The Destroyed Ukraine Bioagents: Dangerous or Benign?

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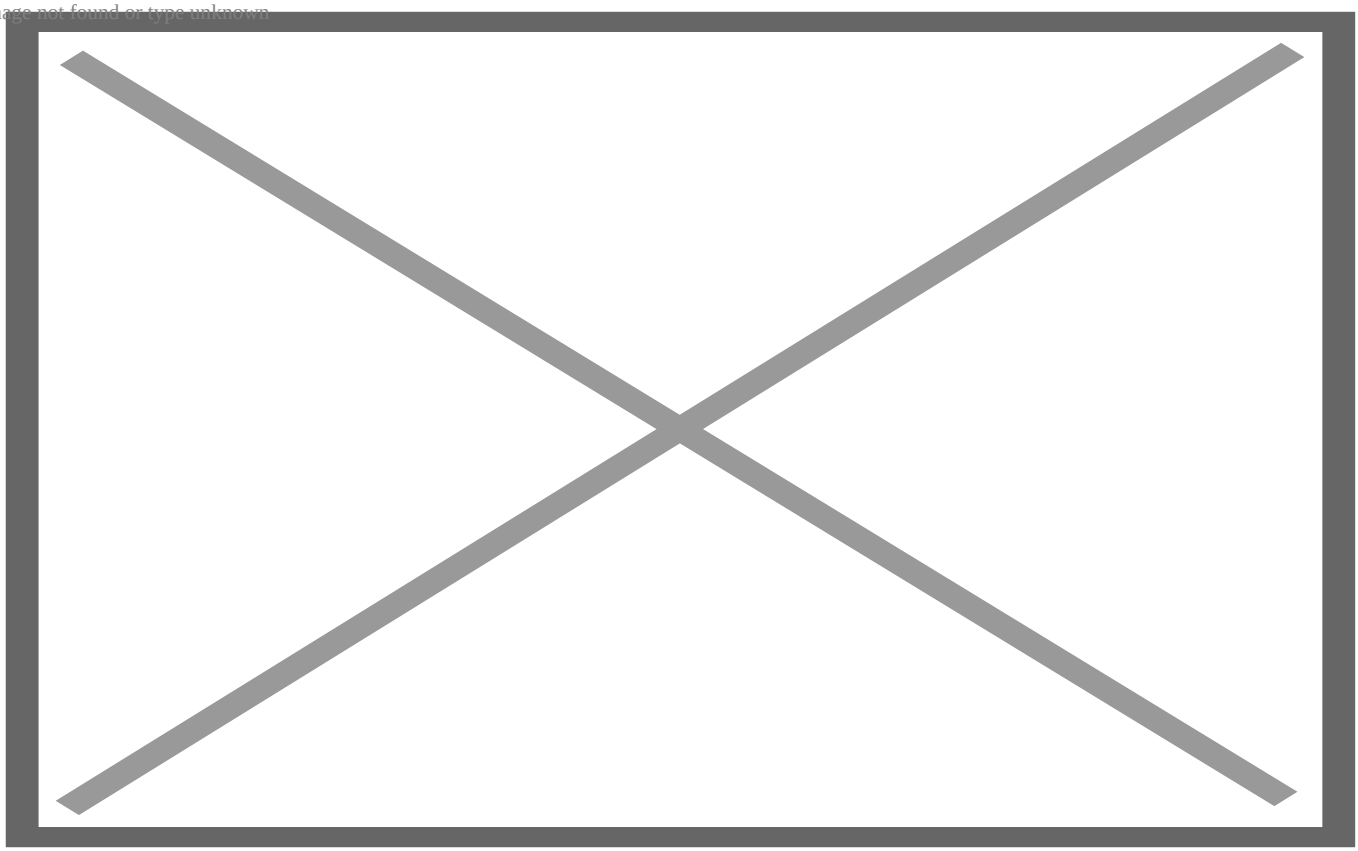

Photo by USAG Public Affairs

Russia’s announcement that it had documentation that Ukrainian biological laboratories, largely funded by the U.S. Defense Department, had harbored “components of biological weapons” and “stockpiles of dangerous pathogens” created a propaganda circus in the press. The United States and Ukraine vigorously denied there were any such pathogens, even though public source documentation argued otherwise.

This article will look at what we know about the documented bioagents and pathogens held in the Ukraine biolabs, based on both Russian and Western sources. The truth about such alleged biological weapons (BW) turns out to be more nuanced than reported by the press — some of which accounts are full of misinformation — and impossible to assess fully without some knowledge of the history of Russian, American, and even Japanese biological warfare programs.

On March 11, the Reuters news agency reported that the World Health Organization, an agency of the United Nations, had "advised Ukraine to destroy high-threat pathogens housed in the country's public health laboratories to prevent 'any potential spills' that would spread disease among the population."

News about biological substances being destroyed at Ukrainian biological laboratories was used as propaganda by both Russia and the United States. The Russians found much to raise suspicions about illegal biological warfare research occurring at the labs, given the history of U.S. biowarfare research, while the United States maintained that nothing untoward was happening at the labs. It charged Putin's claims of U.S. BW operations in Ukraine as delusional.

A March 8 statement by Russian Foreign Ministry spokeswoman Maria Zakharova said, "Documents were obtained from employees of Ukrainian biological laboratories about emergency disposal of particularly dangerous pathogens of plague, anthrax, tularemia, cholera and other deadly diseases, carried out on February 24. In particular, we are talking about the Ukrainian Health Ministry order on prompt disposal of all stockpiles of dangerous pathogens, sent to all bio laboratories."

I have not seen documents that specifically describe any destruction of plague, anthrax, cholera or the other diseases mentioned above, although it is known that tularemia research was undertaken in Ukraine labs, including at least one in a region bordering Russia (to be discussed further on). Also, we know that anthrax research has been conducted at the Institute of Veterinary Medicine at the National Academy of Agrarian Sciences of Ukraine in Kyiv. This work included "selection of the *B. anthracis* and creating new vaccine strains," which must have necessitated storing anthrax samples.

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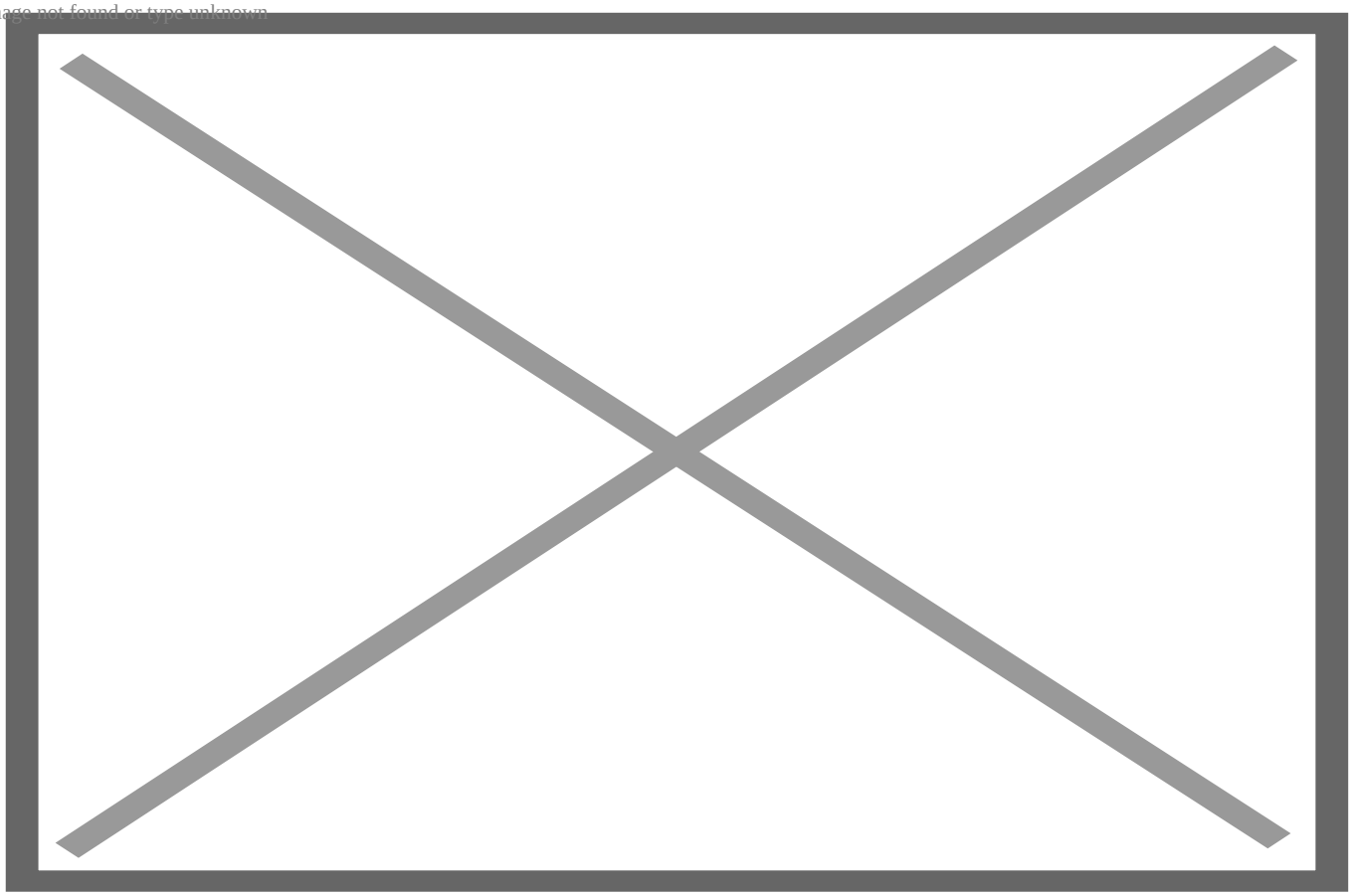

Anthrax Bacillus anthracis, Gram-Positive rods. Contributed by Public Domain Images, Dr. William A. Clark, USCDCP, as pictured in Anthrax Infection, Copyright 2022, StatPearls Publishing LLC. Distributed under terms of the Creative Commons Attribution 4.0 International License (http://creativecommons.org/licenses/by/4.0/)

Importantly, as we shall see, other known pathogens were listed as destroyed in at least one Ukraine biolab. These pathogens may not have been considered as dangerous as anthrax, plague or tularemia, but they included organisms that are considered bioterrorism threats, and other agents that have previously been researched by U.S. and Japanese biowarfare scientists. Those bioagents have been dismissed as harmless or not particularly dangerous in their laboratory form. A complete analysis of these destroyed lab organisms can be found later in this article.

“Components of biological weapons”

“The obtained documentation,” Zakharova continued, “is currently being scrupulously analyzed by specialists of Nuclear, Chemical and Biological Protection troops. However, it is already possible to make a conclusion that the laboratories located in direct proximity from Russian borders worked on development of components of biological weapons.”

As we shall see, this statement can be corroborated by existing U.S. scientific journals.

“Components of biological weapons” as a descriptor is not the same as biological weapons. The components of biological weapons can be stored and assembled later at literally make-shift facilities. In

fact, in the 1990s, the Defense Threat Reduction Agency (DTRA), which has been revealed as U.S. military sponsor for the controversial Ukraine biolabs, conducted a covert study (Project Bacchus) about how to build a secret BW facility cheaply, using only materials from a hardware store!

While little is known about exactly where all the especially dangerous pathogens were kept, a 2020 scientific journal article described research on naturally occurring tularemia in Kharkiv oblast, which abuts the Russian border. While in itself the research is not indicative of BW development, the tularemia samples were examined at various “Oblast Laboratory Centres of the MoH [Ministry of Health] of Ukraine.”

Tularemia is a Category A biological warfare agent. Spread by ticks, it was originally researched as a biowarfare agent by Japan’s Unit 731, and is considered today an extremely dangerous pathogen.

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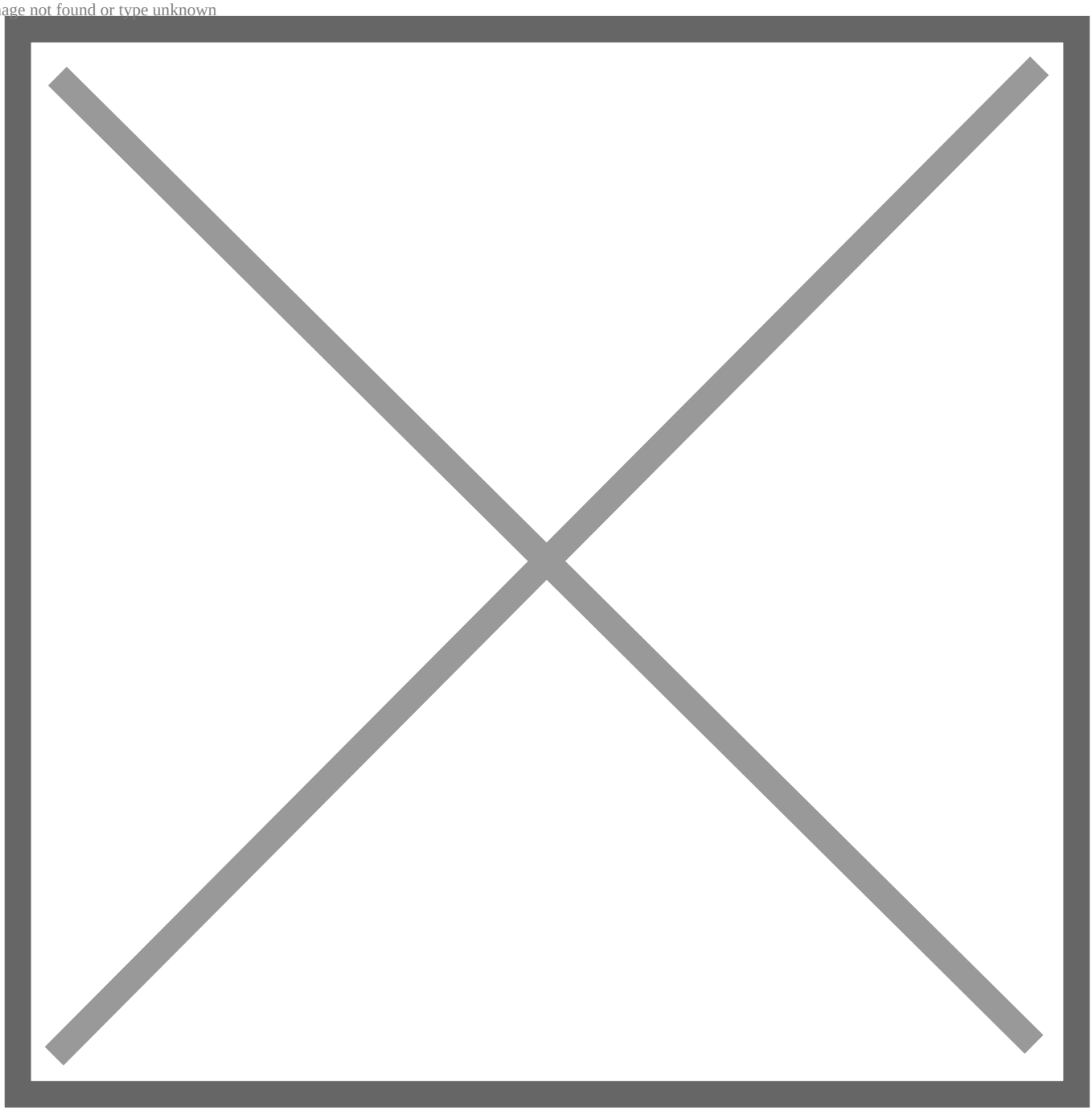

Defense Threat Reduction Agency seal, public domain, U.S. Government — Extracted from PDF version of a DTRA brochure

At a March 11 presentation at the UN Security Council, Russia made its case on the biowarfare charges. They claimed that research in Ukraine, centered at the BSL-3 central reference lab at the Mechnikov Scientific-Research Anti-Plague Institute in Odessa, was “aimed at enhancing the pathogen properties of plague, anthrax, tularemia, cholera, and other lethal diseases with the help of synthetic biology.”

> This work is funded and directly supervised by the Defense Threat Reduction Agency (DTRA) of the United States, i.e. in the interests of Pentagon's National Center for Medical Intelligence… Research centers in other cities also played a role — Kiev, Lvov, Kharkov, Dnipro, Kherson, Ternopol, Uzhgorod, Vinnytsia. Research results were sent to US military biological centers, i.a. to U.S. Army Medical Research Institute of Infections Diseases, Walter Reed Army Institute of Research, US Naval Medical Research, and US Army Biological Warfare Labs in Fort Detrick that used to be the key hubs of the American biological weapons program.

Issues with Ukraine Biosafety

A 2008 monograph by the James Martin Center for Nonproliferation Studies at the Monterey Institute of International Studies described Odessa's over 100 year old Anti-Plague Institute. In its time as a Soviet secret lab, it appears mostly to have been involved in surveillance operations in the seaport city, monitoring for appearance of plague, anthrax, tularemia, cholera and other diseases.

More than 25 years since the fall of the Soviet Union, the Odessa facility has a Department of Especially Dangerous Bacteria and Virus Research, which concentrates "on performing research to clarify the evolution and development of natural foci of tularemia, leptospiroses, psittacosis, cholera and other vibrios, and arboviruses. In recent years, it developed a particular interest in arboviruses related to birds…."

At the UN Security Council meeting, Russia also described Project UP-4, "which was implemented at laboratories in Kiev, Kharkov and Odessa. It studied possibilities of spreading particularly dangerous infections through migratory birds, including highly pathogenic H5N1 influenza (lethal to humans in 50 % of cases) and Newcastle disease. As part of another project, bats were considered as carriers of potential BW agents."

A few years earlier, safety procedures at the Ukraine labs were brought into serious question by the European Union itself.

On July 31, 2019, the Council of the European Union issued a decision in "in support of strengthening biological safety and security in Ukraine in line with the implementation of United Nations Security Council Resolution 1540 (2004) on non-proliferation of weapons of mass destruction and their means of delivery." As a matter of context, the EU statement said:

> The Ukrainian legislation prohibiting biological weapons is detailed and comprehensive. **However, a significant part of this legislation and regulation is outdated and fails to meet international norms and standard**s…. **There is no framework law on biosafety and biosecurity in Ukraine that outlines establishment of a biosafety and biosecurity system and its proper functioning**…. **Mechanisms for state control of adherence to biosecurity requirements during work with biological agents are also absent**. There is no register of economic and non-economic actors working with hazardous biological agents in the territory of Ukraine…. Staff of the majority of Ukrainian life sciences laboratories are experienced in handling dangerous biological materials. However, modern biosafety and

biosecurity principles and approaches, modern techniques and practices, and codes of conduct linked to modern practices are very rare in laboratories. [Bold emphases added]

The Bioagents Destroyed at the Kharkiv Oblast Biolab

On March 17, *The Intercept* published a story by veteran reporter Robert Mackey which weighed in on the controversy over supposed bioweapons at various biolabs in Ukraine that ran, in part, under Pentagon contracts.

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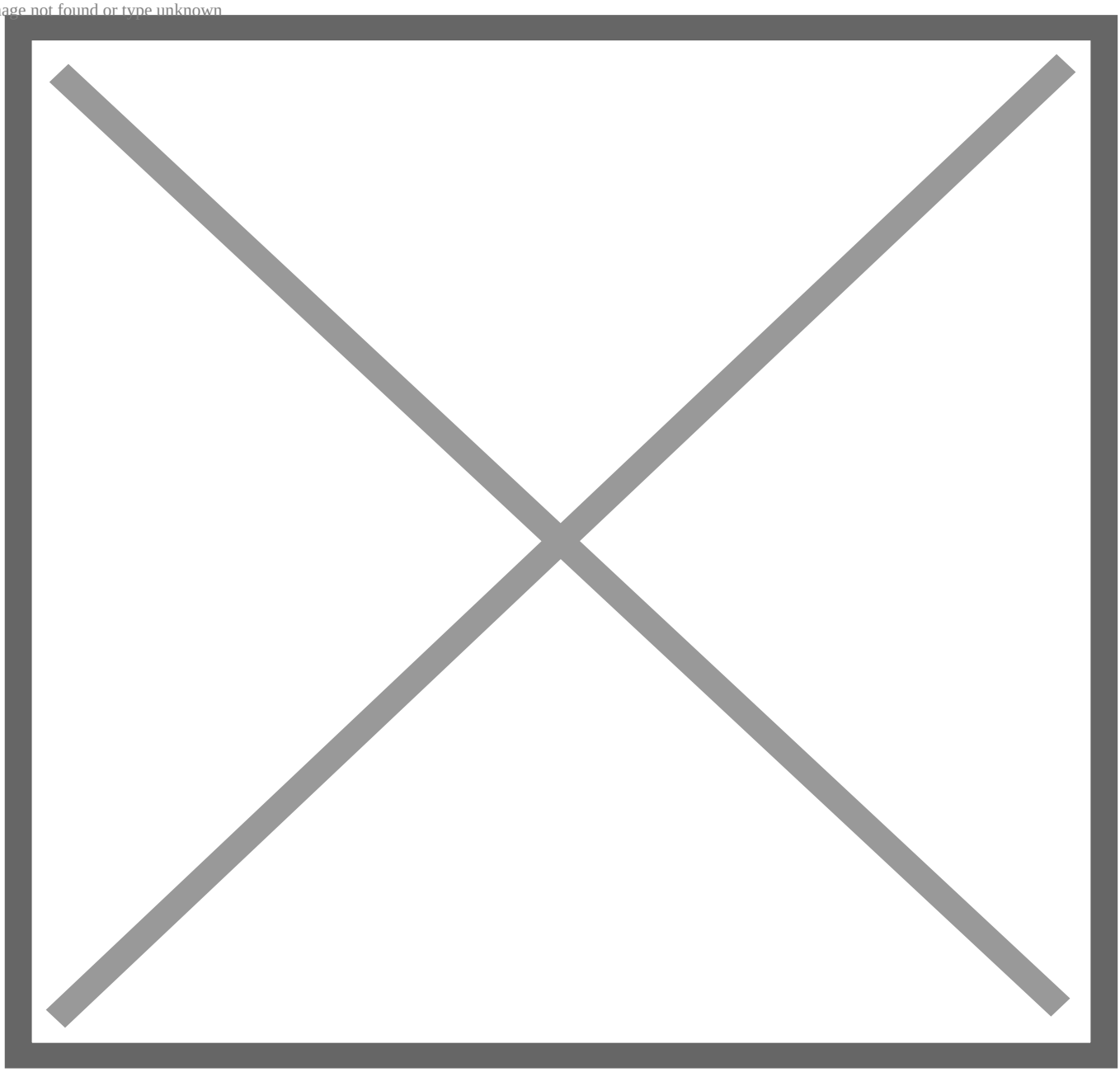

A reproduction of a list of bioagents destroyed on February 25, 2022 at the Kharkiv, Ukraine biolaboratory. The list bears the heading of RIA Novosti, a Russian news agency.

From *The Intercept*:

> According to the [10 Russian] biologists, documents presented to the public last week by Russia's defense ministry as supposed evidence of covert "bioweapons labs" under Pentagon control in Ukraine actually describe relatively harmless collections of pathogens used for public health research. The comprehensive review of the documents by experts who understand both the science and the Cyrillic alphabet took on new importance on Wednesday, as President Vladimir Putin cited the imaginary threat of weapons of mass destruction near Russia's borders as a justification for the invasion of Ukraine.

Mackey also quoted Russian biologist Eugene Lewitin as saying Russia's claim that the Ukraine labs were planning to use birds to spread pathogens into Russia was false, unsupported by any documents released. Lewitin told Mackey that "'the stuff on avian and bat migration investigations,' routine research on strains of flu and other viruses in the wild population that could jump to humans" was "'a complete delirium.'"

I will examine these avian and bat migration issues in more detail in an upcoming article. Suffice it to say that there is a long history of secret Department of Defense research done on bird migration in relation to biological warfare. There was even a famous, if now forgotten, scandal over how the Smithsonian Institute became embroiled in this secret bird migration research in the1960s, as described in this important 1985 *Washington Post* article by Ted Gup.

Returning to the question of the biological agents in Ukrainian labs, the Russian news agency RIA Novosti published a list of twenty bioagents that were destroyed at the Kharkiv Oblast laboratory on February 25. (See photo above.)

When I examined the documents and claims, I found that five of the twenty bioagents listed in the document, and referenced many times by those, like Mackey, debunking Russia's biowarfare research claims, were actually serious pathogens. These included Category B bioterrorism threats, including *Shigella* (which causes dysentery) and *Salmonella* (which in the strain held by the Ukraine lab, causes serious gastroenteritis).

Five, and arguably six, of the others bioagents were considered disease-causing and a threat to laboratory workers.

Shigella species, in particular, were used by Japan's Unit 731 in field trials in China during World War II (pg. 4). So they have a long history of use in biological warfare, and hardly constitute "relatively harmless" organisms.

While a few of the bioagents were, as Mackey and his sources alleged, typical lab agents used for research purposes, such as *Staphlococcus aureus* ATCC 25923 and *E. Coli* B, other pathogens presented dangers of their own. One example is *Proteus mirabilis*, which can cause serious infections in humans, including bacteremia, wound infections, sepsis and pneumonia. (A full examination of all the bioagents listed is included later in this article.)

An Open Letter

The narrative that the pathogens held by the various Ukraine biolabs are not associated with possible bioweapons was boosted by an “Open Letter” from “biologists, graduates of the Russian universities” to “Editors of RIA Novosti, Gazeta.ru, Russia Today, Fontanka, Komsomolskaya Pravda, and other media outlets spreading deliberately false information about biological weapons allegedly found in Ukraine.”

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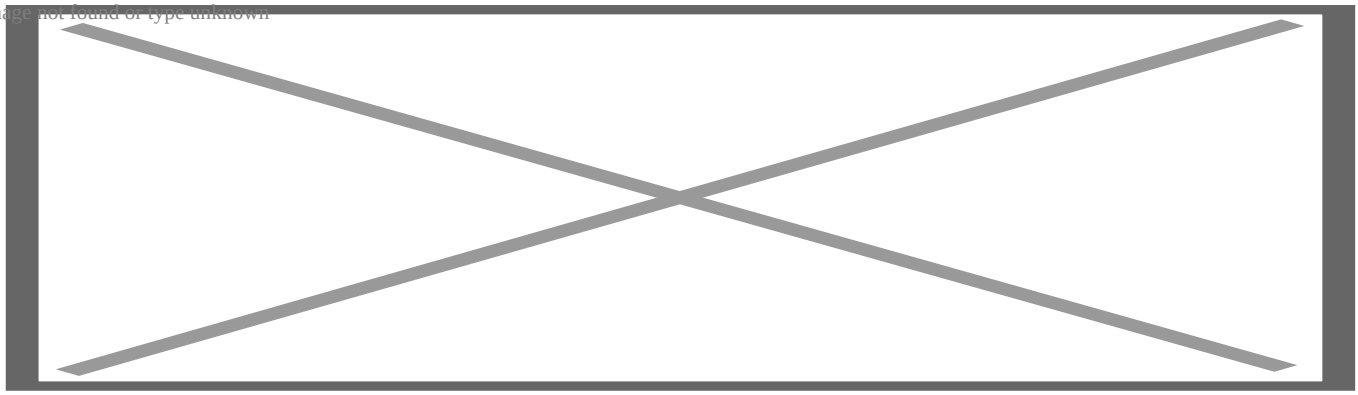

English translation of the Russian Intoduction to the “Open Letter” — To: Editors of RIA Novosti, Gazeta.ru, Russia Today, Fontanka, Komsomolskaya Pravda, and other media outlets spreading deliberately false information about biological weapons allegedly found in Ukraine.

The letter (published in both Russian and English here) claimed, “the ‘evidence’ offered by the media is obviously false. It does not imply any development of biological weapons or even the use of particularly dangerous pathogens in the laboratories. The list of destroyed strains published by RIA Novosti and other Russian media outlets contains not a single particularly dangerous strain. The list contains only strains common to microbiological and even more so to epidemiological laboratories.”

This Open Letter makes other false claims, which I will return to further on. As to why some biologists would make obviously untrue claims about the pathogens listed is difficult to say. Lacking further information about these people, all I can say is that their characterization of these bioagents, with a some exceptions, is false.

A March 11 article in the *New York Times* made similar claims about the Russian evidence, with one crucial difference. Whereas *The Intercept*, drawing on the Open Letter and Lewitin’s statements, found no dangerous strains, the *Times* quoted Robert Pope, director of the Pentagon’s Cooperative Threat Reduction Program, to the effect that “some of the facilities may contain pathogens once used for Soviet-era bioweapons programs, but [Pope] emphasized that the Ukrainian labs currently did not have the ability to manufacture bioweapons.”

Strange modifier, “currently.”

In fact, the pathogens listed in the photo at the beginning of this essay are not the sum total of bioagents held in Ukraine biolabs. We know this by inference from programs the labs themselves undertook with sponsorship of the U.S. Department of Defense’s Biological Threat Reduction Program.

The U.S. Embassy in Ukraine has listed what it called some of the “active research programs through which Ukrainian and American scientists work together. These include:

- “Risk Assessment of Selected Avian EDPs [Especially Dangerous Pathogens] Potentially Carried by Migratory Birds over Ukraine”
- “Prevalence of Crimean Congo hemorrhagic fever virus and hantaviruses in Ukraine and the potential requirement for differential diagnosis of suspect leptospirosis patients”
- “The Spread of African Swine Fever Virus (ASFV) in Domestic Pigs and Wild Boars in Ukraine — Building Capacityfor Insight into the Transmission of ASFV through Characterization of Virus Isolates by Genome Sequencing and Phylogenetic Analysis”

Reviewing the Destroyed Pathogens

Below is a list of the bioagents destroyed at the Kharkiv Oblast Laboratory Center. Online research in press, military and academic sources demonstrates that half the twenty of so pathogens listed in the Ria Novosti document described in the Open Letter are in fact dangerous. Five of them are considered Category B bioterrorism agent or disease by the U.S. Centers for Disease Control, just below Category A pathogens like anthrax, plague, and smallpox.

Other Category B pathogens include brucellosis, glanders, ricin and cholera, all very serious diseases. According to CDC, these types of pathogens are “moderately easy to disseminate,” “result in moderate morbidity rates and low mortality rates,” and “require specific enhancements of CDC’s diagnostic capacity and enhanced disease surveillance.”

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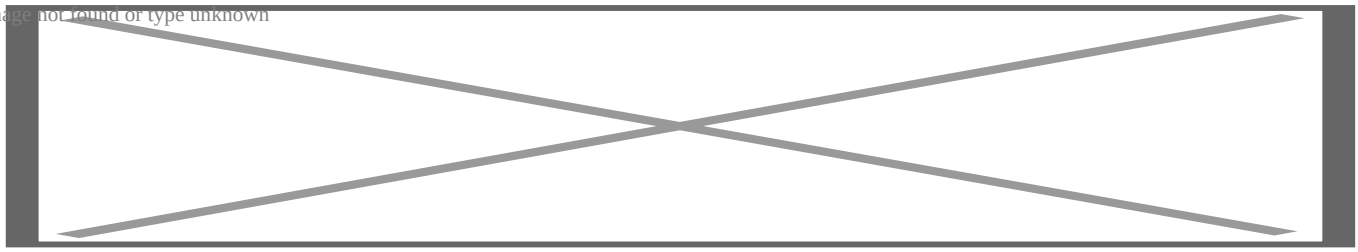

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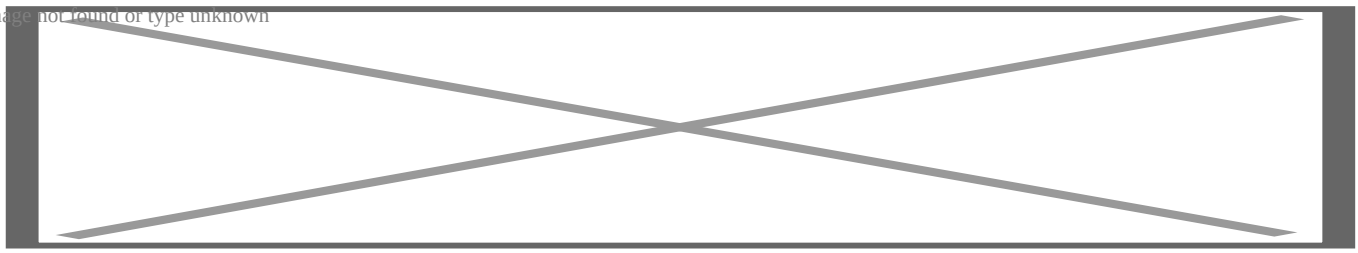

Screenshots from PDF pgs. 136 and 200, in “List of technical reports at Dugway Proving Ground (DPG) or West Desert Technical Information Center (WDTIC) at Dugway Proving Ground, 1950–1960”. The studies above are examples of BW research into Salmonella tryphimurium, one of the pathogens held at the Kharkiv Oblast Lab.

The list below follows the order of the pathogens listed in the RIA Novosti document. Bioagents that have a potentially dangerous profile are marked with an initial asterisk. Pathogens that are Category B bioterrorism agents will have two initial asterisks.

1. *Candida albicans* — This pathogenic yeast is a common cause of fungal infections in humans. It is not considered a potential bioweapon, nor are most mycotoxins.
2. *E. Coli* ATCC 25922 — The ATCC descriptor marks this organism as one particularly engineered by the ATCC company. ATCC has been around for nearly 100 years and manufactures various biorganisms for use by laboratories in research. They are not bioweapon components.
3. *Serratia marcescens* — This bacteria has a long history with the U.S. biological warfare program. While it was not initially thought to be a harmful organism, by the 1960s it was found to be dangerous to humans, particularly in hospital settings. Infection can result in urinary tract infections (UTIs), wound infections, pneumonia, and sepsis. It is transmissible via contaminated food and by direct contact. In the 1950s, *S. marcescens* was used as a BW simulant (a supposedly harmless substance used in place of a dangerous substance for purposes of experimentation). Army researchers sprayed *S. marcescens* over San Francisco in a "mock biological attack." At least one man died as a result, while ten others were hospitalized. "In other tests in the 1950s, Army researchers dispersed Serratia on Panama City, Fla., and Key West, Fla., with no known illnesses resulting." *S. marcescens* is considered fairly rare, though it is has been found to be "an important cause of invasive infections in neonatal intensive care units."
4. ***Shigella sonnei* — According to the World Health Organization, "All species of *Shigella* cause acute bloody diarrhoea by invading and causing patchy destruction of the colonic epithelium." (pg. 2) *S. sonnei* causes a relatively mild form of the disease shigellosis, aka bacterial dysentery. *Shigella* are all highly infectious. There is no vaccine for any serotype of *shigella*. According to a 2018 article in the journal *New Microbes and New Infections*, "*Shigellae* are phylogenetically *E. coli* that were later classified as separate species on the bases of biochemical characteristics and clinical relevance."
5. ***Shigella flexneria — S. flexneria* is the second most virulent form of *Shigella. W*hile *Shigella dysenteriae* produces the most severe disease, one source states, "*Shigella flexneria* serotype 2a [is] the most prevalent species and serotype that causes bacillary dysentery or shigellosis in man." *Shigella* species are considered Category B bioterroism threats. Per the WHO, *S. flexneria* "is the chief cause of endemic shigellosis in developing countries." (pg. 2) According to the military textbook *Medical Aspects of Biological Warfare [MABW]* (2018, p. 4)*, Shigella* was one of the pathogens that Japan's Unit 731 used in its attack on Chinese cities during World War II. The same source states that *Shigella* "causes about 165 million cases [of shigellosis] per year," with "25,000 cases of illness each year in the United States" (p. 74).
6. ***Salmonella typhimurium — S. typhimurium* was researched at Ft. (then-Camp) Detrick in the late 1940s-early 1950s. The pathogen was infamously used by the Rajneesh cult in various biological agent attacks in Wasco County, Oregon in summer 1984. A September 1984 set of attacks on food establishments in The Dalles "caused 751 cases of enteritis and at least 45 hospitalizations" (p. 13, *MABW*). — Salmonella outbreaks are relatively common in the United States, with "1.4 million salmonellosis infections… annually in the United States, resulting in 15,000 hospitalizations and 400 deaths" (p. 44, *MABW*). Its use as a bioweapon goes back at least to World War II, when Japan's biological warfare Unit 731 used *S. typhimurium* and many other bacteria and viruses to experimentally poison prisoners, in addition to "contaminating wells with *S. typhimurium* along the Russian border of Mongolia" (p. 73, *MABW*). Salmonella is considered a Category B Bioterrorism threat. — There is a strain of *S. typhimurium (?pho P/Q)* that is being researched as a vaccine for plague. But this does not appear to be the type held at the Kharkiv lab. Additionally, *S. typhimurium* infects wild birds, and "infected birds may transmit infection to humans, either directly as a result of handling, or more commonly, as a result of

exposure to domestic cats infected by preying on sick and moribund birds," according to a 2004 article in *Seminars in Avian and Exotic Pet Medicine*

7. **Proteus vulgaris* — *P. vulgaris* can cause illnesses in humans. It exists in the intestinal tract, and can cause serious UTIs. Because antibody assays of tularemia can be confounded with those of *P. vulgaris*, it's possible that its presence in the lab had something to do with the study of tularemia. While tularemia was not listed on the RIA Novosti list, it's known from published literature that research on wild tularemia was being conducted by the Kharkiv and other Ukraine laboratories. — According to a Canadian government data sheet, *Proteus* can also cause other infections, including septicaemia and wound infections.
8. *Enterobacter aerogenes* — This organism is also known as Klebsiella aerogenes. Considered an opportunistic pathogen, it is generally not dangerous in healthy people. It is a common gut bacteria. It is also antibiotic resistant. When an infection occurs, it usually happens in a hospital. *E. aerogenes* can cause eye and skin infections, meningitis, pneumonia and UTIs
9. *Staphlococcus aureus* ATCC 25923 — A standard lab testing control strain.
10. *Pseudomonas aeruginosa* ATCC 27853 — Another standard model lab strain, commonly used in biomedical research
11. **E. coli* O55 — Less virulent and nontoxogenic, unlike its more deadly cousin *E. coli* O157:H7, *E. coli* O55 can still cause serious illness. In 2014 and 2015, there were a number of small outbreaks in Dorset, England, and some children were hospitalized. While most *E. coli* are harmless, the O55 strain is one of those that cause intestinal and other illnesses, including, rarely, kidney failure. *E. coli* is usually spread via contaminated food or water.
12. *E. coli* B — This is a research model of E. coli and is commonly used in laboratories. It is considered low risk.
13. **Proteus mirabilis* — According to Jules J. Berman, in Taxonomic Guide to Infectious Diseases (Second Edition), 2019, P. mirabilis is the "species most commonly found in Proteus-caused infections." It is spread by contact with infected materials. P. mirabilis is known most commonly associated with UTIs and kidney stone formation, but can also cause peritonitis and, rarely, blood poisoning.
14. **Klebsiella pneumonia* [*pneumoniae*] — *K. pneumoniae* is often associated with healthcare settings. It lives in your intestines and stool, and can be spread by personal contact or via contaminated materials, such as a catheter in a hospital. It can cause UTIs, pneumonia, bloodstream infections (also called sepsis); wound or surgical site infections; and meningitis. Healthy people are less likely to suffer infections, but if infected, the pathogen can even be fatal, if it enters the bloodstream. Recently, multidrug resistant *Klebsiella* began appearing in some U.S. hospitals in the early 2000s. A medical journal article in 2019 stated flatly, *K. pneumoniae* "has high levels of antibiotic resistance." Thus far, this pathogen has no known history as a possible bioweapon. However, a list of bioweapon agents in a 2003 Ft. Detrick presentation, "Real-Time PCR Diagnostics for Detecting and Identifying Potential Bioweapons," lists *Klebsiella pneumoniae,* as well as other pathogens on the Kharkiv list discussed in this article, including *Proteus mirabilis*, *Corynebacterium* species, and *Shigella flexneri* and *sonnei.* It would seem that the United States Army Medical Research Institute of Infectious Diseases at Ft. Detrick has at least considered *K. pneumoniae* as a bioweapon.
15. *Corynebacterium pseudodiphtheriticum* — Not all Corynebacterium species are considered pathogenic. The most serious, *C. diphtheriae*, which causes diphtheria, is discussed below. *C. pseudodiphtheriticum* is a "putative probiotic" and "opportunistic infector" that lives in the nose and throat. It used to be known as *Corynebacterium hofmannii.* A 2015 article in the journal *Virulence*

called the bacteria an “emerging pathogen,” noting “little is known about virulence factors and pathogenesis of this bacterium to date.” A 1999 article states that it can cause endocarditis (inflammation of a lining of the heart and its valves), pneumonitis (a lung inflammation), and bronchotracheitis (an inflammation of the trachea). I have not seen it mentioned in relation to any bioweapon.

16. **Corynebacterium xerosis 12078* — The United Kingdom’s Advisory Committee on Dangerous Pathogens (ACDP) has listed *C. xerosis* as a Category 2 pathogen. It “can cause human disease and may be a hazard to employees; it is unlikely to spread to the community and there is usually effective prophylaxis or treatment available.” None of the pathogens on the Kharkiv list rise above ACDP Category 2. — *C. xerosis* is found on skin and human mucus membranes. A 2016 article at *BMC Research Notes* remarks, “It is considered an unusual pathogen, and it is rarely found in human and animal clinical samples.” Additionally, it “has been reported as a rare but serious cause of bacteremia, septicemia, pneumonia, septic arthritis, vertebral osteomyelitis, meningitis and, most commonly, endocarditis in adults.” More recently, there was a report of *C. xerosis* causing subcutaneous abscesses in sheep, and therefore could present “a zoonotic risk factor for human infection in sheep farms.” I have not seen it listed in any research or documents related to biological weapons.
17. ***Corynebacterium diphtheriae*, var gravis — According to the CDC, “Diphtheria is a serious infection caused by strains of bacteria called *Corynebacterium diphtheriae* that make toxin (poison). It can lead to difficulty breathing, heart failure, paralysis, and even death. CDC recommends vaccines for infants, children, teens, and adults to prevent diphtheria.” It is a Category B bioterrorism agent. “Gravis” is the most severe form of *C. diphthereriae*. It has been associated with past instances of bioterrorism or biocrime (see link, pg. 16). It was also one of the diseases studied by Imperial Japan’s biowarfare scientists (pg. 480). Diphtheria toxin has been a subject of research at Ft. Detrick in the past, as this 1978 report attests. Interestingly, diphtheria was the first documented case of a laboratory-acquired infection, back in 1898. (See link, pg. 4–8.)
18. ***Corynebacterium diphtheriae*, var mitis — *C. diphtheriae* mitis can cause a mild form of the disease diphtheria.
19. *Bacillus liheniformis* BKM — This bacteria can be found in the soil, on bird feathers, on contaminated food, etc. It is used as an industrial enyzme and has a possible probiotic strains. It is considered safe, but in immunocompromised individuals can cause infections. Since this pathogen includes the acronym BKM (banded krait minor satellite DNA), it was most likely a lab specimen used for DNA fingerprinting. It likely has nothing to do with bioweapons research.
20. *Bacillus stearothermophilus BKM* — Also known as *Geobacillus stearothermophilus.* Like *B. liheniformis above,* this bioagent likely was used in DNA studies, or perhaps for sterilization validation. *B. stearothermophilus* itself is a common contaminant of diary products, causing spoilage. It seems unrelated to any bioweapons research.

The Open Letter was started as a petition at Change.org by Dr. Eugene V. Koonin, who graduated from Moscow State University and is now a NIH Distinguished Investigator at the National Center for Biotechnology Information. I wrote to Dr. Koonin asking him whether he still stood by the characterization in the Open Letter as to the supposed harmlessness of the listed pathogens. As yet, I have not heard back from him. Should he reply, I will update this article with his response.

Issues of BW Delivery Systems and BW Secrecy

A 1998 "working paper" for the Center for Counterproliferation Research (CCR) at the National Defense University, Washington, D.C., makes an important point about biological agents.

> A biological agent is not necessarily a biological weapon. Only if there is a mechanism for spreading the agent is it transformed into a weapon. Thus, a pathogen growing on a petri dish is not a weapon, or even a threat, because it is unlikely to infect anyone. In some cases, the release method need not be very sophisticated. If the agent is highly contagious, infecting a single person or animal may be sufficient to start an epidemic. [p. 16]

If Ukraine in fact had its own biological weapons program, then we would expect to see some evidence somewhere of research on or planning for delivery mechanisms for the pathogens. If their program was subordinate or somehow attached to any alleged U.S. BW program, then the delivery systems would come from the Ft. Detrick complex of labs and testing sites, or perhaps from the U.S. Air Force or the CIA.

As the CCR statement reminds us, the delivery mechanism "need not be very sophisticated." It could amount to poisoning of water supplies or foodstuffs as the Rajneesh people did at The Dalles nearly forty years ago, or spreading of contaminated materials, as was done by Unit 731 personnel, and arguably, U.S. agents themselves during the Korean War.

Because so much about biological weapons programs has been and remains classified, it is difficult to assess the actual state of current BW research or operations. That is true for any country in the world. The Biological Weapons Convention lacks transparency and verification protocols, something the U.S. worked hard to keep out of the BWC.

Perhaps one side effect of this whole controversy over biolabs in Ukraine will be a renewed effort to put some teeth in the BWC, and open up the secret world of biowarfare research, as well as bring attention to the full history of U.S. BW operations.

by Jeffrey Kaye
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