



Background Guide

Commission on Science and
Technology for Development

1 | Establishing a Global Framework for the Ethical Governance of Human Genome Editing Technologies

SDG: 3. Good Health and Well-being; 10. Reduced Inequality; 16. Peace, Justice, and Strong Institutions

Authored by Minji Kim, Jayden Bang, and Taewoo (Tony) Park

Last updated: September 8th, 2025

Table of Contents

Table of Contents	2
Committee Introduction	2
Agenda Introduction	3
Letter from the Chairs	4
Key Terms	5
Historical Background	6
Current State of Affairs	8
Stances of Parties	9
Possible Solutions	14
Questions to Consider	15
Bibliography	16

Committee Introduction

The Commission on Science and Technology for Development (CSTD), created in 1992, serves as a subsidiary to the ECOSOC committee, serving as the pillar of the United Nations (UN) for science, technology, and innovation (STI).

The primary purpose of the CSTD is to hold an annual intergovernmental forum for discussion on timely and pertinent issues regarding all STI matters. The committee aims to both clarify and form country stances as well as harness STI for the benefit of all nations' sustainable and inclusive growth. Facilitating sharing of knowledge with a focus on inclusivity, although being a subsidiary to ECOSOC, the CSTD prepares draft resolutions for ECOSOC after discussion.

The CSTD regularly handles matters regarding sustainable technological growth, for example in 2022 considering the themes of: "Technology and innovation for cleaner and more productive and competitive production" and "Ensuring safe water and sanitation for all: a solution by science, technology and innovation". More recently, the CSTD has discussed concerns regarding both AI and genetic engineering, and its implications on society. As technology becomes increasingly advanced, there is a greater necessity for collaboration and clear deliberation between delegates.

At GECMUN XII, the CSTD committee will be in UNA/USA format. The chairs highly recommend a focus on inclusivity and sustainable growth, as it is intrinsic to the nature of the committee. This means negotiation rather than strawmanning, consideration of various perspectives, and understanding the disparities in technological access.

Agenda Introduction

Over the past two decades, the field of the human genome has undergone substantial advances. Genome editing tools such as CRISPR-Cas9 have made it possible to treat or prevent certain diseases by altering the human genome. This technology has brought unprecedented potential cures for such genetic disorders: sickle cell anemia, cystic fibrosis, and Huntington's disease. With this editing technology and advanced health systems, it could reduce the global concern of hereditary diseases.

Necessary governance structures already exist due to its ethical concerns. Yet, it may need to be reinforced or amended as some processes lack explanation and proper guidance, which pose ethical, legal, and social dilemmas. Without a novel global standard, the usage of genome editing could broaden inequalities and lead to controversial usage of the "designer babies." The world was in a shock when a Chinese scientist announced the birth of the first genetically modified babies. This act spurred controversies in the international scientific communities and the Chinese scientist was sentenced to 3 years. This groundbreaking case accelerated the concern on the absence of the global ethical standards.

As this technology is in the process of continuous research, application of heritable human genome editing is likely to be a much more limited activity in the next few years. To ensure that this editing process does not proceed prematurely to clinical trials, the WHO Expert Advisory Committee recommended that "it would be irresponsible at this time for anyone to proceed with clinical applications of human germline genome editing," in a policy statement.

Delegates will explore the urgent need for a global ethical framework that will ensure the development, distribution, and usage of this technology in a responsible manner. The framework should address not only the technical aspect of this technology, but also ethical safeguarding methods that will lead to equitable access. Also, delegates will be expected to approach this issue with the understanding of the scientific aspect and bioethics on a regional, national, and international scale.

Letter from the Chairs

Dear delegates of CSTD,

Greetings delegate, we are Minji Kim, Jayden Bang, and Taewoo Park, who will be serving as your Head Chair, Deputy Chair, and Associate Chair, respectively, in the GECMUN XII, CSTD committee. It is our honor to welcome you to the GECMUN.

We firmly believe that winning an award is not the fundamental purpose of the Model United Nations. Awards do take some portion of MUN, but we sincerely hope that delegations can learn about cooperation, debate, and the joys of MUN. At its core, MUN is a platform for learning, growth, friendship, and meaningful engagement. GECMUN offers a unique opportunity for you to grow not only as a skilled MUNer but also as a comprehensive, empathic, and confident delegate. As well as elements mentioned previously, MUN lies in your ability to overcome these obstacles. It's MUNers' courage to speak up, the patience to listen, the creativity to draft a resolution, and the resilience to keep pushing forward despite setbacks. Whether you are skilled or a beginner, this conference will remain memorable in your MUN journey.

More importantly, chairs hope delegates enjoy the conference. Even working late at night, drafting a position paper, standing against a strong bloc, answering countless POIs, and giving out your opening speeches, these moments are going to shape you, challenge you, and leave you with the best MUN conference ever. We acknowledge that these may include disagreements between your allies, objections from your enemies, and all the intricate delegating that must be done in between. However, it is up to you to challenge and climb over these obstacles, one by one. Though these challenges may seem daunting, you should ultimately find the entire process rewarding and enjoyable.

We are looking forward to a fruitful and enjoyable debate.

Please contact us via email if there are any further questions.

Minji Kim | Head Chair | s23270936@sjajeju.kr

Jayden Bang | Deputy Chair | jbang27@migrate.kis.or.kr

TaeWoo (Tony) Park | Associate Chair | s22270850@sjajeju.kr

Key Terms

Genome Editing

Genomic editing is the process of making precise changes to the DNA of a cell or organism using biotechnology. Most usually, tools like CRISPRi, CRISPRcas9, and CRISPRa allow scientists to insert, delete, or modify genes and their expression.

CRISPR-Cas9

A form of biotechnology that is utilized to cut DNA for the purpose of modification, insertion, or deletion. The enzyme “*Cas9*” is the molecular scissors that guides RNA to the DNA.

Designer Babies

A topical term that refers to the embryos that have been genetically modified for specific traits, which can create medical fear and distrust about non-therapeutic or enhancement uses of genome editing.

Ethical Governance

The framework or system used to ensure that scientific practices are carried out in a morally acceptable and socially responsible way. It is imperative to set an ethical governance to guide researchers, nations, and all scientists.

Heritable Genetic Modification

Altering genes in a way that the changes can be passed down through generations, particularly when made at the germline level.

WHO Expert Advisory Committee on Human Genome Editing

The WHO Expert Advisory Committee on Human Genome Editing is an established, global, multi-disciplinary panel to examine the scientific, ethical, social, and legal challenges regarding human genomic editing of any kind. The committee carries members globally.

Historical Background

1981: Invention of the First Transgenic Animal

The first transgenic animal was made from a foreign organism inserted into its genome. Thomas Wagner at Ohio University in 1981 began the research of transferring the gene of a rabbit into a mouse genome using DNA microinjection.

1983: The Development of the Polymerase Chain Reaction (PCR)

The polymerase chain reaction, discovered by Kary Mullis, was instrumental in creating many copies of a DNA segment. This reaction has allowed us to copy any DNA to make more copies and generate millions of copies.

1993: Discovery of the CRISPR

Pioneered by Jennifer Doudna and Emmanuelle Charpentier, the principles of CRISPR technology were discovered by Francisco Mojica during his work with bacteria. In the next 10 years, Mojica continued research until 2003 when repeating DNA matched the viruses attacking the bacteria.

1999: First Human Chromosome Sequenced

The United States Congress funded the Human Genome Project in 1988. In 1999, scientists demonstrated the complete sequence for chromosome 22. This has provided invaluable insight into certain diseases through human DNA.

2001: First Gene-Editing Drug Therapy

The U.S. FDA approved gene therapy and successfully sold it as an anticancer drug to treat chronic myelogenous leukaemia (CML). This drug is called Glivec and it is still in use to treat cancer.

2010: The World's First Synthetic Life Form

Craig Venter and his team created the world's first synthetic life form. They transplanted *M. capricolum* recipient cells to new *M. mycoides* cells controlled by the synthetic chromosome.

2011: TALENs

The second generation of designer nucleases was displayed in the form of transcription activator-like effector nucleases (TALENs). They can recognize a single nucleotide and can be manufactured in a few days. TALENs are more beneficial than ZFNs, but they are significantly larger than ZFNs, which makes them more complicated to deliver.

2012: CRISPR Genome Engineering Tool

Jennifer Doudna and Emmanuelle Charpentier, along with their team, have shown the potential

of CRISPR technology in fields of medicine, agriculture, and biotechnology. CRISPR-Cas9 technology is being used to treat cancer, obesity, and many other diseases.

2015: Human Embryo Edited with CRISPR

Junjiu Huang of the Sun Yat-Sen University, China, altered the germline cells that affect heredity to fix gene errors. Huang faced enormous rejections from Western scientists because of the ethical concerns. 3 years after Huang, the human trials for CRISPR were officially approved.

2017: First Gene-editing Cancer Therapy, CAR T Therapy, is approved

CAR T therapy was invented as an effective, non-toxic treatment that might replace chemotherapy. Two CAR T therapies were approved: one for acute lymphoblastic leukemia in children, and one for advanced lymphoma in adults.

2018: CRISPR Human Trials Allowed

Vertex Pharmaceuticals and CRISPR Therapeutics have initiated an experiment for the blood disorder, which might end the cases of this disorder.

2020: First Patient Treated by CRISPR, Nobel Prize

The first patient, Victoria Gray, underwent the CRISPR clinical treatment. In six months, ten patients have made significant progress, including relief from pain and no blood transfusions. Moreover, Emmanuelle Charpentier and Jennifer Doudna won the Nobel Prize in chemistry for the development of CRISPR.

Current State of Affairs

Over the last two decades, humanity has grown human genome editing technology rapidly, with a focus on gene therapy and disease prevention. In 2012, a co-developed technology between France and the USA was introduced: CRISPR-Cas9, a technology that allows for modification of the DNA sequence. It makes it possible for humans to correct errors in the genome and turn on or off specific genes in cells and living organisms.

In 2025, Sun Yat-sen University in China successfully edited the genes of a human embryo in a lab dish in 2015, sparking a global debate about not making a baby by using artificial technology. This brings designer babies and human enhancement as significant issues. On the other hand, the USA has conducted the first human trial of CRISPR-Cas9 to treat sickle cell disease at the NIH and Vertex Pharmaceuticals in 2020. It was found that genome editing technology has the potential to treat or cure several genetic diseases, including Huntington's Disease, Cystic Fibrosis, etc.

One of the biggest reasons why human genome technologies need to be addressed is that more countries are entering the field, leading to an international regulatory gap. In 2023 to 2025, several CRISPR-based therapies for somatic cell diseases have been approved by the USA, UK, and EU, and are entering the mainstream of the medical market. This tilted balance of technologies shall cause a further gap between LEDCs and MEDCs' newly introduced technologies. In 2025, genome editing therapies will be limited to wealthy nations. LEDCs and developing countries largely lack facilities, infrastructure, or funding to provide these treatments.

WHO and UNESCO have called for global frameworks, but no binding enforcement policies exist. Even though regulations such as the He Jiankui affair exist — the 2018 experiment conducted by He Jiankui that reduced the gene causing HIV — they only remain as a warning for the excessive use of genome editing technology. No global system or regulation exists to prevent the risk of misuse of technology, while technologies that are even more precise than CRISPR are now in experimental trials, such as base editing and prime editing.

Human genome editing in 2025 is a double-edged sword, with the potential to cure countless diseases and to misuse the technologies. Allowing access to genome editing for developing countries and preventing ethical issues are going to be the most challenging issues the world is going to face.

Stances of Parties

Algeria

Algeria, as a nation, is opposed to genomic editing. Law 18-11 in Algeria limits access to assisted reproduction for couples unable to naturally procreate, and further bans sex selection, human cloning, or any collection of gametes, embryos, and sperm.

Austria

Austria as a nation also remains incredibly against genomic editing, going as far as to reprimand the EU for a proposal to loosen restrictions on genetic techniques. Austria worries that genomic techniques may harm the nation's organic sector.

Brazil

In Brazil, germline editing in particular is banned, but there are research centers for the purpose of CRISPR research, particularly in fields such as agriculture. Although not fully against genetic editing, Brazil's Biosafety Law implicitly permits some somatic gene-editing research in humans.

Canada

Genome editing in Canada is directly addressed in the *Assisted Human Reproduction Act* of 2004 that which prohibits “[altering] the genome of a cell of a human being or in vitro embryos,” even for research purposes. Despite scientists in the nation pushing for less tight regulation due to the promising results of germline editing, the government remains antagonistic to germline editing.

China

China has remained a trailblazer in germline editing and genomic editing as a whole. Most recently, China has produced the first gene-edited twins. Jiankui is known to have performed the first human embryo editing to result in live births. However, the Criminal Law of the People's Republic of China was used to prosecute He Jiankui. The prosecution was based on Jiankui conducting action without a license and without approved assistance in genome editing. Continuously, this nation permits research on human germline genome editing for research purposes.

Colombia

Colombia has shown a strong interest in the use of CRISPR for agriculture. The Colombian government allows for human genome editing if it is “aimed at relieving, suffering, or improving the health of the person and humanity.” In 2017, researchers from Colombia did in-depth research on genetically modified rice, engendering desired traits. As of now, Colombia has not entered a regulatory status of germline gene editing.

Cuba

Within Cuba, debate is still ongoing on whether genetic editing should be pursued or banned. As of now, they permit gene editing only for therapeutic purposes. Their early entry into this industry has developed medicines to combat dengue fever and meningitis.

Democratic Republic of the Congo

In the Democratic Republic of the Congo, there is a serious lack of a regulatory framework regarding genetic technology. They indicated gaps in their biosafety law for human genome editing technologies. Lack of understanding and knowledge might drive public resistance in implementing national legal frameworks, but they oppose research aimed at reproductive usage. However, research has been made for genetic editing within the pharmaceutical field, being utilized for vaccines and disease elimination.

Ecuador

Ecuador has mixed laws on genetic modification and enforces strong ethical guidelines. Although modification as a whole isn't illegal, transgenic modification is. While gene-edited crops that don't contain DNA from other species are regulated as conventional plants, transgenic GMOs are strictly prohibited.

Egypt

Egypt also has a focus on gene editing within agriculture, with a gene editing market forecasted to grow up to \$21.8 billion by 2030. The Professional Ethics Regulations of the Egyptian Medical Syndicate prohibited sperm, egg, and embryo donations, gestational surrogacy, and sperm or embryo banks. However, Egypt has a personal center for research and regenerative medicine that focuses on the genome. Egypt continues to push the genetic editing field in its nation, hoping to become a prominent player in genetic technology as a whole.

Finland

Finland's government supports CRISPR and genomic techniques within the field of agriculture. However, according to demographic research, the citizens of Finland oppose the change. Due to the clash in government and citizen interest, delegates must be wary of the choices made regarding this nation.

France

Despite the EU's decision as a whole to categorize mutagenesis or any new breeding techniques under GMOs, France opposes these rules. They find that gene-editing techniques in crops are an entirely different category from GMOs. However, France prohibits human editing completely, unless in the context of medical research.

Germany

Germany has the strictest genetic engineering laws in the world and bans virtually all kinds of embryonic gene editing. Implemented in 1993, the German Genetic Engineering Act outlines

strict procedures and regulations. Additionally, the commercial cultivation of GMO crops is entirely prohibited, using the EU's "opt-out" clause.

Guatemala

Genome editing such as CRISPR has been revolutionized in Guatemala which is applied only in agricultural context. Guatemala shows positive approach toward using foreign genetic material to improve crop quality. However, since Guatemala did not demonstrate a strong stance regarding the human genome editing, the further research and development should be undertaken to evaluate the ethical concerns with this innovative technology.

Hungary

Hungary is one of the strongest opponents of the human genome editing technology. The Hungarian government prohibits heritable human genome editing for reproduction. As being the one of the fourteen nations that have ratified the Oviedo Convention, which sets out the guidelines for daily medicine and new technologies in human biology, Hungary do not have additional prohibitions against gene editing technology.

India

India strongly prohibits the practice of sex selection or the sale of human embryos and gametes, even for the purpose of protecting reproductive rights. The Assisted Reproductive Technology Bill and Surrogacy Regulation Bill set these standards. While not directly prohibiting genomic editing, it is similarly related as the manipulation of gametes and/or embryos require selection or sale.

Indonesia

Like many other nations, Indonesia is actively developing genomic editing for the purpose of agricultural development. The Department of Agriculture in the Ministry of Agriculture and Cooperatives within Thailand views the EU's support for genomic editing technology and its recognition to be highly safe for human health and the environment as support for Thailand's own policy consideration of the issue. As a result, Thailand aims to reduce costs and increase both the quality and productivity of agriculture via GMOs.

Iran (Islamic Republic of)

Iran, being an incredibly religious state, has taken genomic editing into consideration, but approaches it incredibly cautiously due to the religious implications. However, scientists in Iran find editing to be permissible.

Japan

Japan is another country that is highly involved in genetic editing. There is already a system that distinguishes between gene-edited and genetically modified organisms (GMOs), with

gene-edited products often subject to a notification process rather than full-scale safety evaluations. However, germline gene editing is permitted for research, not for reproductive purposes, despite being more lax in regulation than the rest of the world, considering genetic editing.

Paraguay

Paraguay has an established framework to regulate the control of genetically modified crops, as most research has focused on the agricultural sector. However, as of now, no gene-edited crop is fully approved for commercial production and sale in Paraguay. In 2019, however, it was put into place that genetically modified plants are regulated equally to natural products, as long as foreign DNA is not introduced to the organism in question.

Portugal

Portugal follows the EU Charter of Fundamental Rights, which restricts germline genome editing. Portugal supports Horizon Europe research initiatives that focus on ethical biotechnology development.

Peru

Peru participated in the Latin American Network for Bioethics (REDBIOÉTICA) discussions, where it emphasized the need for strict regulation and equitable access to genome editing technologies.

Philippines

The Philippines has focused on exploring genome editing in agriculture, but maintained a restrictive stance on human genetic modification due to its alignment with Catholic bioethical teachings.

Poland

Along with EU legislation such as the Clinical Trials Regulation, Poland supports gene editing only for somatic therapy and not for human embryos. Poland has participated in the Council of Europe discussion on bioethics, reinforcing its stance against germline editing.

Romania

As well as other European countries, Romania follows EU directives on gene technologies and has participated in the EU BioTech Summit since 2023. Romania has suggested supporting the increased collaboration with the WHO for global oversight.

South Africa

South Africa is one of the key contributors to the African Academy of Sciences' position on genome editing, highlighting the need for African inclusion in global regulatory discussions.

South Africa also hosted the 2023 African BioEthics Summit, discussing ethical uses of CRISPR and accessibility.

Switzerland

Switzerland published a 2024 report supporting somatic editing but opposing germline changes. The country actively participated in the Global Observatory on Genome Editing conducted by the WHO.

Türkiye

The Health Institutes of Türkiye (TÜSEB) has begun using genome editing research to cure diseases, but the country also bans germline editing. Türkiye participated in the 2023 WHO Eastern Mediterranean regional consultation on ethical genome governance.

United Kingdom

Through the Human Fertilisation and Embryology Authority (HFEA), the UK was one of the first countries to approve genome editing of human embryos for research in 2016. In 2023, the UK supported a global registry for genome editing trials at a WHO summit.

United States of America

The USA has banned germline genome editing by acts of Congress. However, somatic cell gene editing is permitted under a few guidelines. The budget authorizations of the USA prohibited using FDA funds for germline genome editing research. Requiring the FDA's permission leads to effective regulation of illegal gene editing.

Possible Solutions

Strengthen National and Ethical Regulations

Nation by nation, there are rules enforced, but an international agreement must be made. While there are clear ethical frameworks internationally, they must be binding. This means third-party supervision by the UN or science-oriented international organization, such as WHO, with clear forms of enforcement as well as checks and balances. Delegates should consider how this enforcement would take place and the boundaries of genetic editing. They should also consider the local, socio-economic effect of the regulation.

Invest in Public Education and Investment

Investing in public education and investment is vital for genomic editing. Educating the specific target group is essential to build on health literacy, which promotes responsible and equitable use. Education in science will provide a deeper understanding of molecular biology and genetics. Also, not only researchers but students must be educated on the limitations of genome editing to ensure safety in its applications in disease treatment. As genome editing disseminates into agricultural and medical sectors, it is important to raise awareness on both its benefits and risks, as well as identify factors of genome editing. In this way, genome editing can be introduced to societies steadily, removing the harm of an uneducated population.

Consider Private-Public Partnerships (PPP)

Research and development (R&D) through public-private partnerships (PPP) should be explored. Public-private partnerships are long-term collaborations between governments and large enterprises. PPPs allow for higher-quality and well-funded large-scale public and private projects, including hospitals, roads, and highways. Considering the immediacy of the situation, PPPs ensure all deadlines are met.

Questions to Consider

1. Should the applications of genome editing be decided on a local, regional, national, or international scale?
2. Should ethical considerations take priority over practical application in human genome editing technologies?
3. Should nations support the reproductive use of genome editing technology?
4. Should therapeutic usage also be banned if the reproductive usage of genome editing technology is banned?
5. To what extent do the cultural and religious factors influence the prohibition of human genome editing technology?

Bibliography

- “A Long Shot? Cuba’s Vaccines and Medical Diplomacy.” Power 3.0, 17 Mar. 2022. Accessed 5 Aug. 2025.
- “About the Project: Türkiye Genom Projesi.” Health Institutes of Türkiye (TÜSEB), n.d.; website updated 2022. Accessed 5 Aug. 2025.
- “Applications and Challenges of CRISPR-Cas Gene-Editing.” PMC (PubMed Central), 2021. Accessed 5 Aug. 2025.
- “Commission on Science and Technology for Development.” Digital Watch Observatory (GIP), n.d. Accessed 5 Aug. 2025.
- “Cuba’s Five COVID-19 Vaccines: The Full Story on Soberana 01/02/Plus, Abdala, and Mambisa.” LSE Latin America and Caribbean Blog, 31 Mar. 2021. Accessed 5 Aug. 2025.
- “Genome-Editing Technology Advisory Panel Background Materials.” Maine Legislature / AAAS / WHO, 2021. Accessed 5 Aug. 2025.
- Global Observatory for Genome Editing. “International Database.” Global Observatory, Hastings Center. n.d. Accessed 5 Aug. 2025.
- “Human Genome Editing.” World Health Organization. n.d. Accessed 5 Aug. 2025.
- “ISCT and USFQ Launch Ecuador’s First Cell & Gene Therapy Club.” Telegraft Blog, International Society for Cell & Gene Therapy, 9 Apr. 2025. Accessed 5 Aug. 2025.
- Jasanoff, Sheila, and J. Benjamin Hurlbut. “A Global Observatory for Gene Editing.” *Nature*, vol. 555, no. 7697, 22 Mar. 2018, pp. 435–37. PubMed, doi:10.1038/d41586-018-03270-w. Accessed 5 Aug. 2025.
- Kumar, Sujay V., et al. Therapeutic Gene Editing: Delivery and Regulatory Perspectives, PMC, 2017. Accessed 5 Aug. 2025.
- “Perspectives from the Global Observatory for Genome Editing.” *The CRISPR Journal*, May 2025. Accessed 5 Aug. 2025.
- Pew Research Center. “Americans are closely divided over editing a baby’s genes to reduce serious health risk.” Pew Research, 17 Mar. 2022. Accessed 5 Aug. 2025.
- “Poland Pushes to Get Plant Gene Editing Reforms Over the Line.” *Science|Business*, 13 Feb. 2025. Accessed 5 Aug. 2025.

“The Genome Editing Revolution: Review.” PMC (PubMed Central), 2019. Accessed 5 Aug. 2025.

“Title Unknown.” PubMed, PMID 30238377. Accessed 5 Aug. 2025.

Science. “Chinese scientist who produced genetically altered babies sentenced to 3 years jail.” Science, Dec. 2019. Accessed 5 Aug. 2025.

Synthego. “Genome engineering history.” Synthego Learning Center. Accessed 5 Aug. 2025.

“UNESCO Panel of Experts Calls for Ban on ‘Editing’ of Human DNA to Avoid Unethical Tampering with Hereditary Traits.” UNESCO International Bioethics Committee, 5 Oct. 2015; updated 20 Apr. 2023. Accessed 5 Aug. 2025.

United Nations Conference on Trade and Development (UNCTAD). About the Commission on Science and Technology for Development (CSTD). UNCTAD, n.d. Accessed 5 Aug. 2025.

United Nations Conference on Trade and Development (UNCTAD). Commission on Science and Technology for Development, Twenty-fifth Session, 28 Mar.–1 Apr. 2022. UNCTAD, 2022. Accessed 5 Aug. 2025.

United Nations Conference on Trade and Development. Commission on Science and Technology for Development, Twenty-Fifth Session, 28 Mar.–1 Apr. 2022, Geneva. UNCTAD, n.d. Accessed 5 Aug. 2025.

Werlau, Maria C. “Part III. Interferon, Cuba’s So-Called ‘Wonder Drug’ for COVID-19.” Cuba in the Time of Coronavirus: Exploiting a Global Crisis, CubaArchive, May 2020. Accessed 5 Aug. 2025.

Wild, Sarah. “Will South Africa Become First Country to Accept Controversial Form of Human Genome Editing?” Nature, 7 Nov. 2024, doi:10.1038/d41586-024-03643-4. Accessed 5 Aug. 2025.

Yaffe, Helen. “Cuba and Coronavirus: How Cuban Biotech Came to Combat Covid-19.” LSE Latin America and Caribbean Blog, 18 Mar. 2020, London School of Economics and Political Science. Accessed 5 Aug. 2025.