

# Biological weapons

**Biological weapons** are weapons that take advantage of the harmful effects of pathogenic microorganisms or their toxins on humans, livestock, or crops. This includes various bacteria, viruses and toxins (botulinum toxin, aflatoxin, castor). Biological weapons are classified as weapons of mass destruction and their development, production and storage are banned worldwide.

The use of a micro-organism is far more effective and efficient when used as a terrorist weapon. Use as a combat weapon is still problematic because the goal of the attack is to damage the enemy and protect their own people.

## Biological warfare

- An attack by biological weapons used by one state against another during their conflict.
- The goal is the mass elimination of manpower and weakening of combat capability.

### Conditions for the use of microorganisms as combat weapons

- cause a fatal or very serious illness,
- they do not respond well to treatment or this treatment requires high costs,
- they cause the disease even at a very low dose,
- production must be easy (the manufacturer is at greatest risk),
- further interpersonal transmission is undesirable,
- Easy infection control should be possible after the event.

## Terrorist use of a microorganism

- The aim of a terrorist attack is to cause fear, draw attention to oneself, damage the economy:
  - media coverage of the attack,
  - even a small success rate is sufficient.
- Often the security of the terrorist does not matter.
- Regardless of further infection control, interpersonal transmission is irrelevant.

## Classification of biological agents

	disease characteristics	examples of microbes
<b>Category A</b>	the most dangerous, easily spread infection, interhuman transmissible agents, severe and difficult to treat diseases with high mortality	virus smallpox, <i>Bacillus anthracis</i> , <i>Yersinia pestis</i> , toxin <i>Clostridium botulinum</i> , <i>Francisella tularensis</i> , <i>Ebola virus</i> and <i>Marburg</i>
<b>Category B</b>	less dangerous pathogens, without interhuman transmission, there is a possibility of treatment	<i>Coxiella burnetii</i> , <i>Burkholderia mallei</i> , <i>Brucella spp.</i> , <i>Salmonella enterica</i> , <i>Shigella dysenteriae</i> , enterotoxin <i>Staphylococcus aureus</i> , toxin <i>Clostridium perfringens</i>
<b>Category C</b>	less common agents, unlikely to be abused, but have high morbidity or mortality or are difficult to treat	<i>Nipah virus</i> , hantaviruses, tick viruses hemorrhagic fevers, multi-resistant <i>Mycobacterium tuberculosis</i>



Photography of FBI: Envelope contaminated with ricine. Greenville, South Carolina, 2003.



Bioterrorist attack: *Bacillus anthracis*. Kameido, Tokyo, 1993.

## Examples of pathogens

### Smallpox virus (*Poxvirus variola*)

It causes a highly deadly, easily interhumanly transmitted disease, which is one of the most dangerous potential biological agents. Vaccination has eradicated the virus, but since the early 1980s, up to a third of the world's population has become completely immune. Fortunately, the very limited availability of the virus reduces the likelihood of abuse. Officially, the virus is found in only two laboratories in the world (in the USA and Russia). Interpersonal transmission is easy. In case of infection, the infected persons can be protected by post-exposure vaccination with a live vaccine, which must be given within three days of contact with the infection. Vaccination produces local and general side effects that are significantly higher in adults. Area vaccination was completed in 1972 (in our country in 1978).

 For more information see *Smallpox virus*.

## ***Bacillus anthracis* (anthrax)**

Extremely resistant spores *Bacillus anthracis*, which are easy to store and represent other agents. The incubation lasts from 2 days to 6-8 weeks, the first symptoms are usually uncharacteristic. Pneumonia has up to 90% mortality. Interpersonal transmission is rare (not described in pneumonia). Vaccination is possible, but it has a high percentage of complications; chemoprophylaxis and treatment is also possible. Works well on antibiotics ( ciprofloxacin, ofloxacin). When spores are inhaled, the antibiotic is given for 60 days, even to children and pregnant women.

 For more information see *Anthrax*.

## **Botulinum toxin**

Toxin produced by anaerobic bacteria *Clostridium botulinum* is the most toxic substance known. The transfer could be mainly food, or water, or in the form of an aerosol. Affected individuals are treated with antitoxin serum. Late administration of antitoxin is ineffective. There is no vaccination (experimental only). Protection against this infection consists mainly in thorough control and protection of drinking water sources.

 For more information see *Botulism*.

## **Plague**

Diseases caused by bacteria *Yersinia pestis*. The pulmonary form is initially uncharacteristic, the incubation period lasts 1-2 days. Interpersonal transmission is possible. The vaccine is not available, but treatment and chemoprophylaxis are possible.

 For more information see *Plague*.

## **Ebola**

 For more information see *Ebola*.

## **Marburg fever**

 For more information see *Hemorrhagic fevers*.

## **Tlaremia**

Diseases caused by the bacterium *Francisella tularensis*, which is one of the most infectious agents (10 bacteria). Inhalation infections have a mortality rate of 30-60%. European strains have lower virulence and mild course, which is often a diagnostic problem. There is treatment, chemoprophylaxis and vaccination.

 For more information see *Tulareia*.

## **Other candidates**

- Venezuelan horse fever
- Yellow fever
- Rift Valley Fever
- Q fever
- and probably others

## **Links**

### **Relates articles**

- Ebola
- Yellow fever
- Bioterrorism
- Viruses
- Krvácivé horečky
- Anthrax
- Plague



Variola

## Použitá literatura

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- LOBOVSKÁ, Alena. *Infekční nemoci*. 1. edition. Praha : Nakladatelství Karolinum, 2002. ISBN 80-246-0116-8.

## Source

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