Human Fertilization and Embryology Authority (HFEA) to supervise PGD use.

Id.

21. *See* Sarah M. Markwood, *Creating A Perfect Human Is Not So Perfect: The Case for Restricting Genetic Enhancement Research*, 110 PA. ST. L. REV. 473, 479 (2005).

22. The GEP was passed in 1991. *See* Volha Parfenchyk & Alexander Flos, *Human Dignity in a Comparative Perspective: Embryo Protection Regimes in Italy and Germany*, LAW, INNOVATION AND TECH. 1, 21 (2017), https://research.vu.nl/ws/portalfiles/portal/9884683/Parfenchyk_Flos_Human_dignity_in_a_comparative_perspective_embryo_protection_regimes_in_Italy_and_Germany_2017.pdf.

23. Ossareh, *supra* note 20, at 736.

24. Connor, *supra* note 14; *see also* Paul Diehl, *Germline Gene Therapy Concerns*, BALANCE (Sept. 4, 2018), https://www.thebalance.com/what-is-the-concern-over-germ-line-gene-therapy-375621.

25. *See* Gesetz zum Shutz von Embryonen [Act for Protection of Embryos], Dec. 19, 1990, BGBl. I, 69 at 2746 (Ger.), *translated in* https://www.rki.de/SharedDocs/Gesetzestexte/Embryonenschutzgesetz_englisch.pdf?__blob=publicationFile; *see also Germany's Embryo Protection Law is 'Killing' Embryos Rather than Protecting Them*, EUREKALTERT! (July 4, 2007), https://www.eurekalert.org/pub_releases/2007-07/esfh-gep070307.php.

26. *Id.*

27. Eugenics, meaning "well born," is the theory that "humanity could be improved by encouraging the fittest members to have more children." Karen Norrgard, *Human Testing, The Eugenics Movement, and IRBs*, 1 NATURE EDUCATION 117 (2008), https://www.nature.com/scitable/topicpage/human-testing-the-eugenics-movement-and-irbs-724. In Germany in the 1930s, a eugenic policy mandated that those with genetic diseases and other conditions were sterilized so they could not reproduce. *Id.*

the Nazi Regime.[28] Moreover, German courts have emphasized the public policy concern that germline engineering muddies a person's genetic heritage by changing their natural genetic combination.[29] This fear of a eugenic outcome, however, is unfounded when the goal of embryonic editing or manipulation is to eradicate a genetic disease in the child rather than to stop the disease-carrying parent from reproducing.[30] The right to a person's genetic disease should not be protected for a person whose genetic heritage would result in a debilitating illness. As the CRISPR technology progresses, philosophers and researchers have continued to question the justification for banning embryonic gene editing.[31] This technology affords people the opportunity to have healthy children, and Germany's restrictions on CRISPR potentially infringe on the right to procreate.

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28. *See* DONALD KOMMERS, THE CONSTITUTIONAL JURISPRUDENCE OF THE FEDERAL REPUBLIC OF GERMANY 337 (2nd ed. 1997); *see also* Ossareh, *supra* note 27, at 736.

29. Markwood, *supra* note 21.

30. Robert Gebelhoff, *What's the Difference Between Genetic Engineering and Eugenics?*, WASH. POST (Feb. 22, 2016), https://www.washingtonpost.com/news/in-theory/wp/2016/02/22/whats-the-difference-between-genetic-engineering-and-eugenics/?noredirect=on&utm_term=.82e13024753a.

31. *See, e.g.*, *The Ethics of Changing Genes in the Embryo*, EUROSTEMCELL, https://www.eurostemcell.org/ethics-changing-genes-embryo (last visited Sept. 10, 2019) [hereinafter Eurostemcell]; Christopher Gyngell & Julian Savulescu, *The Simple, Ethical Case for Gene Editing*, PURSUIT (Jan. 17, 2018), https://pursuit.unimelb.edu.au/articles/the-simple-ethical-case-for-gene-editing; *see also* Sarah Knapton, *Designer Babies on Horizon as Ethics Council Gives Green Light to Genetically Engineered Embryos*, TELEGRAPH (Jul. 17, 2018), https://www.telegraph.co.uk/science/2018/07/16/designer-babies-horizon-ethics-council-gives-green-light-genetically/; Paul Enriquez, *Why We Should All Embrace Gene Editing in Human Embryos*, HILL (Aug. 16, 2017, 3:20 PM), https://thehill.com/blogs/pundits-blog/healthcare/346845-why-we-should-all-embrace-gene-editing-in-human-embryos; John Harris, *Gene Editing of embryos is both Ethical and Prudent*, LEAPSMAG (Oct. 20, 2017), https://leapsmag.com/gene-editing-is-both-ethical-and-prudent/; Julian Savulescu, *Five Reasons We Should Embrace Gene Editing on Human Embryos*, CONVERSATION (Dec. 2, 2015), https://theconversation.com/five-reasons-we-should-embrace-gene-editing-research-on-human-embryos-51474; John Harris, *Pro: Research in Gene Editing in Humans Must Continue*, NAT'L GEOGRAPHIC (Aug. 2016), https://www.nationalgeographic.com/magazine/2016/08/human-gene-editing-pro-con-opinions/?user.testname=lazyloading:1.

This Note will argue that Germany should protect the right of its citizens to participate in embryonic gene editing for the purpose of curing genetically diseased genes for couples who do not otherwise have a high probability of having healthy children of their own because of hereditary genetic diseases. The right to gene editing falls under the right to procreate and is further supported by Germany's commitment to the right to life.[32] While the CRISPR technology is still in its early stages, this Note will posit that, when the technology is available and deemed safe to use, individuals with genetic hereditary diseases should have a right to access these embryonic technologies, and that laws that ban this access would be unconstitutional under German constitutional law.

Part I of this Note will provide an overview of the current state of embryonic manipulation and show how revolutionary CRISPR is as compared to the reproductive technology pre-2012. CRISPR has the potential to provide couples the virtual certainty of having healthy children. Part II will discuss the German constitutional right to privacy and corresponding case law. The German constitutional right to privacy is formed on the outer ring of civil claims that involve interference with the right to personality, which consists of interference with a person's reputation. The inner ring consists of claims against the government, as well as against other individuals, concerning interference with the complainant's private information, private life, and identity. Part III will move from privacy to the right to life as established by the German Constitutional Court's rulings in the abortion cases. The right to life places an active duty on the state to encourage life. The state can encourage life by allowing access to reproductive technologies for couples that cannot otherwise have healthy children. This Note then argues for the right to embryonic gene editing as an extension of the right to procreate.

Finally, Part IV argues that the right to embryonic genetic editing, as an extension of the right to procreate, falls within the penumbra of the right of self-determination. If the German Constitution protects the right to control personal information and the development of a person's personality and inner identi-

32. The right to life is codified in Article Two of the German Constitution. *See* GRUNDGESETZ [GG] [BASIC LAW], *translated in*, https://www.gesetze-im-internet.de/englisch_gg/englisch_gg.html#p0019. The right to life is also Discussed in the German abortion cases. *See infra* notes 153–173.

ty, then it should allow a couple to control their decision to have a family, and the path they choose to have that family. If they choose to have a family through the use of embryonic gene editing technologies, then the government should allow access to those technologies as part of the right to procreate. This right to embryonic gene editing is backed by the right to life, which, as discussed below, places an active duty on the state to encourage life.[33] The state can encourage life by allowing access to embryonic gene editing technologies for couples that cannot otherwise have healthy children.

I. ADVANCES IN EMBRYONIC GENETIC MANIPULATION

Prior to 2012, scientists had various ways of manipulating embryos so that couples with hereditary diseases would have a higher probability of having healthy children.[34] For example, through Pre-implantation Genetic Diagnosis (PGD),[35] scientists can choose to implant embryos with a lower probability for disease.[36] Alternatively, using a more technical procedure called mitochondrial transfer, scientists can remove DNA from the mother's egg and insert it into a healthy donor's egg.[37] While these procedures increase the probability of a baby being born without a genetic disease, CRISPR directly targets and eradicates the diseased gene itself.[38] Furthermore, advances in genetic engineering technology may open doors to other disease prevention measures, such as therapeutic cloning,[39] which enables scientists to create embryos with the same DNA as the

33. *See infra* notes 153–173, 194–197

34. *See* Jon Johnson, *Embryo transfers: What You Need to Know*, MED. NEWS TODAY (Dec. 10, 2016), https://www.medicalnewstoday.com/articles/314571.php (discussing invitro fertilization and embryo transfer); *see also* Clyde Haberman, *Scientists Can Design 'Better' Babies. Should They?*, N.Y. TIMES (June 10, 2018), https://www.nytimes.com/2018/06/10/us/11retro-baby-genetics.html (discussing Mitochondrial Transfer).

35. *See* Haberman, *supra* note 34.

36. *Id.*

37. *Id.*

38. *Id.*

39. Therapeutic cloning is the cloning of human "genes and other tissue that cannot lead to another human being. . . ." *See The Value of Therapeutic Cloning for Patients*, BIOTECHNOLOGY INNOVATION ORG., https://www.bio.org/articles/value-therapeutic-cloning-patients (last visited Nov. 21, 2019).

diseased cell donor in order to study the diseased gene more closely.[40]

This section will contextualize Germany's embryonic editing laws by providing an overview of the four major genetic manipulation procedures for reproductive purposes. While this Note will argue for the use of CRISPR to edit embryos, the procedures detailed below are useful to see the how revolutionary CRISPR is by comparison. CRISPR provides couples who cannot otherwise have healthy children of their own an avenue for procreation that is virtually certain to be effective. Therefore, Germany's ban on embryonic gene editing seems to interfere more directly with the right to procreate as technology becomes more precise.

A. IVF

IVF is a procedure wherein doctors fertilize a woman's eggs in a lab.[41] After "the fertilized eggs have multiplied," they are transferred into the woman's uterus.[42] The pregnancy then begins when the embryo attaches to the wall of the uterus.[43] For women under thirty-five years old, the rate of live births through IVF is forty-one to forty-three percent, whereas this rate drops to between thirteen and eighteen percent for women over forty years old.[44]

B. PGD

PGD is an offshoot of IVF.[45] PGD allows doctors to genetically test each embryo for the probability that it will manifest a hereditary disease.[46] Then, the doctors choose to implant the embryo that is least likely to pass the disease on.[47] This way, even

40. *Cloning*, NAT'L HUM. GENOME RES. INST. (Mar. 1, 2017), https://www.genome.gov/25020028/cloning-fact-sheet/ [hereinafter, Cloning].
41. Johnson, *supra* note 34.
42. *Id.*
43. *Id.*
44. *In Vitro Fertilization (IVF),* HEALTHLINE, https://www.healthline.com/health/in-vitro-fertilization-ivf (last visited Sept. 26, 2019).
45. Haberman, *supra* note 34.
46. *Id.*
47. *Id.*

before CRISPR, couples had some measure of control over passing on their hereditary diseases.[48]

C. Mitochondrial Transfer ("Three Parent Pregnancy")

Mitochondrial disorders[49] affect at least one in five thousand births in the US.[50] Faulty mitochondria make it very likely that a woman will have children with genetic defects.[51] Mitochondrial DNA provides the genetic blueprint for protein production that fuels a cell.[52] Through a mitochondrial transfer, doctors extract DNA from a woman's egg and implant it into an egg from a woman who has healthy mitochondria levels and who can bear healthy children without metabolic problems.[53]

D. CRISPR

CRISPR revolutionizes the embryonic gene-editing horizon because it allows for calculated gene editing.[54] The ability to precisely target a gene in this way allows for a future where scientists can effectively turn off a disease-causing gene in the embryo and erase the disease before the child is even born.[55] In 2016, US scientists reported some success in correcting sickle

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48. *Id.*

49. Mitochondria are the organelles that produce most of the energy in a person's body. *Mitochondria Diseases*, CLEVELAND CLINIC, https://my.clevelandclinic.org/health/diseases/15612-mitochondrial-diseases (last updated July 17, 2019). Mitochondrial diseases occur when the mitochondria fail to produce enough energy for the body and can affect almost any part of the body. *Id.* Symptoms of mitochondria diseases include muscle weakness, diabetes, and breathing problems. *Id.*

50. Catherine Weiner, *Mitochondrial Transfer: The Making of Three Parent Babies,* SCIENCE IN THE NEWS (Aug. 22, 2018), http://sitn.hms.harvard.edu/flash/2018/mitochondrial-transfer-making-three-parent-babies/.

51. Haberman, *supra* note 34.

52. Weiner, *supra* note 50.

53. *See id.*; *see also* Sara Reardon, *Genetic Details of Controversial "3-Parent Baby" Revealed*, NATURE (Apr. 6, 2017) https://www.scientificamerican.com/article/genetic-details-of-controversial-3-parent-baby-revealed/ (discussing the live birth of a baby as a result of an experimental mitochondrial replacement therapy).

54. *See* Haberman, *supra* note 34.

55. *See, e.g.,* Hydie Ledford, *CRISPR deployed to Combat Sickle-Cell Anemia*, NATURE (Oct. 12, 2016), https://www.nature.com/news/crispr-deployed-to-combat-sickle-cell-anaemia-1.20782#/b1.

cell mutations in mice using CRISPR.[56] In 2017, US reproductive biologists used the enzyme Cas9 "as a scalpel" to snip off a mutated gene in an embryo.[57] This way, if the embryo were implanted into a woman's uterus and brought to term, the child would no longer carry the hereditary genetic disease, nor would any of their progeny.[58] One cut would wipe out an entire line of the disease.[59] Also in 2017, US researchers successfully edited a human embryo to cure "[a] heritable heart condition that is known for causing sudden death in young competitive athletes."[60] Researchers said that, although the embryo was only allowed to grow for a few days and was never intended to be implanted for pregnancy, they would "continue to move forward with the science."[61] When this technology becomes available, parents with genetic diseases should have the right to access it and provide their children and future generations with the opportunity for a disease-free life.

It should be noted, however, that there are also some concerns with the new CRISPR technology. First, the gene is often not the sole determinant of how a trait will manifest.[62] Researchers can select genes known to be associated with certain diseases, but a person's upbringing and environment may change how the gene manifests.[63] Moreover, some traits and diseases are multifactorial,[64] and scientists may not be able to determine the exact combination of genes associated with a disease in order to cure that disease.[65] Genetic manipulation works best with Mendelian traits, which are traits made up of only one gene.[66] For example, the gene for blue eyes is a Mendelian trait, so an edit to that gene would directly affect the color of the child's eyes. In terms of diseases, sickle cell anemia

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56. *Id.*
57. *See* Haberman, *supra* note 34.
58. *Id.*
59. *Id.*
60. Eunjung Cha, *supra* note 8.
61. *Id.*
62. *What are Complex or Multifactorial Disorders?,* U.S. NAT'L LIBR. MED., https://ghr.nlm.nih.gov/primer/mutationsanddisorders/complexdisorders (last visited Dec. 24, 2018) [hereinafter Multifactorial].
63. *Id.*
64. Multifactorial traits are made up of a collection of genes. *See id.*
65. *See id.*
66. *Mendelian Genetics*, GENETICS GENERATION, http://knowgenetics.org/mendelian-genetics/ (last visited Dec. 24, 2018).

and cystic fibrosis are both caused by a mutation to a single gene.[67] In contrast, type two diabetes is caused by a host of genetic, environmental, and lifestyle factors.[68] While this may slightly limit CRISPR's use, it would still be eminently valuable, even if only used on Mendelian traits.

Second, researchers are worried about the unforeseeable consequences of gene correction.[69] Even if the correct gene is edited, researchers have observed that gene editing results in "large deletions of thousands of bases and complex rearrangements" of other ones.[70] The effects of these deletions are not yet known and require close study.[71] Although these deletions in the DNA are not necessarily harmful, researchers from the Wellcome Sanger Institute[72] in the UK fear that gene editing can turn cells cancerous.[73] For example, scientists fear that turning off the sickle cell gene will cause unforeseeable and potentially harmful mutations in other genes.[74]

Despite these concerns, CRISPR technology has developed so rapidly that US human clinical trials began this year.[75] At the end of April 2019, the University of Pennsylvania confirmed that they had used CRISPR to treat two patients with cancer.[76] It is too early, however, to see the effects.[77]

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67. Multifactorial, *supra* note 62.

68. *Id.*

69. Luke Dormehl, *New Study suggest CRISPR Gene Editing Might Have Unforeseen Consequences*, DIGITAL TRENDS (Jul. 23, 2018), https://www.digitaltrends.com/cool-tech/potential-dangers-of-crispr-gene-editing/.

70. *Id.*

71. Julinna LeMieux, *Another "CRISPR Calamity"? U.K. Team Reports CRISPR-Induced Gene Rearrangements*, GENENGNEWS (July 16, 2018), https://www.genengnews.com/insights/another-crispr-calamity-u-k-team-reports-crispr-induced-gene-rearrangements/.

72. The Wellcome Sanger Institute is a British genomic and genetics research institute. *The Sanger Institute*, WELLCOME SANGER INST., https://www.sanger.ac.uk/about/who-we-are (last visited Dec. 24, 2018).

73. Dormehl, *supra* note 69.

74. *Step Toward Gene Therapy for Sickle Cell Disease*, SCIENCE DAILY (Nov. 8, 2016), https://www.sciencedaily.com/releases/2016/11/161108112133.htm.

75. Shelly Fan, *CRISPR Used in Human Trials for the First Time in the US*, SINGULARITYHUB (May 2, 2019), https://singularityhub.com/2019/05/02/crispr-used-in-human-trials-for-the-first-time-in-the-us/.

76. *Id.*

77. *Id.*

Opponents of embryonic gene editing may also argue about the disadvantages of germline editing.[78] They posit the view that the expansive and permanent impact of a germline edit is unnatural.[79] Proponents of embryonic gene editing provide a counter argument that, when CRISPR technology is improved, the benefits may be far too great to ban its use.[80] Other opponents of embryonic gene editing argue that it is just another form of eugenic genetic engineering.[81] In the UK, Dr. David King, Director of Human Genetics Alert,[82] said that embryonic genetic engineering would "lead to a two-tier system where people who could not afford genetic editing would be disadvantaged."[83] Dr. King continued, "[w]e have had international bans on eugenic genetic engineering for 30 years. The people of Britain decided [fifteen] years ago that they don't want [genetically modified] food. Do you suppose they want [genetically modified] babies?"[84] Dr. King's dystopian future should not deter those from seeing the tangible benefits of embryonic gene editing. Embryonic gene editing for the purpose of eradicating diseases and enabling couples to have children of their own should be separated from the designer baby that Dr. King envisioned, where parents genetically edit embryos for cosmetic reasons, or the government creates Super Soldiers to fight its battles.[85]

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78. *See, e.g.*, Mary Darnovsky, *Con: Do Not open the Door to Editing Genes in Future Humans,* NAT'L GEOGRAPHIC (Aug. 2016), https://www.nationalgeographic.com/magazine/2016/08/human-gene-editing-pro-con-opinions/; Markwood, *supra* note 21.

79. *See* Darnovsky, *supra* note 78.

80. *See* Eurostemcell *supra* note 31 (the "opportunity costs of not doing research" will "likely be significant[,]" and if researchers do not pursue research now because it is too risky, then "we will be ensuring that they will forever remain too risky for want of proper investigation!").

81. Knapton, *supra* note 31.

82. Human Genetics Alert is a group that informs the public about human genetic issues. *See About Human Genetics Alert,* HUMAN GENETICS ALERT, http://www.hgalert.org/aboutUs/ (last visited Sept. 4, 2019).

83. Knapton, *supra* note 31.

84. *Id.*

85. *See* Ed Yong, *The Designer Baby Era is Not Upon Us*, ATLANTIC (Aug. 2, 2017), https://www.theatlantic.com/science/archive/2017/08/us-scientists-edit-human-embryos-with-crisprand-thats-okay/535668/; *see also* Pam Belluck, *Gene Editing for Designer Babies? 'Highly Unlikely,' Scientists Say*, N. Y. TIMES (Aug. 4, 2017), https://www.nytimes.com/2017/08/04/science/gene-editing-embryos-designer-babies.html; Tanya Lewis, *There are Really Good Reasons Why We Should – and Shouldn't- Generically Engineer Human Em-*

Nobel Prize-winning biologist Joshua Lederberg[86] has argued that there are important differences between eugenic engineering and genetic engineering for the eradication of diseases.[87] He advocates that the type of eugenics that may come into play when using genetic engineering to eradicate genetic diseases would be "substantially different from the genocidal eugenics committed by the Nazis"[88] because it would not stop those with unwanted diseases from reproducing, but would instead afford them the opportunity to have healthy children.[89] Additionally, a possible class divide, as warned of by Dr. David King, does not justify banning embryonic gene editing technology entirely. When new technology is introduced, there is always an initial divide between the people who can and cannot afford access. But, once the technology becomes accessible to the people that can afford it, it eventually becomes more affordable for the people who initially could not afford it. Ultimately, CRISPR can be used to cure individuals of diseases and provide couples with reproductive options that have never been possible.

II. GERMANY'S CONSTITUTIONAL RIGHT TO PRIVACY

Article One of the German Constitution[90] states that "human dignity shall be inviolable," and obligates the state to "respect and protect it."[91] Additionally, Article Two states that every person possesses "the right to free development of his personality insofar as he does not violate the rights of others."[92] Article

bryos, BUSINESS INSIDER (Dec. 4, 2015), https://www.businessinsider.com/arguments-for-and-against-editing-human-embryos-2015-12; Antonio Regalado, *Engineering the Perfect Baby*, MIT TECH. REV. (Mar. 5, 2015), https://www.technologyreview.com/s/535661/engineering-the-perfect-baby/.

86. "Joshua Lederberg was an American Geneticist and microbiologist who received the Nobel Prize in 1958 for his work in bacterial genetics." *The Joshua Lederberg Papers*, U.S. NAT'L LIBR. OF MED., https://profiles.nlm.nih.gov/BB/ (last visited Dec. 24, 2018).

87. Gebelhoff, *supra* note 30.

88. *Id.*

89. *Id.*

90. The German Consitution is also referred to as the Basic Law.

91. *See* GRUNDGESETZ [GG] [BASIC LAW], *translated in*, https://www.gesetze-im-internet.de/englisch_gg/englisch_gg.html#p0019.

92. *Id.*

Two also grants every person the right to life and physical integrity.[93]

The German Constitution does not explicitly contain the right to privacy, so the German Federal Constitutional Court (the "Constitutional Court") has interpreted the right to privacy to exist within the penumbra of other constitutional principles, particularly the right to personality.[94] Articles One and Two of the German Constitution establish the general personality right[95] that is composed of the right to the protection of human dignity[96] and "the right to develop one's personality freely." [97] These two rights are what the Constitutional Court has called of the "highest constitutional value,"[98] protecting a sphere of privacy beyond the state's reach.[99] Moreover, the right to privacy applies to private people as well as public institutions.[100] Thus, individuals can sue each other for certain invasions of the right to privacy under tort law.[101]

A. The Right to One's Personality

The right to one's personality under German law is very broad, encompassing the protection of personal integrity and freedom of self-development,[102] as well as a general freedom of action through which the personality is developed and expressed.[103] The personality right is motivated by the idea that an individual should be free to develop their personality "in or-

93. *Id.*

94. Robert G. Schwartz, Jr., *Privacy in German Employment Law*, 15 HASTINGS INT'L & COMP. L. REV. 135, 144 (1992).

95. In German, *allgemeines Personlichkeitsrecht. See* GRUNDGESETZ [GG] [BASIC LAW]*, translated in*, https://www.gesetze-im-internet.de/englisch_gg/englisch_gg.html#p0019. *See also* Schwartz, *supra* note 94, at 144–45. *See also* GRUNDGESETZ [GG] [BASIC LAW]*, translated in*, https://www.gesetze-im-internet.de/englisch_gg/englisch_gg.html#p0019.

96. In German, *Recht auf Schutz der Menschenwurde. See* Schwartz, *supra* note 94, at 144–45.

97. In German, *Recht auf freie Entfaltung. See id.*

98. *Id.*

99. J. Lee Riccardi, *The German Federal Data Protection Act of 1977: Protecting the Right to Privacy?* 6 B.C. INT'L & COMP. LAW REV. 243, 245 (1983).

100. Schwartz, *supra* note 94, at 145.

101. *Id.*

102. Bernd R. Beier, *Genetic Testing and the Right of Self-Determination: The Experience in the Federal Republic of Germany*, 16 HOFSTRA L. REV. 601, 605–06 (1988).

103. KOMMERS, *supra* note 28, at 315.

der to become a healthy and satisfied person."[104] This right is so vital that the Constitutional Court will protect it over statutes that interfere with it, so long as there is no public interest that justifies such interference.[105]

The Constitutional Court has recognized that the personality right is so broad that laws regulating almost any action can be claimed as an interference with an individual's personality right.[106] As the court stated, "[a]lmost any content could be poured into [the personality right], and it could easily function as the first and last resort of constitutional arguments."[107] In an attempt to confine the parameters of the right, the court mandated that a claim of interference with it might only be invoked to "challeng[e] a governmental act that invades a liberty interest vital to the exercise of personality outside of the protection of any particular right."[108] In other words, a plaintiff can only invoke the German personality right after finding no violations of an enumerated right.[109] The court further stated that, unlike the right to life, which imposes a duty on the state to protect life,[110] "the right of personality is not an objective value like human dignity, and thus cannot impose of the state an affirmative obligation to take on some particular course of action."[111] While the court has made such attempts to narrow the personality right, it has still been frequently invoked.

The following cases outline the scope of the personality right. In Germany, a person's right to personality entitles them to a civil claim as well as constitutional one, so the scope is very wide.[112] This is because there is an outer ring of claims between individuals; specifically, the German Civil Code protects a "general personality right" with reference to the constitutional personality right.[113] This section will discuss the case law of the

104. Beier, *supra* note 102.

105. *Id.*

106. KOMMERS, *supra* note 28, at 313.

107. *Id.*

108. *Id.*

109. KOMMERS, *supra* note 28, at 313.

110. *See* KOMMERS, *supra* note 28, at 315, 337–48, 349–56 (discussing key translated paragraphs in the Abortion I and Abortion II cases).

111. KOMMERS, *supra* note 28, at 314.

112. Andreas S. Voss, *The Right to Privacy & Assisted Reproductive Technologies: A Comparative Study of the Law of Germany and the U.S.*, 21 N.Y.L. SCH. J. INT'L & COMP. L. 229, 234, 237–38 (2002).

113. *Id.* at 234, 237.

civil and constitutional personality rights in order to construct a full picture of the right.

First, this section will discuss a sample of the German civil law cases where plaintiffs have brought claims about an interference with their reputation. Then, this section will discuss Constitutional Court cases where the court has protected the sphere of a person's private life from public and private interference, leaving plaintiffs with the power to control how their private information is disseminated into the public sphere. Altogether, this private sphere ranges from the person's reputation, to his family and individual identity.

1. Protection of Reputation Under Civil Law

The Constitutional Court first recognized the right to freedom of personality development under civil law in a 1954 case, *Schachtbrief*,[114] in which the court protected a person against an interference with his personality that affected his public reputation.[115] In that case, the defendant published an article in his newspaper that contained a comment from the plaintiff.[116] The plaintiff's attorney then wrote a letter to the defendant in opposition to the article, stating that the comment was incorrect and that it should be removed.[117] Instead of removing the article, the defendant published the plaintiff's letter under the heading, "Letter from Readers."[118] The plaintiff argued that the letter would be misleading to the public because readers would think that the letter was the plaintiff's opinion as a reader, when it was really a request written by his lawyer to have the original comment rescinded.[119]

The court found a violation of the plaintiff's privacy, which, although not explicitly recognized in the Civil Code, fell under the Code's fundamental personality rights that mirror the personality right of Articles One and Two of the German Constitu-

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114. BGHZ 13, 334 (Ger), *translated in* FOREIGN LAW TRANSLATIONS, UNIV. OF TX SCHOOL OF L. (Sept. 19, 1961), *available at* https://law.utexas.edu/transnational/foreign-law-translations/german/case.php?id=740.

115. *Id.* at 238–39.

116. Voss, *supra* note 112, at 238.

117. *Id.*

118. *Id.*

119. *Id.*

tion.[120] The court reasoned that, in publishing the letter, the defendant published the private thoughts of the plaintiff, thereby interfering with the plaintiff's right to freely develop his personality and control how it is projected in the public sphere.[121] The court stated:

> Every verbal expression of a definite thought is an emanation from the author's personality, even when the protection of copyright cannot be attributed to its form. . . . While an unauthorized publication of private notes constitutes—as a rule—an inadmissible attack on every human being's protected sphere of secrecy, a modified reproduction infringes the personality rights of the author because such unauthorized alterations can spread a false picture of his personality.[122]

Altering a person's writing invades their private sphere by misconstruing their message and altering the public perception of them. The court ordered the defendant to take down the letter or publish the whole text with a note that there was a request for correction.[123]

Later, in the 1958 case *Herrenreiter*,[124] the Constitutional Court found a violation of the plaintiff's civil personality right when the defendant advertised his sexual potency product using the image of the plaintiff, who was a famous athlete.[125] The court reasoned that Articles One and Two protect the "inner realm of the personality,"[126] which allows the person to control the actions they take to create their reputation.[127] In a similar 1961 case titled *Ginsengwurzel*,[128] the court found a violation of the plaintiff's personality right where a famous scientist sued a company that produced a tonic known for its aphrodisiac quali-

120. *Id.* at 239.
121. *Id.* at 238–40.
122. *Id*.
123. *Id.* at 240.
124. BGHZ 26, 349 (Ger), *translated in* FOREIGN LAW TRANSLATIONS, UNIV. OF TX SCHOOL OF L. (Sept. 19, 1961), *available at* https://law.utexas.edu/transnational/foreign-law-translations/german/case.php?id=739.
125. Voss, *supra* note 112, at 240.
126. *Id.* at 241.
127. *Id.*
128. BGHZ 35,363 (Ger), *translated in* FOREIGN LAW TRANSLATIONS, UNIV. OF TX SCHOOL OF L. (Sept. 19, 1961), *available at https://law.utexas.edu/transnational/foreign-law-translations/german/case.php?id=738.*

ties while falsely claiming to have the plaintiff's opinion on the value of the tonic.[129] The plaintiff claimed that he had "suffered damage to his reputation as a learned man and had been made an object of ridicule to the public and above all to his students."[130] Again, the court protected the sphere of privacy, within which a person can make decisions about how their personality develops and thus how it will be portrayed to the outside world. In sum, German law protects more than just the intimate decisions related to the human body, but also decisions that affect a person's reputation.

2. Protection of Private Life Under Constitutional law

The next two cases involve state actions that were ultimately deemed to be in violation of one's personality right under the German Constitution. The cases deal with government regulation of the private sphere regarding marital relationships and gender identity. Indeed, the measures taken by the state in these cases were based on a person's private decision and thus the state had interfered with their private life.

In the 1970 *Divorce Records Case*,[131] the Constitutional Court held that the firing of the complainant violated his personality right where the complainant was fired from his high-level civil servant job after the chief examiner received his divorce record documenting an adulterous affair with his secretary.[132] The court reasoned that because the "records of a divorce proceeding indeed concern the private life of marriage partners," the state could not make an employment decision regarding the plaintiff based upon private choices the plaintiff had made.[133]

In the 1979 *Transsexual Case*,[134] the Constitutional Court reversed the Berlin District Court's decision to revert the complainant's legal gender from female to male after the complainant underwent sex reassignment surgery affirming her identity as a woman.[135] The Constitutional Court reasoned that this is-

129. *Id.*

130. *Id.*

131. *Divorce Records Case* (1970), 27 BVerfGE 344, *translated in* KOMMERS, *supra* note 28, at 327–330.

132. *Id.* at 327.

133. *Id.* at 328.

134. *Transsexual Case* (1979), 49 BVerfGE 286, *translated in* KOMMERS, *supra* note 28, at 330–32.

135. *Id.* at 330.

sue violated the general personality rights of Article One and Two because "the spheres that these situations touch belong to that most intimate realm of personhood, which is protected against State interference and with which government may interfere only in pursuance of special public interest concerns."[136] The court also stated that there was no public interest that supported the state's refusal to allow the plaintiff to change her official sex identification.[137]

These two cases demonstrate the court's stance that inner identity and personal relationships are protected.[138] As discussed later on, these cases help establish a German right to procreate because, if the Constitution protects intimate decisions like gender identity and how a person expresses that identity, then the Constitution should also protect the intimate decisions of whether to procreate and allow access to embryonic gene editing technologies if that is the path they choose to manifest that right.

B. The Right to Self-Determination: Control of Personal Information

While the previous section discussed the general personality right, this next set of cases discuss the right to self-determination, specifically the right to control personal information. The right to control personal information supports the argument for embryonic gene editing because it entails a right to control your own personal life and decisions. If the right to self-determination protects control over personal information, then the German Constitution should protect more intimate decisions, such as the right to procreate.

The right to control personal information has largely been defined through litigation about census questions. In the 1969 *Microcensus* case,[139] the Constitutional Court held that a census did not violate a person's personality right due to the fact that it required each and every household to answer questions about vacations and recreational trips or else be subject to a fine.[140] Ultimately, the court found that the census did not force

136. *Id.* at 331.
137. *Id*. at 332.
138. *Id.*
139. *Microcensus Case* (1969) 27 BVerfGE I *translated in* KOMMERS, *supra* note 28, at 299–301.
140. *Id.* at 300.

the individuals in the household to reveal private information[141] because the state could have obtained the information through public travel records, although with more difficulty.[142] The court explained that the personality right could, however, be violated in a census case where the census compels individuals in the household to provide personal information.[143] The court said an individual cannot be treated like an object, that is, an individual's personality cannot be documented like features of an object, even if the surveys are anonymous.[144] This would undoubtedly be inconsistent with the human dignity and privacy guaranteed in Article One and Article Two.[145]

In the landmark *Census Act* case[146] of 1983, the Constitutional Court held that certain parts of the census law were unconstitutional because they interfered with a person's sphere of privacy by requiring citizens to fill out detailed questionnaires about their income, employment, and other basic personal information.[147] The German Constitution bestows upon a person the right to make decisions about whether to expose their personal information and how to use that information.[148] This right is only limited by a compelling public interest,[149] such as a conflict of rights or a public danger, which was not an issue in the case.[150] The court held that the census violated the complainant's right to make decisions without state intrusion in to order to develop his personality because the act would force citizens to relay private information, thus limiting a citizen's control over whether or not to share their personal information.[151]

These last two sections support the right to procreate in two different ways. The section on protection of private life supports the right to procreate because the right to procreate is a

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141. *Id.*

142. *Id.*

143. *Id.* at 299. The court defines personal information as information that is by nature "confidential in character" and "not otherwise accessible to the outside world." *Id.*

144. *Id.*

145. *Id.*

146. *Census Act Case* (1983), 65 BVerfGE I *translated in* KOMMERS, *supra* note 28, at 323–26.

147. *Id*. at 323, 326.

148. Schwartz, *supra* note 94, at 146.

149. In German, *uberwiegendes Allgemeininteresse*. *See id*. at 147.

150. *Id.*

151. *Census Act Case* (1983) *translated in* KOMMERS, *supra* note 28, at 324.

decision as intimate as a marital relationship or gender identity, and so the constitution should protect the right to procreate as it does the right to privacy. Additionally, the right to control personal information protects much broader privacy rights, within which more intimate decisions, like whether to procreate, would fit.

III. THE RIGHT TO LIFE

The right to life supports the right to embryonic gene editing. When a state has the duty to protect and encourage life, as the German Constitutional Court established in the abortion cases discussed below, then that duty should entail providing access to embryonic gene editing. As embryonic gene editing makes a healthy life possible, it falls within the realm of a state's duty to encourage life. In German law, the abortion cases highlight a steadfast commitment to life over privacy, establishing that a fetus' right to life outweighs a woman's decision to terminate her pregnancy.[152] This seems to be the same commitment to life that explains the strict GEP regulations.[153] As the cases will show, the German legislature and Constitutional Court have shied away from demarcating what constitutes life or when life begins.[154] Even though these cases are not part of the privacy doctrine per se, they are helpful in the analysis of the right to embryonic gene editing and the possibility of eradicating genetic diseases. The abortion cases created an active duty on the state to protect and encourage life.[155] This Note will argue that a right to access embryonic gene editing, which allows for healthy children, is part of that state's duty.

In the *Abortion I* [156] case, the court invalidated a statute that decriminalized abortion in the first trimester because the statute violated the "[s]tate's duty to protect the life of the fetus as guaranteed by human dignity and the right to life."[157] Donald

152. See *infra* notes 188–202 about the German abortion cases.

153. KOMMERS, *supra* note 28, at 337.

154. *Id.*

155. Edward J. Eberle, *Human Dignity, Privacy, and Personality in German and American Constitutional Law*, 1997 UTAH L. REV. 963, 1040 (1997).

156. *Abortion I Case* (1975), 39 BVerfGE I, *translated in* KOMMERS, *supra* note 28, at 337–48.

157. Eberle, *supra* note 155, at 1039–40.

Kommers[158] posited that the Nazi's mission to end life can explain Germany's commitment to the right to life.[159] The Constitutional Court held that life begins fourteen days[160] after conception and must be protected from that point on.[161] As such, once human life begins, the German Constitution protects the dignity of that life.[162] The right to life is so fundamental that protection of the right to life is combined with an affirmative duty on the state to ensure that it is protected.[163] This positive obligation requires the state to ensure the right is protected in all aspects of society, from placing criminal sanctions on abortion, to creating a social environment that supports the right to life of a fetus.[164] The court recognized that a woman's freedom to act is implicated in deciding whether or not to have a child when it stated, "[p]regnancy, birth, and child rearing may impair a woman's right to self-determination as to many personal developments."[165] Nonetheless, the court has consistently found that the life of the fetus outweighs a woman's decisional autonomy in this instance.[166]

In 1993, the Constitutional Court ruled on the 1992 Abortion Reform Act in the *Abortion II* case.[167] In deciding whether a woman could legally have an abortion in the first trimester be-

158. Donald Kommers is the author of *The Constitutional Jurisprudence of the Federal Republic of Germany* and a Professor of Government and International studies at the University of Notre Dame. *See* KOMMERS, *supra* note 28.

159. *Id.* at 337.

160. Presumably, the German court is referencing the fourteen-day rule as applied to embryo research. The fourteen-day rule is the generally accepted limit on the development of an embryo in scientific research. *See* John B. Appleby &Annelien L. Brendenoord, *Should the 14-day Rule For Embryo Research Become the 28-Day Rule?,* NATI'L CTR. FOR BIOTECHNOLOGY INFO. (Aug. 7, 2018), https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6127884/. When embryos are used for research and not destined for implantation they must be terminated before the fourteen-day mark. *Id.* After fourteen days, the embryo develops from a continuous sheet of cells to cells of distinct layers. *Id.* It is on this day that the embryo is "individuated and can no longer become a twin." *Id.*

161. *Abortion I translated in* KOMMERS, *supra* note 28, at 337.

162. *Id.* at 337–38.

163. Eberle, *supra* note 155, at 1040.

164. *Id.*

165. *Abortion I translated in* KOMMERS, *supra* note 28, at 339.

166. *Id.*

167. Eberle, *supra* note 155, at 1041. *See also Abortion II Case* (1993), 88 BVerfGE 203, *translated in* KOMMERS, *supra* note 28, at 349–56.

cause of a birth defect or life-threatening pregnancy, the Constitutional Court compromised between the competing political philosophies of the more liberal East Germany and more conservative West Germany, ultimately replacing the third-party determination with mandatory counseling.[168] Mandatory counseling was designed to make the woman aware of her responsibilities during pregnancy and the consequences of her decision to terminate her pregnancy.[169] The statute stressed the woman's right to make a knowledgeable and educated decision regarding her pregnancy by allowing counseling.[170] The court in *Abortion II* then affirmed the core of *Abortion I*, stressing that the born and unborn have a right to life that obligates the mother to carry the life to term.[171] The abortion law did, however, change the options that the state has in fulfilling its duty to protect life.[172] Now, the state has the option of providing a system of counseling for women that would "encourage the woman to bring the fetus to term," thus supporting the right to life of the fetus instead of imposing criminal sanctions.[173]

It is worth noting that, in contrast to the German abortion cases that lay the foundation for the right to embryonic gene editing through the fetus' right to life, US abortion cases have expanded the right to privacy, as Supreme Court jurisprudence recognizing a woman's decisional autonomy and constitutional right to reproductive choice.[174] So, in an argument for embryonic gene editing under US law, the abortion cases support a woman's right to decisional autonomy that could extend to the right to choose gene editing. As such, there is an avenue for carving out the right to embryonic gene editing through abortion case law both in states that recognize the right to life of a fetus and those that recognize the right to reproductive choice.

168. Eberle, *supra* note 155, at 1041.
169. *Id.*
170. *Id.*
171. *Id.* at 1042.
172. *Id.*
173. *Id.*
174. *See* Roe v. Wade, 410 U.S. 113 (1973); *see also* Planned Parenthood v. Casey, 505 U.S. 833 (1992).

IV. ARGUMENTS FOR THE RIGHT TO EMBRYONIC GENE EDITING UNDER GERMAN LAW

The first step in arguing for a right to embryonic gene editing is to crystallize a right to procreate from within the penumbra of Articles One and Two and the corresponding case law. Once that right is explicitly established, this section argues that individuals who cannot procreate naturally due to genetic diseases have the right to access embryonic gene editing technologies in order to procreate. Next, this section will argue that there is no public interest that justifies interference with the aforementioned right to procreate. Third, this section will contend that if there is a right to procreate, then allowing access to embryonic gene editing technologies to prevent later suffering and death caused by genetic diseases falls under the state's duty to protect life. Lastly, this section will posit an alternative path to the right to embryonic gene editing by using the rationale of the civil court. In the 1973 case discussed above, the court protected the bodily integrity of detached body parts that will rejoin the body (i.e., detached sperm that will be implanted into a woman's body). This Note will argue that, like the sperm, a couple's embryo must be protected from interference with its bodily integrity, and this protection comes in the form of gene editing when the embryo would otherwise be diseased.

A. Argument for the Right to Procreate Under German Constitutional Law

Arguably, there is no Constitutional Court case that establishes the right to procreate because the right clearly falls under the broad domain of Articles One and Two.[175] If the privacy right protects against interference with a person's reputation, their personal information, and from employment decisions based on their private choices, then it seems evident that the German privacy right protects the decision to have a child. The privacy cases established a wide scope of protection, formed in part by the tort cause of action for interference with privacy,[176] into which greater invasions of privacy would implicitly fit.

Moreover, in the abortion cases, the Constitutional Court expressly recognized that a woman's freedom to act "embraces

175. *See id.* at 271–72*; see also id.* at 255 for a similar argument ("the right to procreation arguably falls within the broad provisions of Article 1 and 2").

176. *Id.* at 234.

the woman's responsible decision against parenthood," although the court ultimately found that this right is outweighed by a fetus's right to life.[177] Furthermore, the court stated, "[p]regnancy, birth, and child rearing may impair a woman's right to self-determination as to many personal developments."[178] In other words, the court upheld the woman's choices surrounding her pregnancy up until the choices interfered with the life of the fetus. A right to procreate seemingly falls within the array of choices women may lawfully make concerning procreation that do not infringe on the right to life. As such, it seems the court would support it, although it has never explicitly established the right.[179] It is conceivable that, where the right to procreate is implicated and absent a need for protection of a stronger right (like the right to life), the right to procreation should be protected. Thus, this Note argues that individuals who cannot have children because of their genetic makeup should have the right to access CRISPR gene editing technologies that will allow them to actualize their right to procreate. In this case, unlike in the German abortion cases, the right to procreate would prevail because it is not outweighed by another, stronger right.

B. There Are No Public Interests That Justify the Ban on Embryonic Gene Editing

Once the right to procreate is established, the government would have the burden of proof in showing that there are public interests that would justify interference with the right.[180] Germany justified the ban on embryonic gene editing based on its fear of technologies reminiscent of Nazi eugenics.[181] Nazi eugenics, however, were wholly different from anything that embryonic gene editing seeks to achieve.[182] Nazi eugenics prevented individuals with diseases from reproducing, thereby wiping future generations from existence.[183] In contrast, embryonic gene editing has the potential to cure embryos of dis-

177. *Abortion I translated in* KOMMERS, *supra* 28, at 339.
178. *Id.*
179. *Id.*
180. Beier, *supra* note 102, at 605–06.
181. KOMMERS, *supra* note 28, at 337.
182. Gebelhoff, *supra* note 30.
183. *Id.*

eases so that future generations would be able to live healthy, long lives.

Opponents of embryonic gene editing using CRISPR also argue that it will be a gateway for designer babies, but these claims are merely dystopian fantasies.[184] As mentioned in Part I of this Note, CRISPR may only be possible on Mendelian Genes, like certain genetic diseases and eye color. Parents of designer babies would want to alter traits like athleticism and intelligence.[185] Such genes would be almost impossible to target using CRISPR because they are caused by a host of factors.[186] Moreover, even if designer babies were possible, this fear does not justify a ban on the invaluable benefits of embryonic gene editing to cure genetic diseases.[187]

C. The Right to Life Supports Access to Embryonic Gene Editing

Even though the German abortion cases did not further the German right to privacy jurisprudence, they did declare that the fetus has a foundational and unbroken right to life beginning fourteen days after conception.[188] Embryonic gene editing has been performed on embryos before the fourteen-day mark and on non-viable embryos with no intention of implantation to create a pregnancy.[189] In the IVF process, embryos are implanted within five to six says of fertilization.[190] As such, assuming the embryo is edited before implantation, it may not possess the full right to life that is held by a fourteen-day embryo. Moreover, as part of the state's obligation to protect life, the state should allow access to technologies that would enable

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184. *See* Yong, *supra* note 85; *see also* Belluck, *supra* note 85; *see also* Regalado, *supra* note 85.

185. Cecile Janssens, *The Genetic Case Against Designer Babies*, PAC. STANDARD (Dec. 27, 2018), https://psmag.com/social-justice/designer-babies-are-not-likely-to-happen.

186. *Id.*

187. *See* Eurostemcell, *supra* note 31.

188. *See supra* notes 153–73 for the discussion of German the Abortion cases.

189. Zolfagharifard et al., *supra* note 9 (discussing how researchers used non-viable cells); *see also* Connor, *supra* note 14 (stating that none of the embryos were allowed to develop for more than a few days).

190. *In Vitro Fertilization*, JOHNS HOPKINS MED. https://www.hopkinsmedicine.org/gynecology_obstetrics/specialty_areas/fertility-center/infertility-services/ART-procedures/ivf.html (last visited Dec. 26, 2018) ("embryos are usually transferred 5-6 days after the insemination").

life to presently exist and ensure that the life perpetuates in the future. If embryonic gene editing for the purpose of eradicating genetic diseases is used by people who otherwise would not be able to have healthy children, then access to gene editing technology would create life where it may not have otherwise existed or where the life would have been filled with suffering and early death.[191] While the German abortion cases discuss the state's obligation to protect life that is already in existence, the duty to protect life should also include the state's encouragement of life in the future, which would include technologies that enable and perpetuate life. If Germany is truly committed to the right to life in acknowledgement of its past, then it should allow access to life saving and life producing embryonic gene editing technologies.

D. An Alternative Route: Using the Civil Law Cases by Analogy to Support the Right to Embryonic Gene Editing

A 1973 civil law case[192] discussed a line of reasoning that may be useful to support an alternative argument for the constitutional right to embryonic gene editing. In that 1973 case, the court held that a hospital's destruction of the plaintiff's sperm was not a violation of a right to procreate, but a violation of the person's bodily integrity.[193] The court reasoned that where a body part is extracted with the intention of returning it to the body, then that body part "retains functionality."[194] Thus, the "body part that gets separated from the human body will . . . become an object," which the person owns.[195] The court stated that this claim of bodily integrity would apply to eggs, sperm, and other body parts that are meant to be used in the future "to take the place of lost reproductive capacity."[196] Thus, those

191. Some Genetic diseases are fatal. For example, children with infantile Tay Sachs rarely live past four years old or five years old. Children with juvenile Tay Sachs usually pass away by age fifteen. *Tay-Sachs Disease*, HEALTHLINE (Jan. 16, 2016), https://www.healthline.com/health/tay-sachs-.

192. BGHZ 124, 52 VI. Civil Senate (VI 62/93) (Ger), *translated in* FOREIGN LAW TRANSLATIONS, UNIV. OF TX SCHOOL OF L., (Dec. 1, 2005), *available at* https://law.utexas.edu/transnational/foreign-law-translations/german/case.php?id=830.

193. Voss, *supra* note 112, at 258.

194. *Id.* at 258–59.

195. *Id.* at 258.

196. *Id*. at 259.

objects have the same right to self-determination and self-realization as the person who the objects belong to.[197]

A complainant may be able to argue for an analogous claim in front of the Constitutional Court using the right of bodily integrity under Article One[198] of the Constitution. An embryo created from an individual's egg or sperm may furnish a claim for bodily integrity where the complainant can argue that the embryo would not realize its full potential if it was not given the opportunity to be cured of its genetic disease.

CONCLUSION: THE RIGHT TO THERAPEUTIC CLONING AND ALTERNATIVE PROCREATIVE RIGHTS

This Note has argued for the right to embryonic gene editing through the right to procreate, the right to life, and the right of the bodily integrity of a detached body part. Although no German case has explicitly established the right to procreate, this Note has argued that the right to procreate implicitly fits within the wide swath of privacy rights and the right to self-determination that already protect the right against interference with a person's reputation, as well as more intimate rights like the right against interference with the expression of gender identity. When couples can choose to procreate, they can choose how they express that right. Couples who cannot have healthy children on their own should have the right to access embryonic gene editing technologies to actualize their right to procreate.

Furthermore, the German Abortion cases established the state's affirmative duty to protect and encourage life. The *Abortion II* case allowed the state to fulfill this duty through means other than criminal sanctions. This Note argued that one way the state can fulfill this duty is to allow couples access to gene editing technologies that may encourage them to choose to create life where they may have chosen otherwise for fear of having children with genetic diseases. Lastly, this Note argued that an alternative path to the right to procreate would be to use the rationale of the civil law cases that suggest that a detached body part has a right to bodily integrity. One could ar-

197. *Id.*

198. Article One of the German Constitution protects human dignity. *See* GRUNDGESETZ [GG] [BASIC LAW], *translated in*, https://www.gesetze-im-internet.de/englisch_gg/englisch_gg.html#p0019.

gue that an embryo is a detached body part and would not be able to maintain its bodily integrity unless it can be cured of its genetic diseases.

Once a right to embryonic gene editing is established, further scientific advancements may warrant an expansion of the right to include other genetic manipulation technologies, such as therapeutic cloning, that can be used to pursue the eradication of genetic diseases. To achieve therapeutic cloning, scientists would create an embryo with the same DNA as an individual's somatic cell so that scientists can study cloned cells of humans with different genetic diseases to better understand the diseases and find cures for them.[199] No embryonic stem cell clones have yet been produced.[200] While embryonic gene editing aims to cure genetic diseases by editing them out of the gene, therapeutic cloning aims to cure genetic diseases by advancing their study.[201] Currently, section six of the GEP forbids the cloning of embryos, but that might change if a right to therapeutic cloning is established.[202]

Additionally, the establishment of a German right to procreate will raise questions as to the definition of the procreative process. Procreation may not exclusively involve the fertilization of an egg. Future scholarship could argue for an individual's right to reproduce through a human cloning process. For now, this Note aims to separate the public perception of gene editing, that of super soldiers and designer babies, from the reality of gene editing, which can cure genetic diseases in the embryo and provide new possibilities for a healthy life. If a

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199. *Cloning*, *supra* note 40. Therapeutic cloning also has uses in cell replacement therapy to potentially "create various types of tissues such as osteoblasts to counteract osteoporosis, and spinal cord regeneration following trauma." Charlotte Kfoury, *Therapeutic Cloning: Promises and Issues*, 10 MCGILL J. MED. 112, 113 (2007), https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2323472/. The article discusses a scientist "who transferred motor neurons derived from [therapeutic cloning] to rats with a severed spinal cord" that subsequently recovered motility. *Id*. This finding "could lead to lead to clinical applications for paralysis in humans through therapeutic cloning." *Id*.

200. *Id.*

201. *See id*.

202. Gesetz zum Shutz von Embryonen [Act for Protection of Embryos], Dec. 19, 1990, BGBl. I, 69 at 2746 (Ger.), *translated in,* https://www.rki.de/SharedDocs/Gesetzestexte/Embryonenschutzgesetz_englisch.pdf?__blob=publicationFile.

right to embryonic gene editing is established in Germany, then the Constitutional Court may be compelled to overturn the GEP ban and facilitate access to these technologies when they are available, in pursuance of disease-free future generations.

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