Chinese Scientists Lambaste Countryman's Editing of Human Embryos

Two gene-editing experts said Jiankui He's actions were a "gross violation" of Chinese regulations and international standards.

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A pair of experts in gene-editing research in China have sharply criticized the Chinese scientist who announced last fall that he had used CRISPR/Cas9 technology to edit the genes of human twin embryos in an effort to make the resulting babies resistant to HIV.

After the scientist Jiankui He, PhD, first described his research at the second Second International Summit on Human Genome Editingin November, indicating that twin girls had been born as a result of his efforts, an international firestorm of criticism erupted.

The Chinese government has already concluded that He committed serious violations of "ethics, scientific integrity and relevant state regulations," The New York Times reported in January.

The gene editing He conducted sought to alter the CCR5 gene that gives rise to the coreceptor of the same name that sits on the surface of immune cells. Most HIV attaches to CCR5 to begin the process of infecting a cell. The scientist argued that such editing was justified to protect the girls against HIV, given the fact that their father was living with the virus.

But there are multiple safe ways for men living with HIV to impregnate an HIV-negative woman without transmitting the virus. If the man is on fully suppressive antiretroviral (ARV) treatment, he will not transmit the virus to the woman through intercourse. Additionally, if the woman takes Truvada (tenofovir disoproxil fumarate/emtricitabine) as pre-exposure prophylaxis (PrEP) daily, this lowers her risk of contracting HIV through sex by 90% or more. HIV-positive men can also have their sperm washed to rid it of the virus.

Naturally, if a pregnant mother is HIV negative, unborn children will not contract the virus from her. And any casual contact that an HIV-positive father has with his children after they are born will not transmit the virus to them. Furthermore, so long as the father remains on ARVs and maintains an undetectable viral load, he would be incapable of transmitting HIV to anyone.

Publishing their critique in PLOS Biology, the Chinese gene-editing specialists Hayoi Wang, PhD, and Hui Yang, PhD, underlined the multiple ways that HIV transmission can be prevented during conception and following birth. They also noted that while the mutation, known as CCR5-delta32, that He sought to manufacture in the twin girls' genomes, is naturally occurring (but rare) in European populations, it does not block all types of the virus. In particular, some virus latches onto a different coreceptor on the surface of immune cells, known as CXCR4. Additionally, the potential health effects of the mutation in Chinese populations have not been researched.

He did not present any plan to follow the twin girls over time to monitor them for long-term effects of the gene editing.

The two critics further state that He relied on controversial assumptions regarding the molecular processes and outcomes of gene editing and that the quality of the science he conducted was "substandard."

Referring to He and his research team, the two critics stated, "We strongly condemn their actions as extremely irresponsible, both scientifically and ethically." Recommending that Chinese authorities investigate the case and release the team's data to the wider scientific community, the critics asked for the passage of "clear and strict laws" to regulate future research into human germline editing—the editing of human genomes such that the changes can be passed to individuals' offspring.

To read the PLOS article, click here.

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