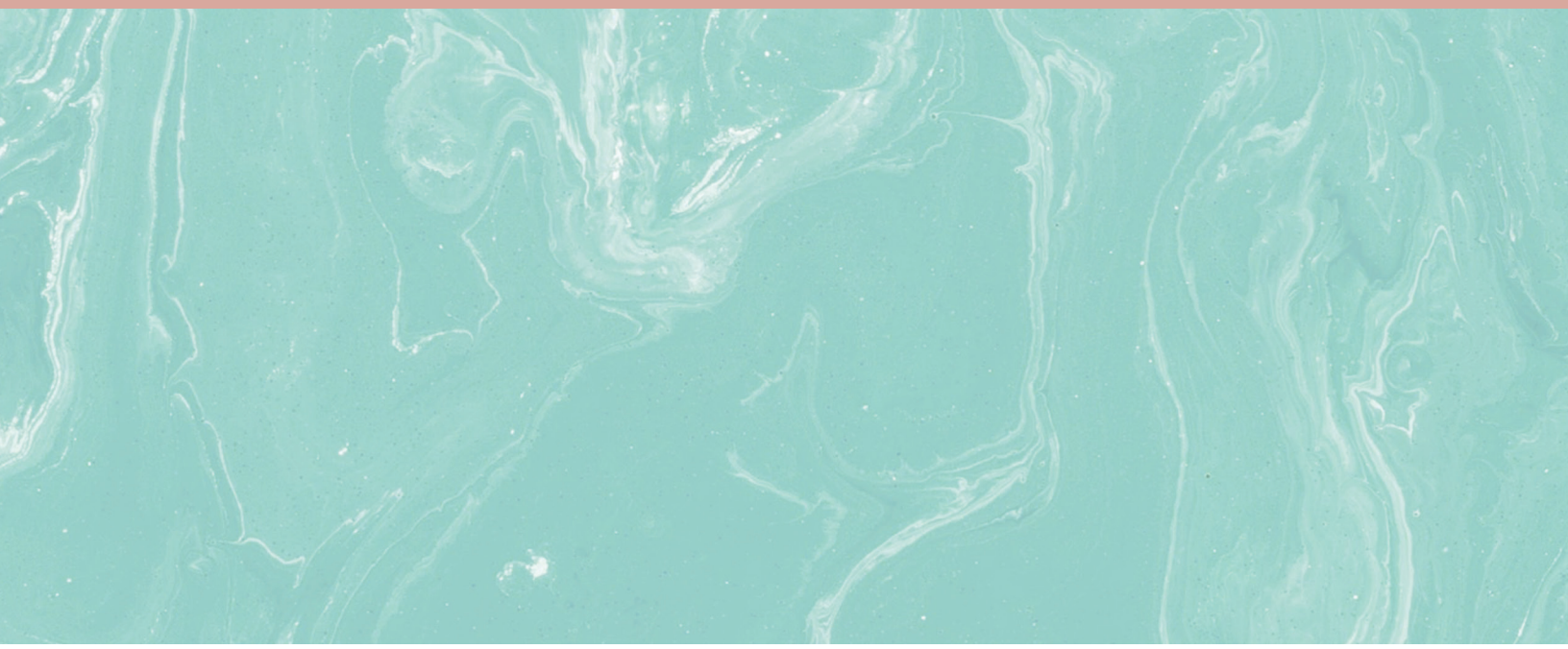
Teaching Human Dignity

The Science & Ethics of Vaccines

AN EXPERT GUIDE BY DANIEL KUEBLER AND MELISSA MOSCHELLA



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How Vaccines Work

One of the first "vaccines" used in the West dates to the 18th century when fluid from cowpox blisters was used to inoculate individuals against smallpox. The cowpox virus was similar enough in structure to the smallpox virus that those who were exposed to the cowpox virus, one that does not trigger serious symptoms in humans, developed immunity to smallpox. While a far cry from the modern process of the development and manufacturing of sterile vaccines, the principle by which this initial smallpox vaccine worked is identical to the principle behind all successful modern vaccines.

When individuals are exposed to a pathogen—the flu, for instance—the body activates a specific series of responses in order to combat it and to better equip the immune system to deal with a subsequent infection from that same pathogen in the future. These responses include the production of antibodies against the pathogen as well as immunological memory cells. The presence of the antibodies and the memory cells allows the body to respond much more rapidly and robustly to a subsequent infection from that same pathogen.

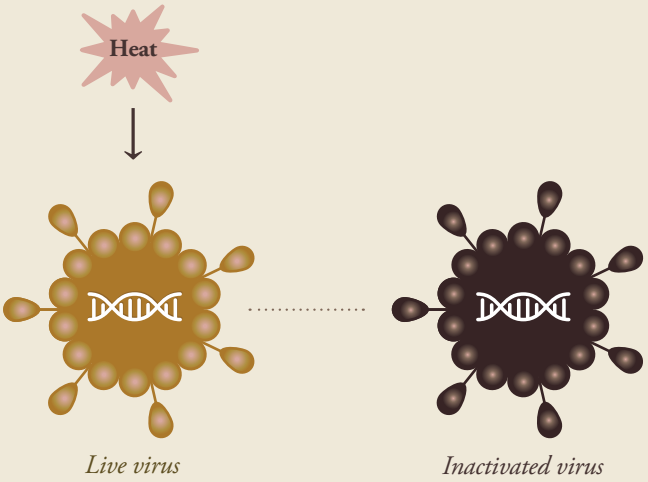
> *"Thus, the key to a successful vaccine is to expose the body to a modified safe version of the pathogen, one that can trigger the development of immunological memory without causing the disease."*

All pathogens, whether they be viral or bacterial, have molecules sticking off their surfaces (surface molecules) that the human immune system recognizes as foreign. If the immune system is functioning properly, it will mount a defense against these molecules and produce antibodies and cells that can fight the pathogen. These antibodies and cells remain in the body after the pathogen is cleared, giving the person immunological memory which allows their body to attack the pathogen quickly and robustly if it encounters that same pathogen again.

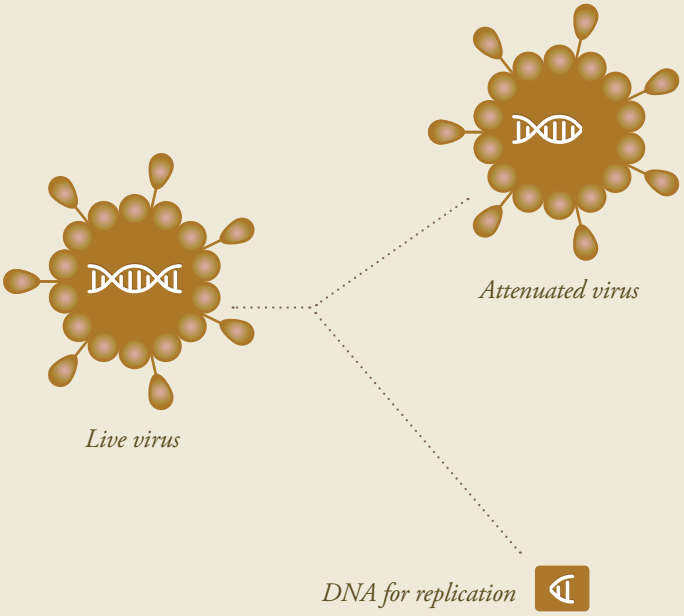
Unfortunately, in the case of smallpox and many other diseases, individuals may never use such immunological memory as some do not survive their first exposure to the live pathogen. Thus, the key to a successful vaccine is to expose the body to a modified safe version of the pathogen, one that can trigger the development of immunological memory without causing the disease. To develop an efficacious vaccine, researchers often aim to activate immunological response and memory by exposing individuals to the surface molecules of the pathogen in question, without actually infecting the person with the full-fledged pathogen. There are two traditional approaches for producing vaccines. The first involves using a modified non-infectious version of the whole pathogen. To generate such a vaccine, the pathogens can be modified via inactivation (i.e., exposing them to chemicals or heat) or attenuation (i.e., removing genes that are essential for replication). Rather than using the whole pathogen, a second approach involves exposing the body to purified surface molecules from the pathogen. Because the individual is exposed to only a part of the pathogen there are often fewer side-effects, but these types of vaccines are more likely to need booster shots.

1 Modifying Pathogens

a. Inactivation: exposure to heat or chemicals



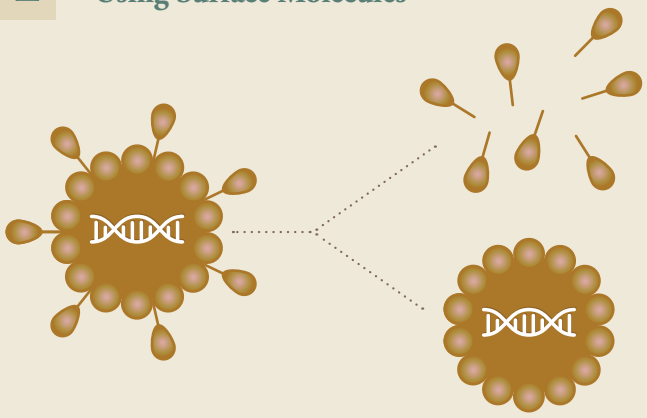
b. Attenuation: removing genes needed for replication



Despite these differences, they both can trigger the development of immunological memory without the risks associated with exposure to the full-fledged pathogen.

While both pathogen infections and vaccines can produce immunological memory, the length of time this memory persists varies. In some cases, as with smallpox vaccines, the immunological memory persists for decades, but in other cases, such as with the tetanus vaccine, immunological memory persists for shorter periods of time and booster shots are required to maintain protection. In addition, some pathogens such as the influenza virus frequently develop mutations in their surface molecules such that the memory cells and antibodies do not effectively recognize the new mutated strain of the virus. As a result, new influenza vaccines are needed each season. These new vaccines are developed to protect against the predominant strains that are predicted to be prevalent in the population each flu season.

2 Using Surface Molecules



Different Types of Vaccines

There are a variety of ways in which vaccines are produced. Some vaccines require human cell lines for production while others require non-human cell lines, and still others can be manufactured without the use of any cell line. All three of these methods have been used to develop modern vaccines. Vaccines that use human cell lines for production are typically vaccines that contain attenuated pathogens, ones that have been modified by removing essential genes often needed for replication in order to make the virus harmless or less virulent. While they can no longer replicate in normal human cells, these attenuated viruses can still replicate in specific genetically modified human cell lines. As a result, the attenuated virus can be grown in these specific cell lines in order to produce the large numbers of attenuated virus that are needed to manufacture a vaccine. In some cases, non-human cell lines can be used to produce large amounts of the modified virus, as is the case with certain influenza vaccines.

In some cases, harmless viruses (viral vectors) can be used to develop successful vaccines against new and emerging pathogens. For example, in 2020 modified adenovirus[1] vectors were used to develop vaccines against Covid-19, the disease caused by the SARS CoV-2 virus. These vectors were used as transporters to deliver the gene that encodes for the SARS CoV-2 spike protein, a key surface molecule on the SARS CoV-2 virus, to the body's cells.

Once an adenovirus vector carrying the SARS CoV-2 spike protein gene in the form of DNA is injected into the human body, it is able to enter human cells[2] and deliver the spike protein gene to these cells. The gene can then be used by these cells to produce the spike protein, which the cells then advertise on their surface. This alerts the immune system to the presence of a foreign substance inside the cell. Once alerted, the immune system can then produce antibodies and cells that specifically recognize the spike protein, thereby generating immunological resources that can be marshalled against a subsequent SARS CoV-2 infection.

Other vaccines use non-human cell lines to produce large amounts of one of the key surface proteins from the pathogen rather than generating attenuated pathogens. In the case of SARS CoV-2, the spike protein has been produced in large quantities in non-human cells such as Chinese hamster ovary cells and insect cells. The spike proteins produced in these cells can then be attached to a larger molecule called a carrier molecule which is more readily recognized by the immune system. Once inside the body, these carrier molecules covered by spike proteins can trigger an immune system response in a similar manner as described above.

Recently, mRNA vaccines, a new type of vaccine that does not require the use of cells in the manufacturing process, have been successfully produced. mRNA molecules are transient molecules (they are typically degraded within minutes to hours[3]) that are used by the cell to produce specific proteins.[4] These new mRNA vaccines involve making synthetic mRNAs that can be used by the body's cells to produce a specific protein from the pathogen. Once synthesized in sufficient amounts, the mRNA molecules are packaged in lipids and then injected into the body. Once inside the body, the lipid covered mRNA packages can fuse with the body's cells in a process that allows the mRNA to enter the cell. The cells can then use the mRNA to produce the pathogen protein and advertise the protein on its surface, triggering an immune response as described above. In the case of the SARS CoV-2 mRNA vaccines, the first mRNA vaccines to reach the market, the SARS CoV-2 spike protein mRNA was used to generate immunity.

[1] Adenoviruses commonly cause respiratory symptoms but most infections are mild and cause few symptoms.
[2] These viral vectors are unable to replicate inside the cell as they are missing key pieces of genetic information needed to replicate properly. As a result, they are unable to damage the cell and cause disease.
[3] Edward Yang, "Decay Rates of Human mRNAs: Correlation With Functional Characteristics and Sequence Attributes," *Genome Research* 13, 8 (2003): 1866, doi:10.1101/gr.1272403.
[4] Protein production in a human cell begins with a stretch of DNA called a gene that is transcribed to produce mRNA. The information in the mRNA is then translated by ribosomes in the cell to create a protein that is specific to that gene.

Regardless of which method is used to produce and manufacture the vaccine, the common goal is to expose the body to molecules that stick off of the surface of the pathogen without triggering a full blown infection. While the methods described above may seem straightforward, they often do not lead to successful vaccines. In some cases, potential vaccines fail to adequately activate the immune system because they degrade too quickly or do not generate enough of an immune response. Successful vaccines are able to generate large amounts of antibodies specific to the pathogen and produce sufficient levels of immunological memory cells that can specifically attack the pathogen if the individual is exposed to it again in the future.

The Use of Fetal Cells Lines in Vaccine Development

There are many benefits associated with using human cell lines to develop vaccines for human use. Human cells often more accurately produce the pathogen proteins used in vaccines, and they avoid the possible exposure to animal components. Unfortunately, many of the human cell lines used in the production and testing of vaccines were generated from tissue obtained from elective abortions. These cell lines continue to be used for vaccine production and development because they are easy to grow and display excellent protein and viral production abilities. In addition, because these cell lines are well understood and have been used to produce vaccines currently on the market, there is a much smoother pathway[5] to obtain FDA approval when using these cell lines in vaccine development.

"Human cells often more accurately produce the pathogen proteins used in vaccines, and they avoid the possible exposure to animal components. Unfortunately, many of the humans cell lines used in the production and testing of vaccines were generated from tissue obtained from elective abortions."

The two most common cell lines used in vaccine production have been the WI-38 and MRC-5 cell lines, both of which were derived from elective abortions in the 1960s. After their initial isolation, these cell lines were found to be free of contaminants and able to support the growth of a wide range of human viruses. Through a variety of methods, these cell lines have since been used to generate attenuated vaccines against rubella, varicella, rabies, and hepatitis A.

The HEK-293 and PER.C6 cell lines are two other abortion derived human cell lines that are currently used in vaccine production. The HEK-293 cell line was derived from the kidney tissue of a fetus aborted in the 1970s, while the PER.C6 cell line was derived from the retinal tissue of a fetus aborted in 1985. For vaccine development, these cell lines have been modified to support the growth of the attenuated adenovirus vector, a vector that can be used to develop vaccines against a wide variety of pathogens. In addition, these cell lines are immortal, meaning that they can grow indefinitely in the lab, a beneficial trait when trying to scale up production for a vaccine. These lines have not only been used in vaccine development but are widely used in molecular biology research and drug development because they are easy to grow under a range of conditions and have been extensively studied. While these lines are used in the production of the vaccine, the vaccine itself does not contain any of these cells. The attenuated viruses that are cultured in these cell lines are extensively purified to remove the cells during the production of the actual vaccine.

[5] Obtaining FDA approval requires extensive documentation of the reagents used in vaccine development and production. Using cell lines that are stable, well studied, and have been previously approved by the FDA, such as HEK-293 lines, can significantly speed up the regulatory approval process.

The Benefits of Vaccinations

It has been estimated that widespread of use of vaccines saves roughly 6 million lives globally every year.[6] In the United States during the 20th century, widespread childhood vaccination has led to the virtual elimination of polio, smallpox, diphtheria, and measles as well as a greater than 99% reduction in cases of mumps, rubella, tetanus, and pertussis (whooping cough). Most vaccines protect vaccinated individuals from developing the disease associated with the pathogen, or they lessen the severity of the disease if a vaccinated individual is infected. In some cases, as with the Hepatitis A vaccine, the vaccine can actually prevent individuals from being infected by the pathogen. In addition, when a large percentage of the population is vaccinated against a specific pathogen, it becomes more difficult for that pathogen to spread through the population. This provides what is called herd immunity for the entire population, such that even those who have not been vaccinated are protected against the disease. In addition, widespread vaccination reduces the opportunity for new variants of the pathogen to emerge. Because vaccination leads to fewer infected individuals, this reduces the pool of pathogens circulating in the population that can potentially mutate into a new strain.

"It has been estimated that widespread use of vaccines saves roughly 6 million lives globally every year"

By decreasing the severity of symptoms normally associated with infection, vaccines also help reduce the impact of secondary complications that are associated with the primary disease. For example, measles vaccination reduces the risk of dysentery, bacterial pneumonia, and malnutrition, all of which are secondary complications associated with measles infection.[7]

Risks Associated with Vaccination

Vaccines are designed to activate the immune system to produce cells and antibodies against a specific pathogen. The activation of the immune response by the vaccine can lead to a variety of side-effects ranging from mild redness and swelling at the injection site to severe allergic reactions. The risk of such a severe reaction is quite low, occurring in the range of 1 case per 100,000-1,000,000 vaccinations depending on the vaccine.[8] Individuals with specific health problems or immune disorders may be at higher risk for such complications following vaccination, but the risk to the general population is extremely low.

It has often been claimed that autism is a risk associated with vaccines. Because the early signs of autism often appear during the time children are receiving immunizations, many studies have investigated the possible link between vaccination and the development of autism. However, several large studies have found no correlation between the two,[9] and the one research study that claimed to have established a link was found to be fraudulent and had to be retracted.

Vaccines also contain preservatives and adjuvants, which are additives that help boost the immune response. One mercury-based preservative, thimerosal, has been used in vaccines since the 1930s. Given that it contains mercury, some have suggested that it may be correlated with an increased risk of developing autism. However, studies have found no link between thimerosal-containing vaccines and autism.[10] While no connection has ever been established, out of an abundance of caution, thimerosal is no longer used in current vaccines, with the exception of some versions of the flu vaccine.

While some of the cell lines used to produce certain vaccines

[6] Jenifer Ehreth, "The global value of vaccination," *Vaccine* 21, 7-8 (2003): 596-600, doi:10.1016/s0264-410x(02)00623-0.
[7] Peter M. Strebel, Mark J. Papania, and N.A. Halsey, "Measles Vaccine," *Vaccines*, ed. Stanley A. Plotkin and Walter A. Orenstein, 4th. ed. (Philadelphia:2004), 389-440.
[8] Michael McNeil, et. al., "Risk of anaphylaxis after vaccination in children and adults," *The Journal of Allergy and Clinical Immunology* 137, no. 3 (2016): 868-878, http://dx.doi.org/10.1016/j.jaci.2015.07.048.
[9] PA Anders Hviid, et. al., "Measles, Mumps, Rubella Vaccination and Autism: A Nationwide Cohort Study," Annals of Internal Medicine 170, no. 8 (2019): doi:10.7326/M18-2101.

raise ethical concerns given their derivation from the tissue of aborted fetuses, receiving a vaccine that was produced using such a cell line is an action that is extremely remote from the actual abortion. Given the benefit to individual health and to the common good that can be achieved by widespread vaccination against specific pathogens, the Catholic Church has stated that the use of such vaccines is morally permissible.[11]

However, Catholics and all who are committed to the dignity of every human life have a duty to voice their concerns over the use of aborted fetal tissue and to call for alternative research practices that do not rely upon abortion. A more detailed analysis of the ethical issues surrounding the Covid-19 vaccines (and other vaccines developed with the help of cell lines derived from aborted fetal tissue) is presented below.

Introduction to Ethical Analysis

The Catholic moral tradition—building on the broader natural law tradition of ethical thinking that is rooted in the works of eminent thinkers such as Plato, Aristotle, Cicero, Augustine, and Aquinas—offers helpful frameworks for analyzing our actions that have some indirect connection to past, present, or future evil. We can use these frameworks to think through the ethics of receiving a vaccine that is made with the help of cell lines originally derived from aborted fetal tissue. While this analysis will apply to the use of any vaccine made with the help of such cell lines, here the focus will be primarily on the Covid-19 vaccines due to their current relevance.

First, it is necessary to explain more clearly why there are ethical concerns about vaccines. In other words, how, precisely, are these vaccines connected with immoral actions? To date12, all of the Covid-19 vaccines use of cell lines derived from aborted fetal tissue at least to some extent. Because the Pfizer and Moderna vaccines are mRNA vaccines, no cells are needed for their manufacture, as explained above. However, these vaccines are tested in cells from the HEK-293 cell line (the most commonly used cell line derived from aborted fetal tissue). The AstraZeneca and Johnson & Johnson vaccines use HEK-293 cells and PER.C6 cells, respectively, for development, production, and testing.[13] Thus, all of the vaccines make use of cell lines that have immoral origins.

It is also necessary to examine more specifically what the immoral actions at the origin of these cell lines are. While the obvious answer seems to be that the cell lines are connected to abortion because they were created with the tissue of aborted fetuses, this answer is imprecise. The abortions occurred for reasons that had nothing to do with the prospect of using the aborted fetal tissue for research, and they would have occured even if the tissue of the deceased fetuses were simply discarded rather than saved for research use. Further, using the tissue of deceased human beings for research purposes is not in itself immoral —some people choose to donate their bodies to science after their death, and such an action can be morally praiseworthy.

[10] Anne M. Hurley, et. al., "Thimerosal-Containing Vaccines and Autism: A Review of Recent Epidemiologic Studies," *The Journal of Pediatric Pharmacology and Therapeutics* 15 no. 3 (2010): 173-81, https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3018252/.

[11] Congregation for the Doctrine of the Faith (CDF), Instruction Dignitas Personae on Certain Bioethical Questions, September 8, 2008, No. 34-35, https://press.vatican.va/content/salastampa/en/bollettino/pubblico/2020/12/21/201221c.html.

[12] This is true as of May, 2021.

[13] Some United States bishops have argued that, because the Pfizer and Moderna vaccines use cell lines derived from aborted fetal tissue less extensively, they are more remote from abortion and therefore morally preferable to the AstraZeneca and Johnson and Johnson vaccines (Kevin C. Rhoades and Joseph F. Naumann, "Moral Considerations Regarding the New COVID-19 Vaccines," December 11, 2020, https://www.usccb.org/moral-considerations-covid-vaccines.) Yet the Congregation for the Doctrine of the Faith does not make this distinction among the vaccines, and the United States bishops indicate clearly that it is still morally permissible to receive any of the vaccines. Upon further analysis, the ethical distinction between the vaccines does not seem to hold up. The AstraZeneca and Johnson and Johnson vaccines are no less remote than the other vaccines from the initial abortions which were the source of the fetal tissue from which the cell lines were derived. The only difference is that the AstraZeneca and Johnson and Johnson vaccines use more cells from these cell lines than the Pfizer and Moderna vaccines. But this difference – a difference in the quantity of cells used – is morally irrelevant, because HEK-293 and PER.C6 are immortal cell lines that reproduce indefinitely. Consequently, the fact that making the AstraZeneca and Johnson and Johnson vaccines requires more HEK-293 and PER.C6 cells, respectively, does not make them any more connected to the original abortion, nor does it create any more demand for new fetal tissue.

The real ethical problem in the origin of cell lines like HEK-293 is, (1) that the tissue was used without proper consent—even if the mother had consented, she would not actually have the moral authority to give consent on behalf of the child she chose to abort; (2) the use of the fetal tissue occurred in the context of common research practices and broader societal attitudes that disregard the intrinsic value of unborn human life; (3) in some cases (though not in the development of HEK-293), researchers may have cooperated with abortion providers in order to procure the tissue, making arrangements in advance or providing compensation; (4) the prospect of using the tissue for research could be used by the abortion provider or the mother to assuage their consciences and attempt to rationalize their action.

In sum, while it is true that the origin of the cell lines was immoral, strictly speaking the evil at the origin of the cell lines is not abortion itself, as many mistakenly believe, since the abortions would have happened anyway. Strictly speaking, the immoral action at the origin of the cell lines is the use of aborted fetal tissue without proper consent or due regard for the dignity of unborn human life, and in some cases cooperation with abortion providers to procure the tissue. There is a connection between the cell lines and abortion, but that connection is complex and indirect.

> *"Strictly speaking, the immoral action at the origin of the cell lines is the use of aborted fetal tissue without proper consent or due regard for the dignity of the unborn human life."*

Cooperation with Evil

Having clarified the ethical concerns surrounding the production of the Covid-19 vaccines—and particularly the ways in which the vaccines do and don't relate to abortion—we can now employ the relevant moral frameworks to determine whether or not it is morally permissible to be vaccinated. One helpful moral framework frequently referred to in discussions about the ethics of the Covid-19 vaccines is the cooperation with evil framework. This framework is used in the statements by the United States Conference of Catholic Bishops and the Congregation for the Doctrine of the Faith, both of which indicate that it is morally permissible to use any of the available Covid-19 vaccines.[14]

The cooperation with evil framework is about determining when it is morally permissible to contribute to someone else's present or future evildoing. While it may seem abstract and technical, this framework is implicitly applied in everyday moral decision-making because living in society means that most of our actions—from paying taxes to buying groceries—are interconnected with the actions of others, both good and evil. If we were to try to completely avoid cooperating with evil, we would have to cut ourselves off from society entirely. It's crucial to understand that this attempt to isolate oneself from all connection to evil would *not* be a morally superior way of life because—except perhaps in rare cases of those called to live as hermits—doing this would most likely be a failure to fulfill our responsibilities to others and live out our vocations.

The cooperation with evil framework distinguishes between two broad types of cooperation with evil, formal cooperation and material cooperation. Formal cooperation with evil, in which one shares in the evildoer's intention, is always morally wrong.

[14] Kevin C. Rhoades and Joseph F. Naumann, "Moral Considerations Regarding the New COVID-19 Vaccines," December 11, 2020, https://www.usccb.org/moral-considerations-covid-vaccines; and Congregation for the Doctrine of the Faith (CDF), "Note of the Congregation for the Doctrine of the Faith on the Morality of Using Some Anti-Covid-19 Vaccines," December 21, 2020, https://press.vatican.va/content/salastampa/en/bollettino/pubblico/2020/12/21/201221c.html.

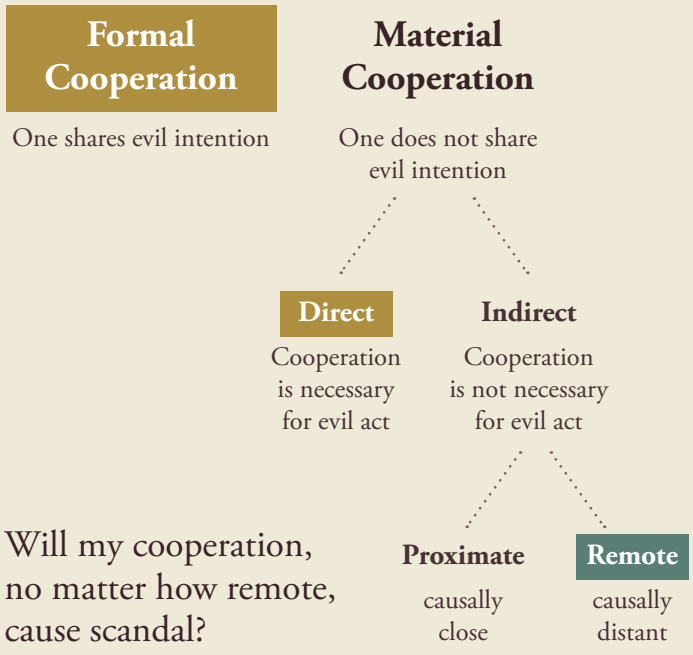
An example of formal cooperation related to the evil of abortion would be donating to Planned Parenthood with the goal of facilitating access to abortions. Material cooperation with evil occurs when someone facilitates evil without sharing in the evil intention. This occurs when, for instance, for financial reasons we invest in index funds supporting companies that donate to Planned Parenthood, without intending to facilitate abortions. Material cooperation may or may not be permissible, depending on how proximate (i.e., causally close) and direct our connection is to the evil, and on whether or not we have a proportionately serious reason to engage in the action despite the fact that it unintentionally contributes to others' evildoing.

> *"Living in society means that most of our actions– from paying taxes to buying groceries– are interconnected with the actions of another, both good and evil."*

For example, working as an administrative assistant checking in patients at an abortion clinic—simply because it is the only job available, but not because one actually seeks to facilitate abortions (otherwise the cooperation would be formal)—would be direct and proximate material cooperation with evil, and would be morally wrong. On the other hand, working as a nurse in the oncology unit of a large hospital in which abortions are performed would be indirect and remote[15] material cooperation with evil. (It contributes to the evil indirectly insofar as one's work contributes to the hospital's survival and therefore indirectly enables the hospital to continue to provide abortions.) Such indirect and remote material cooperation would be morally permissible, given that there are proportionately serious reasons for the nurse to work at the hospital. For instance, the nurse's work promotes important goods like the health of patients and the support of the nurse's family. While the nurse could work at a Catholic hospital in which abortions are not performed, there can be proportionate reasons for him or her to choose work at a non-Catholic hospital even if positions at Catholic hospitals are available, not least of which is the opportunity to provide Christian witness to patients and coworkers. This example also illustrates what was said above about the fact that avoiding cooperation with evil, they would be unable to fulfill their specific vocation as lay women and women, which the Second Vatican Council describes as "[working] for the world from within as a leaven."[16]

The last factor that is important to consider in determining the moral permissibility of material cooperation in evil is the risk of scandal, which could occur if others were led by one's actions to believe that the evil in question is actually not so bad. Sometimes the likelihood of serious scandal would make otherwise permissible material cooperation morally wrong. In general, anytime one is engaged in material

Cooperation with Evil Framework



[15] To say that one's action has only a remote connection to evil is to indicate that the action's causal connection to evil is relatively distant. Remoteness is not about distance in space or time, but about causal distance from evil.
[16] Dogmatic Constitution on the Church, Lumen Gentium, November 21, 1964, No. 31.

cooperation with evil, there is an obligation to avoid scandal by ensuring that others do not reasonably infer from your actions that you actually approve of the evil that you are knowingly but unintentionally facilitating. This obligation can be fulfilled by making clear one's opposition to the evil and seeking to work against it to the extent possible. For instance, doctors or nurses working at a hospital in which abortions are performed should make sure (in appropriate ways) that others know of their opposition to abortion.

The Cooperation with Evil Framework Does Not Imply that the Ends Justify the Means

The claim that material cooperation with evil can sometimes be justified if there is a proportionately serious reason needs to be clarified. This claim might be misinterpreted to imply that the end justifies the means, or that evildoing itself can be justified if it is the only way to achieve an important goal. Yet Catholic moral theology and the natural law tradition recognize that there are intrinsically evil acts that can never be justified, no matter how important the good one is seeking to achieve. For example, natural law thinkers argue that the bombing of Hiroshima and Nagasaki was unjust because it is always wrong to intentionally kill innocent civilians, even though the bombing succeeded in ending the war and saving thousands of American lives.

The basic reasoning underlying the cooperation framework is that one is primarily morally responsible only for one's own actions and choices, not those of others. Nonetheless, because natural law sees morality as ultimately about respecting and promoting human flourishing in its various dimensions, one also has a responsibility to consider whether one's action may indirectly and unintentionally result in evil—as when one foresees that by engaging in an otherwise morally upright action, one may facilitate another's evildoing. In such cases—like the above-mentioned case of a nurse working in the oncology unit of a hospital that performs abortions—morally responsible action requires determining whether it is reasonable to go ahead with one's action despite knowing that it may facilitate another's evildoing, and considerations of proportionality are relevant to that determination. By contrast, if one's action is wrong in itself, considerations of proportionality are irrelevant, because no end—no matter how good or important—can justify an evil action.

Does Receiving a Covid-19 Vaccine Involve Cooperation with Evil?

The cooperation with evil framework is often used in a broad sense to analyze the ethical issues related to the Covid-19 vaccines. These analyses (like that of the USCCB and the CDF) conclude that the cooperation with evil in this case is passive remote material cooperation,[17] and that there are proportionate reasons related to individual health and the common good to justify this cooperation. If one defines cooperation with evil in a strict way, however, taking the vaccines actually involves *no* cooperation with evil because the evils we are concerned about occurred in the past, and nothing that we do now can change what happened. This is why the cooperation is described as "passive," but the language is confusing. If taking the vaccines does not contribute to present or future evil, then it is not cooperation with evil at all, strictly speaking. Some dispute this claim, arguing that the willingness to use the vaccines despite their connection

[16] Dogmatic Constitution on the Church, Lumen Gentium, November 21, 1964, No.31.

[17] The use of these cell lines in the development, production and/or testing of vaccines is a step removed from ethical problems at the origin of the cell lines (which is already a step removed from the grave evil of abortion), and reception of the vaccines is an additional step removed from abortion. Thus, the connection between abortion and the use of the vaccines is extremely remote and indirect.

to these past evils indirectly perpetuates the practice of using aborted fetal tissue to make new cell lines, by showing that consumers are willing to use products made with the help of these cell lines.[18] This claim is questionable, given that the cell lines are immortal and that for scientific purposes there are huge advantages to using established cell lines with well-known properties, as discussed above. In other words, continuing to use an established cell line like HEK-293 on balance is actually most likely to *reduce* the demand for the creation of new fetal cell lines.

In this regard, it's also important to note the crucial difference between the use of modified fetal cell lines like HEK-293, which are not identical to the original fetal tissue and which reproduce indefinitely, and the direct use of fetal tissue or human embryos in research. The latter *does* perpetuate unethical research practices and indirectly contributes to more abortions and embryo destruction by creating ongoing demand for new tissue or embryos, but the use of fetal cell lines like HEK-293 does not. Many ethical analyses of the vaccines—particularly those that presume the *quantity* of cells used to make the vaccines has ethical relevance—seem to be based on a failure to recognize this crucial difference between using *immortal cell lines* derived from aborted fetal tissue and using *fetal tissue itself.*

The Appropriation of Past Evil Framework

Because, as argued above, use of the Covid-19 vaccines does not actually contribute to present or future evil, a better framework for assessing the permissibility of taking the Covid vaccines is the appropriation of past evil framework, which considers the conditions under which it is morally permissible to benefit from past evil. According to this framework appropriating the fruits of past evil while approving of that evil involves ratification of the evil and is always wrong, just like formal cooperation with evil.[19] But appropriation can be problematic even when there is no ratification of the past evil, because benefiting from evil involves a risk of corrupting our character by desensitizing us to that evil and/or weakening our opposition to it. Thus, proportionate reasons are necessary to justify accepting these risks of character corruption that are involved in benefiting from evil and also to justify accepting the risk of scandal. We are also obligated to make a conscious effort to avoid these risks of character corruption and scandal by renewing and making known our opposition to the evil, and by taking steps, when possible, to prevent similar evils from happening in the future.

In the case of the vaccines, the existence of proportionate reasons to accept the risks of character corruption and scandal is obvious, given the crucial importance of widespread vaccination in order to achieve herd immunity, which is the only thing that will enable everyone—including the vulnerable, who may not be able to be vaccinated for health reasons—to resume normal social and economic life. Still, as the appropriation framework indicates, it is at the same time necessary to renew one's opposition to the evil of abortion and to continue to make efforts to put an end to abortion. Those who can do so should also lobby for an end to the use of aborted fetal tissue in research and push for the development of protocols to obtain fetal tissue ethically from spontaneous miscarriages, nonviable pre-term births, etc., with proper consent from the child's parents.

[18] This argument was made by Stacy Trasancos of Children of God for Life in a webinar organized by the Institute for Theological Encounter with Science and Technology (ITEST) held on February 13, 2021: https://faithscience.org/covid-19-vaccine/

[19] M. Cathleen Kaveny, "Appropriation of Evil: Cooperation's Mirror Image," Theological Studies 61 (2000): 280 –313, https://doi.org/10.1177/004056390006100204.

Analogous Cases

A discussion of some analogous cases may help to put the issue into perspective. Consider, for instance, the fact that many (if not most) modern medical treatments have at least an indirect connection to gravely immoral actions. To take just one example, the anti-malaria drug chloroquine was developed by Nazi scientists through experiments on those in concentration camps.[20] Whenever someone takes or prescribes that drug, or uses the information obtained by the Nazis to produce the drug, he or she is benefiting from those grossly unjust experiments. Even outside the medical arena, we continually benefit from past evils in our daily lives. Much of the land we now use was unjustly taken from Native Americans. Most of the railroads in the American south were built by slaves; riding on those railroads means benefiting from past slave labor. Further, almost all processed foods and pharmaceutical products use HEK-293 cells in development, production, or testing.[21] In other words, many of the products we use on a daily basis have exactly the same connection to cell lines derived from aborted fetal tissue as the Covid-19 vaccines. Just as we can take chloroquine, inhabit the land, ride the railroad, use cosmetics, and eat processed foods without approving of or perpetuating the past evils that enabled us to enjoy these benefits, we can also receive a Covid-19 vaccine without approving of or perpetuating the evil of abortion. Because we live in a fallen and morally complex world, benefiting from past evil is unavoidable.

These are all examples of ways in which we routinely (and permissibly) benefit from past evils, but do not actually contribute to present or future evil. But we also perform countless actions in which we actually do cooperate with evil by indirectly contributing to present or future evil.[22]

For instance, many common products that we buy on a regular basis—products like rice, coffee, chocolate, clothing, carpets, etc.—are produced using slave labor, child labor, or other gravely unjust labor practices. Buying these products creates a demand for more of them and thus perpetuates these injustices. Further, hundreds of companies—like Nike, Heinz, Energizer, Walmart, and CVS—donate to Planned Parenthood; when we buy those companies' products a tiny portion of that money ends up facilitating abortions.[23] The same is true of investing in any large index fund, all of which have significant shares in companies that donate to Planned Parenthood, conduct research on human embryos, or engage in other unjust practices.

The point of these examples is not to be paralyzed, afraid to do anything lest one indirectly facilitate evil. Of course, it is good to make some effort to be informed and conscientious about one's purchases and investments—first and foremost by avoiding the temptation to consumerism, and also by trying to buy ethically-produced products or choose ethical investments when feasible. But we shouldn't be scrupulous about this because our connection to these evils is extremely indirect and remote, and there are competing goods at stake. If we had to thoroughly research the origins of every product we used, we would have little time for anything else and would likely be neglecting other more important responsibilities. We should strive to be conscientious, but that doesn't mean obsessing about the ways in which we may be indirectly contributing to evil due to our embeddedness in the sinful structures of a fallen world, but rather focusing on loving God and serving others in line with our particular vocation.

[20] W. U. Eckart and H Vondra, "Malaria and World War II: German malaria experiments 1939-45," Parassitologia vol. 42,1-2 (2000): 53-8, https://pubmed.ncbi.nlm.nih.gov/11234332/

[21] Ryan T. Anderson, et al., "Statement from Pro-Life Catholic Scholars on the Moral Acceptability of Receiving COVID-19 Vaccines," *Public Discourse* March 11, 2021, https://www.thepublicdiscourse.com/2021/03/74594/.

[22] Matthew Scheider, "12 Things Less-Remote Cooperation with Evil than Covid Vaccines," Patheos December 18, 2020, https://www.patheos.com/blogs/throughcatholiclenses/2020/12/12-things-less-remote-cooperation-in-evil-than-covid-vaccines/.

Conclusion

Widespread vaccination against deadly and crippling pathogens has vastly improved human health over the past century. In fact, the positive impact that widespread vaccination has had on human health is rivaled only by the general availability of clean drinking water and the development of antibiotics. This major achievement has been accomplished with little risk to the population as severe side-effects from vaccine administration are quite rare.

The above ethical analysis of the Covid-19 vaccines can be summarized as follows: First, the crucial facts to keep in mind are that the connection between the vaccines and abortion is extremely remote (causally far-removed) and indirect, and that taking the vaccine does not perpetuate the evil of abortion, or even the (lesser) evil of using aborted fetal tissue for research without proper consent or regard for the dignity of unborn human life. With those facts in mind, it is clear that taking the vaccine involves no cooperation with evil, strictly speaking, because taking the vaccine does not contribute to any present or future evil. And even if taking the vaccine in some way makes it more likely for scientists to justify the future creation of fetal cell lines, this cooperation would be extremely remote and indirect—more remote and indirect than many other common actions.

Applying the appropriation with evil framework, it is clear that while taking the vaccine does involve indirectly benefiting from past evil, it does not imply approval of abortion or involve a significant risk of scandal or of desensitization to the evil of abortion. Finally, it is necessary to consider whether or not there are proportionately serious reasons for taking the vaccine, despite its connection to past evil. Given that achieving herd immunity from Covid-19 requires widespread vaccination and is crucial for the common good because it is the only way to safely restore normal social and economic life, the reasons to be vaccinated are very strong even for those who are not personally at grave risk of serious illness. Vaccination is therefore not only morally permissible, but is also, as the USCCB has stated, a duty for the common good and an act of charity for the protection of the most vulnerable.

[23] "Companies that Support Planned Parenthood," Family Council, accessed June 7, 2021, https://familycouncil.org/?page_id=14547.

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