

**REVIEW CONFERENCE OF THE 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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**VIEWS OF STATES PARTIES ON NEW SCIENTIFIC AND TECHNOLOGICAL
DEVELOPMENTS RELEVANT TO THE CONVENTION (PARAGRAPH 13 OF
THE REPORT OF THE PREPARATORY COMMITTEE)**

Note by the Secretariat

In paragraph 13 of the report of the Preparatory Committee for the Review Conference of the Parties to the Convention on the Prohibition of the Development, Production and Stockpiling of Bacteriological (Biological) and Toxin Weapons and on their Destruction (BWC/CONF.I/3), the Committee decided to invite States Parties who wished to do so to communicate to the Secretary of the Committee their views on new scientific and technological developments relevant to the Convention.

In paragraph 14 of the report, the Committee further decided to request the Secretary of the Committee to compile these views and provide them to States Parties at the Review Conference.

This document reproduces the replies of States Parties communicated to the Secretariat by 29 February 1980.

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Hungary

"As regards new scientific and technological developments relevant to the Convention, the Hungarian People's Republic has nothing to communicate, due to the fact that its scientific and technological potentials are employed in other fields of peaceful purposes."

Sweden

"Scientific and technological developments of relevance to the coverage of the convention on the prohibition of the development, production and stockpiling of bacteriological (biological) and toxin weapons and on their destruction are described below. One basic assumption is that organisms or genetic material, used as biological weapons, must proliferate within the exposed target to induce the intended harmful effects.

During the last ten years, there has been considerable progress in the fields of cell-genetics and biotechnology, particularly in the areas of gene and enzyme technology. These techniques have the potential to produce molecules and organisms that are harmful to living organisms or otherwise hazardous.

The gene technology has created new methods to examine in detail genes from higher organisms. The structure, function and control of these genes may, accordingly, be determined using the new techniques.

Gene technology involves new experimental methods to fragmentate genetic material to separate genes (or part of genes) and then recombine these genes with other types of genes, resulting in recombinant DNA molecules.

With this technique it is possible e.g. to permanently transfer genes from one type of bacterium to another type of bacterium. It is also possible to transfer genes between different types of species, e.g. introduction of genes from man into bacteria. Production and transfer of synthetic genes or parts of genes is a future possibility.

Quite recently, it has also become possible to use bacteria, which contain human genes introduced by gene technology, to produce human hormones such as somatostatin, insulin and human growth hormone. It also seems to be possible to produce animal virus vaccine components in bacteria.

These genetic techniques imply a potential to change existing potential BW-agents, e.g. in order to increase their ability to survive in different environments. Genes with ability to induce resistance against different types of antimicrobial agents (including antibiotics and disinfectants) could also possibly be regarded as potential BW-agents. It cannot be excluded that new BW-agents

(e.g. combinations between existing viruses or combinations between viruses and other genes) could be constructed with this technique. Production of protein toxins (e.g. from toxogenic microorganisms, animals or plants) in microorganisms, that contain introduced toxingenes, is another future possibility.

Pure nucleic acids from microorganisms could conceivably be used to infect plants and animals as has been shown in experimental systems. This concerns e.g. nucleic acids from (carcinogenic or non-carcinogenic) viruses. Antimicrobial vaccines or antisera protect the exposed organism against complete microbes -- not against the nucleic acids derived from them. There now exist different techniques -- including physical microencapsulation techniques -- for the protection of pure nucleic acids against harmful factors in the body.

Pure nucleic acids containing information for synthesis of toxic material may in the future possibly be introduced into exposed organisms and then through gene action induce damage in the host. If these nucleic acids do not need a proliferation stage in the host before induction of damage, they may be classified as toxins of biological origin and therefore toxins in the sense of the convention which, does not differentiate toxins on the grounds of production methods.

Analogously, synthetic nucleic acids inducing similar effects may be classified as toxins in the meaning of the convention.

The development of enzyme technology is now approaching applications on an industrial scale. It thus seems probable that cell-free enzymes (isolated from different types of organisms) could in the future be used for large-scale synthesis of toxins of different kinds -- including those with protein character (such as the most potent toxin, botulinus toxin), as well as those which do not have protein character. These latter toxins are probably difficult to produce through microorganisms via the technique of genetic engineering, since so many genes are involved in the cellular synthesis of these toxins.

The scientific and technological achievements, relevant to the BW-convention, which have been described above, imply a potential to produce harmful molecules and organisms for use as biological or toxin weapons. As has been demonstrated,

the convention covers all envisageable types of harmful molecules of biological origin and organisms with harmful effects -- regardless of the production method. Harmful synthetic molecules and new techniques of production of existing BW-agents are also covered.

The convention thus covers all recent advancements in science and technology for weapon purposes.

In view of the accelerating development in genetics and biotechnology, the Swedish Government, however, considers it highly important that the operation of the convention is periodically reviewed, in order to assure that the purpose of the preamble and the provisions of the conventions are being realized."