

Trump's ban on “gain-of-function” research: An attack on science and preparation for war

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On May 5, 2025, President Donald Trump signed an executive order with the seemingly benign title, “Improving the Safety and Security of Biological Research.” A more accurate title would have been, “Blindfolding science and encouraging anti-China hysteria,” but Trump and his fascist aides traffic in lies and conspiracy theories, not the truth.

The order bans federal funding of what it describes as “dangerous gain-of-function research” carried out overseas in “countries of concern,” singling out China by name. It also places such research under strict federal control within the United States itself, whether funded by the government or conducted privately.

While there is no mention of Wuhan and only one reference to COVID-19, the executive order amounts to weaponizing the fascist conspiracy theory that SARS-CoV-2, the virus that causes COVID-19, was created in the Wuhan Institute for Virology and inadvertently or deliberately leaked to infect the world’s population.

The order comes just two weeks after the White House entirely revised its web presentation of the COVID-19 pandemic, embracing the “lab leak” theory and presenting Trump as the strongman who would beat back the supposed Chinese threat. This of course conveniently ignored, as the executive order does, the fact that Trump was in the White House when the pandemic began, and did nothing to stop it, while promoting groundless quack theories about curing the deadly disease with hydroxychloroquine, ivermectin and even bleach.

An additional feature of this conspiracy theory, developed most extensively by the bipartisan Select Subcommittee on the Coronavirus Pandemic, is that longtime public health official Dr. Anthony Fauci oversaw the funding of dangerous research at WIV through EcoHealth Alliance, the non-profit research organization led by Dr. Peter Daszak. The fact sheet that accompanies Trump’s executive order regurgitates these slanders.

The WSWS has analyzed and rebutted these conspiracies extensively, and presented comprehensive evidence amassed over five years that points compellingly to a natural, zoonotic origin for SARS-CoV-2, likely stemming from wildlife trade at the Huanan Seafood Wholesale Market in Wuhan. This record can be accessed [here](#).

Most recently, a study published in *Cell* in May 7, 2025, just two days after Trump’s executive order, drawing on phylogenetic and phylogeographic analyses, provided significant evidence reinforcing the role of the animal trade in the emergence of both SARS-CoV-1 and SARS-CoV-2.

The study found that the closest bat virus ancestors of SARS-CoV-1 and SARS-CoV-2 existed less than a decade before their human emergence, but their natural dispersal in horseshoe bats was not sufficient to carry them the large distances to the sites where they first emerged in humans. This pattern strongly suggests that the viruses “hitched a ride there with other animals via the wildlife trade,” mirroring what happened during the 2002 SARS outbreak where related viruses were found in civets and raccoon dogs hundreds of miles from bat populations. This new research

underscores how interactions with intermediate hosts through the wildlife trade were critical to the zoonotic spillover events for both pandemics. It also provides objective scientific refutation of the entire Wuhan Lab conspiracy theory that has been promoted globally.

This “lab leak” falsification served to deflect from the devastating failures of the domestic pandemic response in numerous capitalist countries by scapegoating China and attacking scientists and institutions that contradicted the preferred political line. Trump’s executive order, therefore, represents the codification of this politically motivated agenda, leveraging the power of the state to restrict crucial scientific research under the pretext of a theory overwhelmingly contradicted by available evidence, turning the pursuit of origins tracing into a political witch-hunt against science and public health.

“Gain-of-function” research: myth versus reality

During the signing of the executive order, HHS Secretary Robert F. Kennedy, Jr.—notorious for purveying virtually every anti-science conspiracy known to man—opined, referring to “gain-of-function” research, “Can’t point to a single good thing that comes from it.” Perhaps he was thinking about his decades of anti-scientific campaigning against vaccination. In any case, he knows little about such research and understands nothing.

At its core, gain-of-function (GOF) research involves genetically altering an organism, particularly pathogens, to study how enhanced virulence, pathogenicity, or transmissibility could develop, in order to deepen the understanding of the pathogen and assist in developing countermeasures.

This is distinct from loss-of-function (LOF) research, which investigates weakened pathogens, though the two methods are interconnected and often used in the same study.

Gain-of-function research has demonstrably provided significant benefits to humanity, contrary to claims that it has yielded nothing good:

- It is a foundational technique in modern biology, underlying much biomedical progress.

- GOF and LOF experiments allow investigators to understand the complex nature of host-pathogen interactions, including transmission, infection, and pathogenesis. This fundamental knowledge is crucial for fighting and preventing diseases.

- The methodology has been integral to landmark scientific breakthroughs, particularly in vaccine development. Louis Pasteur’s early work, while largely LOF, set precedents for manipulating pathogens to obtain health benefits.

- It helps scientists identify which mutations make viruses more transmissible or virulent, allowing researchers to anticipate public health

threats. By simulating how viruses might evolve in nature—which is in effect a giant laboratory conducting nonstop GOF experiments through mutation and natural selection—researchers can preemptively build defenses.

Specific examples of benefits include:

- Development of a weakened African swine fever virus (LOF, but related methodology) used as a vaccine that fully protected pigs.
- Investigating how bacteria like *Pseudomonas aeruginosa* interact with a host in animal systems to understand how they fundamentally function, such as invading cells or avoiding the immune system.
- Understanding how and why bacterial pathogens develop antibiotic resistance, informing the development of treatments for “superbugs.”
- Gaining insight into how viruses evolve to evade the immune system.
- Identifying mutations that make a gene work better, mapping and studying critical control sites.
- Discovering natural animal reservoirs for viruses and providing early warnings about potential outbreaks.
- Aiding in the development and testing of COVID-19 vaccines and treatments.
- Contributing to the development of CAR-T cancer therapies.
- Applications beyond pathogens, such as engineering drought- or pest-resistant crops or developing oncolytic viruses used to treat cancer. At least two FDA-approved products resulted from providing viruses with new functions.
- GOF research has established that avian influenza viruses can acquire mammalian transmissibility and that bat-associated coronaviruses posed a danger to human populations years before COVID-19, advancing pandemic preparedness.

The attack on scientifically vital research

The history of controversy surrounding GOF research is marked by specific incidents. Significant debate arose in 2011 following studies by Ron Fouchier and Yoshihiro Kawaoka that set up experiments designed to generate strains of H5N1 avian influenza transmissible between mammals. These experiments, while seen by some as crucial for understanding potential pandemic threats (which have been vindicated by the current H5N1 bird flu panzootic), triggered concerns about the safety and security risks of creating potentially more dangerous pathogens. In the end, their work resulted in a pathogen that was able to transmit via aerosol among ferrets (increased transmissibility) but had reduced impact (decreased virulence).

This led to a temporary pause in federal funding for new GOF studies on specific viruses in October 2014. During this pause, the National Science Advisory Board on Biosecurity (NSABB) conducted a deliberative process to inform new policies. The moratorium was lifted in December 2017, based on the view that GOF research is important for identifying, understanding, and developing countermeasures against rapidly evolving pathogens.

The debate intensified during the COVID-19 pandemic, fueled by allegations regarding the origin of SARS-CoV-2 and research conducted at the WIV. Despite official statements that included documentary evidence that was made public by the National Institutes of Health and EcoHealth Alliance that their work with the WIV under a specific grant was not classified as gain-of-function under the operative definition at the time, the controversy persisted, highlighting definitional ambiguity and political polarization.

In response to concerns, the US government has established multiple regulatory measures to oversee potentially risky research. These include

policies on Dual-Use Research of Concern (DURC) and the Framework for Guiding Funding Decisions about Proposed Research Involving Enhanced Potential Pandemic Pathogens (P3CO).

The P3CO framework, for instance, guides HHS funding decisions for research reasonably anticipated to create, transfer, or use enhanced potential pandemic pathogens. These frameworks are intended to ensure a multidisciplinary review and evaluation process to inform funding decisions and balance the benefits of life sciences research with biosafety and biosecurity risks. Oversight is meant to be incorporated into existing frameworks and enhanced when necessary. There is no debate that adequate enforcement and transparency are necessary, and strengthening these aspects are critical for the conduct of such important research and use of the tools that provide insight into life and social processes that can provide the world with the ability to address these questions. However, the executive actions and cuts to public health stand in sharp contrast to these aims.

As noted in its report critiquing Trump’s executive order on GOF, Global Biodefense correctly states that these policies threaten all US virology. The report underscores several key concerns regarding the current state of GOF research and oversight. A primary consideration is the potential for overly broad restrictions that, in the name of enhanced safety and security, could impede beneficial scientific progress necessary for pandemic preparedness, drug development, and understanding infectious diseases. This is exacerbated by a persistent lack of uniformity and clarity in definitions for terms like GOF or “enhanced potential pandemic pathogens” (ePPP), making it difficult to target regulation effectively and potentially leading to subjective interpretations which suit the Trump administration’s agenda.

The crackdown on GOF will create a chilling effect in laboratories across the US, since researchers cannot predict experimental outcomes with complete accuracy. A genetic modification could increase or weaken a particular function, and the result cannot be known precisely in advance. Even worse is the effective ban on international collaboration in research. Pandemics are of intrinsically of international concern because viruses, bacteria and other pathogens do not respect borders.

The work done by EcoHealth Alliance and the WIV

Trump’s executive order on gain-of-function research specifically links the COVID-19 pandemic’s origin to laboratory incidents stemming from this type of research, an indirect reference to the work conducted on bat coronaviruses in China by EcoHealth Alliance and the Wuhan Institute of Virology. However, multiple sources dispute this claim, characterizing it as a politically motivated justification that lacks credible scientific evidence and is used to restrict research.

In the important rebuttal to the false accusations of the Select Subcommittee on the Coronavirus Pandemic (SSCP), EcoHealth Alliance and Dr. Peter Daszak strongly assert that the experiment conducted at the Wuhan Institute of Virology (WIV) under NIH grant R01 AI110964 was not considered gain-of-function research according to the definitions and decisions in place at the time.

The experiment in question, proposed by WIV scientists as part of the grant, involved *in vivo* mouse experiments using recombinant bat coronaviruses, specifically to generate SARS-like coronaviruses and assess the risk of their emergence from wildlife. The goal was to determine if potentially pathogenic bat SARS-related coronaviruses posed a risk to humans. The experiment involved infecting mice, measuring viral genome copies per gram over time, and collecting survival data and tissues for pathological analysis. Results showed that in some mice

infected with recombinant bat coronaviruses, viral genome copies per gram reached higher levels at days 2 and 4 post infection compared to the parental backbone strain (WIV1), but these levels dropped to resemble other strains by the end of the experiment. In short, they were not more pathogenic.

According to the EcoHealth Alliance and supporting testimony, this experiment was not GOF research for several key reasons:

- NIH's Official Determination in 2016 was that the proposed WIV experiments were not covered by the definition of gain-of-function and were therefore not subject to the GOF research pause in place at the time. This determination was repeatedly confirmed by various NIH officials in public and on-the-record testimony. Notably, even the SSCP Majority (Republican) lead counsel stated during testimony that "what EcoHealth did, did not fall under the P3CO definition."

- EcoHealth argues that the determination of whether an experiment constitutes GOF is made prior to the experiment being conducted, not retroactively based on the outcome.

- The experiment did not involve human pathogens or study transmissibility in humans. Bat coronaviruses are not the same as human coronaviruses because they are not expected to infect or cause harm to humans and therefore are considered exempt from being deemed enhanced pathogens. Leading virologists support the view that research involving non-human species cannot predict pathogenicity in people and that the lack of transmissibility study is significant.

- EcoHealth's position is supported by statements from leading virologists who publicly stated that the WIV experiment did not meet the definition of GOF research, did not break rules, and was monitored according to scientific norms. Dr. Ralph Baric, a leading corona-virologist who collaborated with EHA and WIV on related work, stated in his testimony that "any enhanced viral growth in an experiment is not gain-of-function if the experiment does not use human pathogens." He also confirmed that based on the regulations, the WIV experiments proposed would be exempt.

- EcoHealth asserts that the results of the experiment were reported in their Year 4 report submitted in April 2018, ahead of the deadline, and included again in the renewal proposal in November 2018. Despite multiple exchanges with NIH staff, NIH did not request further information, raw data, or lab notebooks, or express any concerns about the experiment results until over three years later in 2021. EcoHealth interpreted this lack of follow-up from NIH in 2018 as confirmation that the experiment did not present concerns at the time.

EcoHealth Alliance correctly viewed the allegations that they conducted dangerous GOF research as politically motivated and unsupported by the evidence and regulations in place. They contend that their detailed reports and testimony refute these claims and demonstrate the concocted character of reports alleging wrongdoing. However, they were never allowed to challenge these claims and the entire political establishment, including mainstream media, have repeatedly asserted that this small study was a GOF study overlooking the regulatory definitions and oversight on the project.

Conclusion

Trump's executive order on gain-of-function research is predicated on the assertion that the COVID-19 pandemic likely originated from laboratory incidents. However, this claim is a politically motivated lie, lacking credible scientific evidence and serving as a "political cudgel" rather than a scientifically supported conclusion. This unsubstantiated "lab leak" theory, promoted initially by figures like Steve Bannon and

amplified through media aligned with the right-wing anti-China agenda, functions as "American capitalism's 'big lie,'" as the WSWS has previously noted.

It serves the dual purpose of deflecting blame from the disastrous response of the ruling class to the pandemic and fomenting nationalist hatred to support the strategic aim of economic and potentially military conflict with China. This lie is actively shaping both foreign and domestic policy: internationally, by ending federal funding for potentially critical research in countries like China, thereby severing vital lines of surveillance and cooperation and undermining global health security; and domestically, by imposing sweeping restrictions on research and contributing to a broader "war on science," attacking and seeking to criminalize scientists whose findings support a natural origin, and dismantling public health institutions.

The implication is that this politically motivated framework, rather than enhancing safety or preparedness, hobbles essential scientific inquiry needed to understand and mitigate future biological threats, while simultaneously serving the interests of the ruling class in shifting accountability and advancing imperialist aims.



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