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POLICY MEMO

Pathogen as Policy: Defending Against Chinese Biowarfare

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The COVID-19 pandemic was a stress test for governments, healthcare providers, and medical innovators. Their responses revealed that policymakers and officials need to make their citizens and economies more resilient against acute health emergencies. In the pandemic's early days, Washington found itself reliant on the People's Republic of China (PRC) for supplies of personal protective equipment (PPE) like medical masks and gloves. The Trump and Biden administrations responded by issuing directives to break America's reliance on China for these materials. Still, by some measures, the United States is more reliant on this foreign adversary for PPE in 2025 than it was during the COVID-19 crisis.[1]

But in other important fields like vaccines, the United States has dominated. In 2020, Pfizer and Moderna developed vaccines with mRNA technology, won quick approval from the Food and Drug Administration (FDA), and distributed them globally. Superior biotechnology allowed America to emerge from the pandemic quickly and manage subsequent viral mutations with relative ease. Meanwhile, the PRC had to institute draconian zero-COVID policies to compensate for its inferior vaccines and lower vaccination rates.

US policymakers need to prepare for the next crisis. Advancements like artificial intelligence (AI) will allow bad actors to weaponize biotechnology with a cellular level of precision. The Chinese Communist Party (CCP) has long explored potential military applications of biotechnology, and the People's Liberation Army (PLA) is working with biomedical labs throughout China to develop these capabilities. The CCP is also angling to break America's advantage on mRNA technology and position Chinese companies to dominate this space.

Chinese biotechnology dominance would pose a profound threat to the United States. The PRC could genetically engineer a virus that targets certain ethnicities but spares its own people from infection, for example. Alternatively, China could develop a vaccine in advance but selectively withhold it from the target population.

Biotechnology could change lives for the better. But it can also be weaponized with devastating effects. US policymakers need to get ahead of the problem now before it is too late.

Biotech's Transformative Potential

Biotechnology is not new. For decades, scientists have manipulated biological fundamentals like DNA to serve human ends. Synthetic insulin and genetically modified crops are two early examples. The novel element today is the scope and scale of innovation that AI enables, specifically in gene editing and synthetic biology.

In 2020, Google DeepMind's AlphaFold accurately predicted the three-dimensional structures of proteins based solely on their amino acid sequences. In subsequent iterations, the AI program scaled this capacity to over 200 million protein structures—a task that would previously have required years of human labor. Today, scientists can train computer models like AlphaFold to accomplish similar tasks in a matter of days.[2] Gene-editing systems like clustered regularly interspaced short palindromic repeats (CRISPR), enhanced by AI, are transforming biology from a descriptive science into an engineering discipline.[3] This technology's economic and societal implications are profound. Genetically engineered crops need less water and are more resilient to pests, and gene therapies are solving previously incurable diseases like sickle cell anemia. AI has even unlocked the potential to tailor medicine for an individual's unique genetic code.

Biotechnology could also help break supply chain roadblocks in critical sectors. For decades, the United States has relied on the PRC for refined rare earth elements that are essential for appliances, vehicles, and defense platforms. The Department of Defense recently invested in an American rare earths mining company in California, an operation that would traditionally take years to scale. But advances in biotechnology have created enzymes that target and extract elements from rare earth deposits that current technology cannot mine.[4] According to the congressionally mandated National Security Commission on Emerging Biotechnology (NSCEB), this technology "could help meet demand from semiconductor and advanced weapons manufacturers, while insulating our economy from the CCP's exploitation of this critical industry."[5]

Beijing's Biotech Gambit

Of course, the United States is not the only nation racing to develop and leverage biotechnology. In 2006, the PRC released the Outline of National Medium- and Long-Term Science and Technology Development Plan, a 15-year strategy to build a science and technology innovation base in China.[6] Nine years later, Beijing issued Made in China 2025, a plan that sought to establish Chinese dominance in 10 strategic sectors. The final sector listed was biotechnology.[7] The following year, the State Council published the Thirteenth Five-Year Plan, which stated Beijing's intent to "accelerate the transformation of China from a biotech power to a biotech superpower."[8] The document identifies two critical lines of effort:

1. **Dominate genetic sequencing.** "Accelerate breakthroughs in . . . genomics technologies, synthetic biology, [and] biological big data . . . [and] seize a commanding position in international biotechnology competition."[9]

   Fueled by PRC government subsidies that enable them to charge below-market rates, national champions like BGI Group now dominate the global sequencing equipment and genetic testing industries. Other PRC companies have become global leaders in drug production. For instance, by one estimate WuXi AppTec was involved in one-fourth of US-based drug production in 2024.[10] Importantly, both firms have acquired competitive American genomics companies, which has alarmed Washington. In 2021, the National Counterintelligence and Security Center published a report that highlighted BGI Group's 2013 purchase of Complete Genomics and WuXi's 2015 acquisition of NextCODE Health.[11]

   Over the past decade, the US biotechnology sector has developed critical dependencies on and allowed greater

access to PRC companies. Nearly 80 percent of US biopharmaceutical companies depended on manufacturing inputs from WuXi or other Chinese companies.[12] According to the US Department of Commerce, BGI subsidiaries "present a significant risk of diversion to China's military programs" and "a significant risk of contributing to monitoring and surveillance by the government of China, which has been utilized in the repression of ethnic minorities in China."[13] According to a 2024 letter from bipartisan members of Congress to senior administration officials, WuXi has connections to the PLA and is also complicit in the CCP's genocide of Uyghurs in Xinjiang.[14]

Drug discovery company Hongene Biotech Corporation has also positioned itself as a leader in nucleic raw materials. PRC state media reported in 2022 that Hongene was responsible for 70 percent of global nucleic materials production.[15] Two years later, Hongene inked a strategic collaboration agreement with an American company to accelerate global drug development.[16]

2. Contest US superiority in vaccine development. "Research on key technologies such as major vaccines . . . [to] construct an internationally competitive pharmaceutical biotechnology industry system."[17]

Beijing also seeks to dominate specific biotech applications that are downstream of genetic sequencing. One such industry is vaccine development. Synthgene Biotech Co. has led Beijing's efforts to end China's dependence on US companies for mRNA vaccines. Founded one year before the COVID-19 pandemic, Synthgene has partnered with leading Chinese biotech innovation centers to "debottleneck the raw material supply" of mRNA and oligonucleotide manufacturing.[18] Synthgene's US subsidiary, Areterna, claims its mission is to "democratize mRNA vaccines and therapeutics"—PRC shorthand for weakening America's market share.[19] Following the model other Chinese companies have used to monopolize critical sectors like telecommunications and renewable energy, Synthgene is vertically integrating its entire value chain, from raw material procurement to research and production.[20]

Synthgene has received significant financial support from multiple PRC state-backed entities,[21] as well as from the PLA. During the pandemic, the Chinese National Center of Technology Innovation for Biopharmaceuticals (NCTIB) selected Synthgene to participate in a project aimed at leveraging AI to bypass Western patent protections on vaccine technology. The State Key Laboratory of Pathogenic Microbiological Safety at the PLA's Academy of Military Sciences partnered with Synthgene on the project.[22] The company also established Xinjiang Synthgene Biotechnology Co. in 2020, a joint venture with a Chinese state-owned enterprise. This suggested the company may be involved with the forcible DNA sampling of Uyghurs, a key part of the CCP's genocide in Xinjiang.[23]

Synthgene uses Areterna to expand its global reach. In February 2024, Areterna announced a distribution agreement with an Egyptian company to deliver "high-quality, cost-effective raw materials and services for mRNA and oligo research and manufacturing in the Middle East and North Africa."[24] That same month, Areterna signed a similar agreement with a European partner.[25]

These examples suggest that Beijing seeks to undercut Western biotechnology competitors with cheap prices to dominate the global market—as it has done in telecommunications, renewable energy, batteries, and other critical industries. Recent evidence suggests that this plan is working. In May 2025, Pfizer announced a $6 billion licensing pact with China's 3Sbio.[26] In 2024, Bayer expanded into Shanghai and built a life sciences incubator site.[27] Three years ago, only 5 percent of drug discovery came from the PRC. By 2024, that figure had jumped to 30 percent. In the first quarter of 2025, it had risen to 40 percent.[28] Months later, the Belfer Center at Harvard University released a study of US-China competition in key next-generation technologies. Its findings underscored Beijing's

progress: "Among the technologies examined in this index, China has the most immediate opportunity to overtake the United States in biotechnology."[29] If China successfully diverts funding for research and development away from the United States, it stands to dominate the rest of the value chain—as it already does with critical minerals.[30]

Early Warning Indicators

In 1997, the Pentagon assessed that the PRC maintained "a variety of fighters, bombers, helicopters, artillery, rockets, mortars, and sprayers available as potential means of delivery for [nuclear, biological, or chemical] weapons."[31] Technological developments since then, particularly CRISPR and genetic editing, have transformed this threat. The CCP no longer needs to use missiles or rockets to infect foreign populations with biological weapons; it can now release them covertly.

Americans encountered this possibility in December 2022 when local law enforcement stumbled upon an unlicensed laboratory across the street from a residential neighborhood in Reedley, California. An initial inspection revealed medical-grade freezers holding vials of biological material.[32] Some material was labeled in Mandarin, while other vials were unmarked.[33] Lab workers identified themselves as PRC nationals.[34] Subsequent inspections by local and federal officials revealed the presence of (a) narcotics;[35] (b) mice genetically engineered to catch and transmit SARS-CoV-2 (the virus that causes COVID-19);[36] and (c) potentially infectious bacterial agents, parasites, and viral agents, including Ebola.[37] Zhu Jiabei, a man wanted by Canadian authorities for stealing US intellectual property, was overseeing the lab.[38] The House Select Committee on Strategic Competition Between the US and the CCP published a report in November 2023 with a startling finding: "No one knows whether there are other unknown biolabs in the United States because there is no monitoring system in place. . . . There does not appear to be any voluntary vetting of the purchase of pathogens or the equipment and materials needed to increase the lethality of pathogens."[39]

In June 2025, the Department of Justice announced charges against two PRC nationals for conspiracy, false statements, visa fraud, and smuggling. The final charge was the most concerning, as the item in question was a fungus called *Fusarium graminearum*. According to the DOJ, this fungus is "a potential agroterrorism weapon" responsible for head blight, a disease that targets wheat, maize, barley, rice, and other grains. Each year, this fungus causes billions in economic losses worldwide. Its effects on humans and livestock include vomiting, liver damage, and reproductive disruptions. This attempted agroterrorism suggests that Beijing at the very least wants to maintain the ability to attack Americans through the US food supply.

Both incidents underscore the CCP's belief in biotechnology's transformative power and the asymmetric advantages China seeks to gain by weaponizing biotech advancements. Scholars at the PLA's National University of Defense Technology have identified "ethnic-specific genetic weapons" as a potential element of "biological deterrence" and argue that "the high lethality, low cost, and diverse means of genetic attack . . . will have a profound impact on future wars." It is concerning, then, that much of China's use of CRISPR research occurs at PLA medical facilities.[40]

Policy Recommendations

The PLA has investigated bioengineered viruses as elements of twenty-first-century warfare, and the United States has had several near misses with Chinese nationals handling pathogens on US soil.

Chinese ambitions, empowered by advances in biotechnology, point toward a dangerous possibility: that the PLA could release a human-engineered virus that would target specific ethnicities and spare Han Chinese. The United States lacks the infrastructure to detect and respond to the virus quickly in such a crisis. Compounding the issue, Beijing has already had some success in hollowing out American drug discovery and moving biotechnological innovation to the PRC, while also trying to

control the manufacturing supply chain. In the next pandemic, Washington cannot take for granted that US companies will be able to develop and manufacture a vaccine—particularly if China has engineered the virus to withstand such efforts.

In July 2025, the Senate Armed Services Committee released its draft of the National Defense Authorization Act for fiscal year 2026. The text included a requirement for Pentagon officials to brief lawmakers by April 1, 2026, on "foreign adversary threats to genetic medicine supply chains."[41] While helpful, the requirement is insufficient to protect the American people from biological threats and deter the CCP in this domain. Policymakers should consider the following additional steps:

- **Designate and sanction additional PRC entities.** The Department of Defense should designate additional Chinese biotechnology companies as Chinese military companies under its 1260H List.[42] The Pentagon should especially target entities involved in genomics equipment manufacturing and mRNA research, development, and production. The Department of the Treasury should also sanction PRC biotech companies with PLA ties.[43]
- **Restrict executive agencies from working with PRC genomics companies.** The BIOSECURE Act was a commendable attempt to ensure that (1) the US government avoids reliance on BGI Group and WuXi AppTec and (2) US government grantees do not use PRC genomics equipment or drug development. Unfortunately, political opposition scuttled the legislation in December 2024.[44] Congress and the Trump administration should work together to revive and enact these policies, as well as expand the list of entities of concern to include companies such as Hongene and Synthgene.
- **Prohibit US pharmaceutical companies from acquiring companies controlled by foreign adversaries.** Congress should pass legislation ensuring that American pharmaceutical giants support biotechnological innovation in American companies, not companies controlled by the CCP or affiliated with the PLA.
- **Require US subsidiaries to divest from PRC biotechnology companies.** In 2024, Congress passed legislation requiring US software applications owned or controlled by a foreign adversary to divest from their foreign parent companies.[45] Congress should pass similar legislation that would forcibly separate American biotechnology companies from PRC owners.
- **Expand viral monitoring.** The COVID-19 pandemic revealed systemic corruption in the World Health Organization (WHO).[46] Washington cannot rely on the WHO for timely information about public health threats. American companies like Ginkgo Bioworks and XWELL partner with the US Centers for Disease Control and Prevention (CDC) to detect more than 30 viruses, bacteria, and other pathogens at four international airports: New York City (JFK), San Francisco (SFO), Boston (BOS), and Washington, DC (IAD).[47] The CDC should expand this program to other airports participating in its Traveler-Based Genomic Surveillance (TGS) program and work with governments in Europe and Asia to expand monitoring.
- **Implement domestic manufacturing requirements for key vaccine modalities.** America's ability to respond to the next pandemic—whether naturally occurring or bioengineered—depends on the country's ability to manufacture the next generation of vaccines without foreign intervention or assistance. To support an effective US vaccine industry, the Centers for Medicare and Medicaid Services should require that all nucleic acid vaccines and therapeutics covered under its programs be manufactured in the US using a domestic supply chain.

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