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Inserm

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Press release

Ethical issues surrounding CRISPR-Cas9 technology

On 13 June last, the Inserm Ethics Committee assembled over a hundred individuals at its annual seminar. All those present had the benefit of an ethical perspective on many problems posed by biomedical research. One of the questions addressed was that of CRISPR-Cas9 technology. The Ethics Committee has devoted a specific opinion to it, while the NIH has just obtained a first green light for a human cancer immunotherapy trial.

The Inserm Ethics Committee (CEI) may receive referrals or carry out investigations on its own initiative to reflect on ethical questions raised by medical science- and health-related research carried out within the Institute. At the end of its reflection, it issues an opinion in the form of notes that may evolve as new contributions are added. In 2015, the CEO of Inserm requested the Ethics Committee to specifically examine questions related to the development of CRISPR technology, and particularly:

1- What are the questions raised by the technology as such?
2- Does the rapidity of its development raise particular problems?
3- Does the simplicity of its use call for regulation of its implementation in the laboratory?

Given the technical advantages of the method, and its very rapid dissemination, the question now is to evaluate where, when and how its use might pose an ethical problem. It seemed immediately important to distinguish three areas associated with different issues:
1/ application of the technology to humans, which essentially raises the question of germ line modifications;
2/ application to animals, particularly “pest” species, which raises the question of potential horizontal gene transfer and the emergence of irreversible damage to biodiversity;
3/ risks of damage to the environment.

Recommendations of the Inserm Ethics Committee

The Committee immediately proposes that Inserm adopt the following principles:

1- To encourage research aimed at evaluating the efficacy and safety of CRISPR technology and other recently published genome editing technologies, in experimental models that can allow case-by-case determination of the benefit/risk balance of a therapeutic application, including any applications that involve germ cells and the embryo. This information is essential to the future determination of what might be authorised for human use in terms of therapeutic approaches.

2- The potentially adverse effects of gene drive systems must be evaluated before any use outside of a laboratory, observing the containment rules already in force for other genetic modifications. Evaluations must be made over long periods, given the transmissible nature of the driver gene. Reversibility measurements should be provided for in the event of escape or adverse effects. Such analyses and the design of multiple scenarios require the constitution of pluridisciplinary teams.

3- To comply with the prohibition of any modification of the germ line nuclear genome for reproductive purposes in the human species, and not support any application to modify the legal conditions until uncertainties about the risks have been clearly evaluated, and until a broad consultation involving multiple partners from civil society has ruled on this scenario.

4- To participate in any national or international initiative dealing with questions of freedom of research and medical ethics, including initiatives with emerging countries that will also be affected by the development of genome editing technologies.

5- Finally, to draw attention to the more philosophical question which contrasts the plasticity of life with the idea of a human nature founded on the only biological constant. Awareness needs to be increased regarding the utopia and dystopias that can be generated by some therapeutic promises.

Sources

Note by the Ethics Committee on the referral concerning questions related to the development of CRISPR-Cas9 technology

Composition of Working Group: Bernard Baertschi, Catherine Bourgain, Hervé Chneiweiss, François Hirsch and Anne-Sophie Lapointe. Report written by Hervé Chneiweiss. Subsequent comments and corrections by all CEI members.

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