The ethical debate around RLR and CRISPR: Morality, responsibility implications and risks in the era of genome editing

Amir Ebrahimi[1], Sara Nouri Basirat2, Navid Jolayousefi[1,2], Arash Daryaii[1], Abdolhassan Kazemi[3] and Hosein Shahsavaranii[1,2*]

1. Dept. of Cell & Mol Sci, Faculty of Life Sci. & Biotechnology, Shahid Beheshti Uni., Tehran, Iran
2. Lab. of Regenerative Medicine and Biomedical Innovations, Pasteur Institute of Iran, Tehran, Iran
3. Medical Philosophy & History Research Center, Tabriz Uni of Med. Sci., Iran

[*]Corresponding author. Email: hosein.shahsavarani@gmail.com

Capability of performing millions of genetic manipulations simultaneously by Retron Library Recombineering (RLR) have made great promises in the field of regenerative medicine and biotechnology with less limitations compared to the CRISPR system. But a competence for making multiple changes to the human genome increases all kinds of moral questions about how far scientists can go with it though this system is faster, cheaper, more accurate than previous genome editing approaches. Aside from the moral considerations for inheritable modifications, these novel genome editing techniques may be unsafe since they aren't essentially as accurate as it is sometimes defined. Considering recent advance in artificial intelligence and nanobiotechnology and the possibility of their application for improving genome editing, raised the ethical concerns and challenges such as the potential application of this technique for nefarious purposes, such as transhumanism, harmful mutations to the living being, bioterrorism, or interrupting ecological balance. Here we summarized a comprehensive report for ethical implications of RLR and CRISPR based on the databases of Science Direct, Pub-Med, SID, Scopus, Web of Science, etc. Supranational and religious criteria for genome editing regulations, access to LRL/CRISPR3 applications; and design for regulatory frameworks for clinical research and germline will be discussed. We conclude that global ethical and legal decision making should be developed as the science of genomic engineering progress and international administrations must update evidence-based guideline of certain genomic manipulations for the betterment of human health and progress.

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