Boston University study on Omicron variant smeared as dangerous gain-of-function research by right-wing reactionaries

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Researchers investigating the SARS-CoV-2 virus conducted at Boston University's (BU) National Emerging Infectious Disease Laboratories (NEIDL), one of the world's safest facilities for work on deadly pathogens, recently released an important preprint study.

The scientists, BU and the NEIDL have since come under vicious media attack by right-wing reactionaries and proponents of the fraudulent "Wuhan lab leak" theory. The conspiracy theorists have condemned the study as "gain-of-function" research, that is, an effort to increase the infectiousness or lethality of the virus, and cited it as further "proof" that SARS-CoV-2 was engineered at the direction of the Chinese Communist Party at the Wuhan Institute of Virology (WIV).

The BU study involved adding an Omicron spike protein on to the backbone of the original SARS-CoV-2 virus to address why the Omicron subvariants are less virulent but more infectious. This is a very crucial question that has the potential for identifying new strategies for therapeutics and mechanisms for viral evolution, especially in light of the global catastrophe that has claimed the lives of more than 22 million people and countless more millions impacted by the chronic consequences of their infections.

Rather than the work being examined on its merits, the situation has quickly deteriorated further as federal officials are now weighing in, demanding answers about why the BU researchers had not informed them about the study. The manuscript of the research report had cited support from grants provided by the National Institute of Allergy and Infectious Diseases (NIAID), part of the National Institutes of Health (NIH).

Last week, a spokesman for the NIH told the media, "NIH is examining the matter to determine whether the research conducted [at BU] was subject to the NIH grants policy statement or met the criteria for review under the government's guidelines for certain experiments with dangerous viruses."

A Boston University spokesman countered, "The research was reviewed and approved by the Institutional Biosafety Committee, which consists of scientists as well as local community members. The Boston Public Health Commission also approved the research. We fulfilled all required regulatory obligations and protocols."

Even the *New York Times,* which has suggested that the lab leak "theory" should be given equal weight to the science-based explanation that COVID-19 originated in a zoonotic spillover, had to admit in its reporting on the BU controversy that the hybrid virus created by BU scientists had not made "a new version of the virus," and that "the study did not fall under the dangerous pathogen guidelines." As BU researchers explained, "We set out to understand how the virus works, not identify new ways to make it more potent."

Nonetheless, the attacks on social media exploded last week after a right-wing British newspaper, the *Daily Mail,* wrote that the hybrid deadly virus killed 80 percent of the mice in the study. They avoided mentioning that these "humanized mice" are deliberately made very susceptible to the SARS-CoV-2 coronavirus and 100 percent of the mice infected with the original strain, rather than the modified strain, had died.

Richard Ebright, a molecular biologist at Rutgers University and proponent of the lab leak theory, weighed in, calling the BU study a "gain-of-function" experiment. Recently, he posted a nonsensical thread rehashing the international collaborative work between EcoHealth Alliance, a US-based research group, and the Wuhan Institute of Virology, as evidence of malevolence.

He even threw in for good measure the idea that the furin cleavage site on SARS-CoV-2 was proof of genetic engineering. This is the very same "smoking gun" conjured up by former *New York Times* science writer Nicholas Wade, perhaps the most publicized disseminator of the "lab leak" hoax.

This scientific-sounding but thoroughly unscientific claim has been debunked by many respected scientists, including in two major scientific reports, the *Origins of SARS-CoV-2* and the *Proximal Origin of SARS-CoV-2,* by Edward Holmes, Kristian Andersen and colleagues, which have provided important insight into the natural origin of the coronavirus.

Andersen, an evolutionary biologist at Scripps Research Institute in La Jolla, California, and one of the authors of the two studies, is one of a few voices in defense of the BU scientists. He tweeted, "Since day one, we have been obsessed with the SARS2 spike, but the 'BU study' shows that key determinants of viral pathogenicity lie elsewhere. This is critical insight, yet the number of uninformed bad takes and motivated reasoning has been astounding." He also noted that the study did not, in his opinion, fit the category of a gain-of-function experiment.

Still, unproven and unhinged hypotheses about the Wuhan lab continue to be thrust into the political limelight. Compounding the smearing of the important work being done by researchers like those at BU has been the publication of a new hack job by *ProPublica* and *Vanity Fair* reporters, who are in cahoots with Ranking Member of the Senate Committee on Health, Education, Labor, and Pensions, Republican Senator Richard Burr. His interim report seeks to pass on their conclusions that the pandemic was "the result of a research-related incident," based on zero facts and willful misinformation. These efforts only serve to incite fervent nationalist chauvinism and antagonize consciously against science and scientific thought.

The Boston University study of the Omicron variant

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Emerging infectious diseases (EIDs) pose a real threat to the world. As in any crisis, scientific inquiry is fundamental to ascertain important lessons for the future. However, to find answers to some of these more complex questions surrounding EIDs requires working with these viruses in biosafety labs. It is imperative to learn how and why specific changes in the viral genetics lead to changes in how it interacts with its host.

Such experiments have fallen under indistinct terms like "gain of function" and "dual-use research of concern." This means that though the research is intended to provide important answers and clear public benefits, it could also pose significant risk to public health and safety if misapplied or missteps occurred that released the dangerous biological materials into the community at large.

"Gain-of-function" studies are more specifically defined as those that have the potential to enhance the pathogenicity or transmissibility of potential pandemic pathogens.

The issue of "gain-of-function" studies has been debated for more than a decade. But the emergence of the novel coronavirus and fraudulent claims that SARS-CoV-2 was a byproduct of such experiments, then leaked into Wuhan either intentionally or accidentally, has deeply politicized such important and urgent scientific contributions to the critical issue of emerging infectious diseases.

It bears reviewing the findings of the BU study in brief and ask if the study offered any relevant, important information and "critical insight" to researchers and scientists to assist them in fighting the pandemic.

The Omicron variant of the SARS-CoV-2 coronavirus has shown to be highly transmissible and yet less virulent than earlier strains. Though it has been assumed the spike protein with its numerous mutations is responsible for its infectivity, could the decline in its virulence be attributable to the broader population-based immunity from vaccines and prior infections or intrinsic to the evolving strains of coronavirus, and if so, is the spike protein a factor in this?

The BU study received approval through their Institutional Biosafety Committee and was conducted at NEIDL, headed by Mohsan Saeed, and performed in a biosafety level three facility used for the study of infectious agents or toxins that may be transmitted via aerosol and capable of causing potentially lethal infections.

The researchers first created a chimeric recombinant SARS-CoV-2 (a merging of elements of two different variants) by taking the spike protein from the BA.1 strain of Omicron and genetically splicing it in the backbone of the ancestral SARS-CoV-2 coronavirus that first appeared in Washington state back in February 2020. They then compared this "chimeric virus" with the original and the Omicron strain in various cell lines and "humanized" mice.

In particular, the Omicron strain in these mice models only produced a mild illness. However, 80 percent of the mice infected with the "chimeric" virus died. But all the mice who were infected with the original virus perished. Lung autopsies were done on all the mice and the authors noted a predilection for the Omicron strain to infect the upper airways while the chimeric and the original strains tended to cause significant inflammation deep in lung tissue.

With regards to escaping immune antibodies, both the Omicron and chimeric virus demonstrated equal immune-escape characteristics compared to the original strain. The authors noted that the spike on the Omicron strain appears to have evolved to hinder antibody binding but has *preserved* its ability to bind to the ACE2 receptor on human respiratory cells.

They wrote, "This opens the possibility of targeting the conserved and structurally constrained regions of spike involved in ACE2 recognition for the design of broad-spectrum vaccines to control the current COVID-19 pandemic." They also underscored that "mutations outside of the spike are major determinants" for Omicron's decreased virulence meaning changes.

Right-wing media sensationalizes BU study as a "gain-of-function" experiment

However, as soon as the study was released in preprint form, rather than soberly taking measure of the relative findings and their implications, the media attack commenced.

On October 17, the conservative tabloid, *The Daily Mail*, published an article stating the BU researchers were "playing with fire," and "it could spark a lab-generated pandemic." They then intentionally took out of context the 80 percent kill rate to sensationalize their report, distorting the fact that the researchers had not made a more lethal virus than the original strain, but rather these high mortality figures were attributable to the nature of the highly sensitive mice models and the large intranasal inoculum of virus they were given.

The Daily Mail soon came to the real objective of their sensationalism by calling the experiment gain-of-function research and grafting the idea to the unproven, politically-motivated hypothesis that such research had been conducted at WIV, writing, "Gain of function research—when viruses are purposefully manipulated to be more infectious or deadly—is thought to be at the center of COVID's origin. A Chinese laboratory located just miles from the first cluster of cases carried out research on bat coronaviruses." On no occasion do they offer any factual or concrete evidence for their assertions, couching them in mere speculations.

Dr. Ronald B Corley, NEIDL director and BU Chobanian & Avedisian School of Medicine Chair of Microbiology, fired back, stating, "this research is not gain of function research." He added, referring to the 80 percent number, "This was a statement taken out of context for the purpose of sensationalism, and it totally misrepresents not only the findings, but [also] the purpose of the study. *[This] research mirrors and reinforces the findings of other, similar research performed by other organizations, including the FDA*." [Emphasis added]

Not surprisingly, former White House chief strategist for Donald Trump and one of the architects of the Wuhan lab conspiracy theory, Steve Bannon, who has repeatedly claimed the Chinese Communist Party deliberately released the coronavirus, weighed in. On his podcast channel, *Real America's Voice*, he said, "Outside this lab that is doing gain of function experiments unbeknownst [to anyone], we had [Republican] Senator Marshall from Kansas saying that this was more dangerous than playing with nuclear weapons."

Bannon has been a key player in promoting the lab leak theory and has previously called for beheading Dr. Anthony Fauci and placing his head on a pike in front of the White House for allegedly not disclosing that NIH funds were given to EcoHealth Alliances for work done in collaboration with WIV.

In July 2021, former White House trade adviser Peter Navarro, speaking on Bannon's *War Room Pandemic* podcast, discussed the theory that COVID-19 originated in a lab in Wuhan. He said, "Tony Fauci, if that [COVID] came from that lab, is the godfather of this pandemic and he has the blood of over four million people on his hands."

During the recent podcast, Bannon dropped hints that some of the funding for the BU study may have been tied to a Chinese firm whose CEO is in the Communist Party. The actual facts were left ambiguous, unsubstantiated and, even if true, would be irrelevant. Nonetheless, the political purpose is evident: to claim that the lab leak hypothesis should have equal weight with actual scientific findings about the origins of COVID-19.

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NIH launches an inquiry into the Boston University study

Regarding the issue with the NIAID, at no point has anyone made any allegations that the work conducted by the scientists at BU was done carelessly or improperly. BU has repeatedly affirmed that they have not "created a new deadly COVID strain," and "[the media] has sensationalized the message, they misrepresent the study and its goal in its entirety."

The BU safety protocols had even stipulated that had the study produced a strain that was deadlier than the wild-type strain, the researchers were obligated to stop work immediately and destroy the viruses.

NEIDL, opened in 2009, is one of the foremost biosafety labs in the world with numerous research projects on some of the world's deadliest pathogens—Ebola, Lassa, Marburg—credited to its facility. An expert source told the *World Socialist Web Site* that NEIDL "is one of the safest labs in the world." The facility has some of the strictest safety procedures and rigorous safety reviews, including independent monitoring in place.

However, rather than seek clarification on the issue of funding, NIAID division director of microbiology and infectious diseases Dr. Emily Erbelding chose to stoke more controversy while speaking to the media.

In an interview with Helen Branswell of *STAT News*, Dr. Erbelding said, "[The] original grant application did not specify that the scientists wanted to do this precise work nor did the group make it clear that it was doing experiments that might involve enhancing a pathogen of pandemic potential (ePPP) in the progress reports it provided to NIAID." Under the rules of the Department of Health and Human Services (HHS), any federally funded research that might produce an enhanced pathogen must get approval through the NIAID.

Virologist Angela Rasmussen told Branswell, "Because so much of the definition of ePPP pertains to reasonable anticipation of results in humans, it's very difficult for researchers to say, 'Oh, yes, this is ePPP.' I'd personally reach out for clarification from NIAID when in doubt, but it's often not obvious when additional guidance is warranted. … I'm very tired of people suggesting that virologists and NIAID are reckless or don't care about biosafety. The problem isn't that. The problem is that the guidelines and expectations aren't clear for many experiments and the process isn't transparent."

Dr. Corley explained that the study in question was not funded by the federal agency but paid for directly by the university. As a follow-up report in *STAT News* later noted, "some funding from NIAID went towards work that might be considered foundational to the questioned research." Corley acknowledged that it is difficult to draw these lines at times as "different pots of money" are used to do these projects, adding, "It is a murky world, but in our view because the funding was not supporting the work that was supported in this paper, that it wasn't necessary to report it to NIH."

Conclusion

The controversy raised over the BU study will certainly inform the ongoing review currently being undertaken by the National Science Advisory Board for Biosecurity (NSABB), which is expected to release sweeping new rules by early next year. These include modifications to the current definitions of ePPP and increased oversight by the federal government.

Revealingly, however, recent compiled public comments from the September meeting reviewing the preliminary draft by the NSABB come from the likes of Richard Ebright, Tom Inglesby of Johns Hopkins Center for Health Security, Harvard epidemiologist Marc Lipsitch, and David Relman, expert on microbiology and biosecurity at Stanford University. To one degree or another, all of these scientists have promoted the lab leak theory or believe it should be given equal weight to the natural origin conception.

Transparency in all research and safe practices, especially of biosafety laboratories, is at the heart of the debate and constitute an important part of the scientific processes. However, this also includes international collaboration, which is being impeded by the repeated attempts to make the pandemic a political issue by promoting a fringe theory that has no basis in scientific facts.

A report co-published by Elsevier, a Netherland-based academic publishing company, and the Association of Pacific Rim Universities (APRU), warned of the danger of the type of complete separation of Chinese and American scientists advocated by the anti-China militarists like Navarro and Bannon, stating, "The world cannot afford to divide the world's two largest producers of published research. The joint publication of the two countries constitutes the largest bilateral research relationship so far, sharing top research talents from both sides. Geopolitical divisions around national interests and technological sovereignty may not disappear any time soon, leading to increased governance or controls related to research collaborations."

The recent report by the Independent Task Force on COVID-19 was a critical document that underscored the need for funding such work. Peter Daszak, president of EcoHealth Alliance and one of the members of the independent task force, speaking to *Intercept* in March, said bluntly, "The real reason this has become so divisive is because it's being used politically. That's it."

Writing on the current issues surrounding the BU study, Kristian Andersen observed, "Such discussion is important, but we need to separate things out. The BU study was performed at BSL-3 and approved by their biosafety committee—all of which is appropriate in my opinion (no, this is not gain-of-function). And, again, the research [is] very important. *This is especially true since nature is literally performing the very same experiment thousands of times on a daily basis—in BSL-1, that is —the type of biosafety level you might expect as you walk into your dentist's office*." [Emphasis added]

In this regard, it can be said that the financial oligarchs and government leaders who are instigating the "forever COVID" pandemic policies are the principal instigators of this global experiment on the human population.

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