

BIOWARFARE AND BIOTERRORISM

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The malicious use of pathogen microorganisms is, nowadays, a real threat but terribly underestimate. However, it is not is a novelty, since the humanity has used the biowarfare for centuries. Currently, the rapid development of biotechnology makes possible the creation or modification of pathogens and their transformation into mass destruction weapons

HISTORY OF BIOWARFARE

- approx. 1500 BC: First episode known of biowarfare, by Hittites
- Assyrians, Greeks and Romans used fungi and human feces during sieges.
- 1340: The Tartars triggered the Black Death in Europe, after using infected carcasses as a weapon.
- XVI-XVIIIth centuries: Spanish, French and British used smallpox against American indigenes.
- XXth century: The great powers create programs for developing biological weapons. Japanese and the Soviets used them during World War II.
- 1975: Prohibition of biological weapons. USSR ignored the convention and continued with a clandestine development program.
- 1979: A escape of *Bacillus anthracis* spores in a Soviet factory caused at least 60 deaths.
- Last 40 years: Many States, especially Arab dictatorships, initiate development programs: North Korea, Syria, Iran, Iraq, Sudan, Libya...



The Plague in Florence (Sabatelli). Represents the Black Death epidemics in Europe.



Contaminated envelopes with *Bacillus anthracis* spores in the attempt in USA in 2001.

HISTORY OF BIOTERRORISM

- 1984: A Hindu sect contaminated with *Salmonella typhimurium* several restaurants in Oregon, USA. 751 persons became ill. No deaths.
- 1995: A Buddhist sect released *Bacillus anthracis* spores in Tokyo. They committed the mistake of using a non-virulent strain, therefore had no effect.
- 2001: Various letters with spores of *Bacillus anthracis* were addressed to journalists and senators in USA. 22 persons became ill, of whom 5 died.

CONCLUSIONS AND EXPECTATIONS

- Microorganisms have shown their capacity to kill millions of people in a short time. The panic that could create a biological attack can be much greater than that of a conventional attack.
- A bioterrorist act is almost inevitable, it can occur at any time.
- It is necessary to make awareness in both political and health authorities.
- Preparation is essential at all levels: scientific, medical, pharmaceutical, economic and military or security forces.

HOW IS A BIOLOGICAL WEAPON?

- High death rate/morbidity
- Effective transmission
- Low infective dose
- Without vaccine or treatment
- Difficult diagnosis
- Easy to manipulate
- Easy to obtain
- Easy to scatter
- Stable in environment
- Capacity of create panic

Category	Agents	Features
A	<ul style="list-style-type: none"><i>Bacillus anthracis</i><i>Clostridium botulinum</i> toxin<i>Yersinia pestis</i><i>Francisella tularensis</i>Smallpox virusHemorrhagic fever viruses (Ebola, Marburg, Lassa, yellow fever...)	<ul style="list-style-type: none">Easily disseminated or spread person-to-personHighly lethalSerious public health effectsMay cause great panic and social disruption
B	<ul style="list-style-type: none"><i>Brucella</i> spp.Epsilon toxin of <i>Clostridium perfringens</i><i>Burkholderia mallei</i> and <i>B.pseudomallei</i><i>Clamydia psittaci</i><i>Coxiella burnetii</i>Staphylococcal enterotoxin B<i>Rickettsia prowazekii</i>Water safety (e.g. <i>Vibrio cholerae</i>) or food safety threats (e.g. <i>Salmonella</i>, <i>Shigella</i> or <i>E.coli</i> O157:H7)Viral encephalitis viruses (p.ej. VEE)	<ul style="list-style-type: none">Moderately easy to disseminateModerate morbidityDifficult diagnosis
C	<ul style="list-style-type: none">Nipah virusSARS virusHantavirus	<ul style="list-style-type: none">Emerging pathogensPossible future threats because of genetic manipulation, lack of information...

Adapted from <http://www.bt.cdc.gov/agent/agentlist-category.asp>

IS POSSIBLE A BIOLOGICAL ATTEMPT?

- In fact it is practically inevitable. Most pathogens can be found in the environment and it is not difficult or expensive to disperse them.
- In 2001 a group of microbiologists developed a simulated biological weapon with only 1.5 million dollars. The attempt of the same year was carried out by a laboratory technician of an Army Research center.

SMALLPOX AS A WEAPON

- It is the deadliest disease in history, and has a great capacity of cause panic.
- Currently eradicated, which carries some risks: lack of immunity and vaccination, little information, inexperienced doctors in diagnoses and treatment.
- High mortality (about 30%) and efficient person-to-person transmission.
- There are two legal stocks, but it is suspected that there may be more.
- USA and the EU have developed response strategies, but there are few vaccines and there is no effective treatment.

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