UNESCO

Novice
ECOSOC

TOPIC: Ethical Challenges of Synthetic Biology

CHAIRS: Madison Herczeg, Hudson Long

LAIMUN XXVIII

December 3-4

Letter from the Secretaries-General

Dear Delegates,

On behalf of our entire staff, it is our pleasure to welcome you to Session XXVIII of the Los Angeles Invitational Model United Nations (LAIMUN) conference. LAIMUN XXVIII will take place on Saturday, December 3 and Sunday, December 4 of 2022 at the Mira Costa High School (MCHS) campus.

Our staff, composed of over 100 MCHS students, has been working tirelessly to make your debate experience the best it can be. You will find your dais members to be knowledgeable about the issues being debated and MUN procedure. We pride ourselves in hosting a conference that is educational and engaging, and we hope you take advantage of that as you prepare and debate.

At LAIMUN, we value thorough research and preparation. We ask that delegates write position papers following these directions. The deadline to submit position papers to be considered for Committee and Research Awards is Friday, November 25 at 11:59 PM PT. The deadline to submit to be considered for Committee Awards is Thursday, December 1 at 11:59 PM PT.

We also encourage all delegates to read the LAIMUN Rules of Procedure for conference-specific information and as a reminder of points and motions that can be made during committee.

Feel free to reach out to our staff with any questions or concerns you may have. Delegates can find their chairs' contact information next to their committee profile and the Secretariat's email addresses on the staff page. Any member of the LAIMUN staff will be happy to assist you.

We look forward to seeing you in December!

Sincerely,

Allyssa Lessinger and Brady Stephens
Secretaries-General, LAIMUN XXVIII
secretarygeneral@mchsmun.org

Introduction to the USG

Hello Delegates! My name is Ava Reyes and I am the Under-Secretary General of ECOSOC. This is my fourth year in the Mira Costa Model UN program and I am beyond thrilled to welcome you to LAIMUN XXVIII!

I'm so excited to see the various diplomatic strategies of debate and topical discussions concerning the very real and pressing issues we encounter on a global scale. Our chairs intend to hold the delegates to high standards of research, diplomacy, speeches, and solutions.

As you may know, we have a strict no pre-written resolutions policy—resolutions may only be worked on at your chair's discretion. Please verify that your work is authentic to ensure all delegates experience a fair and relatively accurate depiction of a United Nations conference.

The Mira Costa Model UN program has provided me with incredible opportunities and lasting memories; I hope that LAIMUN XXVIII will be a memorable experience for you as well! Mira Costa MUN strives to ensure that delegates gain knowledge, confidence, speaking skills, and most importantly, a new understanding of international relations and the current events around us that affect the way we live today. All LAIMUN XXVIII staff have been hard at work to provide the best experience for everyone in attendance and we wish you the best of luck throughout your preparation!

If you have any questions or concerns, please don't hesitate to reach out to ecosoc@mchsmun.org or any other secretariat member. Looking forward to seeing you in December!

Regards,

Allyssa Lessinger and Brady Stephens
Secretaries-General

Ava Reyes
Under-Secretary General

Introduction to the Dias

Hi everyone! I'm Madison Herczeg, I am going to be one of your chairs at LAIMUN UNESCO Novice this year. I have been in Model UN at costa since I was a freshman and I absolutely love it. I first joined just to get better at public speaking but after the first debate I discovered that it was actually really fun. At the end of my freshman year we all went into lockdown and it was a challenge to learn to debate virtually. This was a bit of a struggle seeing that I had only gone to one debate before, but I adapted and came out the other side.

A little bit about myself outside of Model UN, I am on the dance team at Costa. I have also been on the team since freshman year and I really love it. Most of my friends are on the team as well. I have been dancing pretty much my whole life and can't imagine doing any other sport. Mainly because I'm not good at most other sports, but also because I love dance.

I also work at Fit Kids, which is a gymnastics place where little kids go to learn gymnastics, which is really fun. I also love music. Not necessarily making it, but definitely listening to it. My favorite artist changes all the time, but right now it is probably Djo or Louis Tomlinson. I've also been really into the Sex Education sound track, its really good, highly recommend. I'm so excited to be your chair this year! If you have any questions regarding debate, you can reach me or my co-chair at unesco.nov.laimun.xxviii@gmail.com. I can't wait to see all of your amazing suits and dresses at debate!

Sincerely,

Madison Herczeg

Welcome to LAIMUN!

I'm Hudson Long, and I'll be one of your chairs for our upcoming LAIMUN XXVIII UNESCO novice committee. I'm super excited to be able to chair what I'm sure will be an amazing debate on a topic I personally find fascinating. I've been involved with Model UN since I was a freshman, but I recently fell in love with it during my past sophomore year. The world's fascinating history of international diplomacy and delegation will always capture my interest and make these conferences infinitely more enjoyable.

Outside of Costa MUN, I really enjoy surfing and music. I've been surfing since before I could walk and it's a real privilege to be able to live here in Manhattan Beach where the ocean is readily accessible. I also play a wide variety of musical instruments, such as the guitar, piano, drums, etc., mostly as a hobbyist. I find it really relaxing and I am always able to calm myself by throwing on one of my playlists of music I enjoy.

I couldn't be more excited to be a part of this upcoming debate and I know we'll all have a wonderful time discussing the ins and outs of one of modern technology's biggest controversies. Please reach out to the committee email for any questions at unesco.nov.laimun.xxviii@gmail.com.

See you soon,

Hudson Long

Committee Description

The United Nations Educational, Scientific and Cultural Organization ensures international security and cooperation in education, culture, sciences, information and communication. UNESCO contributes to developments that attempt to achieve the Sustainable Development Goals that were defined in the 2030 Agenda through actions that establish mutual understanding and cooperation between various people and countries.

UNESCO is built upon the ideal that in order to secure lasting support of different cultures and people, peace must be founded on mutual dialogue and understanding—political and economic measures only go so far to help individual entities. UNESCO specifically promotes the protection of cultural heritage and fights against cultural assimilation, which often results in the death of a particular culture. Through measurable actions, UNESCO is able to foster bonds between nations through assisting scientific programs and foundations to maximize development and cooperation between the international community. UNESCO is often referred to as the "laboratory of ideas" due to its nature in establishing programs and international standards that essentially foster the flow of ideas and overall exchange of knowledge between political entities, people, and even opposing parties.

While the lack of cultural diversity, rejection of scientific information, and global threats to freedom of expression continue to exist, UNESCO continues to maintain its mission of defending these structures and secure the humanist ideals of education, science and culture.

Topic: Ethical Challenges of Synthetic Biology

I. Background

The possibility for gene editing and altering became available and more widespread in 2013 with the discovery of clustered regularly interspaced short palindromic repeats or CRISPR/Cas9. This allows for genetic engineers to modify and edit DNA fragments at an exceptionally fast pace. Along with editing DNA fragments, CRISPR can now be used by genetic engineers as a diagnostic tool. These CRISPR sequences work to transcribe the DNA into short, abrupt RNA strands. These strands are able to match with certain DNA fragments; when said fragments are found, the Cas9 enzyme cuts off the DNA removing it from the sequence. Scientists and gene editors are able to use CRISPR/Cas9 to study the function of each gene as well as repair any mistakes in any of the three codon sequential sections of DNA.

Among CRISPR/Cas9, there are other forms of gene editing that have arisen over the years, one of these being CAR T-Cell Therapy[1]. This therapy is a type of immunotherapy that is used to battle cancer. A t-cell is a special type of white blood cell that is created in a gland-like organ known as the thymus. These CAR T-cells are genetically modified to find and attack any cancerous cells in the body. These modified T-cells work to construct chimeric antigen receptors (CAR) that stick to tumors and help to destroy them. These CAR T-cells have been approved by

[1]"CAR T Cell Therapy." *Pennmedicine.org*, https://www.pennmedicine.org/cancer/navigating-cancer-care/treatment-types/immunotherapy/what-is-car-t-therapy.

the FDA as an acceptable means to battle acute lymphoblastic leukemia, non-Hodgkin lymphoma, and multiple myeloma.

In 2008, CRISPR was used for the first time by Danisco. This company chose to use this method of gene editing in order to improve the immunity of certain bacterias in order to better fight off viruses. Today, CRISPR is used by many companies as a means to produce certain foods such as yogurt and cheese. This gene editing technique can also be used to edit human DNA, make transgenic animals, and grow animal cells in a petri dish. Such transgenic animals include mice, zebrafish, primates, and pigs. In a short six to seven years, CRISPR was proven effective in creating cells immune to HIV in humans as well as eliminating muscular dystrophy and even eliminating a rare liver disease in mice. The end goal of these tests is to hopefully create human organs and make organ transplants easier. With easier transplants would come a smaller list of side-effects or the elimination of side-effects in general. One side effect that genetic engineers hope to eliminate is the graft-versus host disease.

The tools for gene editing were created between 1994 and 2010 using a joint effort with academia and industry[2]. The equipment was created through using meganucleases for the proof-of-concept and zinc finger nucleus which was used for editing the native loci. This tool box was very successful at the time of its release based on the TAL effector domain.

As mentioned above, TALENs or transcription activator-like effector nuclei were created to help further edit DNA. TALENs are created by binding a TAL effector DNA-binding domain

[2] "What Is Genome Editing?" *Genome.gov*, https://www.genome.gov/about-genomics/policy-issues/what-is-Genome-Editing.

and a DNA binding cleavage[3]. By using these TALENs, genetic engineers are now able to better edit DNA by isolating certain areas and picking certain fragments. TALENs work similar to CRISPR in the sense that they allow for genetic engineers to alter a person or animal's DNA to either better benefit them in the future or meet the parents genetic expectations.

The final type of gene editing is Zinc Finger Nucleases or ZFNs[4]. ZFNs are a wildly popular method of DNA editing. A Zinc Finger Nuclease is a programmable protein that can be used for a multitude of different things: locating and breaking specific sites in the double stranded helix of the DNA, initiate homeology repair–only if the endogenous-repair template is provided–, and bind to a specific location on the double helix DNA. ZFNs are typically a more specific type of DNA modifier based on the location and sequence of the individual zinc finger. This can be done outside the body by extracting the target cells and DNA, using the ZFNs to edit the selected portions of DNA, then replacing the new edited DNA back into the body. Because of this specificity, ZFNs can be used in higher organisms and allow for just about any area of the genome to be edited.

When discussing gene therapy and gene editing, it is impossible to breeze past the ethics behind it. As it currently stands, there seems to be no problem utilizing these gene editing techniques on lab animals, most predominantly mice, however, there becomes a problem when humans enter the equation. Over the years, CRISPR has grown in popularity when it comes to

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[3]Bergman, Mary Todd. "Harvard Researchers Share Views on Future, Ethics of Gene Editing." *Harvard Gazette*, Harvard Gazette, 28 Oct. 2019, https://news.harvard.edu/gazette/story/2019/01/perspectives-on-gene-editing/.

[4]Zinc Finger Nuclease." *Zinc Finger Nuclease - an Overview | ScienceDirect Topics*, https://www.sciencedirect.com/topics/medicine-and-dentistry/zinc-finger-nuclease.

editing animals, but recently there has been an influx in use by humans. Ethical concerns have been raised—especially as it relates to religious standpoints—about the usage of gene editing techniques on humans, this includes a developing fetus. In order to use CRISPR to edit genes, scientists must insert the modifier into the cell being edited. This doesn't require the cells to be extracted, this process is called in vivo editing. This poses an issue seeing as the advancements in the technology needed to perform gene editing has advanced at a rapid pace since its discovery in the late 1900s, but the research in the ethics behind it have been racing to catch up. In order to properly decide if being able to edit genes should be deemed ethical or not, all aspects and risks must be assessed first.

One aspect that has been called into question is the editing of somatic–any cell that helps to form the body of a multicellular organism–versus germline cells[5]. When editing somatic cells, genetic engineers harvest a few cells from the host and edit those cells, when said cells divide, the new mutated DNA will spread throughout the area of the initially impacted cell[6]. With somatic cell editing, the only person affected is the patient. On the other hand, with germline editing all cells are affected, this includes the sperm or egg cells. Unlike somatic cell editing, germline editing affects not only the current patient, but all generations to come. The consequences and outcomes of germline editing is significantly riskier considering there has not been enough research done to completely solidify the long term effects.

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[5] Bergman, Mary Todd. "Harvard Researchers Share Views on Future, Ethics of Gene Editing." *Harvard Gazette*, Harvard Gazette, 28 Oct. 2019, https://news.harvard.edu/gazette/story/2019/01/perspectives-on-gene-editing/.
[6] LT;, Rhuma NR;Fituri OA;Sabei. "Mutational Analysis of AGXT Gene in Libyan Children with Primary Hyperoxaluria Type 1 at Tripoli Children Hospital." *Saudi Journal of Kidney Diseases and Transplantation : an Official Publication of the Saudi Center for Organ Transplantation, Saudi Arabia*, U.S. National Library of Medicine, https://pubmed.ncbi.nlm.nih.gov/29456205/.

Through somatic cell editing, genetic engineers are able to modify the DNA in order to treat or cure a patient for a genetic disorder or disease that would be otherwise untreatable. But through germline editing, engineers are able to alter the DNA of the earliest stages of an embryo which will not only affect the resulting person but likely the rest of the bloodline starting from this initial embryo. Germline editing also poses quite a few more unknown risks than somatic cell editing. For example, off-target impacts–when editing one gene might cause an issue or problem in another separate gene–is a possibility, but researchers and genetic engineers are unsure of the long term effects this could have as well as the probability rate. That being said, there are many benefits that in most cases outweigh the risks of germline editing. This begs genetic engineers to question just how unethical this line of gene editing is.

II. United Nations Involvement

In 1999, the UN passed a crucial document in the advancement of gene editing on humans known as the Implementation of the Universal Declaration in the Human Genome and Human Rights[7]. This document explains the basic principles as it applies to the study of biology as well as the application of this study on human genes. These guidelines were intended for the use of UNESCO member states and their headquarters, the Intergovernmental Bioethics Committee (IGBC), the International Bioethics Committee (IBC), non-governmental organizations (NGOs), and finally the general civilian (especially families with genetic mutations that, if tampered with, could become fatal).

[7] "Universal Declaration on the Human Genome and Human Rights." *UNESCO*, 21 Jan. 2022, https://en.unesco.org/themes/ethics-science-and-technology/human-genome-and-human-rights.

At the 2020 UNESCO meeting in Paris, a recently discovered concern was raised by the International Bioethics Committee or IBC. This concern was based on the balance of the advertisement of gene editing and the consequences that come with it as well as encouraging people to utilize this new technology. The solution created to solve this issue consisted of three branches. The first branch required privacy and consent, the second protected the sharing of information and each intellectual's property rights, the third and final branch highlighted the ethical concerns and boundaries that lie within gene editing.

In 2018, UNESCO started hosting roundtable meetings in order to discuss the ethics, advancements, and implementation of genome editing. In March of 2021, the round table discussion was on the topic of the engagement of the public in the decision making process of gene editing as well as the introduction of new technologies into society. At the final roundtable meeting in January 2022, the speakers and attendees discussed the ability to create equal access of genome editing to all and how this access fits into each respective nations' governments.

The WHO recently made a report on the topic of gene editing and more broadly gene therapies in general[8]. This report recommended the overseeing of human genome editing in nine different and separate locations. The report mainly focuses on base level or system level improvements in order to build all nations accessibility to gene editing to reach the same level, in other words, the WHO is focused on ensuring that all nations have the same access to gene editing. The report also stressed the importance of government involvement. It layed out a

[8] "WHO Issues New Recommendations on Human Genome Editing for the Advancement of Public Health." *World Health Organization*, World Health Organization, https://www.who.int/news/item/12-07-2021-who-issues-new-recommendations-on-human-genome-editing-for-the-advancement-of-public-health.

framework that outlines specific scenarios, tools, and institutions where challenges may arise in the regulation and oversight of gene editing. The framework provides recommendations to do in certain scenarios such as somatic cell or epigenetic genome editing for an enhanced athletic performance as well as services such as preimplantation genetic diagnosis and in vitro fertilization (IVF). The ending parts of the report offers WHOs next plans to set up a registry, which includes methods by which research can be better monitored and regulated.

III. Topics To Consider

A. Mobilization of gene editing research and tools and dual-use technologies

With the unknown nature of Gene Editing, it may be too risky to mobilize technology and research shortly after its conception. It could be considered safer to keep this research within larger developed countries where operations can be performed at maximum safety and efficient research can be conducted. Cutting off mobilization also deals with another ethical issue, being the accessibility to dual-use technologies. Many synthetic biology tools have an equal potential for good and bad, and these technologies could cause horrible things in the wrong hands. If commercial and mobile streams of these technologies are stopped, it could decrease risk, but also leave underdeveloped countries behind the rest of the world.

B. Effects on future generations

The concept of germline modifications is divisive. While it may prevent future generations of a family from inheriting a genetic condition, it can also influence the development of a fetus in unforeseen ways or have unknown long-term consequences. These future generations who will be affected by germline gene therapy are unable to choose whether or not

to receive treatment because they have not yet been born. Decisions must be made on if it is required to have consent from all those affected (i.e. unborn parties). Regulations may be put in place to ensure that these germline alterations reach a predetermined amount of necessity before the procedure.

C. Safety concerns

Countless safety concerns still plague the area of genome editing. These risks, either inherent or caused by a lack of development, add to the ethical controversy of such topics. Two primary points of interest arise when discussing the safety of genome editing. These are off-target effects and mosaicism. Off-target effects are when edits are made in the wrong place, and mosaicism is when some cells carry the edit, but others do not. Scientists and researchers present at the International Summit on Human Gene Editing[9] mostly are of the opinion that germline genome editing techniques cannot be used clinically until they are deemed fully safe through research. In most cases, the risk heavily outweighs the potential benefit. Another argument used to support the risks of germline genome editing is that there are safer alternatives available, such as preimplantation genetic diagnosis and in-vitro fertilization. Though in some cases germline editing can address certain needs that PGD cannot. Another safety issue is one already discussed, the potential side and long term effects on fetuses and unborn children.

[9]"Read 'Second International Summit on Human Genome Editing: Continuing the Global Discussion: Proceedings of a Workshop–in Brief' at Nap.edu." *Second International Summit on Human Genome Editing: Continuing the Global Discussion: Proceedings of a Workshop - in Brief | Second International Summit on Human Genome Editing: Continuing the Global Discussion: Proceedings of a Workshop–in Brief |The National Academies Press*, https://nap.nationalacademies.org/read/25343/chapter/1.

D. Accessibility and Enhancement

Accessibility and socioeconomic divide in care is another major concern when it comes to germline genome editing. Due to the cost of certain procedures, it is a concern that only the wealthy will be able to afford these methods that could save their lives and the lives of their bloodline. Furthermore, existing inequities in access to health care and other treatments would be exacerbated. Some fear that if germline editing is pushed to the extreme, it would create classes of people characterized by the quality of their modified genome. In addition, there is the polarizing topic of the usage of gene therapy, not for reproductive diseases or conditions, but instead for enhancement of traits; such as height, athletic ability, or appearance. Many who believe that gene editing, once proved safe, is a moral imperative, believe that genetic enhancement is a topic which must be handled through policy, regulation, and much more research.

E. Neo-Eugenics and their challenge to difference

Eugenics have a disgusting history of violence and misery that has ruined nations and peoples. There is a history of murder and genocide that has occured in the past in the name of race hygeine and improvement of the human race[10]. Though, with new improvements in gene modification and therapy, the possibilities of the future can be very divisive. Perfection is subjective, and if the population moves towards a single opinion of perfection, the concept of eugenics could cause another threat to equality if gene therapy is implemented incorrectly.

[10]"Home - PMC - NCBI." *National Center for Biotechnology Information*, U.S. National Library of Medicine, https://www.ncbi.nlm.nih.gov/pmc/.

Attempts to change the genetic makeup of a group or population nearly invariably necessitate the involvement of third parties in individual's and couple's reproductive decisions. Someone other than the people who are producing children must establish a policy and a standard. Because individuals may disagree with the policy, third parties may strive to impose their vision of betterment on an unwilling population, these initiatives have nearly always included force or coercion in our time. Another argument against allowing eugenic aspirations to affect parenting is that it will result in significant socioeconomic inequities. Allowing parents to choose their children's genetic composition risks creating a genetic "overclass" with unfair advantages over those whose parents did not or could not afford to bestow them with the appropriate biological dispositions and features. Alternatively, it may lead to societal homogenisation, in which diversity and difference are lost in the quest to generate only ideal people, putting anyone with even the smallest impairment or weakness at a considerable disadvantage. In societies devoted to equal opportunity for all, equity and justice are unquestionably significant concepts.

IV. Case Study

The most well known approach to genome editing is called CRISPR-Cas9, short for clustered regularly interspaced short palindromic repeats and CRISPR-associated protein 9. It is considered faster, more affordable, more accurate, and more efficient than other popular methods. CRISPR-Cas9 is built on naturally occurring genome editing techniques utilized by bacteria to protect themselves. When bacteria are infected with viruses, they catch small pieces of the virus's DNA and insert them precisely into their own DNA, forming CRISPR arrays. Bacteria can "remember" viruses (or closely related ones) thanks to CRISPR arrays. If the

viruses reemerge, the bacteria make RNA segments from CRISPR arrays that locate and bind to specific sections of the viruses' DNA. The bacteria then utilize Cas9 or a similar enzyme to tear the virus's DNA apart, rendering it inoperable. This immune defense mechanism was modified to alter DNA by researchers. They make a small piece of RNA with a short "guide" sequence that connects to a specific target sequence in a cell's DNA, similar to the RNA segments produced by bacteria using the CRISPR array. This guide RNA attaches to the Cas9 enzyme additionally. When the guide RNA is injected into cells, it detects the desired DNA sequence, and the Cas9 enzyme cuts the DNA at the desired location, similar to how bacteria do it. Although Cas9 is the most commonly utilized enzyme, other enzymes (such as Cpf1) are also viable. Researchers employ the cell's own DNA repair mechanism to add or delete portions of genetic material, or to make modifications to previously existing segments with new altered ones.

When genome editing, like CRISPR-Cas9, is used to change human genomes, many ethical considerations and issues arise. The majority of genome editing's effects are restricted to somatic cells, which are cells other than egg and sperm cells (germline cells). These modifications are limited to certain tissues and are not passed down from generation to generation. Changes to genes in egg or sperm cells or in the genes of an embryo, on the other hand, could be handed down to future generations. The use of germline cell and embryo genome editing to improve normal human qualities raises a number of ethical questions, including whether it is legal to utilize this technology to improve normal human features (such as height, intelligence, or athleticism).

The main danger of CRISPR/Cas9 technology is the possibility of off-target genome editing impacts. In human DNA, CRISPR/Cas9 technology can cause site-specific DNA alterations. Off-target effects of the CRISPR/Cas9 system have been identified in addition to cleavage at the specified target site. These off-target effects are caused in part by imperfect homologies between gRNA and other genomic regions. These off-target ramifications have yet to be identified. There's also the possibility of unintended repercussions from on-target events. There is also currently a lack of post-exposure prophylactic medication and alternative strategies to mitigate or undo damage caused by CRISPR-Cas9 off or on-target effects and nuclear material change.

With the increase in this currently dangerous technology, comes an increase in the dangers posed with implementation of said technology. All drugs and developing medical technology typically will go through a process of clinical trials to determine the safety and validity of such technology. These clinical trials can run into many issues, such as affordability, and patient enrollment/drop out rate. Since the 1990s, the percentage of clinical trials conducted in developing nations has increased from 10% to 40%. International trials proponents assert that the pertinent ethical standards are the same everywhere in the world and that the lower cost of conducting trials overseas makes it very appealing to U.S.-based businesses. Additionally, conducting research in many nations can help to guarantee that the patient group testing the drug is diverse. Drug-drug interactions are less likely to have negative effects on persons in low- or middle-income countries since other medicine is taken less frequently than in high-income nations.

Informed consent is another prevalent issue when discussing clinical trials. Patients must be fully aware of their diagnosis and all risks that come with trials. Most importantly, their decision to enroll must not be influenced by any outside factors. Due to the diverse testing that has increased, would providing incentives for lower income families or those without healthcare qualify as coercive and influential? Therefore, should only those with access to medical care be allowed to partake in trials? Then, a large socioeconomic divide would occur in clinical trial patients which negates earlier efforts to (or actions that in consequence) increase diversity[11]. Additionally, would candidates that have only achieved low educational attainment, that may not be aware of relatively basic scientific concepts such as bacteria or cells be qualified to enroll with informed consent? This large gap created by issues with informed consent could possibly negate social diversity and cause previous patients of the clinical trials to not be able to afford the drug post-trials because of their economic status, combating and reversing progress made previously by using the drug. All of these issues tied to general clinical trials can be related to the issue of testing genome editing at its current stage.

V. Guiding Questions

A. How can you utilize your country's policy to decide the extent to which genome editing is ethical?

B. What measures can UNESCO take to further discuss and possibly regulate the usage of genome editing?

[11] University, Santa Clara. "Up, up, and Away: Clinical Trials Go International." *Markkula Center for Applied Ethics*, https://www.scu.edu/ethics/focus-areas/bioethics/resources/up-up-and-away-clinical-trials-go-international/.

C. How does an ethical discussion affect the regulation of gene editing?

D. How does your country's size and policy affect your decision about the mobilization of research and technology?

E. Since consent cannot be gained from future generations affected by genetic engineering, is it ethical to perform?

F. How can the risks of Neo-Eugenics be prevented from increasing through new gene therapy and enhancement methods?

G. How can clinical trials be performed with maximum diversity and safety while still recognizing informed consent?

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