

**Meeting of the States Parties to the Convention
on the Prohibition of the Development,
Production and Stockpiling of Bacteriological
(Biological) and Toxin Weapons and on Their
Destruction**

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2018 Meeting

Geneva, 4-7 December 2018

**Meeting of Experts on Review of developments in the field
of science and technology related to the Convention****Geneva, 9-10 August 2018**

Item 7 of the provisional agenda

**Genome editing, taking into consideration, as appropriate,
the issues identified above**

Review of Developments in the Field of Science and Technology Related to the Convention - Genome Editing

Submitted by the Islamic Republic of Iran

1. Many biological scientists view the present century as the century of genetic engineering and molecular biotechnology. By applying gene engineering, scientists strengthen or modify the inherited characteristics of living organism. Relying on new genetic engineering methods, biotechnology in the last three decades has offered and demonstrated diverse and valuable capabilities in various fields of science. Genome editing is one of the few cases in which fundamental researches have quickly reached an applied level. Genome editing technology today has widespread applications for peaceful use in various fields including in medical sciences, industry and agriculture.
2. The discovery of main genes inducing diseases, the use of various genetic screening methods and accurate predictions about fetal fate determination with respect to genetic diseases before and after birth are among notable capabilities of genetic engineering and gene therapy. Despite the fact that gene therapy is currently costly and requires advanced and specialized techniques, however, this method will soon be used for a wide range of diseases. There is also growing and promising evidence that use of modern methods in the not-so-distant future will reduce the cost of treatment hundreds of times.
3. The genetic engineering applications in medical and pharmaceutical sciences includes, among other things, the invention of new methods for molecular diagnosis of pathogenic mechanism, the production of new drugs and recombinant vaccines, the development of diagnostic kits, the production of monoclonal antibodies, and so on. As an example, human insulin is now produced as a recombinant protein which is very similar to

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human insulin and its production is inexpensive which makes it possible to use for patients in developing countries.

4. Efforts to treat cancer with the use of genetic engineering and molecular biotechnology are being intensified. Among various genome editing technologies, Clustered, Regularly Interspaced, Short Palindromic Repeat (CRISPR) technique is the most attractive one and has been widely used for its effectiveness, precision and low cost. This technique is being applied in the treatment of serious diseases such as cancers and production of new drugs and vaccines and for other peaceful purposes. The overwhelming majority of genetic scientists with the understanding of their responsibility believe that their efforts and researches in the field of genetic engineering and molecular biotechnology can lead to very valuable applications in medical fields which should be used only for the purposes of prevention, diagnosis and treatment of diseases.

5. Genetic engineering has various applications in the industry and provides valuable contribution in the industrial production of required materials for food industry and cleaning products. The design of genetically engineered microbial strains has led to major advances in the production of enzymes and biocatalyst as the main materials in various food, chemical, cellulose, oil, detergent industries and so on. Industrial production of many organic acids such as citric acid, acetic acid and lactic acid, as well as the production of oils with special fatty acid compounds which have high value in food industry and cleaning products and also the production of protein polymers are examples of active genetic engineering presence and applications in the industry. Genome editing technology, in particular CRISPR is used in the industry for targeted manipulation and increased efficiency. Recently, a group of scientists, using CRISPR technology, succeeded in modifying and genetically engineering algae. As a result, reportedly the production of biofuels based on algae has more than doubled.

6. The growing world population underlines the need to and importance of sufficient food supply and food security. Genetic engineering could contribute directly and indirectly to food security through enabling mass production and provision of biological pest control. It is expected that the genome editing would play a significant role in the human efforts in this regard.

7. Applications of genome editing technology in medical, pharmaceutical, industrial and agricultural fields have brought economic grows and financial profits for the countries which possess such a capability. The global market for products and services based on genome editing technique is expected to substantially increase. In some countries the number of patent applications in the field of gene editing has significantly increased in recent years. Currently, a limited number of countries have acquired the capability of applying genome editing technology not only for their scientific research and the promotion of the public health, but also for contributing to their economic growth.

8. States Parties to the Biological Weapon Convention (BWC) have undertaken, under Article X, to facilitate "the fullest possible exchange of equipment, materials and scientific and technological information for the use of bacteriological (biological) agents and toxins for peaceful purposes." They have the inalienable right to participate in such an exchange. "Parties to the Convention in a position to do so shall also co-operate in contributing individually or together with other States or international organisations to the further development and application of scientific discoveries in the field of bacteriology (biology) for the prevention of disease, or for other peaceful purposes." Furthermore, Article X articulates that "this Convention shall be implemented in a manner designed to avoid hampering the economic or technological development of States Parties to the Convention or international co-operation in the field of peaceful bacteriological (biological) activities."

9. States Parties to the BWC in particular developed countries and those possessing advanced biotechnology have legal commitment, under Article X of the BWC, to cooperate

in capacity building, knowledge sharing and transfer of technology in the areas of preparedness, prevention, protection, diagnosis and treatment and other peaceful purposes. Given the wide range of applications of genome editing for peaceful purposes and the gap between developed and developing States Parties in enjoying the benefits of this technology, provision of international cooperation in particular for knowledge sharing and transfer of technology in the area of genome editing is essential for capacity building in developing States Parties and reducing the existing gap between developed and developing States Parties.

10. Applying restrictive measures by certain States to cooperation with States Parties including imposition and maintenance of restrictions and limitations in exchange and transfer of knowledge, technology, equipment and materials associated with new technologies such as genome editing and CRISPR technique for peaceful purposes are unjustified and inconsistent with the provisions of the BWC in particular Article X obligations. Various applications of genome editing in the fields of health, diagnosis and treatment of disease as well as in the area of production of industrial products underlines the importance and necessity of access to this technology and relevant knowledge for developing countries.

11. While concerns regarding potential risks of genome editing need to be addressed appropriately including by redoubling efforts to enhance universalization of the BWC, such concerns should not be used as a pretext to hamper the economic or technological development of States Parties to the Convention or international co-operation in the field of peaceful biological activities and to deprive developing countries from access to genome editing technology and its benefits.

12. Considering the above-mentioned points, the Islamic Republic of Iran believes that the one-sided view of some developed countries towards potential risks of genome editing continues to hinder the access of developing countries to such an important technology. Such an approach is wholly inconsistent with the objectives of the Convention and the 2018 Meeting of Experts on review of developments in the field of science and technology related to the Convention should reach to common understandings regarding facilitation of cooperation in the area of genome editing among States Parties with a view to agreeing on effective action in this regards, in accordance with its mandate.
