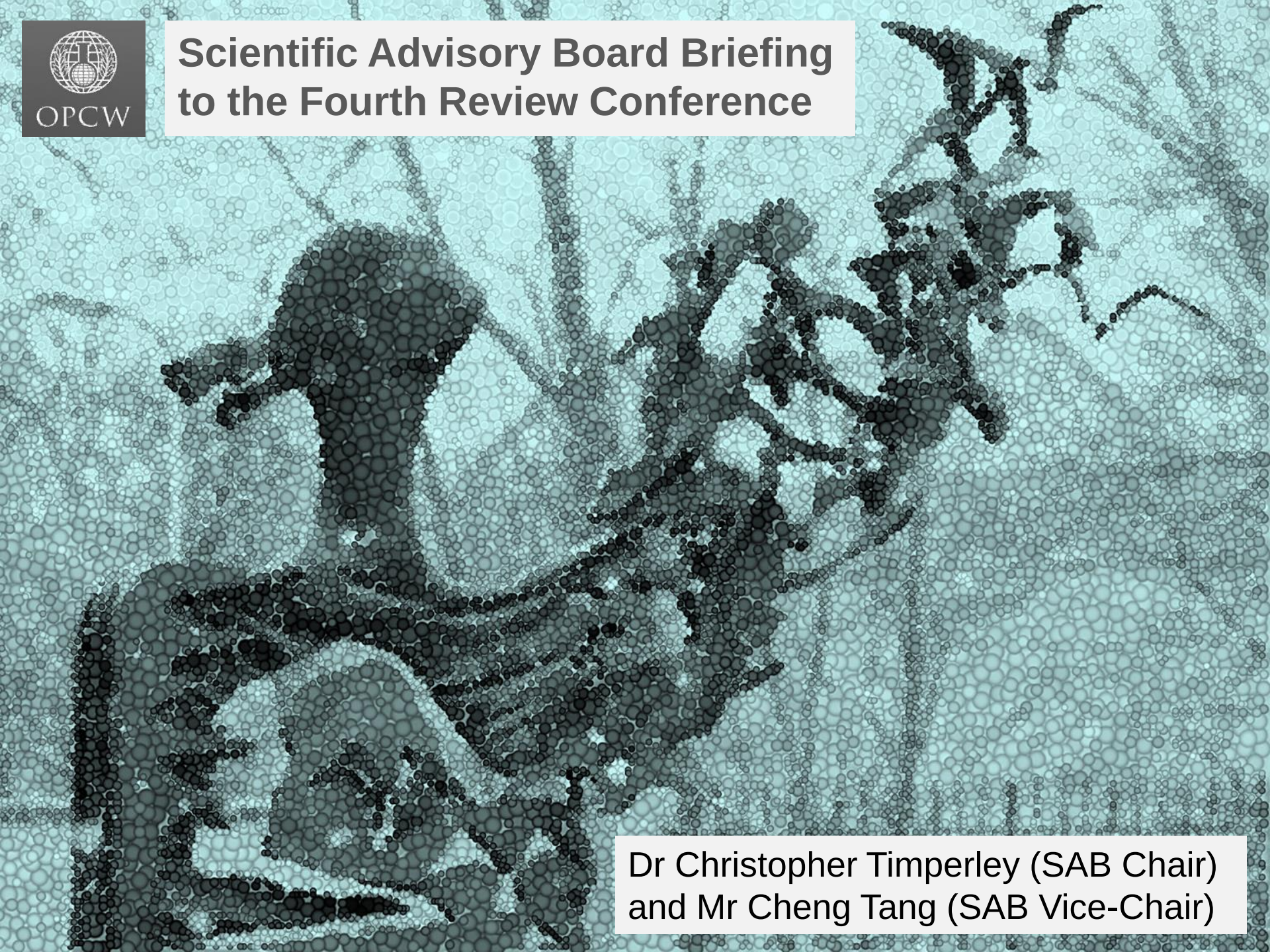
Scientific Advisory Board Briefing to the Fourth Review Conference



Dr Christopher Timperley (SAB Chair)
and Mr Cheng Tang (SAB Vice-Chair)

Scientific Advisory Board's Recommendations to the Fourth Review Conference of the Chemical Weapons Convention

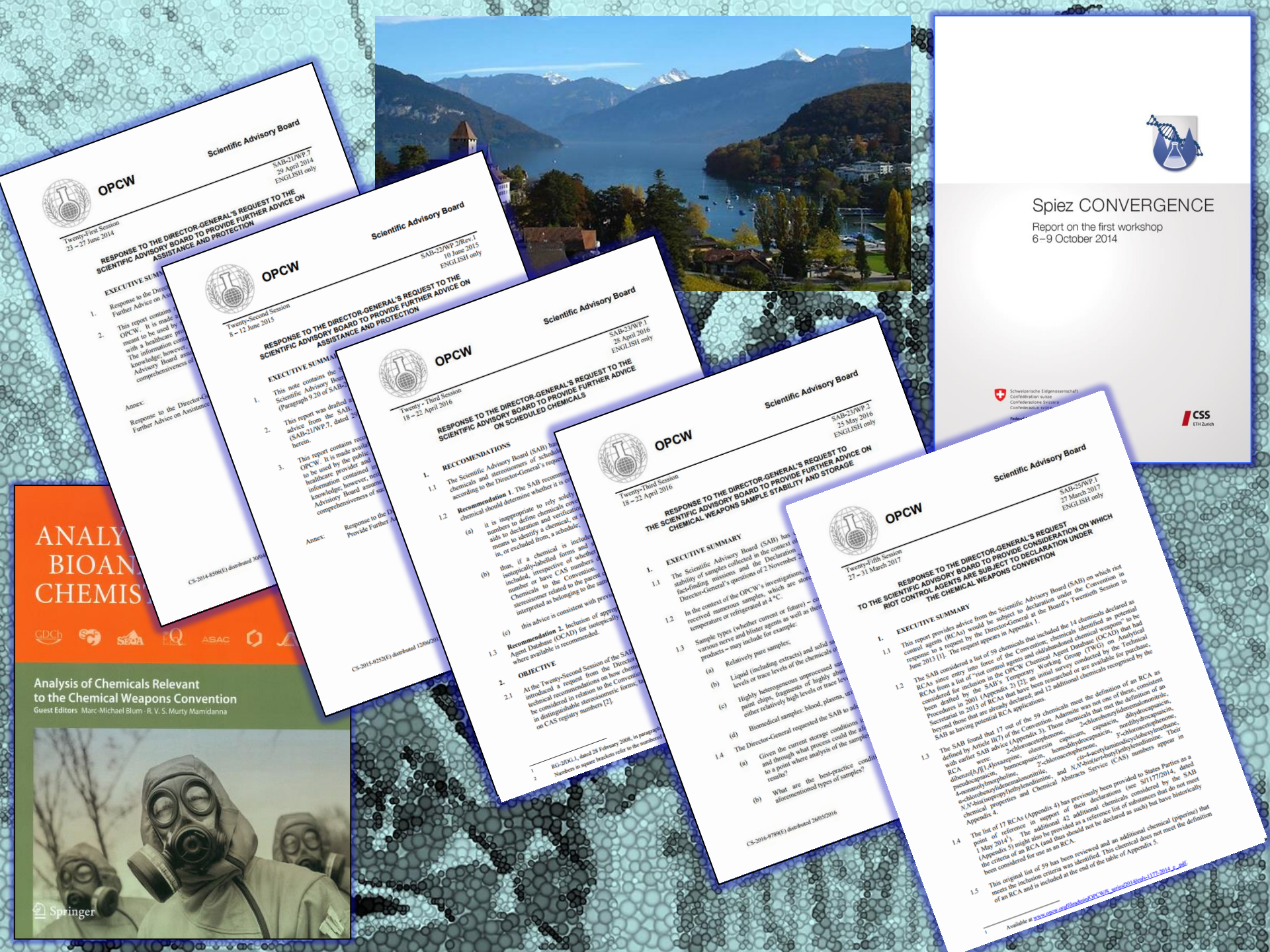
A quick reference guide to the executive summary recommendations of the OPCW Scientific Advisory Board's report on developments in science and technology to the Fourth Review Conference (RC-4/DG.1, dated 30 April 2018).

Download RC-4/DG.1

SGDSN
SECRÉTARIAT GÉNÉRAL
DE LA DÉFENSE ET DE
LA SÉCURITÉ NATIONALE

IUPAC
The National
Academies of
SCIENCES
ENGINEERING
MEDICINE
ACADEMIA
BRASILEIRA
DE CIÊNCIAS
ANOS

imi
Institute
for Medical
Research and
Occupational
Health


OPCW
Scientific Advisory Board
SAB-21/WP.7
29 April 2014
ENGLISH only
Twenty-First Session
23 – 27 June 2014
RESPONSE TO THE DIRECTOR-GENERAL'S REQUEST TO THE SCIENTIFIC ADVISORY BOARD TO PROVIDE FURTHER ADVICE ON ASSISTANCE AND PROTECTION
EXECUTIVE SUMM
Annex:
OPCW
Scientific Advisory Board
SAB-22/WP.2/Rev.1
10 June 2015
ENGLISH only
Twenty-Second Session
8 – 12 June 2015
RESPONSE TO THE DIRECTOR-GENERAL'S REQUEST TO THE SCIENTIFIC ADVISORY BOARD TO PROVIDE FURTHER ADVICE ON ASSISTANCE AND PROTECTION
EXECUTIVE SUMMA
Annex:
OPCW
Scientific Advisory Board
SAB-23/WP.1
28 April 2016
ENGLISH only
Twenty - Third Session
18 – 22 April 2016
RESPONSE TO THE DIRECTOR-GENERAL'S REQUEST TO THE SCIENTIFIC ADVISORY BOARD TO PROVIDE FURTHER ADVICE ON SCHEDULED CHEMICALS
1. RECCOMENDATIONS
2. OBJECTIVE
OPCW
Scientific Advisory Board
SAB-23/WP.2
25 May 2016
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Twenty-Third Session
18 – 22 April 2016
RESPONSE TO THE DIRECTOR-GENERAL'S REQUEST TO THE SCIENTIFIC ADVISORY BOARD TO PROVIDE FURTHER ADVICE ON CHEMICAL WEAPONS SAMPLE STABILITY AND STORAGE
1. EXECUTIVE SUMMARY
OPCW
Scientific Advisory Board
SAB-25/WP.1
27 March 2017
ENGLISH only
Twenty-Fifth Session
27 – 31 March 2017
RESPONSE TO THE DIRECTOR-GENERAL'S REQUEST TO THE SCIENTIFIC ADVISORY BOARD TO PROVIDE CONSIDERATION ON WHICH RIOT CONTROL AGENTS ARE SUBJECT TO DECLARATION UNDER THE CHEMICAL WEAPONS CONVENTION
1. EXECUTIVE SUMMARY
Spiez CONVERGENCE
Report on the first workshop
6–9 October 2014
CSS
ETH Zurich
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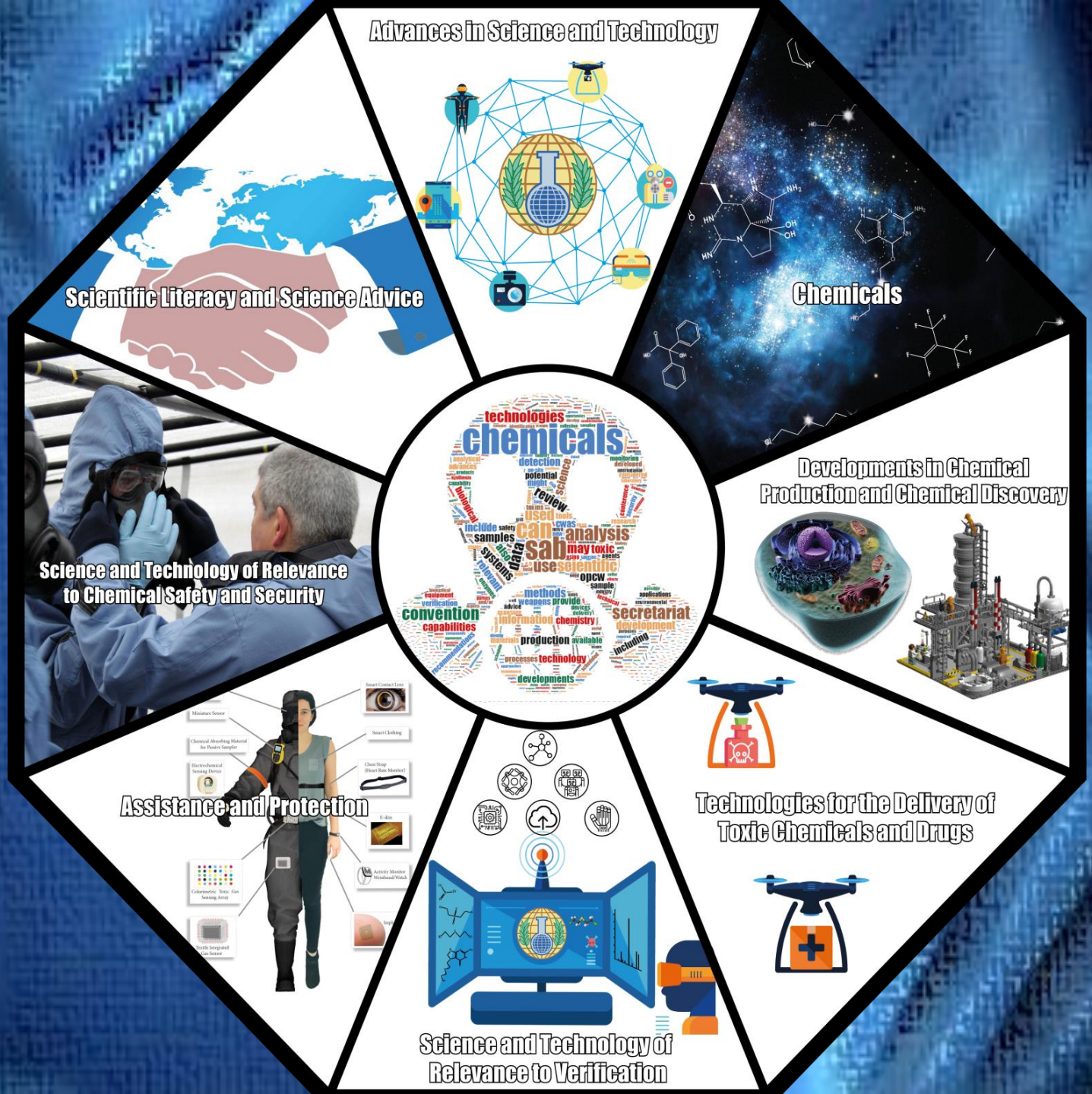
CHEMIS
Analysis of Chemicals Relevant to the Chemical Weapons Convention
Guest Editors Marc-Michael Blum · R. V. S. Murty Mamidanna
Springer


Advances in Science and Technology
Scientific Literacy and Science Advice
Chemicals
Developments in Chemical Production and Chemical Discovery
Science and Technology of Relevance to Chemical Safety and Security
Assistance and Protection
Technologies for the Delivery of Toxic Chemicals and Drugs
Science and Technology of Relevance to Verification
chemicals
technologies
detection
potential
review
used
include
samples
can
analysis
data
sab
may
toxic
use
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opcw
methods
provide
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secretariat
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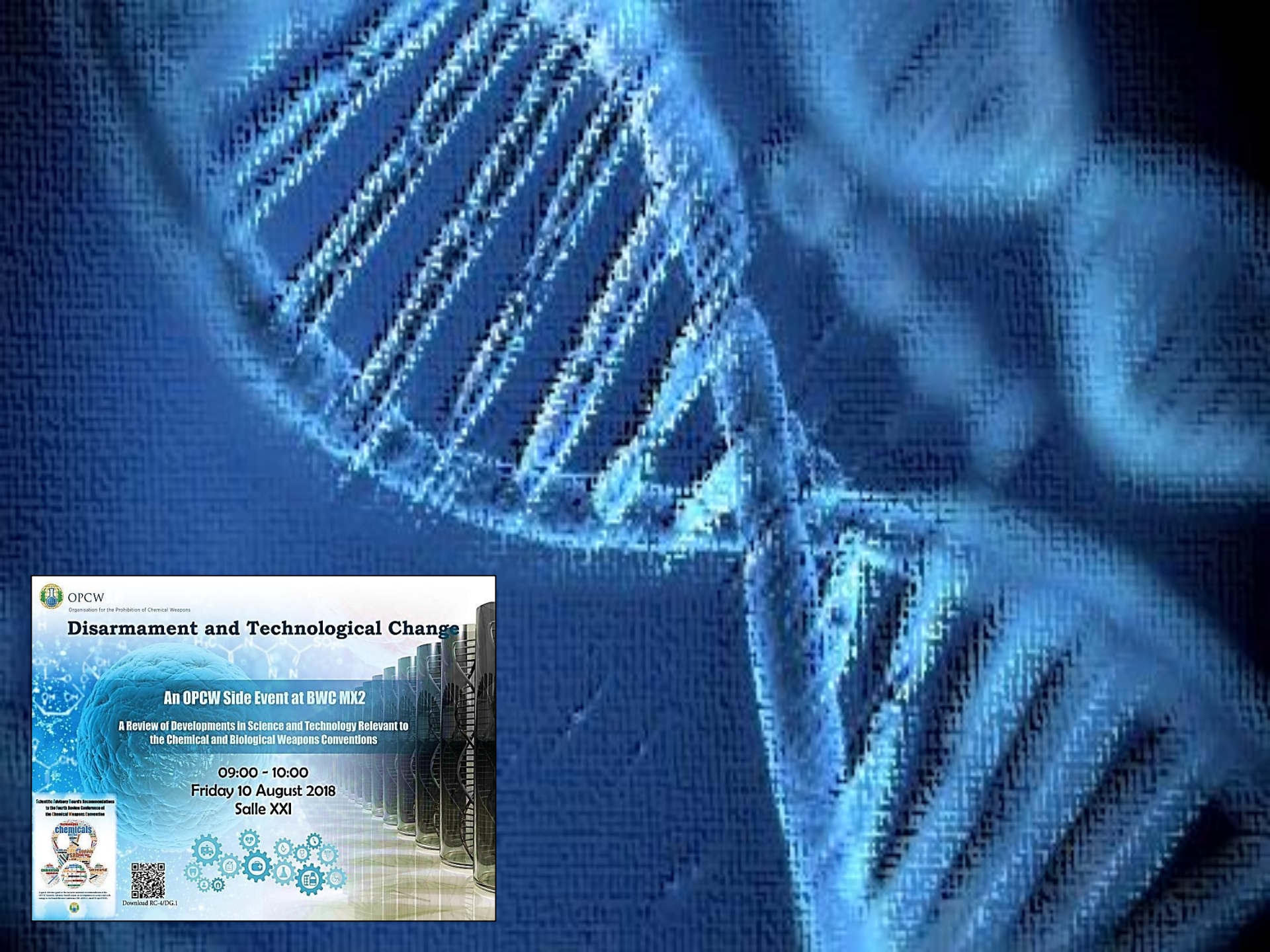
information
chemistry
production
available
including
technology
developments


OPCW
Organisation for the Prohibition of Chemical Weapons
Disarmament and Technological Change
An OPCW Side Event at BWC MX2
A Review of Developments in Science and Technology Relevant to the Chemical and Biological Weapons Conventions
09:00 - 10:00
Friday 10 August 2018
Salle XXI
Download RC-4/DG.1

Schedule 1

Guidelines for Schedule 1

The following criteria shall be taken into account in considering whether a toxic chemical or precursor should be included in Schedule 1:

(a) It has been developed, produced, stockpiled or used as a chemical weapon as defined in Article II;

(b) It poses otherwise a high risk to the object and purpose of this Convention by virtue of its high potential for use in activities prohibited under this Convention because one or more of the following conditions are met:

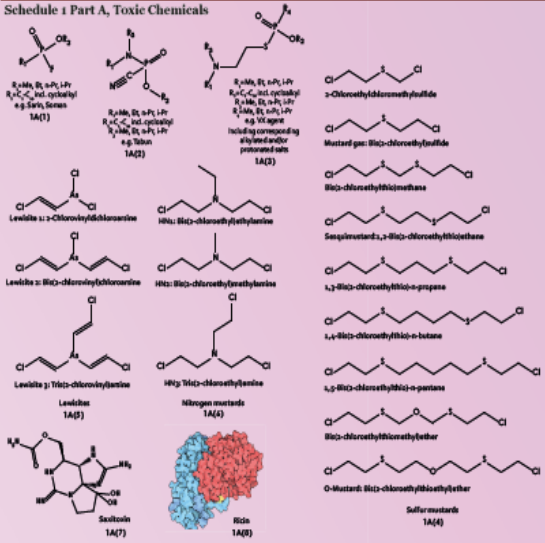
(i) It possesses a chemical structure closely related to that of other toxic chemicals listed in Schedule 1, and has, or can be expected to have, comparableproperties;

(ii) It possesses such lethal or incapacitating toxicity as well as other properties that would enable it to be used as a chemical weapon;

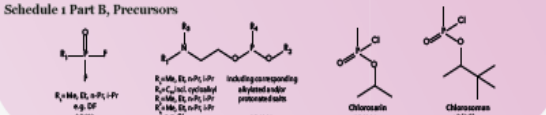
(iii) It may be used as a precursor in the final single technological stage of production of a toxic chemical listed in Schedule 1, regardless of whether this stage takes place in facilities, in munitions or elsewhere;

(c) It has little or no use for purposes not prohibited under this Convention.

Schedule 1 Part A, Toxic Chemicals



Schedule 1 Part B, Precursors



Schedule 2

Guidelines for Schedule 2

The following criteria shall be taken into account in considering whether a toxic chemical not listed in Schedule 1 or a precursor to a Schedule 1 chemical or to a chemical listed in Schedule 2, part A, should be included in Schedule 2:

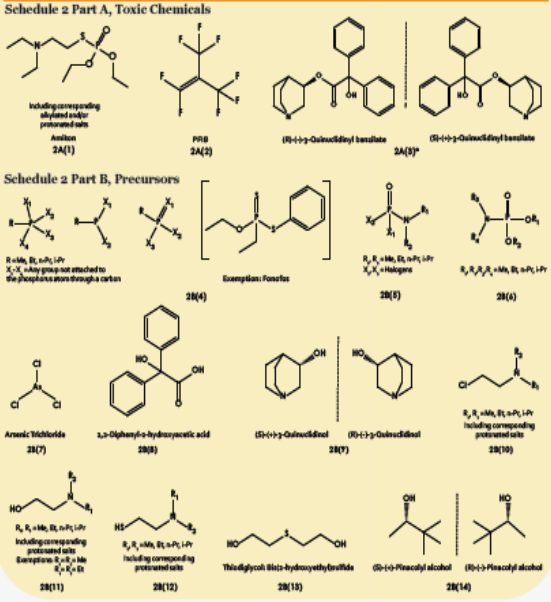
(a) It poses a significant risk to the object and purpose of this Convention because it possesses such lethal or incapacitating toxicity as well as other properties that could enable it to be used as a chemical weapon;

(b) It may be used as a precursor in one of the chemical reactions at the final stage of formation of a chemical listed in Schedule 1 or Schedule 2, part A;

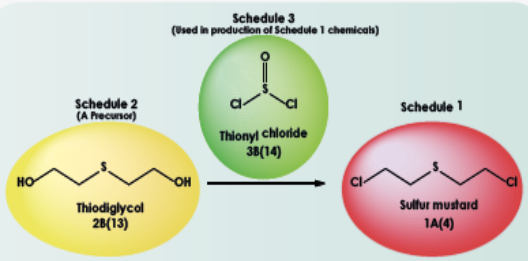
(c) It poses a significant risk to the object and purpose of this Convention by virtue of its importance in the production of a chemical listed in Schedule 1 or Schedule 2, part A;

(d) It is not produced in large commercial quantities for purposes not prohibited under this Convention.

Schedule 2 Part A, Toxic Chemicals



Schedule 2 Part B, Precursors



Relationship between Schedules, illustrated with sulfur mustard.

Schedule 3

Guidelines for Schedule 3

The following criteria shall be taken into account in considering whether a toxic chemical or precursor, not listed in other Schedules, should be included in Schedule 3:

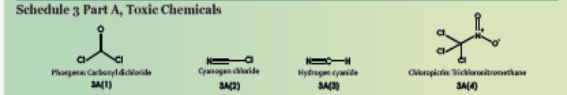
(a) It has been produced, stockpiled or used as a chemical weapon;

(b) It poses otherwise a risk to the object and purpose of this Convention because it possesses such lethal or incapacitating toxicity as well as other properties that might enable it to be used as a chemical weapon;

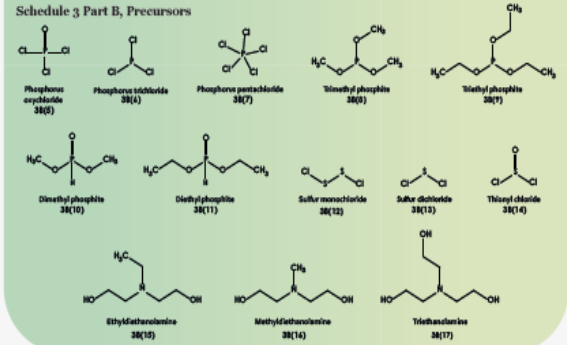
(c) It poses a risk to the object and purpose of this Convention by virtue of its importance in the production of one or more chemicals listed in Schedule 1 or Schedule 2, part B;

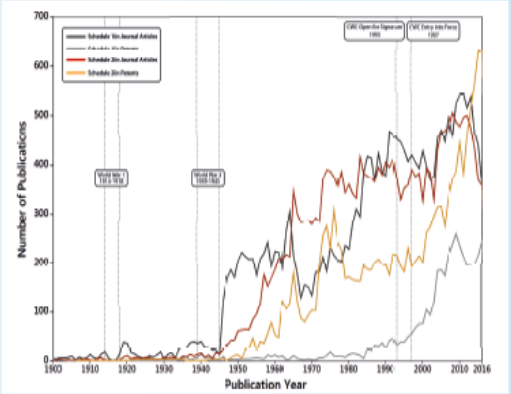
(d) It may be produced in large commercial quantities for purposes not prohibited under this Convention.

Schedule 3 Part A, Toxic Chemicals



Schedule 3 Part B, Precursors



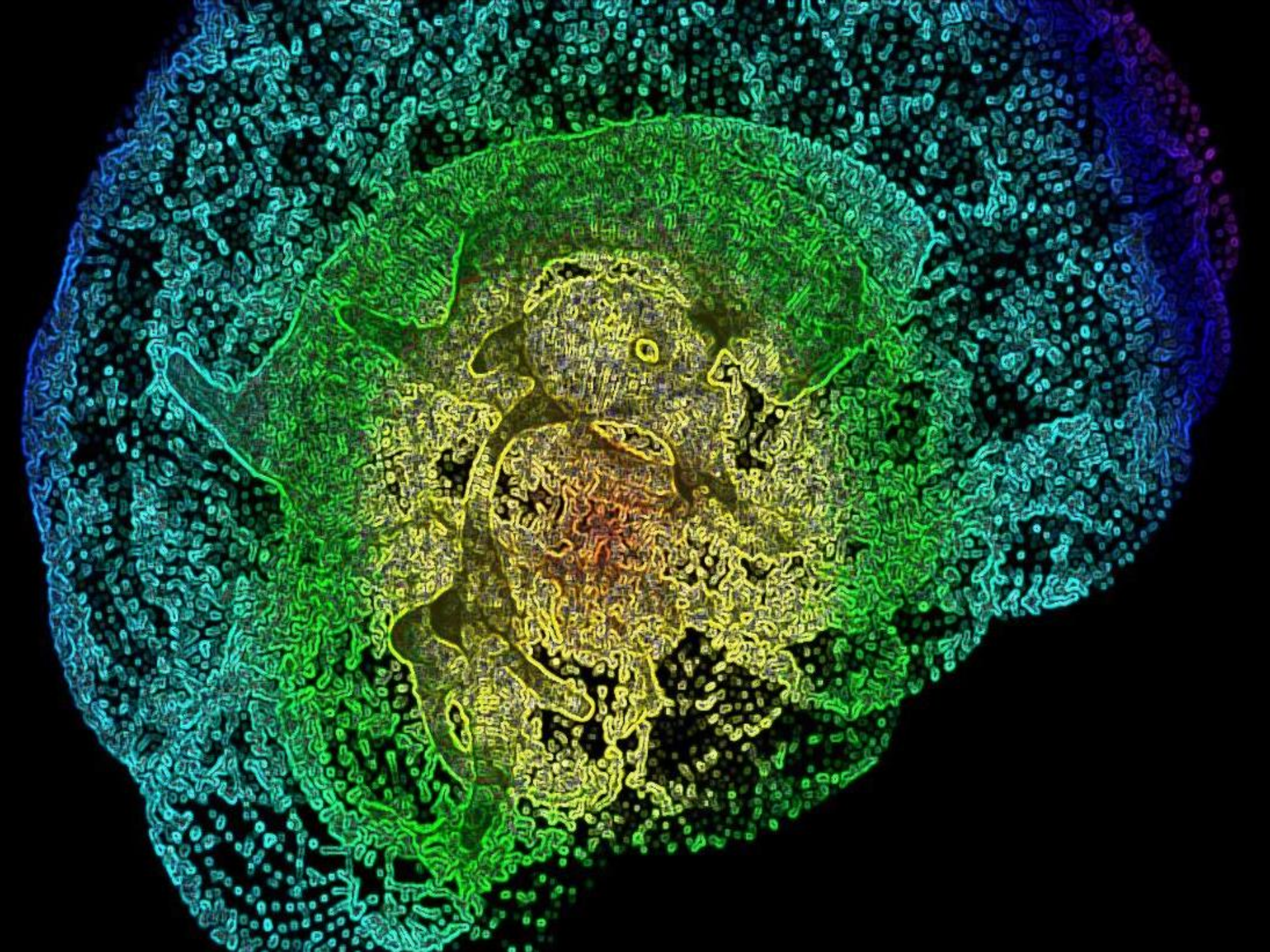


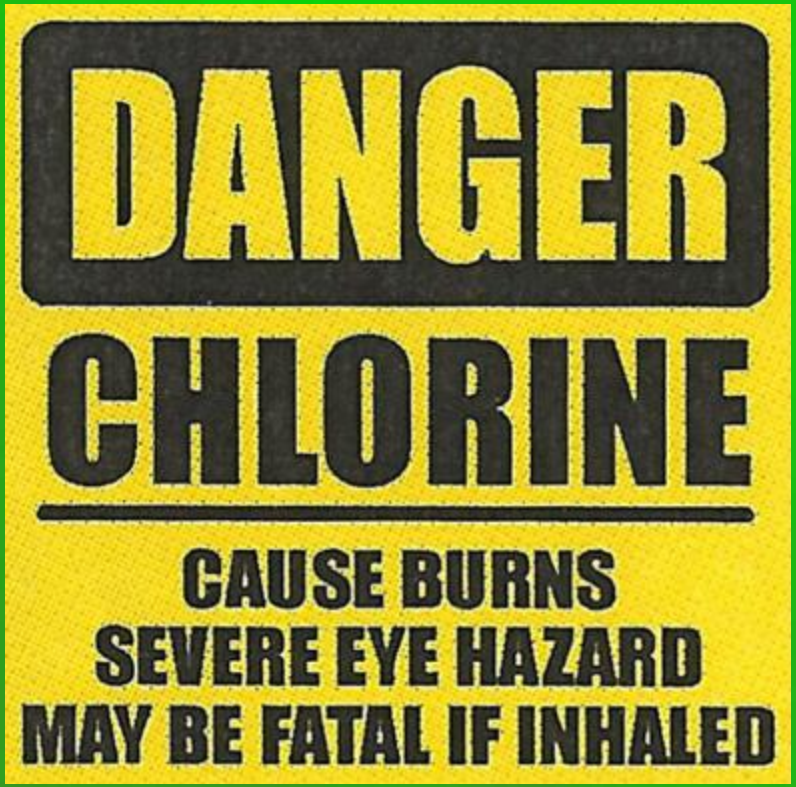
Scheduled chemicals, including those in schedules 1 and 2, can have scientifically and economically important uses. This chart captures the number of yearly scientific publications that refer to them.

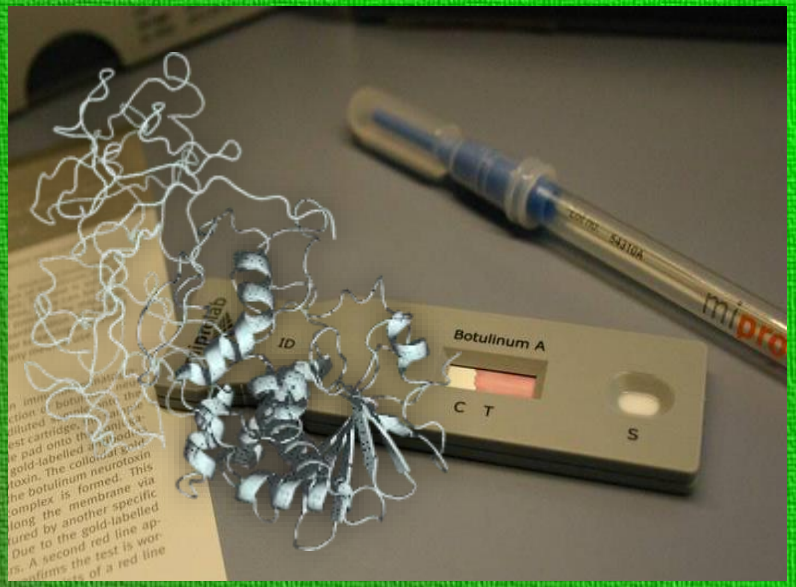
ORGANISATION FOR THE PROHIBITION OF CHEMICAL WEAPONS

Working Together for a World Free of Chemical Weapons

@opcw @opcw_pt /opcwonline /opcwonline /company/opcw /opcw




DANGER
CHLORINE
CAUSE BURNS
SEVERE EYE HAZARD
MAY BE FATAL IF INHALED


Botulinum A
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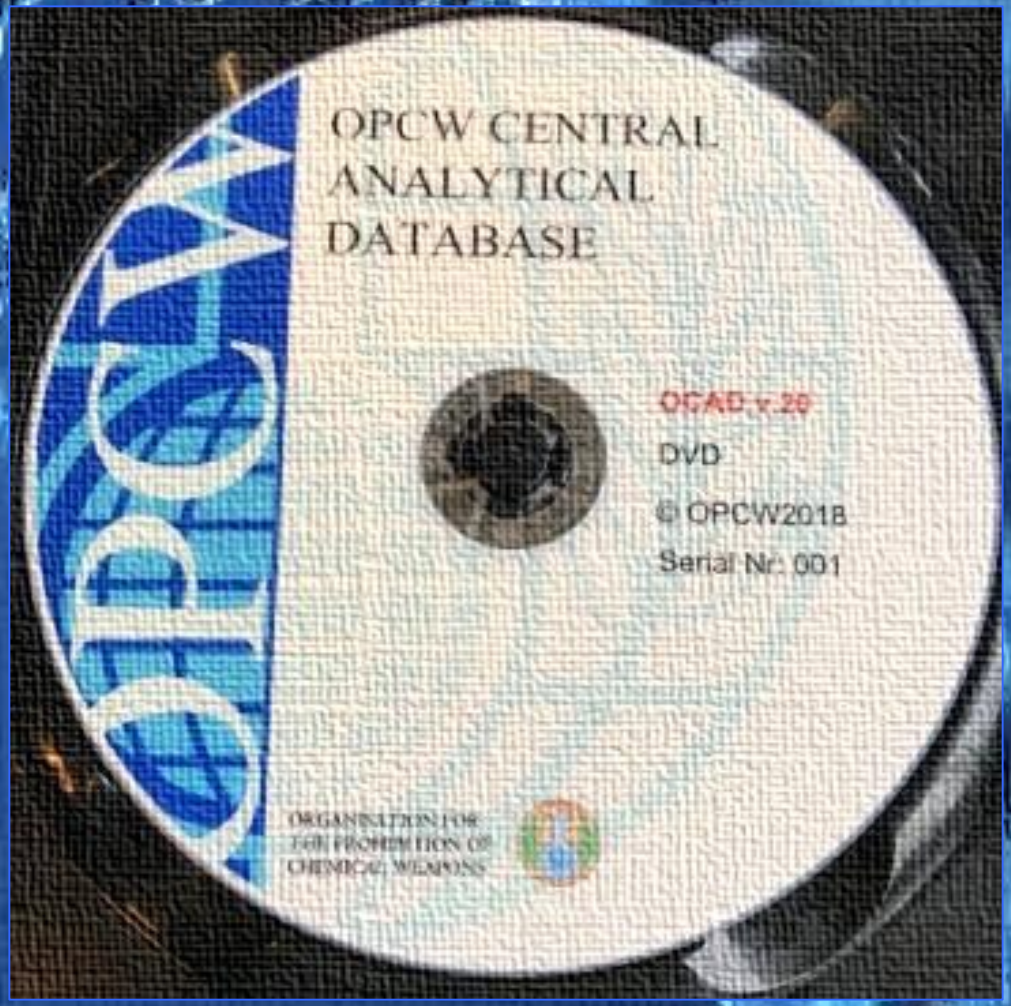
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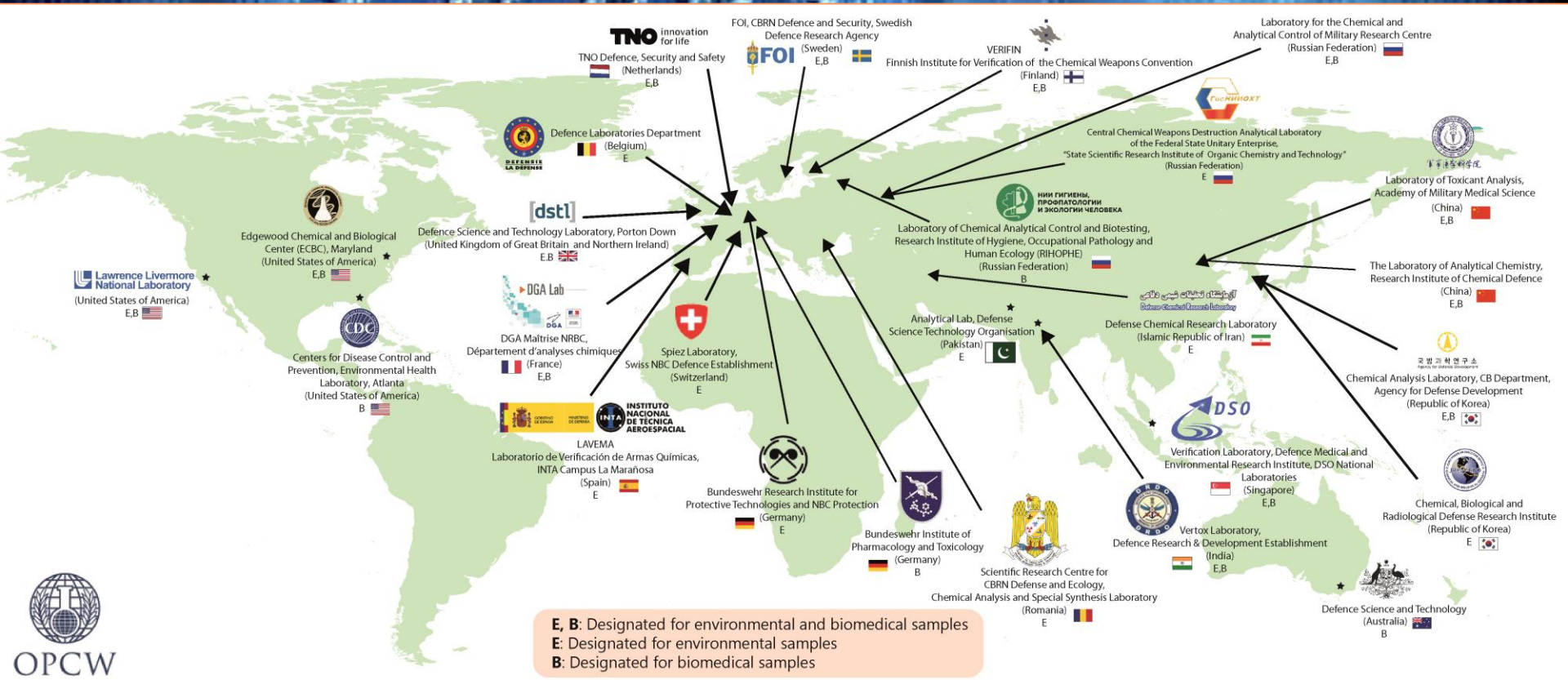
THE PROHIBITION OF
CHEMICAL WEAPONS


TNO innovation for life
TNO Defence, Security and Safety
(Netherlands)
E,B
FOI, CBRN Defence and Security, Swedish
Defence Research Agency
(Sweden)
E,B
VERIFIN
Finnish Institute for Verification of the Chemical Weapons Convention
(Finland)
E,B
Laboratory for the Chemical and
Analytical Control of Military Research Centre
(Russian Federation)
E,B
Defence Laboratories Department
(Belgium)
E
Central Chemical Weapons Destruction Analytical Laboratory
of the Federal State Unitary Enterprise,
"State Scientific Research Institute of Organic Chemistry and Technology"
(Russian Federation)
E
Laboratory of Toxicant Analysis,
Academy of Military Medical Science
(China)
E,B
[dstl]
Defence Science and Technology Laboratory, Porton Down
(United Kingdom of Great Britain and Northern Ireland)
E,B
Edgewood Chemical and Biological
Center (ECBC), Maryland
(United States of America)
E,B
Laboratory of Chemical Analytical Control and Biotesting,
Research Institute of Hygiene, Occupational Pathology and
Human Ecology (RIHOPHE)
(Russian Federation)
B
Lawrence Livermore National Laboratory
(United States of America)
E,B
The Laboratory of Analytical Chemistry,
Research Institute of Chemical Defence
(China)
E,B
DGA Lab
DGA Maîtrise NRBC,
Département d'analyses chimiques
(France)
E,B
Analytical Lab, Defense
Science Technology Organisation
(Pakistan)
E
Defense Chemical Research Laboratory
(Islamic Republic of Iran)
E
Centers for Disease Control and
Prevention, Environmental Health
Laboratory, Atlanta
(United States of America)
B
Spiez Laboratory,
Swiss NBC Defence Establishment
(Switzerland)
E
Chemical Analysis Laboratory, CB Department,
Agency for Defense Development
(Republic of Korea)
E,B
INSTITUTO NACIONAL DE TÉCNICA AEROESPACIAL
LAVEMA
Laboratorio de Verificación de Armas Químicas,
INTA Campus La Marañosa
(Spain)
E
DSO
Verification Laboratory, Defence Medical and
Environmental Research Institute, DSO National
Laboratories
(Singapore)
E,B
Bundeswehr Research Institute for
Protective Technologies and NBC Protection
(Germany)
E
Chemical, Biological and
Radiological Defense Research Institute
(Republic of Korea)
E
Bundeswehr Institute of
Pharmacology and Toxicology
(Germany)
B
Vertox Laboratory,
Defence Research & Development Establishment
(India)
E,B
Scientific Research Centre for
CBRN Defense and Ecology,
Chemical Analysis and Special Synthesis Laboratory
(Romania)
E
Defence Science and Technology
(Australia)
B
E, B: Designated for environmental and biomedical samples
E: Designated for environmental samples
B: Designated for biomedical samples

OPCW

Temporary Working Group on Investigative Science and Technology

Reporting to the Scientific Advisory Board (SAB), the Temporary Working Group (TWG) will in particular consider the following questions:

Question 1:

Which methods and capabilities used in the forensic sciences could usefully be developed and/or adopted for Chemical Weapons Convention-based investigations?

Question 2:

What are the best practices and analysis tools used in the forensic sciences for effectively cross-referencing, validating, and linking together information related to investigation sites, materials collected/analysed, and individuals interviewed?

Question 3:

What are the best practices for management of data collected in investigations, including compilation, curation, and analytics?

Question 4:

What are the best practices for the collection, handling, curation and storage, and annotation of evidence?

Question 5:

Which technologies and methodologies (whether established or new) allow point-of-care and non-destructive measurements at an investigation site to help guide evidence collection?

Question 6:

Which technologies and methodologies (whether established or new) can be used in the provenancing of chemical and/or material samples collected in an investigation?

Question 7:

Which methods are available (or are being developed) for the sampling and analysis of environmental and biomedical materials and can be used in the detection of toxic industrial chemicals relevant to the Chemical Weapons Convention?

Question 8:

Which technologies and methodologies (whether established or new) can be used in ensuring chain of custody and verifying authenticity (especially in regard to digital images and video recordings)?

Question 9:

Which technologies and methodologies (whether established or new) can be used to ensure the integrity of an investigation site?

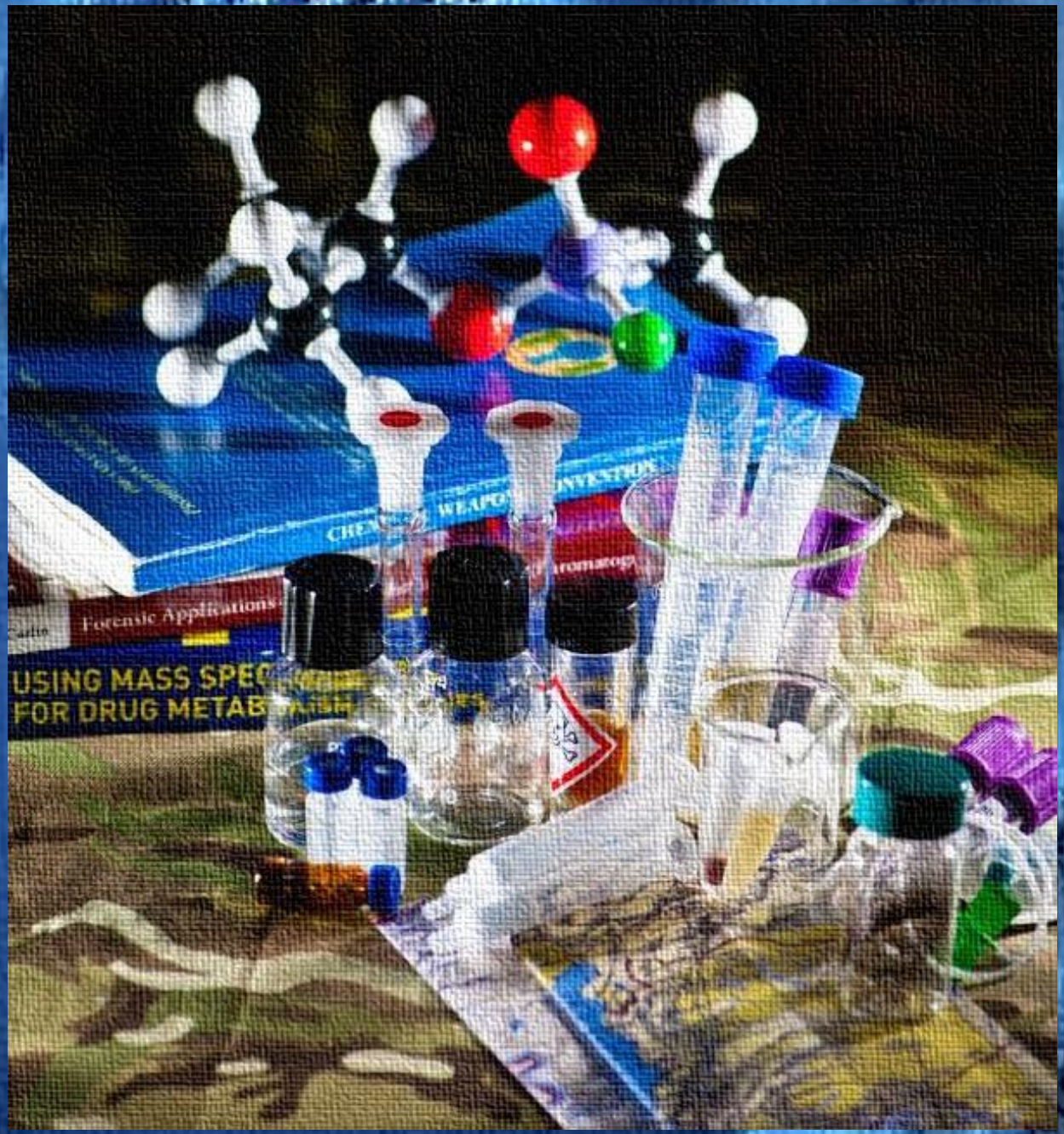
Question 10:

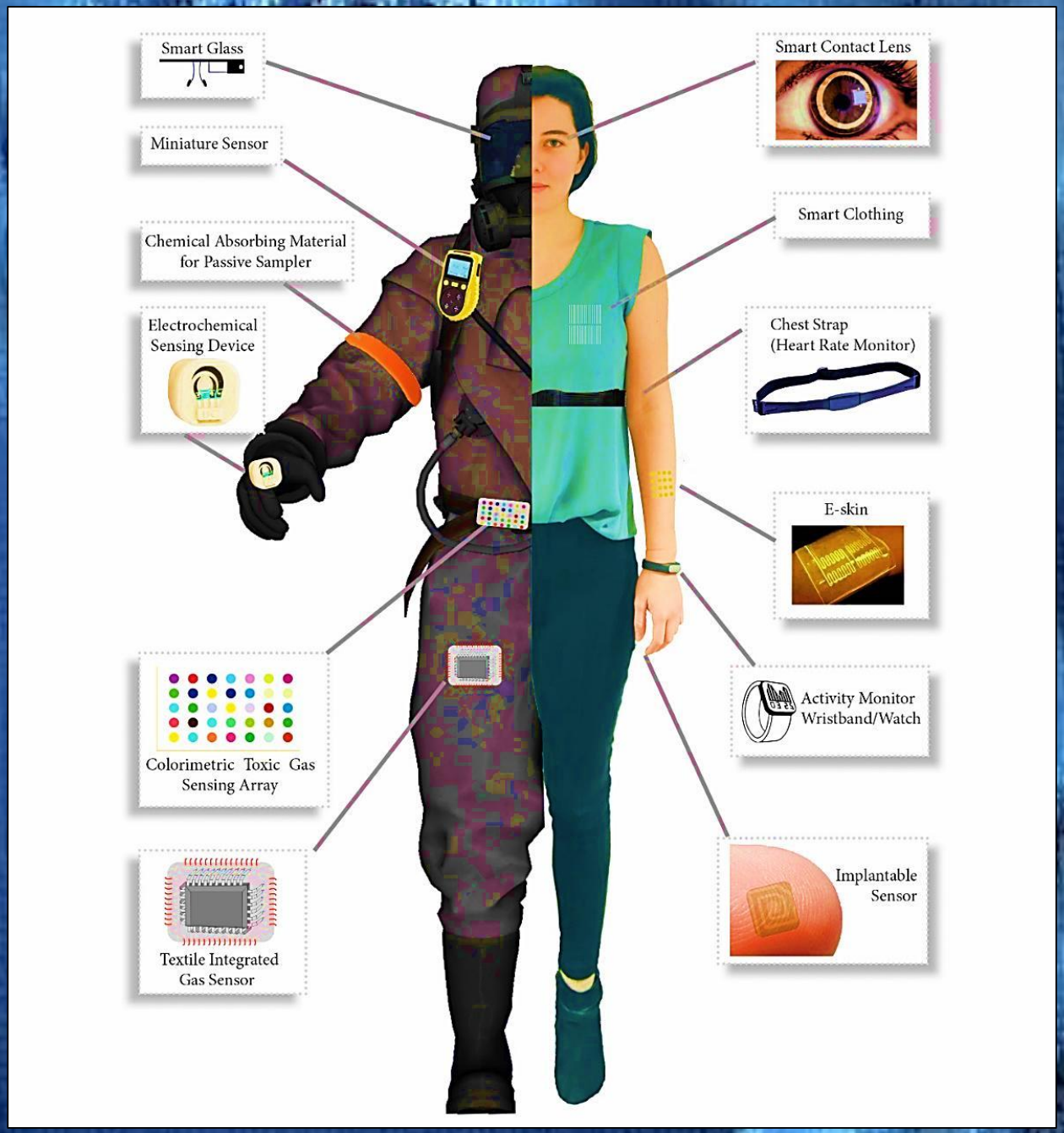
Do collections of physical objects, samples, and other information for chemical weapons-related analysis exist and can they be made available to investigators for retrospective review? How might these collections be used to support investigations?

Question 11:

Are there stakeholders that the Technical Secretariat could usefully engage with to leverage their capabilities on investigative matters?

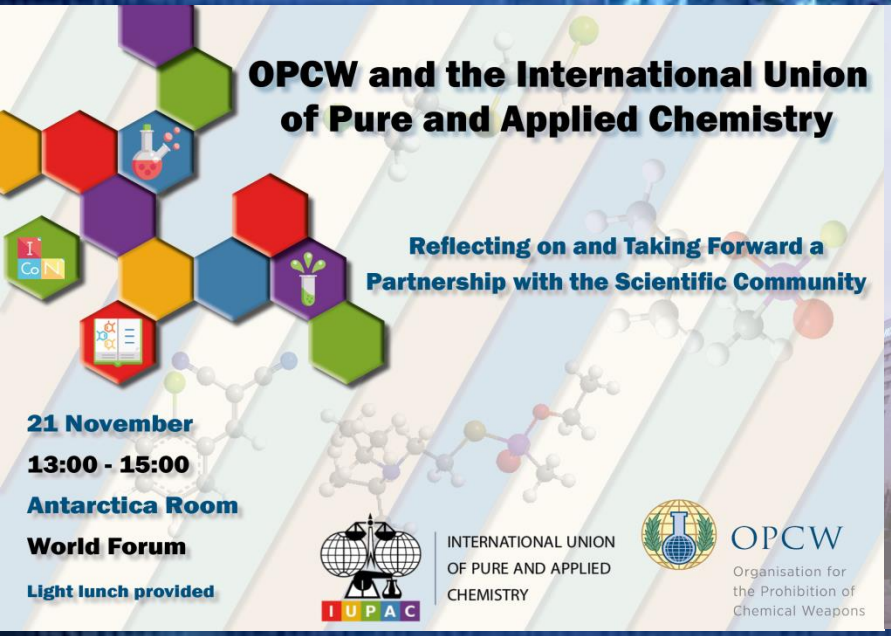
In addition, the TWG will provide advice on Technical Secretariat proposals for methodologies, procedures, technologies, and equipment for investigative purposes.

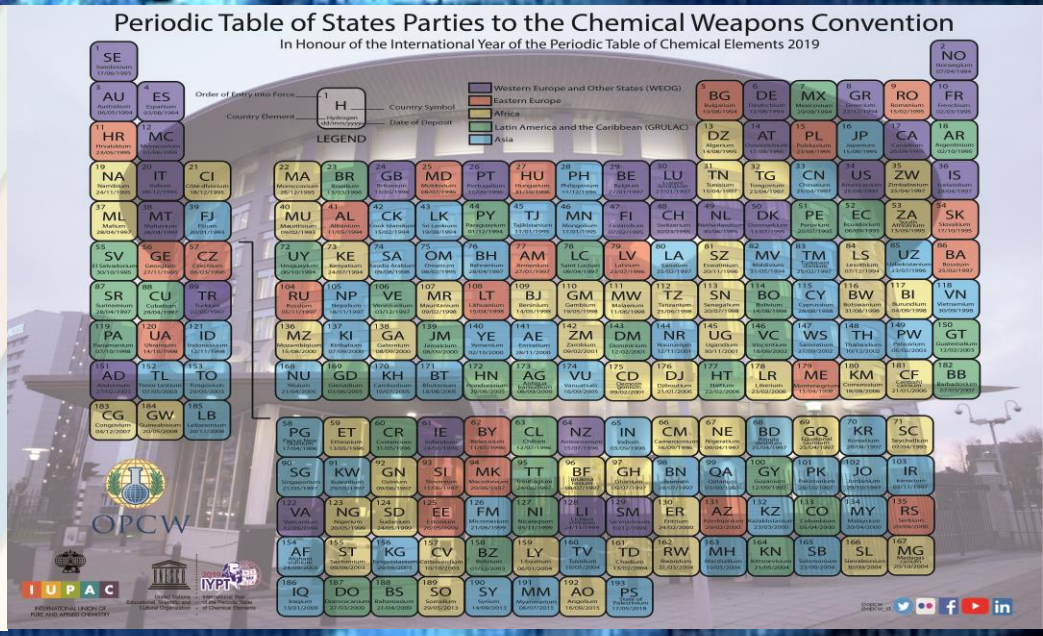

Forensic Applications
USING MASS SPEC
FOR DRUG METAB


Smart Glass
Miniature Sensor
Chemical Absorbing Material for Passive Sampler
Electrochemical Sensing Device
Colorimetric Toxic Gas Sensing Array
Textile Integrated Gas Sensor
Smart Contact Lens
Smart Clothing
Chest Strap (Heart Rate Monitor)
E-skin
Activity Monitor Wristband/Watch
Implantable Sensor

United Nations Educational, Scientific and Cultural Organization
Sustainable Development Goals
The Future of
SCIENTIFIC ADVICE TO THE UNITED NATIONS
A Summary Report to the Secretary-General of the United Nations from the
SCIENTIFIC ADVISORY BOARD
September 2016

26 TO 30 JUNE
HOFBURG PALACE
VIENNA, AUSTRIA
SCIENCE AND TECHNOLOGY
2017
CTBTO
PREPARATORY COMMISSION
preparatory commission for the comprehensive nuclear-test-ban treaty organization
MORE INFORMATION COMING SOON


OPCW and the International Union of Pure and Applied Chemistry
Reflecting on and Taking Forward a Partnership with the Scientific Community
21 November
13:00 - 15:00
Antarctica Room
World Forum
Light lunch provided
INTERNATIONAL UNION OF PURE AND APPLIED CHEMISTRY
IUPAC
OPCW
Organisation for the Prohibition of Chemical Weapons


Periodic Table of States Parties to the Chemical Weapons Convention
In Honour of the International Year of the Periodic Table of Chemical Elements 2019
LEGEND
Western Europe and Other States (WEOG)
Eastern Europe
Africa
Latin America and the Caribbean (GRULAC)
Asia
OPCW
IUPAC

Science for Diplomats at EC-86
Innovation
and
the Chemical Weapons Convention:
The Scientific Advisory Board's Report on Emerging Technologies
OPCW
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A Visual Guide to

GREECE

Talanta 188 (2018) 808–832

Contents lists available at ScienceDirect

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journal homepage: www.elsevier.com/locate/talanta

Advice on chemical weapons sample stability and storage provided by the Scientific Advisory Board of the Organisation for the Prohibition of Chemical Weapons to increase investigative capabilities worldwide

Christopher M. Timperley[a,*], Jonathan E. Forman[ab,**], Mohammad Abdollahi[b], Abdullah Saeed Al-Amri[c], Isel Pascual Alonso[d], Augustin Baulig[e], Veronica Borrett[f], Flerida A. Cariño[g], Christophe Curty[h], David González Berrutti[i], Zrinka Kovarik[j], Roberto Martínez-Álvarez[k], Robert Mikulak[l], Nicia Maria Fusaro Mourão[m], Ramasami Ponnadurai[n], Slawomir Neffe[o], Syed K. Raza[p], Valentin Rubaylo[q], Koji Takeuchi[r], Cheng Tang[s], Ferruccio Trifirò[t], Francois Mauritz van Straten[u], Paula S. Vanninen[v], Volodymyr Zaitsev[w], Farhat Waqar[x], Mongia Saïd Zina[y], Marc-Michael Blum[z], Hugh Gregg[z], Elena Fischer[aa], Siqing Sun[aa], Pei Yang[aa]

[a] Defence Science and Technology Laboratory (Dstl), Porton Down, Salisbury, Wiltshire, United Kingdom
[b] The Institute of Pharmaceutical Sciences, and the Department of Toxicology and Pharmacology, Faculty of Pharm
Republic of Iran
[c] Saudi Basic Industries Corporation (SABIC), Riyadh, Saudi Arabia
[d] University of Havana, Havana, Cuba
[e] Secrétariat Général de la Défense et de la Sécurité Nationale (SGDSN), Paris, France
[f] BAI Scientific, Melbourne, and Honorary Fellow, University of Melbourne, Australia
[g] University of the Philippines, Quezon City, Philippines
[h] Spiez Laboratory, Spiez, Switzerland
[i] Facultad de Química, Universidad de la República, Montevideo, Uruguay
[j] Institute for Medical Research and Occupational Health, Zagreb, Croatia
[k] Complutense University, Madrid, Spain
[l] United States Department of State, USA
[m] Brazilian Chemical Industry, São Paulo, Brazil
[n] Computational Chemistry Group, Department of Chemistry, Faculty of Science, University
[o] Military University of Technology, Warsaw, Poland
[p] Institute of Pesticides Formulation Technology (IPFT), Gurugram, Haryana, India
[q] State Scientific Research Institute of Organic Chemistry and Technology (GosNIIOKhT
[r] National Institute of Advanced Industrial Science and Technology (AIST), Japan
[s] Office for the Disposal of Japanese Abandoned Chemical Weapons, Ministry of Nat
[t] Department of Industrial Chemistry, University of Bologna, Italy
[u] South African Nuclear Energy Corporation SOC Ltd., Pretoria, South Africa
[v] VERIFIN, Department of Chemistry, Faculty of Science, University of Helsinki,
[w] Taras Shevchenko National University of Kyiv, Ukraine
[x] Pakistan Atomic Energy Commission, Pakistan
[y] Faculty of Sciences of Tunis (FST), Tunis, Tunisia
[z] OPCW Laboratory, Rijswijk, The Netherlands
[aa] OPCW Headquarters, The Hague, The Netherlands
[ab] Secretary to the Scientific Advisory Board and Science Policy Advis

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Pure Appl. Chem. 2018; aop

Preface

Mark C. Cesa, Vitor Francisco Ferreira, Jonathan E. Forman*, Cheng Tang, Christopher M. Timperley, Camly Tran and Bernard West

OPCW-IUPAC Workshop on Innovative Technologies for Chemical Security

https://doi.org/10.1515/pac-2018-0701

Abstract: The Organisation for the Prohibition of Chemical Weapons (OPCW), the International Union of Pure and Applied Chemistry (IUPAC), The National Academies of Science, Engineering and Medicine of the USA, the Brazilian Academy of Sciences, and the Brazilian Chemical Society held a workshop. "Innovative Technologies for Chemical Security", in Rio de Janeiro, Brazil, from 3 to 5 July 2017. This event was part of a four workshop series held to inform the report of the OPCW Scientific Advisory Board on developments in science and technology to the Fourth Review Conference of the Chemical Weapons Convention, which will be held in November 2018. The workshop explored the potential of new technologies to enhance capabilities for the implementation of the Chemical Weapons Convention. There is a continuing need for recognition that emerging scientific developments can have beneficial applications with respect to implementation of the Convention, particularly in prevention of re-emergence of chemical weapons. The objectives of this workshop were to present, discuss and critically evaluate the emergence and practical applications of new and existing technologies – as tools for detecting biochemical change in complex environments – and the applications of these technologies in support of chemical disarmament and chemical security. This issue of *Pure and Applied Chemistry* presents a series of papers that originate from topics discussed in the workshop. Preface describes the scientific review process for the Chemical Weapons Convention and how it was ed by the Rio de Janeiro hop, as well as introducing the papers in the collection and their cor- authors.

al disarmament; chemical security; chemical weapons; Chemical
Convention 2017; emerging technologies; innovation; OPCW;
l Weapons; remote sensing; scientific review; sensor; wearable

nnovative Technologies for Chemical Security, based on work done
4 collection of invited papers based on presentations at the Work-
Rio de Janeiro, Brazil, on 3–5 July 2017.

er and Secretary to the Scientific Advisory Board, Organisation
ds, e-mail: jonathan.forman@opcw.org
on of Pure and Applied Chemistry, Wheaton, IL, USA
Rio de Janeiro, Brazil
ation for the Prohibition of Chemical Weapons; Office for
tional Defence, Beijing, China
rganisation for the Prohibition of Chemical Weapons;
United Kingdom of Great Britain and Northern Ireland
e United States of America, Washington, DC, USA
Pure and Applied Chemistry, Toronto, ON, Canada

ORGANISATION FOR THE PROHIBITION OF CHEMICAL WEAPONS
Eight SAB Sessions

Four SAB Workshops

Four Temporary Working Groups

"Working together for a
world free of chemical weapons"