

**Federation of American Scientists Working Group on Biological Weapons**

**Non-Lethal Chemical and Biological Weapons<sup>1</sup>**

**November 2002**

Biomedical sciences and the pharmaceutical industry are in the midst of a revolution in the science and technology of drug discovery that will significantly complicate the control of chemical and biological weapons (CBW). The Chemical Weapons Convention (CWC), the Biological and Toxin Weapons Convention (BWC) and the Geneva Protocol are thus challenged by these technological developments. Scientists contributing to this revolution need to understand the implications of their work, and arms controllers must recognize that there are profound changes underway that will affect the technical landscape of CBW control.

The drivers of this revolution are new methodologies that make the process of drug discovery less empirical and more rational, and therefore much faster--a trend that will accelerate as our physiological understanding deepens. These developments likewise speed the identification and development of new potential CBW agents, most of which, like drugs, are physiologically active agents. The new methods are opening up entirely new areas for investigation, including new physiological targets for CBW agents.

The new technologies include combinatorial chemistry, genomics, microarrays, proteomics, toxicogenomics, and database mining. These technologies are supported by an immensely sophisticated and rapidly growing micro-scale instrumentation and computational base. Computer-controlled production and analytical devices are critical components, and all the laboratory technologies depend on computers for the collection and analysis of data. Bioinformatics can hardly keep up with the flood of genomic and proteomic data that threatens to overwhelm the capacity to integrate and understand it.

An immense amount of time and money are being invested in work using these methodologies. The intellectual momentum is immense and clearly unstoppable. Thus, a very large number of new, highly toxic compounds with precisely understood and controllable physiological effects will soon be discovered. Many of these will enter production as drugs or as research agents. The range of known, potential CBW agents will thus broaden by a very large factor in a very short period of time. Most of them will be synthesized from precursors that are not currently regulated under the CWC.

For a review of the technologies and their relevance to CBW control, see the original article by Mark Wheelis on which this commentary is based.

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<sup>1</sup> Based on an article entitled "Biotechnology and Biochemical Weapons" by Mark Wheelis in *The Nonproliferation Review*, Spring 2002.

## The Problem of Non-Lethal Agents

The CWC prohibits development and possession of chemical agents that “can cause death, temporary incapacitation or permanent harm to humans or animals,” except where intended for purposes not prohibited under the Convention. “Purposes not prohibited” are specified and include only one purpose that may involve combat: “law enforcement including domestic riot control.” However, riot control agents, defined as chemicals that rapidly produce physical effects which disappear within a short time following exposure, cannot be used as a method of warfare.

Some CWC States Parties are interpreting the Convention’s wording as limiting the prohibition of non-lethal agents to interstate armed conflict, and are consequently pursuing their development and the development of munitions to deliver them. These actions raise urgent questions: will there be an attempt to justify the use of non-lethal agents in attacking Iraq? Should the use of riot control agents in military operations that may involve armed conflict, such as counterterrorism, peacekeeping, monitoring and the like, be permissible as “law enforcement?” The ambiguities that arise are illustrated by the recent use of fentanyl to subdue hostage-takers in a Moscow theater. Was it law enforcement, counterterrorism, or interstate conflict? Is fentanyl, or similar agents, permissible for law enforcement? It is not a “riot control agent,” since its effects do not disappear within a short time and it is demonstrably not “non-lethal.” Unless the States Parties to the CWC can reach consensus on the nature and limits of the Convention’s prohibitions, there is certain to be uncontrolled development of semi-lethal weapons.

In fact, a categorical distinction between lethal and non-lethal agents is not scientifically feasible. Not only are certain individuals more susceptible to some agents, but synergy between two different non-lethal agents may make their combination highly lethal to everyone. Rational strategies to discover such synergistic pairs will soon be available. Thus, the development of multiple non-lethal agents may provide a lethal CW capability, in clear violation of the Convention. Even without synergism, stockpiles of non-lethal weapons and munitions would defeat a fundamental goal of the Convention, to exclude completely the possibility of the use of chemical weapons by preventing states from entering a war with a stockpile of CW whose use is proscribed, but which might nevertheless be employed under pressure of military necessity.

A variety of new “non-lethal” agents is on the horizon. Neuropharmacology is one of the areas in rapid expansion; the toll of mental illness, and the growing promise of chemical treatment, make it certain that a wide range of new psychoactive chemicals will be discovered. In the near future, agents will be developed that affect perception, sensation, cognition, emotion, mood, volition, bodily control, and alertness. Further, the International Committee of the Red Cross has just issued an *Appeal on Biotechnology, Weapons and Humanity* which cites the possibility of ethnic targeting and of covertly-spread agents that would alter consciousness, behavior, fertility and heredity. Given the great potential for such agents to be abused, it would be foolish, even suicidal, not to

analyze carefully their long-term implications before deciding whether to permit the exploitation of non-lethal agents by the military establishments of the world.

For agents that fall under both Conventions, the BWC closes the loophole in the CWC that permits chemical agents for law enforcement. There is general agreement that “other biological agents, or toxins” in Article I of the BWC covers all the biochemical products of living organisms that in abnormal doses could be used as toxins, including bioregulators, neurotransmitters, and hormones, as well as their analogs and synthetic derivatives. All the types of potential non-lethal agents discussed here are analogs of naturally-occurring biochemicals, because their physiological activity depends on their ability to bind at the same sites as the natural biochemicals do. The term “biochemical weapon agent” can be used for all the toxic agents covered by both Conventions.

The BWC also prohibits development or possession of means of agent delivery designed to be used for hostile purposes, which is a broader category than armed conflict or warfare and would include many counterterrorism, peacekeeping and law enforcement activities. Thus, there are several reasons for concluding that the non-lethal agents discussed here are definitively prohibited by the BWC.

## **Conclusion**

The interest of some States Parties in the development of non-lethal CBW for purposes they classify as law enforcement threatens to undermine both the Chemical and the Biological Weapons Conventions. Given the new technologies that are promoting the rapid emergence of non-lethal agents with a horrendous potential for abuse, it would be a wise human move to nip the development of these weapons in the bud. States Parties need to affirm decisively that both Conventions prohibit all military use of so-called non-lethal agents, except perhaps for tightly-specified agents and purposes. The use of national intelligence, coupled with a strengthened BWC and a willingness to employ challenge inspections, could serve as a deterrent. In the end, however, the only effective long-term solution is a universal norm against CBW, which can only be reached via sustained efforts for universality of the Conventions, transparency in chemical and biological defense activities, and public understanding of the stakes.