Transdisciplinary developments in science and technology present **new opportunities and challenges** for the OPCW

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Biotoxins

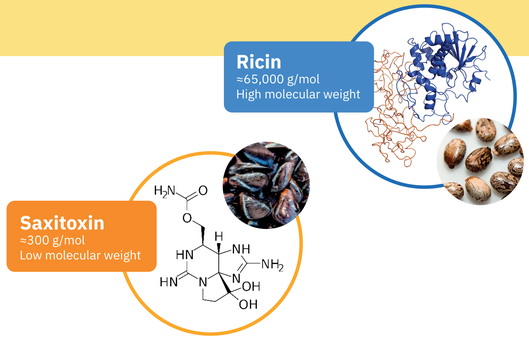
Many biotoxins are as toxic as, and often more toxic than, traditional nerve agents.

Two biotoxins are listed in Schedule 1A of the Annex on Chemicals to the CWC: Saxitoxin and Ricin. There are other families of biotoxins of potential security concern.

Given the diversity of biotoxins, various expertise and analysis techniques are needed:

• For LMW biotoxins, traditional MS-based techniques are often suitable

• For HMW biotoxins, a combination of MS-based techniques and orthogonal techniques, such as immunological methods and toxin activity assays, is often necessary



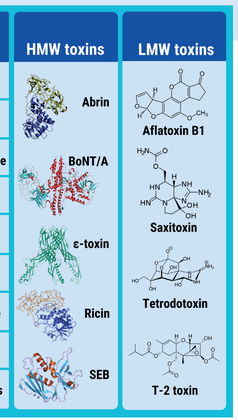
OPCW preparedness
An increased risk of misuse of biotoxins requires the OPCW to be prepared to handle all types of investigations and missions related to alleged use.

Enhanced capabilities
There is a need to determine the difference between biotoxins naturally occurring in the environment compared to deliberate release.

Additional information related to sample provenance would be beneficial in augmenting capabilities.

Strong partnerships
The OPCW is strengthening its existing relationship with the UNSGM and other organisations and laboratories with expertise in biotoxin analysis

Biotoxin	Health effect	Toxic mechanism
Abrin	RIP II poisoning	Ribosomal inactivation
Aflatoxin B1	Immunotoxicity, carcinogenicity	Binds to DNA and proteins
BoNT/A	Botulism	Neurotoxic: inhibits acetylcholine release
Epsilon toxin	Enterotoxaemia	Erythrocyte lysis and cell necrosis
Ricin	RIP II poisoning	Ribosomal inactivation
Saxitoxin	Paralytic shellfish poisoning	Neurotoxic: sodium channel blocker
SEB	Food poisoning, toxic shock syndrome	Superantigenic: inflammatory response
Tetrodotoxin	Pufferfish poisoning	Neurotoxic: sodium channel blocker
T-2 toxin	Alimentary toxic aleukia	Inhibits synthesis of DNA, RNA, proteins



Chemicals of Concern

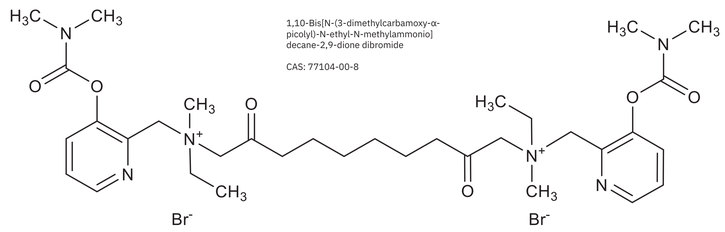
Four new entries were recently added to the CWC Annex on Chemicals, **all phosphorus-based and carbamate nerve agents**

There is limited publicly available information related to:

- analytical data of the compounds, precursors and degradation products
- property information such as vapour pressure, reactivities, toxicity data, etc
- information on chemical degradation pathways and products

General Purpose Criterion
Any chemical intended for chemical weapons purposes, regardless of whether it is specifically listed in the Convention or its Annexes is considered a chemical weapon.

This means that the OPCW must be prepared to respond to the misuse of different types of chemicals including toxic industrial chemicals, pesticides, central nervous system-acting chemicals, bioregulators, etc.



Artificial Intelligence

AI is a highly disruptive cross-cutting technology with an unparalleled flexibility of application. AI (including machine learning and deep learning) has the potential to revolutionise the chemical and biological sciences

The OPCW closely monitors the rapid development in this field and considers not just the potential risks that it poses, but also the opportunities it presents.

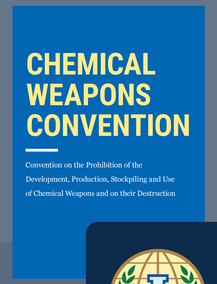
Opportunities

- Strengthening the verification regime
- Predicting toxic chemical properties and hazards
- Rapid design and discovery of medical countermeasures for chemical warfare agents

Risks to the CWC and work of the OPCW

- Discovery of new toxic compounds that could be misused
- Identification of novel synthetic routes to toxic compounds
- Automation of design and production of toxic compounds via robotic platforms

Chemical Weapons Convention
Entering into force in 1997, the **Chemical Weapons Convention** is the world's first multilateral disarmament agreement to eliminate an entire category of weapons of mass destruction.



OPCW
The Organisation for the Prohibition of Chemical Weapons is the implementing body for the Chemical Weapons Convention (CWC), and **oversees the global endeavour to permanently and verifiably eliminate chemical weapons.**

The OPCW Technical Secretariat is headquartered in The Hague, The Netherlands, and works with governments and other partners to carry out verification activities worldwide.

Science underpins the Convention
The Chemical Weapons Convention is underpinned by science. This is reinforced by the inclusion in the treaty of language requiring the **constant monitoring and review of developments in science and technology to understand impact** on the CWC and the OPCW, as well as States Parties' ability to implement its provisions.

99%
Over 99% of the chemical weapons stockpiles declared by possessor States have been verifiably destroyed

193
193 nations have committed to the Chemical Weapons Convention

The OPCW received the 2013 Nobel Peace Prize for "extensive efforts in eliminating chemical weapons".

Investing in science and technology
OPCW Member States have confirmed their ongoing commitment to the Convention and the importance science and technology plays with the recent construction of the new Centre for Chemistry and Technology. The ChemTech Centre will support the OPCW's **essential verification and inspection activities and become a global knowledge-sharing hub.**

Keeping pace with scientific and technological change
The Scientific Advisory Board (SAB) is a group of **25 independent experts** from all geographic regional groups. The SAB **provides specialised advice** to the Director-General, and by extension States Parties to the Convention, in monitoring developments in science and technology of relevance to the OPCW and the CWC.

The SAB has a focus on monitoring emerging technologies, converging technologies, and disruptive technologies. The SAB also leads temporary working groups to draw upon **extended expertise on specific scientific issues of relevance to the Convention.**