Minutes of the European Group on Ethics in Science and New Technologies

Brussels, 19-20 February 2019

1. **Approval of the agenda**

2. **Nature of the meeting:** non-public

3. **List of points discussed:**

1. Updates from the members
2. Discussion on website and digital tools
3. Structure of the Opinion on Gene Editing
4. Human and germline editing
5. Hearings with Prof. John Harris
6. Ethics of AI
7. Non-germline gene editing
8. Gene editing in non-human primates (NHPs)
9. Agricultural applications of gene editing

DAY 1: 19 February 2019

Introduction & Updates from the members

Christiane Woopen and Jim Dratwa welcomed the members to the meeting and provided updates on recent and forthcoming activities, including:

- The open letter from the Chair of the EGE to President Juncker setting out a constructive set of suggestions in the context of the continuing development of guidance on the ethics of AI.
- The NEC Forum on 4-5 April 2019. It was announced that Siobhan O'Sullivan would participate and would represent the EGE. Members were requested to inform the secretariat if they were also planning to attend.
- The event on Gene Editing on 2 April 2019, at the European Parliament. An EGE member is sought to participate in this event organised by Re-Imagine Europa, a non-partisan think tank, together with the Science Advice Mechanism Unit of the European Commission and exploring the possible impact on society of agricultural applications of genome editing.
- The launch of the WHO Expert Advisory Committee on Gene Editing. A letter was sent to the WHO requesting structural collaboration.
- The meeting between the Chair of the EGE and the Cabinet of Mariya Gabriel, European Commissioner for Digital Economy and Society, on the ethics of Artificial Intelligence.
- A meeting organised by the German Data Ethics Commission with employers and employees in the context of forthcoming German legislation on data protection covering employees, in which the EGE Opinion on the Future of Work was a useful reference for discussions.

- A panel discussion of Brad Smith (President of Microsoft) and the Chair of the EGE in Berlin about regulation of facial recognition, in which the EGE Statement on Artificial Intelligence, Robotics and ´Autonomous´ Systems was presented.

In the context of the updates from the members, it was underscored that for impact monitoring purposes, members should send in written updates about participation in events, interviews etc.

Discussion on website and digital tools

The members explored the different possibilities to optimise the drafting of the new opinion. Among the possible solutions, Microsoft Office 365 Groups was proposed for simultaneous document editing. The Secretariat is exploring the platforms available and will summarise the strengths and weaknesses so that members can decide collaboratively. Members requested that the tool selected should include notifications.

The Secretariat informed that the current overhaul of the European Commission's web presence has now been applied to the EGE website. The Secretariat is working with IT services to improve the transition to the new digital platform. The transition has affected the feasibility of using a wiki as a common repository of documents and information. Following the decision by the SAM Group to abandon this tool, further reflection on its usefulness is required. It was proposed to make a pilot phase with a group of 'first adopters'; volunteers for this role were requested from among the members.

Discussion on the structure of the Opinion on Gene Editing

The members discussed the potential structure of the Gene Editing Opinion and the relative merits of an issues-based or an ethics-based organising framework.

It was argued that ethical analysis will vary according to different issue areas, with different risks and principles coming into play.

The link between the structure of the Opinion and the broader role of the EGE was raised: the need to bring rigour and clarity to complex debates; the need to be policy relevant; the need to engage in in-depth ethical deliberation.

Reference to potential recommendations was made (including e.g. international governance mechanisms; potential changes to the EU Directive on GMOs).

Discussion on human and germline editing

The question of the ownership of the human genome was raised, based on recent debates in countries such as South Africa and India that the right to control and use genomic information for commercial purposes should belong to the state where that genome occurs (in line with the 1992 Convention on Biodiversity). It was highlighted that this would run counter to the understanding that genetic rights should be viewed through the prism of human autonomy.

The Group categorised different positions that can arise in society regarding gene editing in humans for reproductive purposes, including:

- Those who categorically object to any gene editing in human embryos for reproductive purposes, should it be for spiritual, religious or any other reasons;
- Those who would favour gene editing if it is proven to be safe and to be used only for specific purposes;
- Those who believe that the safety and usefulness of gene editing cannot be reliably demonstrated for methodological reasons and therefore it should not be carried out.

A discussion followed concerning these categories. An important focus was the notion of safety: what are the conditions/criteria that designates a technology as 'safe' or at least 'safe enough'. In the context of gene editing, how do these criteria address unforeseen and long term side effects, where impacts may be over generations?

Could advances in healthcare have been made if such a high criteria of safety were applied to the development of important medical technologies? Parallels were drawn with the history of techniques such as IVF and vaccinations.

Another identified criteria was 'usefulness': are alternative (safer? cheaper?) methods, such as preimplantation genetic diagnosis, sufficient? Should it be used only in severe (what defines severe?), untreatable (what defines untreatable) cases? Are reproductive rights sufficient a justification for applying this technology when there would be relatively few couples for whom this would constitute the only viable option for having children?

It was pointed out that most of the common diseases are multi-genetic, i.e. there is more than one gene involved. These include diabetes, Parkinson disease, Alzheimer disease. Gene-editing could provide solutions to fighting these diseases (whereas preimplantation genetic diagnosis could not).

Another aspect regarding the application of human gene editing would be to define the purposes to which it would be ethically acceptable. These range from therapeutic to prevention and enhancement applications.

Another set of difficult questions revolve around experiments involving human embryos. It was highlighted that origin, use and post-experiment treatment of human embryos raise serious ethical concerns.

Hearings:

Professor John Harris, University of Manchester

John Harris started his presentation by referring to the recent announcement that a Chinese scientist had used CRISPR technology to edit two embyros of twin babies. He contended that a well-regulated approach to this technology would prevent the premature and reckless use of gene editing.

He referred to the example of IVF to challenge the coherence of the precautionary principle: in 1970s it was an entirely new, non-regulated technology which generated much opposition and was applied after only being tested on mice. Since then, it has culminated in around 5 million babies born as a result of this procedure.

His central argument is that we have an inescapable moral duty to continue with scientific investigation of genome editing techniques to the point at which we can make a rational choice about its use and should not rule out human genome editing if it can be made 'safe enough'.

Professor Harris categorised three principal arguments against gene editing: the sacred nature of the human genome ('common heritage' argument); the argument that it constitutes an unacceptable risk to future generations; and the inability to obtain consent of future generations.

He discounted those arguments one by one, contending that sexual reproduction is itself very risky (approx. 6% of the world's population are born with a genetic defect, 60% of conceptions are unsuccessful), and that parents regularly make decisions for future generations, unborn children, without their consent. On the contrary, he suggests that if there is any discernible duty here it is to create the best possible child. He concluded by invoking the need for humankind to eventually adapt and escape a failing planet, with gene editing as a potential solution to make humanity future-proof.

Discussion with the speaker covered a wide range of issues, including:

- How to define 'safe enough'; the need for a case-by-case evaluation, taking into account both risks and benefits (to the society and to the individual).
- Nature, naturalness and the human imperative to intervene in nature for the greater good (nature does not represent an inviolable state). Example given here is the development of the smallpox vaccine and WHO intervention that made this vaccination routine, eradicating smallpox from nature.
- Weighing risk: is there a moral imperative to intervene, even if technology carries risks, if we know that it will prevent suffering and death?
- Regulatory frameworks and oversight mechanisms necessary to govern use of gene editing technology: example given of the UK, where mitochondrial transfer was passed by both houses of Parliament, licensed by a technical licensing authority that examines each application on a case-by-case basis, in addition to carrying out monitoring and follow up studies. How to address situation in member states where there is no equivalent to the HFEA (e.g. Portugal)?
- The role of democracy: democratic processes act as an added safeguard, open debate and some form of democratic consensus addresses issues of wider public consent – means by which society decides collectively what is safe enough, how to weigh the balance of risks.

- Interpretations of 'liberty' in the context of gene editing. Reproductive freedom, and the imperative to give maximum liberty to all citizens (Mill) versus the contention that modifying the genome violates the freedom of future generations (Habermas).
- The precautionary principle, rational decision-making and differing interpretations of this principle within the EU.
- Enhancement and therapy: coherent distinction or a continuum? What constitutes enhancement (e.g. eye glasses?) Risks for exacerbating an uneven societal playing field?

Discussion on the ethics of AI

At the request of the Chair, Jim Dratwa provided an update with regard to the ongoing development of guidance on the ethics of AI, including the revision of the ethics guidelines and possibility of a Commission Communication on AI ethics.

It was proposed that the EGE develop a short piece on the role of ethics and its place in European decision-making.

Jeroen van den Hoven informed that the Netherlands has issued a non-paper on the AI ethics guidelines by the AI High Level Expert Group, which he will share with the EGE.

Discussion on non-germline gene editing

Application of somatic gene editing within the different steps of the classic value chain of health (Laboratory, clinical studies, uptake in healthcare systems, broad implementation in society) raise different concerns. These include a lack of adequate regulatory structures and a lack of expertise within ethics committees which would enable them to perform necessary oversight. Complexity is exacerbated by the fact that clinical trials are often multinational. While therapies are already covered by a high level of regulation (Clinical Trials Directive, Advanced therapy medicinal products Directive), there are gaps (e.g. compassionate use).

Additional areas of concern include the availability of CRISPR tools for purchase on the open market from private laboratories, and DIY uses of this technology (e.g. biohacking), leading to risks to safety, potential dual use, and tensions between the individual and the state.

DAY 2 – 20 February 2019

Discussion on gene editing in non-human primates (NHPs)

The Group began with a discussion on gene editing in non-human primates addressing the set of questions indicated by Susanna Louhimies (DG Environment) following the January EGE meeting, including: whether gene-editing techniques should be allowed to be used on non-

human primates in the EU? Whether any general principles and approaches could be drawn to provide guidance to project evaluators with aim of improving consistency across EU? And whether any "red-lines" should be established that should not be crossed?

The Group discussed whether there is a need for regulation of gene editing on NHPs in addition to existing European regulation on experimentation on animals. Some suggested that use of NHP might be beneficial for clinical studies, others pointed to the challenging moral aspects arising from using sensitive species in experiments. It was suggested that the EGE should take the SCHEER Opinion on the need for non-human primates in biomedical research as a starting point in order to build on the SCHEER conclusions.

The members reported concerns raised in the scientific community regarding potential overregulation in this domain. It was acknowledged that it should be clearly stated under what conditions gene editing should be used, and guidelines should be elaborated for project evaluators. The feasibility of drawing red lines was discussed, given the complexity of the field, and the fast moving nature of the science.

It was agreed to create a working group consisting of 2-3 members who would examine these questions. Anne Cambon-Thomsen, Jeroen van den Hoven and Carlos Casabona volunteered to join this working group.

Discussion on agricultural applications of gene editing

The Group engaged in a discussion on ethical questions linked to gene drives in plants, agricultural application of gene editing techniques as well as regulatory and governance frameworks covering these areas. Issues of risk assessment, benefit assessment and assessment of the risks of non-action were discussed as an important basis to any application of the technology.

The role of politics overriding scientific considerations in the area of agricultural imports and food production was highlighted, and the ethical implications of restricting productivity in agriculture discussed.

The Group explored issues linked to the commercialisation of new technologies, patent rights and risks of monopolies. Risks highlighted included a potential reluctance by companies to share patents of plants with different traits (such as drought resistance and pest resistance) with potentially important implications for the usefulness and efficacy of the technology.

Touching on the recent ruling of the Court of Justice on the GMO Directive, the Chair requested that all members read the statement of the Scientific Advice Mechanism Group in advance of Professor George Gaskell's hearing at the March EGE meeting.

Julian Kinderlerer then provided a historical overview of the United Nations Convention on Biodiversity, the Cartagena Protocol and the impact in shaping subsequent legislation and Directives on GMOs. As a result of being bound by international law, the room for manoeuvre to alter definitions and interpretations with regard to this legislation will be

limited, given that the majority of countries, except the US, have ratified both the Treaty and the Convention.

It was pointed out that the European regulatory framework bears not only on EU agriculture but also, due to trade and norm-setting behaviour, on African and Asian countries who may otherwise use GMOs in their agriculture, with consequences for economic development of those regions.

It was agreed to create a working group consisting of 2-3 members who would examine these questions. Julian Kinderlerer, Andreas Kurtz, and Herman Nys volunteered to join this working group.

AOB

- The Group discussed potential speakers for forthcoming hearings, focusing on the topics not yet covered by previous hearings and filling in gaps in expertise within the Group. Topics to be covered included biohacking, clinical and safety aspects, including relevant regulatory frameworks, a representative of the Court of Justice. In addition, members were invited to reflect on potential speakers for the Round Table on gene editing.
- At the request of the Chair, Jim Dratwa presented the rationale of the upcoming event of International Dialogue on Bioethics and Ethics in Science and Technologies, to be organised back-to-back with the Round Table. The rationale and approach were refined by the Group. Precise timing and length of the event were discussed and the nature of invitees (representatives of ethics councils), as well as the limited human resources available.
- An update was given of the video competition on gene editing, suggested as a means to increase participation and engagement. The Secretariat presented the framing and parameters of the competition elaborated together with Barbara Prainsack. It would invite young people across Europe to express in a creative ways their opinions on gene editing, with the most thought-provoking videos to be shown during the Round Table.

4. Conclusions/recommendations/opinions

- Establish a working group to examine issues relating to non-human primates, starting with preparing a résumé of the Opinion published by the SCHEER committee. To be composed of Anne Cambon Thomsen, Jeroen van de Hoven and Carlos Casabona. Other members are invited to express their interest to join the working group.
- Establish a working group to examine issues relating to gene editing in plants. To be composed of Julian Kinderlerer, Andreas Kurtz, Herman Nys. Other members are invited to express their interest to join the subgroup.
- Christiane Woopen will invite the Chair of the newly formed WHO expert advisory committee on gene editing to join the April/May EGE meeting.
- Secretariat will explore options for document editing platforms.

- All members are requested to re-read the statement of the Scientific Advice Mechanism Group on the 2018 ECJ ruling on the GMO Directive in advance of Professor George Gaskell's hearing at the March EGE meeting.
- Members to send in written updates about their participation in events, interviews etc.

5. Next meeting

19-20 March 2019, Brussels

6. List of participants

Day 1: Emmanuel Agius, Anne Cambon-Thomsen, Ana Sofia Carvalho, Eugenijus Gefenas, Julian Kinderlerer, Andreas Kurtz, Herman Nys, Carlos Maria Romeo Casabona, Nils-Eric Sahlin, Marcel Jeroen Van den Hoven, Christiane Woopen (Chair), Jim Dratwa, Louiza Kalokairinou, Johannes Klumpers, Maija Locane, Joanna Parkin.

Day 2: Emmanuel Agius, Anne Cambon-Thomsen, Eugenijus Gefenas, Julian Kinderlerer, Andreas Kurtz, Herman Nys, Carlos Maria Romeo Casabona, Nils-Eric Sahlin, Marcel Jeroen Van den Hoven, Christiane Woopen (Chair), Jim Dratwa, Louiza Kalokairinou, Maija Locane, Joanna Parkin.