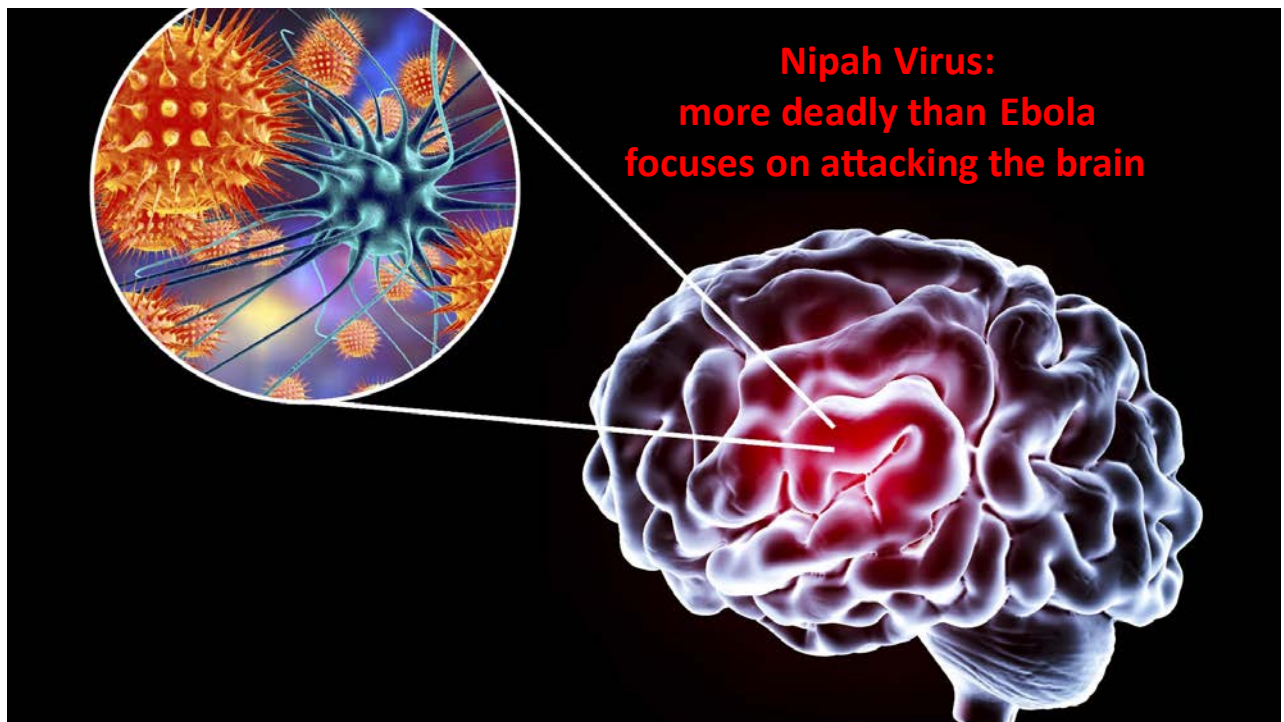


Weaponizing the Nipah Virus:
Rapidly Accelerating Strategic Risks
Inside the Chinese Communist Party System

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DEDICATION TO DR. ROBERT MCCREIGHT:

Friend, Colleague, and Co-Author



1948-2024

Dr. Robert McCreight served for 27 years in the US Army in combined active and reserve duty and served for 35 years in the US Department of State as an intelligence analyst in INR as senior Soviet military analyst, as political military affairs analyst, and as the Deputy Director of Global Scientific Exchanges.

He also participated in the design and coordination of White House nuclear readiness command crisis exercises during the Reagan administration. During his federal career he designed, developed and coordinated well over twenty-six cabinet level strategic nuclear preparedness exercises, worked on Presidential Protection and Survivability Programs and directed the operation of several dozen senior-level military exercises involving theoretical force-on-force scenarios between the United States and the Soviet Union.

After his retirement from government service in 2004 he was an adjunct professor at Georgetown University, George Washington University, George Mason University, Virginia Tech University, and the National Defense University.

He most recently worked as a consultant to the Department of Defense, working on cognitive warfare. He recently published articles on cognitive warfare in the Small Wars Journal, US Army Mad Scientist, and Academia Biology. Dr. McCreight co-authored this assessment of the risk of a global pandemic from dangerous research on the Nipah virus being conducted by Chinese civilian and military researchers. It was completed just before his untimely death.

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Weaponized Zoonotic Pathogens and Other Biological Weapons: Core Elements of the CCP's Standard Order of Battle

The People's Liberation Army (PLA) is ambitious in developing biological weapons as they are regarded as one core approach under the Unrestricted Warfare Doctrine. In 2015, then-president of the Academy of Military Medical Sciences (AMMS) He Fuchu (贺福初) argued that biotechnology will become the new 'strategic commanding heights' of national defense, from biomaterials to 'brain control' weapons.⁸ In addition, the 2017 edition of *Science of Military Strategy* (战略学), a textbook published by the PLA's National Defense University that is considered to be authoritative, debuted a section about biology as a domain of military struggle, mentioning the potential for new kinds of biological warfare to include 'specific ethnic genetic attacks.'⁹

Bioweapons are part of the CCP's standard order of battle; not an unconventional set of capabilities only to be used under extreme circumstances. This represents a fundamental difference in strategic thinking regarding these domains in Beijing. This is not a hypothetical point. There was a sharp statistical increase in Chinese military activity in the South China Sea, East China Sea, Taiwan Straits, and along the Sino-Indian border during the most acute phases of the COVID-19 outbreak in 2020 and 2021.¹⁰

These research programs are not obscure 'moonshots'; they are core strategic focus areas that are designed to be utilized over the near-term and within current state strategic circumstances, such as in Taiwan. Any breakthrough in this research would provide unprecedented tools for the CCP to forcibly establish a new world order, which has been Xi Jinping's lifelong goal.

For example, these capabilities can 'fit' into the CCP's anti-access/area denial strategy in the Indo-Pacific. Imagine (at least partially) immunized PLA troops being inserted into a geography where a specific weaponized bacterial strain has been released prior to their entry to prepare the ground and eliminate points of resistance. Local government lock-down orders, instituted most recently with COVID-19, would clear the streets of civilians. Any remaining

⁸ Elsa Kania and Wilson Vorndick, 'Weaponizing Biotech: How China's Military Is Preparing for a 'New Domain of Warfare'', *Defense One*, 14 August 2019. *The Science of Military Strategy 2017*, National Defense University, People's Liberation Army, Beijing, 2017. Tianliang Xiao [肖天亮], eds., *The Science of Military Strategy* [战略学]. PLA National Defense University Press, Beijing, 2015. Jieming Wu [吴杰明] and Zhifu Liu [刘志富], *An Introduction to Public Opinion Warfare, Psychological Warfare, [and] Legal Warfare* [舆论战心理战法律战概论], PLA National Defense University Press, Beijing, 2014. Academy of Military Science Military Strategy Research Department [军事科学院军事战略研究部], eds., *The Science of Military Strategy* [战略学]. Military Science Press, Beijing, 2013. Qiao Liang and Wang Xiangsui, *Unrestricted Warfare: Two Air Force Senior Colonels on Scenarios for War and the Operational Art in an Era of Globalization* [超限战], PLA Literature and Arts Publishing House, Beijing, February 1999. Baocun Wang and Fei Li, 'Information Warfare', *Liberation Army Daily by Federation of American Scientists*, June 1995.

⁹ Elsa Kania and Wilson Vorndick, 'Weaponizing Biotech: How China's Military Is Preparing for a 'New Domain of Warfare'', *Defense One*, 14 August 2019. *The Science of Military Strategy 2017*, National Defense University, People's Liberation Army, Beijing, 2017.

¹⁰ For example, please see Ryan Clarke, 'Is China Converting COVID-19 Into a Strategic Opportunity?', EAI Background Brief No. 1545, National University of Singapore, 9 July 2020.

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sources of resistance on the ground are then dealt with through CCP NeuroStrike¹¹ weaponry that instills intense fear and/or other forms of cognitive incoherence resulting in inaction.

The net result of such a scenario would be the PLA establishing absolute control over a geography such as Taiwan while simultaneously blunting any American strategic options to intervene and physically insert personnel into the theater. This would effectively negate and render inert America's overwhelming conventional superiority with very few (if any) near-term remedies. This scenario is based on known existing CCP research programs and what the clear strategic aims of those programs are.

There Are No Civilian Labs in China Under the CCP: Civil-Military Fusion and National Security Law

The Civil-Military Fusion Law, which was exercised by the PLA during the COVID-19 pandemic, renders any institution, private company, or non-governmental organization vulnerable to forcible takeover by the state at any time. In addition, high-risk pathogen research that is being conducted at various Chinese virology institutes is under the direction of the CCP and, in some cases, the PLA. This represents a fundamental difference in the system between China under the CCP and the few other nations that have the demonstrated capability to work with dangerous pathogens.

Superficially, officially civilian research institutes in China operate along an American-style biomedical research and hospital network system with interlinking research institutes, laboratories, clinical facilities, medical education and technology commercialization operations that are designed to be mutually reinforcing and beneficial across the entire network. For example, specific Principal Investigators (PIs) within a specialized lab/s will be tasked with analyzing samples and providing technical opinions on complex patient cases coming from clinical care. They may also be asked to develop new technologies to address these complex challenges, be it in the form of new drugs, diagnostic tests, vaccines, prophylactics, or bioinformatics software.

As part of these activities, Chinese PIs will interact with and seek input or guidance from international collaborators who work in a similar domain area, especially in the United States and Europe. These activities are designed to enhance clinical activities and position CCP-run biomedical institutes as world leaders in both patient care, scientific knowledge generation, and biomedical technology development.

In addition, non-clinician scientists are enabled to be deeply embedded in the flow of clinical activities and to configure their own respective scientific research agendas around current and emerging clinical priorities within the system. Under this type of system, virtually all research is applied and directly linked to clinical priorities and other national priorities set by the CCP. 'Blue sky,' or more open-ended research without clearly pre-determined required outcomes, is largely absent within the Chinese system.

While the basic structure of CCP biomedical research institutes resemble an American-style system, material differences have emerged over time. First, like other leading biomedical research institutes in China, all members of the Chinese leadership teams and leading clinicians

¹¹ [Enumerating, Targeting and Collapsing the Chinese Communist Party's NeuroStrike Program — The CCP BioThreats Initiative](#)

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and scientists are strongly encouraged, if not outright required, to be CCP members and carry out party work in addition to their clinical/scientific work.¹² While Chinese government control over biomedical research institutes is usual under China's system of governance, this marks a substantial divergence from counterparts in other countries.

Second, under China's Civil-Military Fusion Law, there is a possibility that any Chinese biomedical research institute can be repurposed and directly controlled by the CCP under specific contingencies, including lab accidents.¹³ The Civil-Military Fusion Law is an overarching legal framework within which any Chinese institute must operate.

Third, international scientific collaborations appear to be more tenuous and vulnerable to immediate disruption due to external non-scientific factors, especially in more strategically sensitive fields. This is evidenced by the email conversations between Dr James LeDuc and his counterparts at Galveston/University of Texas Medical Branch and the National Academy of Sciences (NAS) regarding their access to the BSL4 lab in Kunming being denied "due to the current US-China situation" and a new CCP Party secretary "recently arriving" in June/July 2019. These developments appear to have surprised LeDuc as these respective teams had been jointly engaging in scientific publications and conferences without any apparent issues.¹⁴

There was no specificity or rationale provided nor were there any timelines or conditions for BSL4 lab access being granted. This was also despite LeDuc and his colleagues jointly organizing a lab safety and global health security conference with the Institute of Medical Sciences, CAMS in Kunming, Yunnan province.¹⁵

Finally, China's National Security Law poses major challenges to international data sharing, especially in the field of virology. It is unclear whether Chinese researchers can freely share data and other related information regarding pathogens that have been recently discovered or are being analyzed within Chinese institutes on a priority basis due to perceived acute public health risks.

Notably, Chinese companies are often expressly forbidden from 'exporting' even basic financial statements outside of China to foreign auditors, regulators, potential investors, or even

¹² Ryan Clarke and Lam Peng Er, 'Coronavirus Research Networks in China: Origins, International Linkages and Consequences', Centre for Non-Traditional Security Studies, May 2020, Singapore.
<https://rsis-ntsasia.org/wp-content/uploads/2021/06/NTS-Asia-Monograph-Coronavirus-Research-in-China-by-Ryan-Clarke-and-Lam-Peng-Er-May2021-1.pdf>, accessed on 9 February 2022

¹³ Ibid. For additional analysis of the Civil-Military Fusion Law, please see 'Alibaba and Ant Group: Involvement in China's Military-Civilian Fusion Initiative', RWR Advisory Group, 2 October 2020.
<https://www.rwradvisory.com/wp-content/uploads/2020/10/RWR-Report-Ant-MilCiv-Fusion-10-2020.pdf>, accessed on 9 February 2022. For a more in-depth discussion, please see Ryan Clarke, 'Emerging Global Pandemic Risks Come from Engineered Viruses in Chinese Labs, Not the Jungle or Bat Caves', *Epoch Times*, 4 September 2021.
https://www.theepochtimes.com/emerging-pandemic-risks-come-from-engineered-viruses-in-chinese-labs-not-the-jungle-or-bat-caves_3980204.html, accessed on 9 February 2022.

¹⁴ These email conversations were legally obtained via a Freedom of Information Request made by US Right to Know Executive Director Gary Ruskin and shared with Ryan Clarke. Additional documentation is available upon request. For example, please see Pei-Yong Shi, 'Spike mutation D614G alters SARS-CoV-2 fitness', *Nature*, Vol. 592, 2021. Qi Chen et al., 'Treatment of Human Glioblastoma with a Live Attenuated Zika Virus Vaccine Candidate', *mBio*, Vol. 9, Issue 5, 2018. 'CAS-NAS Workshop on Emerging Infections and Global Health Security Held', Beijing Institutes of Life Sciences, Chinese Academy of Sciences, 1 October 2015.
http://english.biol.scas.cn/news/news/201701/t20170109_173250.html, accessed on 11 February 2022.

¹⁵ These email conversations were voluntarily shared with Ryan Clarke by Gary Ruskin.

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existing shareholders. This even includes Chinese companies that are publicly listed on American or British stock exchanges.¹⁶ While this example derives from a different domain, it nonetheless can be used to possibly infer how the CCP, which exerts direct control over all Chinese biomedical research institutes, would likely view international data sharing in the domains of virology research.

Did the CCP Attempt to Convert COVID-19 Into a Strategic Opportunity? Evidence from The First Half of 2020

The COVID-19 viral outbreak, with its initial point source of origin in Wuhan¹⁷, spread with high velocity throughout China and the world. Several of China's immediate neighbors, such as Taiwan, Japan and South Korea, demonstrated extraordinary competence in early detection, pandemic risk characterization, widespread serological testing, epidemiological data analysis and mapping, and subsequent control measures. Japan also responded decisively utilizing its more decentralized, bottom-up approach that empowers individual cities and prefectures to take actions based on their own respective epidemiological ground realities.

However, some of China's other neighbors, such as the Philippines,¹⁸ Indonesia, India, and Pakistan were all experiencing severe outbreaks with widespread sustained community transmission. India has roughly 120,000 square kilometers of disputed territory with China and has been experiencing continuous multiple land-based standoffs with PLA troops¹⁹ while Indonesia has continuously deployed its naval forces to confront Chinese naval vessels within Indonesian waters, including recurring events around Indonesia's Natuna Islands. The COVID-19 outbreak impacted China's long-time ally Pakistan in a particularly severe manner as well.

The first confirmed COVID-19 case in the United States was on January 21, 2020, in Washington State. The speed at which COVID-19 spread throughout the US surprised many given the level of preparedness of the US public health system. Within the first half of 2020, the US had already suffered over 100,000 fatalities,²⁰ multiple key cities and states were under lockdown conditions, and the US Navy had to rapidly withdraw multiple assets, namely the aircraft carriers USS Theodore Roosevelt and USS Ronald Reagan, out of the Indo-Pacific due

¹⁶ This assessment is based on Ryan Clarke's direct experience covering the Chinese market during his time in the investment banking sector.

For additional analysis, please see 'The Risk Exposure of U.S. Investors Holding Chinese Sovereign Bonds', RWR Advisory Group, 28 October 2020.

<https://www.rwradvisory.com/wp-content/uploads/2020/11/RWR-China-Sovereign-Bond-Report.pdf>, accessed on 9 February 2022.

'President's Working Group on Financial Markets: Report on Protecting United States Investors from Significant Risks from Chinese Companies', US Department of Treasury, 24 July 2020.

<https://home.treasury.gov/system/files/136/PWG-Report-on-Protecting-United-States-Investors-from-Significant-Risks-from-Chinese-Companies.pdf>, accessed on 9 February 2022.

¹⁷ For example, please see Peng Zhou, Xing-Lou Yang, and Zheng-Li Shi, 'A pneumonia outbreak associated with a new coronavirus of probably bat origin', *Nature*, 579, 270-273, 3 February 2020.

W. Guan et. al., 'Clinical Characteristics of Coronavirus Disease 2019 in China', *New England Journal of Medicine*, 28 February 2020.

Qun Li et. al., 'Early Transmission Dynamics in Wuhan, China of Novel Coronavirus-Infected Pneumonia', *New England Journal of Medicine*, 29 January 2020.

¹⁸ The Philippines is a treaty US ally with mutual defense obligations. In the event of any security events between China and the Philippines in the South China Sea, the US is obliged to defend the Philippines from any external aggression.

¹⁹ The maritime element of this Sino-Indian land-based territorial dispute is discussed in detail in Section 7.3 and 7.4.

²⁰ As a point of reference, total American casualties during the Vietnam War totaled 47,424.

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to force protection considerations on the account of COVID-19 infection risks.²¹ These events were unprecedented.

There was strong directly observable evidence that the top leadership in the CCP and PLA viewed the COVID-19-induced crisis as a major opportunity to pursue a range of strategic goals that were previously considered to be too costly or outright impossible. **Table 1** includes a full table of key CCP decisions/actions taken since late 2019/early 2020 that clearly demonstrates a trend towards the majority of Chinese foreign policy actions being driven by strategic considerations and by the PLA. China's diplomatic corps, while they were becoming increasingly vocal, were clearly marginalized throughout these escalatory dynamics.

Overt CCP Strategic Maneuvers During the COVID-19 Outbreak: Clear Strategic Intent

The deployment of the Liaoning Aircraft carrier naval battle group²² through the international waters of the Miyako Strait off the coast of Taiwan on the immediate tails of the US Navy withdrawing multiple assets, multiple deliberate naval (and even air) incursions into clear international and/or territorial waters of multiple East Asian/Southeast Asian countries, and significant increases in aggressive People's Liberation Army Navy (PLAN) activities in the South China are all clear signals and indications of the line of strategic thinking in key CCP and PLA leadership circles during the most acute phases of the COVID-19 pandemic during the first half of 2020.

These naval activities also occurred against the backdrop of China's State Council's official declaration on April 18, 2020, that the city of Sansha in Hainan now has two new administrative districts to 'administer waters in the South China Sea.' China's Nine-Dash Line in the South China Sea was never an opening negotiating position; it was an absolute non-negotiable claim.

What also escaped the attention of many analysts was the successful May 5, 2020, launch of China's Long March-5B rocket that is officially part of China's Moon/Mars/Tiangong Space Station mission ambitions. The Long March-5B consists of many of the same components that are used in a range of missile platforms. This successful launch occurs on the back of at least three recent failures of other rockets from the same family as the Long March-5B. The willingness to take on this type of technological risk in such a high-profile domain (space) during the COVID-19 pandemic that was still in a very active phase (including in China itself) suggests ambition to accelerate China's key strategic activities regardless of external/third party assessments and/or considerations.

Frontline South China Sea: Strategic Testing Ground for Bioweapons Deployment?

The South China Sea is the most strategically important maritime territory in the world today. The CCP and the PLA do not officially, and likely will never, voluntarily acknowledge the claims of multiple Southeast Asian claimants as well as the claims of Taiwan. Further, recent maritime activities by the PLAN, the Coast Guard, and the Maritime Militia clearly demonstrate that Xi Jinping and his leadership team view the American military presence and its associated security guarantees of key sea lanes of communication (SLOCs) as not necessary and unwanted. It is within this context that other related activities, such as artificial island creation, in the theatre should be analyzed and understood.

²¹ Crews from a total of five US aircraft carriers tested positive for COVID-19.

²² The Liaoning Aircraft carrier naval battle group also consisted of two destroyers, two frigates, and one combat support ship.

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Beyond maintaining domestic stability, controlling the South China Sea and developing, validating, and maintaining the ability to continuously blunt American abilities to intervene in multiple South China Sea scenarios is the top strategic priority of the CCP and PLA leadership.²³ Dominance of the South China Sea presents China with a wide array of previous unattainable strategic options in relation to Taiwan, traditional Southeast Asian rivals such as Vietnam, control over highly valuable fisheries and subsea oil and gas deposits, and the ability to hold multiple SLOCs at-risk at will in the event of disputes with Japan, the United States, India, as well as other adversaries (real or perceived) that have critical dependence.

The Hague Court ruling²⁴ and traditional diplomacy have been unable to yield any identifiable material stabilization effects in the South China Sea. On the contrary, the strategic situation has continued to escalate with the trend oscillating between linear and exponential across various timescales. We are now clearly in an exponential phase without any clear de-escalation pathways. This is especially critical given China's near unitary focus on this theatre regarding the development of its anti-access/area denial strategies which rely heavily on near-zero warning precision strike capabilities against key US/Allied military assets throughout the Asia-Pacific, including well outside the immediate South China Sea region. Pathogens are one key platform that offer such capabilities and have been recently field-tested.

Blurring the Line Between Civil and Military in the Maritime Domain

In the maritime domain, and in the South China Sea in particular, the CCP has taken a unique strategy of simultaneously utilizing very low-end and high-end methods. The low end includes sending 'civilian' fishing vessels to harass a mix of civilian and military vessels belonging to various Southeast Asian countries, Taiwan, and the United States. The high end includes developing and deploying frontier capabilities, such as hypersonic missiles designed to keep US/Allied Forces confined to the First Island Chain, Second Island Chain, and even the US West Coast itself. Some assessments²⁵ have suggested that the DF-ZF, China's key deployed hypersonic missile platform,²⁶ can hit targets on the US West Coast within an hour from launch, even from within Chinese territory itself. In this highly unpredictable and escalatory environment, historical precedents and traditional established strategic templates have limited utility.²⁷

At the opposite end of the spectrum is China's increasingly aggressive and bold use of its civilian fishing vessel fleet (often referred to as the Maritime Militia) that engages in military-style operations independently or even in coordination with China's Coast Guard, a force that has a fleet that more closely resembles an advanced navy and clearly has the ability to engage

²³ For a more in-depth discussion, please see Kerry Gershaneck and James Fanell, 'If a Chinese-American War Happens, It Will Start in the South China Sea', *The National Interest*, 18 November 2019. Anders Corr (ed), 'Great Powers, Grand Strategies: The New Game in the South China Sea', Naval Institute Press, Annapolis, January 2018. James Fanell, 'China's Global Naval Strategy and Expanding Force Structure', *Naval War College Review*, Vol. 72, No. 1 (Winter 2019), pp. 10-55.

²⁴ For example, please see Oliver Holmes and Tom Philips, 'South China Sea dispute: what you need to know about the Hague court ruling', *The Guardian*, 12 July 2016.

²⁵ For example, please see Missile Defense Project, "DF-17," *Missile Threat*, Center for Strategic and International Studies, February 19, 2020, last modified March 26, 2020, <https://missilethreat.csis.org/missile/df-17/>.

²⁶ The DF-ZF is technically a hypersonic glide vehicle that is launched off of a DF-17 missile)

²⁷ For an in-depth domain-specific analysis on hypersonic missiles, please see Richard Speier, George Nacouzi, Carrie Lee, and Richard Moore, 'Hypersonic Missile Nonproliferation', RAND Corporation, 2017.

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in conventional combat operations in the South China Sea as well as the East China Sea.²⁸ One well known tactic that has been witnessed in the Paracel Islands, Spratly Islands, and the Scarborough Shoal is referred to as a ‘cabbage strategy’ where Chinese fishing vessels, Chinese Coast Guard vessels, and even occasionally PLAN vessels encircle disputed island/maritime features like the concentric leaves of a cabbage in order to gradually alter the status quo and establish de-facto Chinese control.²⁹

This approach of utilizing the entire spectrum of strategic capabilities is designed to introduce the maximum amount of strategic ambiguity and unpredictability possible. At the low-end, traditional and validated frameworks related to deterrence (pre-event and/or in-event), response protocols, and escalation/de-escalation control become very blurry and difficult to operationalize in dealing with nominally civilian Chinese fishing vessels that only occasionally operate in a multi-modal manner. The CCP is clearly aware of this and is willing to push these activities as close into conventional strategic territory as possible, a threshold which still has not apparently been breached as evidenced by the fact that the US Navy/Other Allied Forces have not yet taken clear kinetic action against a Chinese civilian fishing vessel, even during ‘cabbage operations.’

In the domain of advanced weapons platforms, while Chinese surface ship, submarine, and aircraft carrier-based capabilities are significant, it is China’s hypersonic missiles that introduce the most optionality and generate the most potential instability given the challenges with determining their trajectories under highly compressed timescales. While the extreme ends of the technological spectrum, China’s civilian fishing vessel fleet and its hypersonic missiles share the same set of strategic principles designed to ‘muddy the waters’ as much as possible thereby attempting to keep China’s adversaries off balance and unsure about even the primary impacts of any kinetic action.

All available evidence suggests that the CCP and PLA are seeking to fully maximize this currently blurry strategic situation in the South China Sea to bring about a final conclusive solution that enforces all of China’s claims without any compromise. Central to this will be the attempt to deter, confuse, and/or rapidly blunt any American involvement in this theatre of operations. However, this approach also carries the risk of multi-geography escalation well outside of the initial South China Sea area.

Inferring Strategic Intent from the CCP’s 2020 Actions

It is clear is that the sharp uptick in Chinese strategic activities in the South China Sea, East China Sea, the Sino-Indian border, the Taiwan Straits, Hong Kong, and other domains clearly suggest that the CCP and PLA leadership view biowarfare as ‘fair game’ and existing within the same framework as ‘conventional warfare’ regardless of whether a dangerous pathogen emerges from nature or from a laboratory environment. Many political leaders and analysts are actively looking for the ‘evil genius’ behind these developments. The reality is that this doctrine is clearly widespread and deeply embedded across multiple CCP party layers and PLA command structures as evidenced by the continuation of these activities with even overt

²⁸ For a more in-depth targeted analysis on China’s Coast Guard, please see James Fannell and Kerry Gershaneck, ‘White Warships and Little Blue Men – The Looming ‘Short, Sharp War’ in the East China Sea over the Senkakus’, Project 2049 Institute, March 30, 2018

²⁹ David Santoro, ‘Beijing’s South China Sea Aggression Is A Warning to Taiwan’, Foreign Policy, September 16, 2019.

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references to the superiority of the Chinese COVID-19 containment operations relative to those of the United States.

These actions do not represent a random tactical opportunistic move by the CCP and/or the PLA to simply take advantage of an emergent situation. The use of unconventional methods to achieve similar effects that have traditionally been obtained through conventional kinetic war has been a major strain of Chinese strategic thinking since at least 1999, when then-Colonels Qiao Liang and Wang Xiangsui published 'Unrestricted Warfare.'³⁰ While Qiao and Wang do not openly advocate for biological warfare, they were the first modern Chinese strategists to compress military, legal, economic, and other related domains into one coherent battlespace.

The primary impacts (i.e. adverse epidemiological impacts/societal incapacitation) and secondary impacts (i.e. highly disrupted military activities of adversaries, double-digit unemployment in adversary countries, inability to service Chinese debt obligations thereby enabling China to foreclose on multiple strategic global assets throughout Asia and Africa) are the ideal realizations of the strategic frameworks and templates architected by Qiao and Wang back in 1999. It would be difficult to argue that this is simply a coincidence.

Bioweapons Converge with the Cybersecurity Domain: CCP Strategic Hacking Operations Inside the United States in 2020

In May 2020, the Federal Bureau of Investigation and the Department of Homeland Security accused Chinese hackers of directly targeting multiple research institutions, healthcare providers, and others involved in COVID-19 vaccine development, to illicitly obtain information.³¹ This was interpreted by many analysts as an attempt to be first to market with a COVID-19 vaccine. However, there are some possible flaws in this seemingly simple argument. For one, uptake for any Chinese manufactured COVID-19 vaccine was always highly unclear in advanced markets and the most promising major emerging markets. These are governments capable of making the massive bulk orders and locking in the long-term supply contracts that make vaccine development a high-risk but also highly profitable exercise. Even in-licensing Chinese COVID-19 vaccine technology to a reputable multinational corporation was always going to be highly unlikely given the close and often indistinguishable links between key Chinese biomedical/pharmaceutical companies and the CCP.

Secondly, other infectious diseases such as HIV, MERS, SARS-CoV-1, H1N1, have caused substantial harm in China yet none have an effective vaccine. Intensive research has been underway for decades, especially in the case of HIV, yet these respective researchers were not apparently subjected to the same massive and targeted onslaught of cyber industrial espionage as their counterparts working on COVID-19 projects were. This targeting anomaly was substantial and should not be underestimated. The first company/nation to market with an HIV vaccine would capture a similar, if not greater, amount of economic value as would any company that had developed the first COVID-19 vaccine. HIV is a globally endemic disease that has been in circulation for decades and is prevalent throughout multiple socio-economic

³⁰ Qiao Liang and Wang Xiangsui, 'Unrestricted Warfare'. People's Liberation Army Literature and Arts Publishing House, 1999.

³¹ For example, please see Zack Whittaker, 'FBI and DHS accuse Chinese hackers of targeting US COVID-19 research', Tech Crunch, May 13, 2020.

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income strata.³² Further, an HIV vaccine would likely be reimbursed by health insurers and/or national governments around the world.

Irrespective, what is clear is that a PLA and/or broader Chinese population that was at least partially vaccinated against COVID-19 would have a major strategic advantage and set of options against an opposing force and/or broader population that was not. Further, the CCP has the ability to force these vaccinations domestically thereby further stimulating China's own biopharmaceutical sector through bulk purchases and long-term supply contracts while also pressuring various governments with strong financial dependence on China to do the same with their own populations. It should be noted that the CCP currently has a mandatory annual influenza vaccination. This generates an option for the CCP to create a bioweapon, create a vaccine against it and secretly put it in the flu shot without anyone knowing.

Table 1: Key CCP Decision Table During Acute Phases of COVID-19 Pandemic

| Date | Decision/Action | Domestic or Regional Implications | Domain |
|------------------|---|-----------------------------------|---------------|
| 31 December 2019 | Wuhan Municipal Health Commission Issues Public Notice Claiming that Some Medical Institutions Have Found a Link Between Pneumonia Cases and the Huanan Seafood Market. However, the notice also claimed that there is no evidence of human-to-human transmission and that no medical personnel have been infected. | Domestic | Public Health |
| 31 December 2019 | National Health Commission visits Wuhan and establishes three diagnostic criteria: Patient must have a history of contact with the Huanan seafood market (despite the fact that 1/3 of all cases, including Patient Zero) had no prior contact with the Huanan Seafood Market) | Domestic | Public Health |

³² For example, please see Marzetta CA et. al., 'The potential global market size and public health value of an HIV-1 vaccine in a complex global market', *Vaccine*, 14 May 2010. Blythe Adamson et. al., 'The Potential Cost-Effectiveness of HIV Vaccines: A Systematic Review', *PharmacoEconomics*, March 2017.

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|---------------------|--|--|---------------|
| | <p>Patient must have a fever (despite the fact that many carriers are asymptomatic)</p> <p>Whole genome sequencing must be done</p> <p>All three must be complete before a COVID-19 case can be confirmed.</p> | | |
| 1 January 2020 | Huanan Seafood Market officially posts a note of closure followed by an immediate clean up and bleaching operation of the market. | Domestic | Public Health |
| 3 January 2020 | China's National Health Commission issues a directive to all labs and other institutions involved in characterizing the still-unknown virus to destroy all existing samples, destroy any information related to the samples, and to immediately cease the release of all papers and data. | Domestic | Public Health |
| 4 January 2020 | Hong Kong government activates 'Serious Response Level' in response to the outbreak on the Mainland | Special Autonomous Region / Domestic | Public Health |
| 6 January 2020 | A research team led by Dr. Zhong Yongzhen at the Shanghai Public Health Clinical Centre isolated and completed the genome sequence of the previously unclassified virus. They then submitted their findings to the National Health Commission with clear recommendations for preventative actions to be taken. | Domestic with International Implications | Public Health |
| 6 – 17 January 2020 | Wuhan City and Hubei Province report zero new cases and decide to hold | Domestic | Public Health |

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| | | | |
|------------------|---|----------------------------|---------------|
| | annual political meetings with over 2,000 delegates | | |
| 11 January 2020 | Shanghai Public Health Clinical Centre releases the full genome sequence of the COVID-19 virus after receiving no response from the National Health Commission | Domestic | Public Health |
| 17 January 2020 | Wuhan Tourism Bureau issues 200,000 free tourism tickets to encourage people to visit Wuhan | Domestic | Public Health |
| 18 January 2020 | Baibuting district in Wuhan went ahead with the Annual Lunar New Year Banquet in which 40,000 families attended | Domestic | Public Health |
| 23 January 2020 | The city of Wuhan is officially locked down, including Wuhan Tianhe International Airport | Domestic | Public Health |
| 7 February 2020 | PLA General Dr. Chen Wei official assumes control of WIV's P4 Laboratory | Domestic | Public Health |
| 14 February 2020 | Xi Jinping publicly calls for the inclusion of biosecurity into China's national security framework for the expressed purpose of accelerating the introduction of a biosecurity law | Domestic | Strategic |
| 9-30 March | Chinese Coast Guard Vessels were spotted multiple times in and around the disputed Mischief Reef, Second Thomas Shoal, First Thomas Shoal, and Half-Moon Shoal. | Regional – South China Sea | Strategic |
| 16 March 2020 | 10 Chinese speedboats entered Taiwanese waters and attacked a Taiwanese vessel that was clearing illegal Chinese fishing nets | Regional - Taiwan | Strategic |

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|---------------|--|----------------------------|-----------|
| 30 March 2020 | A Japanese destroyer was damaged in East China Sea after it was rammed by a Chinese 'fishing boat' | Regional – East China Sea | Strategic |
| 2 April 2020 | A Vietnamese fishing boat was sunk near the Paracel Islands | Regional – South China Sea | Strategic |
| 10 April 2020 | An 'unspecified number' of PLA H6 bombers, J11 fighters, and KJ-500 airborne early warning and control aircraft flew over the Bashi Channel (just southwest of Taiwan) between Taiwan and the Philippines before circling back to an unspecified base in China. Taiwan scrambled fighter jets to warn off the PLA aircraft. China officially acknowledged that this 'far sea long-range drill' has taken place at least four times since January 2020 and is now a regular component of PLA activity. Taiwan claimed that this was the 6 th occasion just in 2020 when PLA aircraft operated close to Taiwanese airspace. | Regional - Taiwan | Strategic |
| 11 April 2020 | When a US Navy Destroyer was transiting Taiwan the PLA staged aggressive military exercises in the Taiwan Strait without any prior announcement or warning. In addition to these specified events, there have been multiple confirmed instances of sporadic standoffs between the US Navy and the PLAN, Chinese Coast Guard, and suspected | Regional - Taiwan | Strategic |

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|---------------|---|----------------------------|----------------------|
| | members of China's Maritime Militia. | | |
| 16 April 2020 | China deployed a 'research vessel' clearly within Malaysia's EEZ | Regional – South China Sea | Strategic |
| 18 April 2020 | China's State Council's official declares that the city of Sansha in Hainan now has two new administrative districts to 'administer waters in the South China Sea' | Regional – South China Sea | Diplomatic/Strategic |
| 22 April 2020 | Xinhua reports that Xi Jinping, while referencing China's response to the COVID-19 outbreak, states 'Crises and opportunities always exist side by side. Once overcome, a crisis is an opportunity' | Regional – Pan-Asia | Strategic |
| 5 May 2020 | After a series of previous failures, China successfully launches its Long March-5B rocket that is officially part of China's Moon/Mars/Tiangong Space Station mission ambitions. | International - Space | Diplomatic/Strategic |
| 5 May 2020 | Multiple skirmishes occur between the PLA and Indian troops at multiple locations around the Line of Actual Control, a disputed border region consisting of roughly 120,000 square kilometers of disputed territory | Regional – South Asia | Strategic |
| 26 May 2020 | Xi Jinping orders the PLA to increase its combat readiness citing increased threats from 'Taiwan independence forces' and in recognition that 'epidemic control efforts have been normalized'. | Regional - Taiwan | Strategic |

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| | | | |
|-------------|--|--|-----------|
| 28 May 2020 | CCP promulgates Hong Kong National Security Law | Special Autonomous Region / Domestic | Strategic |
| 29 May 2020 | Li Zuocheng, Chief of the Joint Staff Department and Member of the Central Military Commission, openly stated that China will use force against Taiwan if there is no other way to prevent Taiwan from becoming independent. | Regional - Taiwan | Strategic |
| 1 June 2020 | Information begins to circulate that China is planning to attempt to impose an Air Defense Identification Zone (ADIZ) in the South China Sea similar to Beijing's actions of establishing in ADIZ in the East China Sea in 2013. | Regional – South China Sea | Strategic |
| 2 June 2020 | China's Ministry of National Defense announces that its first domestically built aircraft carrier, CNS Shandong, is carrying out sea trials in preparations for deployment. | Regional – South China Sea and/or East China Sea | Strategic |

CCP's 'Three Warfares' Strategy and Combined Arms Warfare

In addition to the observed CCP strategic actions of 2020, there are also official CCP doctrinal sources of evidence. In 2014, China's National Defense University fully articulated the 'Three Warfares' strategic concept for the first time. Three Warfares is specifically designed to enable China to achieve end goals that have traditionally been accomplished by conventional military force through the effective use of psychological warfare, media warfare, and legal warfare.

The Three Warfares is intended to be integrated across the entire spectrum of military operations. Functions have also expanded and correspond to the PLA's increasing range of military missions. Core functions include, but are not limited to:

- Control of public opinion (舆论控制)
- Blunting an adversary's determination (意志挫伤)
- Transformation of emotion (情感转化)
- Psychological guidance (心智诱导)

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- Collapse of (an adversary's) organization (组织瓦解)
- Psychological defense (心理防御)
- Restriction through law (法律制约)³³

In broader strategic terms, the primary missions are to seize the “decisive opportunity” (先机) for controlling public opinion, organize psychological offense and defense, engage in legal struggle, and fight for popular will and public opinion.³⁴ Under this combined framework, China must simultaneously unify military and civilian thinking, divide an enemy into factions, weaken the enemy's combat power, and organize legal offensives. The CCP bioweapons programs are an essential capability to achieve these strategic endpoints.

The COVID-19 pandemic generated massive social upheaval inside the United States, destabilized the Presidency of Donald Trump and left enduring political fragmentation inside the American political system and broader society. While this is not to suggest that all of the COVID-19 pandemic-related events inside the United States were by design and directed by the CCP, it is a reasonable assumption that the CCP closely observed, analyzed and has fully assessed that the ‘whole of system degradation effects’ that a novel pathogen can have on American society. The impact of a weaponized Nipah virus inside of the United States, as you will understand from this report, would completely eclipse that of COVID-19.

Previous Proven GoF Research on Nipah Virus: High-Probability Bioweapons Research With (At Least) International Awareness at the Wuhan Institute of Virology

World-renowned physician, vaccine developer, biomedical scientist and co-author of this monograph Dr Steven Quay recently testified in a U.S. Congressional hearing that his team has identified evidence that WIV was conducting dangerous experiments on Nipah virus at least in late December 2019, literally at SARS-CoV-2 was emerging. Nipah is a BSL4-level pathogen and US Centers for Disease Control and Prevention (US CDC)-designated Bioterrorism Agent.

Dr. Quay and his team made this detection in raw RNA-Seq sequencing reads which were deposited by WIV itself and produced from five December 2019 patients infected with SARS-CoV-2.³⁵ Research involving Nipah infectious clones has never been reported to have occurred at the WIV and these patient samples were also reported to contain reads from several other viruses: Influenza A, Spodoptera frugiperda rhabdovirus and Nipah. Other scientists erroneously interpreted the presence of these virus sequences as indicative of co-infections of the patients in question by these pathogens or laboratory contamination. However, Quay's analysis clearly demonstrates that Nipah genes are actually present in synthetic vectors, which were specifically designed for the assembly of an infectious Nipah clone. Quay and his team also note that contamination of patient sequencing reads by an infectious Nipah clone of the highly pathogenic Bangladesh strain could indicate a significant breach of BSL4 protocols.³⁶

Quay documents the presence of Nipah sequences, Bangladesh strain, interpreted as likely for assembly of a Nipah infectious clone, found in raw sequencing reads by WIV from five patients

³³ Elsa Kania, “The PLA's Latest Strategic Thinking on the Three Warfares”, *China Brief*, Vol. 16, Iss. 13, 22 August 2016.

³⁴ Ibid.

³⁵ Nipah virus vector sequences in COVID-19 patient samples sequenced by the Wuhan Institute of Virology, Steven C. Quay, Daoyu Zhang, Adrian Jones, Yuri Deigin, ArXiv, (2021), <https://arxiv.org/abs/2109.09112>

³⁶ Ibid.

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infected with SARS-CoV-2 sampled by the Wuhan Jin Yin-Tan Hospital at the beginning of the COVID-19 outbreak.³⁷ The Bangladesh strain of Nipah virus was often associated with high levels of oral shedding and is one of the most transmissible and pathogenic strains of Nipah viruses. The five patients experienced COVID-19 illness onset between 12 December 2019 and 23 December 2019 and were admitted to intensive care between 20 December 2019 and 29 December 2019 with all BALF (bronchoalveolar lavage fluid) sampling conducted on 30 December 2019 and 10 January 2020. BioProject PRJNA605983 containing the analyzed samples was actually registered by WIV with GenBank on 11 February 2020 and consists of nine RNA sequencing (RNA-Seq) BALF datasets. NGS (next-generation sequencing) was undertaken at the WIV using BGI MGISEQ-2000 and Illumina MiSeq 3000 sequencers.³⁸

Some mistakenly interpreted³⁹ the presence of these virus sequences as indicative of co-infection of early Wuhan COVID-19 infected patients with these microbes. However, Quay analyzed the presence of a sequence H7N9 Hemagglutinin A segment 4 gene and found in a synthetic vector in these COVID-19 patient samples. He concluded that contamination was the likely cause while his colleague Dr Zhang Daoyu⁴⁰ identified the presence of a Nipah infectious clone in the datasets.

Nipah was designated as a priority research area at WIV.⁴¹ However, after a search using Google Scholar and Pubmed, only two publications by WIV-affiliated authors were found in the 2018-2020 year period on nipah: a general overview of phylogeny, transmission and protein structure⁴² and an article relating to rapid detection assay research, but which only concerns N gene pseudotyped Nipah virus, rather than a fully assembled Nipah infectious clone.⁴³ Interestingly, WIV Chief Biosafety Officer Yuan Zhiming is on public record openly stating that WIV is working on synthetic biology studies to manipulate the proteins of Nipah viruses as well as Ebola that involve animal models.⁴⁴

³⁷ Peng Zhou, Shi Zheng-Li, et. al., 'A pneumonia outbreak associated with a new coronavirus of probable bat origin', *Nature*, Vol. 579, 12 March 2020.

³⁸ Peng Zhou, Shi Zheng-Li, et. al., 'A pneumonia outbreak associated with a new coronavirus of probable bat origin', *Nature*, Vol. 579, 12 March 2020.

³⁹ For example, see Sandeep Chakraborty, 'There was a simultaneous outbreak of the zoonotic Nipah henipavirus in Wuhan - 4 out of 5 patients have the virus in Jinyintan Hospital, along with SARS-Cov2, in their metagenome - which seems to have resolved by itself', OSF, 1 October 2020.
Mohammed Abouelkhair, 'Non-SARS-CoV-2 genome sequences identified in clinical samples from COVID-19 infected patients: Evidence for co-infections', *PeerJ*, 2 November 2020.

⁴⁰ Steven Quay, Daoyu Zhang, et. al., 'Vector sequences in early WIV SRA sequencing data of SARS-CoV-2 inform on a potential large-scale security breach at the beginning of the COVID-19 pandemic', *Zenodo*, 19 September 2021.

⁴¹ Shi Zheng-li, 'Inter-nation collaboration Sino-French NiV taskforce 2019', Nipah Virus International Conference, 9-10 December, Singapore.
<https://cepi.net/wp-content/uploads/2020/06/2019-Nipah-Conference-Proceedings.pdf>

⁴² Bangyao Sun, et. al., 'Phylogeography, Transmission, and Viral Proteins of Nipah Virus', *Virologica Sinica*, Vol. 33, No. 5, 2018.

⁴³ Liping Ma, et. al., 'Rapid and specific detection of all known Nipah virus strains' sequences with reverse transcription-loop-mediated isothermal amplification'. *Frontiers in Microbiology*, Volume 10, Article 418, March 2019

⁴⁴ 'U.S China Dialogue and Workshop on the Challenges of Emerging Infections, Laboratory Safety, Global Health Security and Responsible Conduct in the Use of Gene Editing in Viral Disease Research', Draft Version 4, Harbin Veterinary Research Institute – Chinese Academy of Agricultural Sciences, 8-10 January 2019. This document was obtained via a Freedom of Information request from the University of Texas System.

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Over the course of Dr. Quay's Nipah-focused investigation he and his team detected other contaminating sequences, including HIV, Simian Virus and Woodchuck Hepatitis Virus. These findings converge with previous findings of significant contamination at Wuhan sequencing facilities. For example, previously documentation by Dr. Zhang Daoyu⁴⁵ of Middle Eastern Respiratory Syndrome (MERS) and SARS-CoV-1 genomes recovered from agricultural sequencing datasets. Those sequences are consistent with the infectious Nipah clone and numerous other synthetic sequences⁴⁶ found in samples from the earliest sequenced COVID-19 patients in Wuhan. Quay notes that this could indicate serious contamination problems at WIV. Quay fundamentally assesses that the finding of Nipah gene sequences attached to synthetic vectors (presumably for assembly as a full length infectious Nipah clone of the highly pathogenic Bangladesh strain) in datasets of the earliest sequences COVID-19 patients in Wuhan is potentially a significant breach of BSL4 protocols.⁴⁷

Chinese pathogen facilities are closely networked with many Western laboratories which provided significant assistance, including physical design and construction of facilities, joint design and execution of the most high-risk experiments, and even direct transfer of research funds and materials, including pathogen strains and experimental transgenic mice, to Chinese institutions such as WIV. Indeed, under the mentorship of the Western scientists, Chinese virology labs have impressively grown in capability and coverage of dangerous pathogens. GoF studies have become their unique expertise with the cloning of Nipah virus being clear evidence of their accelerating ambition.

August 2022 LayV Outbreak: PLA in Command (Via Front Organizations), Anomalous Infection Patterns with Likely Human Experimentation

The discovery of Langya Henipavirus (LayV) in Shandong and Henan provinces of China has quickly attracted the attention of medical experts around the world.⁴⁸ LayV is a type of zoonotic henipavirus and 35 people have been identified to be infected with this pathogen since 2019 in these two provinces in China. Among all the patients, 26 people were infected with LayV only while nine others were co-infected with other pathogens at the same time. All 26 patients with the LayV infection have experienced fever with their probability of suffering from anorexia, coughing, weakness, muscle pain and leukopenia are as great as 50 percent. In addition, liver function impairment, thrombocytopenia, and headaches are also common symptoms of LayV infection.⁴⁹

⁴⁵ Steven Quay, Daoyu Zhang, et. al., 'Vector sequences in early WIV SRA sequencing data of SARS-CoV-2 inform on a potential large-scale security breach at the beginning of the COVID-19 pandemic', *Zenodo*, 19 September 2021.

Daoyu Zhang, et. al., 'Unexpected novel Merbecovirus discoveries in agricultural sequencing datasets from Wuhan, China', *ArXiv* 6 June 2021.

⁴⁶ Steven Quay, et. al., 'Contamination or Vaccine Research? RNA Sequencing data of early COVID-19 patient samples show abnormal presence of vectorized H7N9 hemagglutinin segment', *Zenodo*, 3 July 2021.

⁴⁷ Steven Quay, et. al., 'Contamination or Vaccine Research? RNA Sequencing data of early COVID-19 patient samples show abnormal presence of vectorized H7N9 hemagglutinin segment', *Zenodo*, 3 July 2021.

⁴⁸ 'A new virus that can infect people has been discovered', Health Commission of Hebei Province, 9 August 2022.<http://wsjkw.hebei.gov.cn/wbcz/390125.jhtml>

Wang, Linfa, Wei, Liu, et. al, 'A Zoonotic Henipavirus in Febrile Patients in China', *New England Journal of Medicine*, Vol. 387, 4 August 2022.

⁴⁹ Wang, Linfa, Wei, Liu, et. al, 'A Zoonotic Henipavirus in Febrile Patients in China', *New England Journal of Medicine*, Vol. 387, 4 August 2022.

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This report also mentioned that a live LayV sample was isolated from an infected patient and that the full genome sequence was characterized. The phylogenetic analysis based on the L gene homology indicated that LayV was more closely related to the Mojiang Virus, not Nipah or Hendra virus, the two more commonly known henipaviruses.⁵⁰ This surprised and confounded many experts although it should be noted that these authors conducted a Blast analysis of the Mojiang mine virus (GenBank KF278639) and these LayV viruses (Genbank OM101125) and found only 78% identity, which is substantial but should also be viewed conservatively.

The Mojiang virus was found in an infamous abandoned mine in Mojiang County in China's Southwestern Yunnan Province. This mine in Yunnan first attracted attention in 2012 when six miners working inside it contracted severe pneumonia of unknown origin and three of them died.⁵¹ Researchers at the time claimed that the Mojiang Virus originated from rats in the mine.⁵² In 2013, Shi Zhengli from WIV discovered the coronavirus RaTG13 from bats in the Mojiang mine, which is the official closest known relative to the new coronavirus SARS-CoV-2 (with a 96 percent genetic similarity between the two) and the Mojiang mine gained additional attention from researchers in China and their international collaborators.⁵³

This mine in Mojiang resembles a 'cave of viruses' harboring these two dangerous viruses in different hosts: Coronaviruses in bats and Mojiang Virus in rodents. However, there are still many questions that remain unanswered about this mysterious mine: what happened to the other three miners who had unknown pneumonia but did not die? Did they have any other coinfection with other viruses? After the Mojiang Virus was identified, did those miners' samples get retested for any potential zoonotic infection from the Mojiang Virus? What is unique about this cave that makes it such a hub of emerging pathogens?

Another material issue related to the discovery of LayV in this recent study is the involvement of PLA medical entities. The two key Chinese scientists that have taken the lead in the analysis of LayV are Dr. Li-Qun Fang and Dr. Wei Liu, both of whom are part of the Beijing Institute of Microbiology and Epidemiology (BIME). However, BIME is actually the same entity of Institute of Microbiology and Epidemiology under AMMS and, by extension, the PLA. In addition, Supplementary materials related to this study clearly indicated that the PLA's 990 Military Hospital in Henan province was involved in this study. Interestingly, BIME reporting has indicated that 34 out of the 35 LayV patients were local farmers.⁵⁴ **Why were the farmers' samples analyzed in a military hospital during a sentinel surveillance program?**

BIME has also indicated that those 35 patients infected with LayV were identified during sentinel febrile illness surveillance (i.e., routine infectious disease surveillance) in 2020. Given the nature of LayV, it is very unusual to report the discovery and isolation of a live henipavirus with significant delay of three years. A new henipavirus is highly epidemiologically significant and should have been publicly reported in 2019 as soon as it was discovered. Meanwhile,

⁵⁰ Wang, Linfa, Wei, Liu, et. al, 'A Zoonotic Henipavirus in Febrile Patients in China', *New England Journal of Medicine*, Vol. 387, 4 August 2022.

⁵¹ Xavier Fernández-Aguilar, et. al., 'Novel Henipa-like Virus, Mojiang Paramyxovirus, in Rats, China, 2012', *Emerging Infectious Diseases*, Vol. 20, No. 6, June 2014.

⁵² Diego Cantoni, et. al., 'Pseudotyped Bat Coronavirus RaTG13 is efficiently neutralised by convalescent sera from SARS-CoV-2 infected patients', *Communications Biology*, Vol. 5, No. 409, 3 May 2022.

⁵³ Joanna, Mazet, Peter, Daszak, Shi, Zheng-Li, et. al., 'Isolation and characterization of a bat SARS-like coronavirus that uses the ACE2 receptor', *Nature*, Vol. 503, No. 28, November 2013.

⁵⁴ Supplementary Appendix to Wang, Linfa, Wei, Liu, et. al, 'A Zoonotic Henipavirus in Febrile Patients in China', *New England Journal of Medicine*, Vol. 387, 4 August 2022.

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among the 35 patients, six patients were found to be co-infected with Severe Fever with Thrombocytopenia Syndrome Virus (SFTSV) while 2 patients were found to be co-infected with Hantavirus.⁵⁵

The SFTSV and Hantavirus are highly infectious viruses that could lead to severe viral hemorrhage and their outbreaks in China are relatively rare events. SFTSV is, in fact, a tick borne virus, although one study found its prevalence in its host at only 0.2%.⁵⁶ So, in this so-called ‘sentinel febrile illness surveillance,’ this group of military scientists identified three dangerous pathogens at one time with some patients being co-infected with two rare pathogens. **How likely would this be to happen in a natural situation?** Also, in regular sentinel febrile illness surveillance, these viruses would not be included in the regular screening under normal circumstances.

LayV, SFTSV and Hantaviruses can also all infect rodents. SFTSV is a novel phlebovirus (in the Bunyaviridae family) and certain tick species have been demonstrated as a competent vector of SFTSV by experimental transmission study and field study.⁵⁷ Further, LayV and Hantavirus can infect humans if people encounter rodent droppings or feces. So, for the patients to be co-infected with SFTSV and LayV, the rodents need to be infected by the ticks first to get SFTSV, and also their droppings and feces need to be touched by those farmers. **How ‘lucky’ these scientists were to find all of these exceedingly rare co-infection cases from a single field case study under an official sentinel surveillance framework.**

Although SFTSV and Hantavirus infections have become endemic in Shandong or Henan Provinces in recent years, it is still very unusual to see patients co-infected with these dangerous pathogens. In the BIME study, no patient died even though SFTSV and Hantavirus normally have high mortality rates. Given these dynamics, his study appears to be a targeted surveillance project to look for certain pathogens’ zoonotic infection risk to humans via transmission by rodents (with screening of different species of rodents).

Would it be possible that this study was a test of these dangerous pathogens and to see which one was more prone to cause human infection? With the involvement of a military hospital and scientists from the PLA, would it be possible that this was a field release of multiple dangerous pathogens followed by field screening of rodents and potential human infections caused by infected rodents? The answer to this question is beyond the scope of this specific monograph, but these questions are reasonable speculation and should serve as an alarm for national security experts.

⁵⁵ Supplementary Appendix to Wang, Linfa, Wei, Liu, et. al, ‘A Zoonotic Henipavirus in Febrile Patients in China’, *New England Journal of Medicine*, Vol. 387, 4 August 2022.

⁵⁶ Luo LM, et al., *Haemaphysalis longicornis* Ticks as Reservoir and Vector of Severe Fever with Thrombocytopenia Syndrome Virus in China. *Emerg Infect Dis*. 2015 Oct;21(10):1770-6. doi: 10.3201/eid2110.150126. PMID: 26402039; PMCID: PMC4593435.

⁵⁷ Yuan-Yuan Hu, et. al., ‘Role of three tick species in the maintenance and transmission of Severe Fever with Thrombocytopenia Syndrome Virus’, *PLOS Neglected Tropical Diseases*, Vol. 14, No. 6, 10 June 2020.

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The Wuhan Institute of Virology: Track Record of Conducting Synthetic Biology Experiments with the Bangladesh strain of Nipah Virus from at least 2019 to 2023

The WIV was creating an infectious clone of the Nipah virus, as identified by Quay et al.⁵⁸ in patient samples sequenced in late December 2019. The WIV had not previously acknowledged this research before this time or even since. However, two 2023 papers^{59,60} from the WIV appear to be an extension of this previous work. Below is a screen shot of the researchers on this paper, showing an extensive network of Chinese institutions. Of note, Nanjing Normal University is considered medium risk by the Australian government for working with the PLA.⁶¹ Nanjing Normal University has a close relationship with the regional government in Xinjiang, where over one million Uyghurs and Kazakhs are currently held in internment camps. Are they included here because they could conduct human clinical trials in the internment camps with vaccine candidates?

Vaccines based on the fusion protein consensus sequence protect Syrian hamsters from Nipah virus infection

Mingqing Lu,^{1,2} Yanfeng Yao,³ Hang Liu,³ Xuekai Zhang,^{1,2} Xuejie Li,^{2,4} Yuanhua Liu,⁵ Yun Peng,³ Tong Chen,^{2,4} Yun Sun,^{4,6} Ge Gao,³ Miaoyu Chen,³ Jiaxuan Zhao,^{1,2} Xiaoyu Zhang,^{1,2} Chunhong Yin,¹ Weiwei Guo,^{1,2} Peipei Yang,^{1,2} Xue Hu,¹ Juhong Rao,^{1,2} Entao Li,⁷ Gary Wong,⁴ Zhiming Yuan,^{1,3} Sandra Chiu,⁷ Chao Shan,^{1,3,8} and Jiaming Lan⁴

¹State Key Laboratory of Virology, Wuhan Institute of Virology, Chinese Academy of Sciences, Wuhan, China. ²University of the Chinese Academy of Sciences, Beijing, China. ³Center for Biosafety Mega-Science, Wuhan Institute of Virology, Chinese Academy of Sciences, Wuhan, China. ⁴CAS Key Laboratory of Molecular Virology & Immunology, Shanghai Institute of Immunity and Infection Chinese Academy of Sciences, Shanghai, China. ⁵Institute of Neuroscience, State Key Laboratory of Neuroscience, Key Laboratory of Primate Neurobiology, Center for Excellence in Brain Science and Intelligence Technology, Chinese Academy of Sciences, Shanghai, China. ⁶College of Life Sciences, Nanjing Normal University, Nanjing, China. ⁷Division of Life Sciences and Medicine, University of Science and Technology of China, Hefei, China. ⁸Hubei Jiangxia Laboratory, Wuhan, China.

The above 2023 paper is the description of the creation of a DNA vaccine vector using the pVAX-1 vector. This is the same vector found in the patient specimens by Quay et al. This latest paper uses a technique called ‘consensus sequence’ creation, in which the most common amino acids in each position of a viral protein are identified by comparing a large number of related virus proteins.

Using this consensus sequence protein as the antigen in a vaccine candidate has the highest likelihood to be more broadly protecting. The fusion protein consensus sequence used in the 2023 paper turns out to be 100% identical over the entire 546 amino acids with the Bangladesh strain AY988601.1. This Nipah virus strain has a complex history with the WIV. In the spring

⁵⁸ Quay SC, Zhang D, Jones A, Deigin Y. Nipah virus vector sequences in COVID-19 patient samples sequenced by the Wuhan Institute of Virology, ArXiv. <https://arxiv.org/abs/2109.09112>

⁵⁹ Lu M, Yao Y, Liu H, Zhang X, Li X, Liu Y, Peng Y, Chen T, Sun Y, Gao G, Chen M, Zhao J, Zhang X, Yin C, Guo W, Yang P, Hu X, Rao J, Li E, Wong G, Yuan Z, Chiu S, Shan C, Lan J. Vaccines based on the fusion protein consensus sequence protect Syrian hamsters from Nipah virus infection. JCI Insight. 2023 Dec 8;8(23):e175461. doi: 10.1172/jci.insight.175461. PMID: 37917215; PMCID: PMC10795836.

⁶⁰ Lu, M., Yao, Y., Zhang, X. et al. Both chimpanzee adenovirus-vectored and DNA vaccines induced long-term immunity against Nipah virus infection. npj Vaccines 8, 170 (2023). <https://doi.org/10.1038/s41541-023-00762-3>

⁶¹ <https://unitracker.aspi.org.au/universities/nanjing-normal-university/>

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of 2019, it was shipped from Canada's only BSL4 laboratory to the WIV.⁶² This is the same strain that was found in the patient specimens by Quay et al. In the Lu et al. paper, it notes: The NiV-M (GenBank ID: AF212302.2; <https://www.ncbi.nlm.nih.gov/genbank/>) and NiV-B (GenBank ID: AY988601.1) strains employed in the challenge studies were obtained from the National Virus Resource, Wuhan Institute of Virology, Chinese Academy of Sciences.

The actual source of both viruses is the Canadian laboratory but this is not stated.

The CCP is Actively Engaged in Additional Nipah Bangladesh Virus Vaccine Efforts Utilizing Military Technology

A second Chinese group published a different Nipah vaccine in 2023.⁶³ This used an attenuated rabies virus to insert the Nipah genes, G and F. This rabies vaccine system was first developed in 2014 by the Key Laboratory of Jilin Province for Zoonosis Prevention and Control, Institute of Military Veterinary, Academy of Military Medical Sciences, Changchun 130122, China.⁶⁴ Once again, these researchers use the Bangladesh strain that was sent to the WIV from Canada in 2019. Because they use the genetic sequence for the Nipah genes from GenBank it is not necessary for them to get this strain from the WIV. There is no acknowledgement of the WIV in this paper. This study looked at the immune response in mice.

Some Chinese Work is Focused on the Less Lethal Nipah Malaysian Strain, But is Being Conducted in BSL2 Labs Under High-Risk Conditions

A different Chinese group has made a model system to study the Nipah virus life cycle in cells or animals under BSL2 conditions.⁶⁵ Here they surprisingly use the less lethal Malaysian strain. There seems to be no overt connection with this group to the WIV.

Their virus-like particles that they think allows them to study Nipah under BSL2 conditions, the equivalent of a dental office, is troublesome. Their 'clever' method of limiting the production of infectious virus particles is to put three of the essential genes, P, N, and L, on separate plasmids while the virus-like particles have the remaining three genes, M, F, and P. The scheme is shown here:

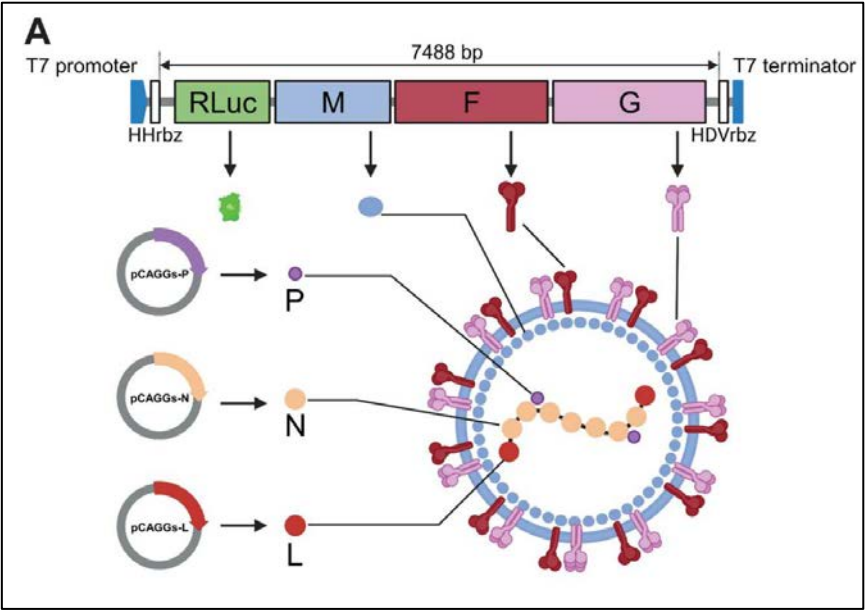
⁶² <https://www.cbc.ca/news/canada/manitoba/canadian-scientist-sent-deadly-viruses-to-wuhan-lab-months-before-rcmp-asked-to-investigate-1.5609582>

⁶³ Li, Z.; Zhu, Y.; Yan, F.; Jin, H.; Wang, Q.; Zhao, Y.; Feng, N.; Wang, T.; Li, N.; Yang, S.; et al. Inactivated Recombinant Rabies Virus Displaying the Nipah Virus Envelope Glycoproteins Induces Systemic Immune Responses in Mice. *Vaccines* 2023, 11, 1758. <https://doi.org/10.3390/vaccines11121758>

⁶⁴ Wang H, Jin H, Feng N, Zheng X, Li L, Qi Y, Liang M, Zhao Y, Wang T, Gao Y, Tu C, Jin N, Yang S, Xia X. Using rabies virus vaccine strain SRV9 as viral vector to express exogenous gene. *Virus Genes*. 2015 Apr;50(2):299-302. doi: 10.1007/s11262-014-1160-y. Epub 2015 Feb 28. PMID: 25724175.

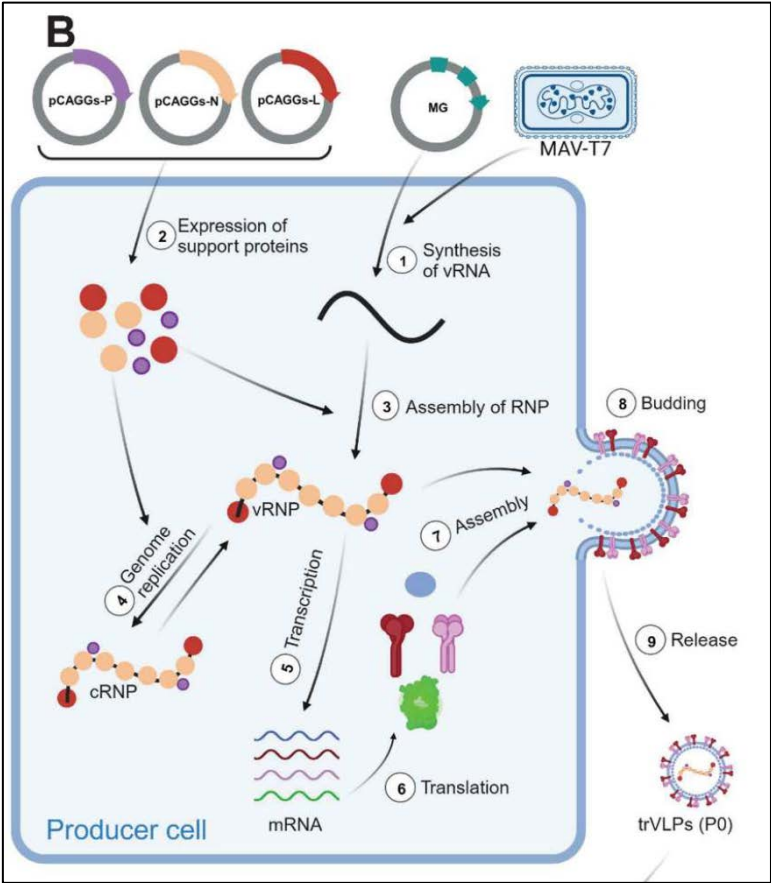
⁶⁵ Wang, Y., Fan, L., Ye, P., Wang, Z., Liang, C., Liu, Q., Qian, J. (2024). Novel transcription and replication-competent virus-like particles system modelling the Nipah virus life cycle. *Emerging Microbes & Infections*, 13(1). <https://doi.org/10.1080/22221751.2024.2368217>

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Figure 1



When the particles are first passed in cells, the three support plasmids for the P, N, and L proteins need to be present in the cells, as shown here:

Figure 2

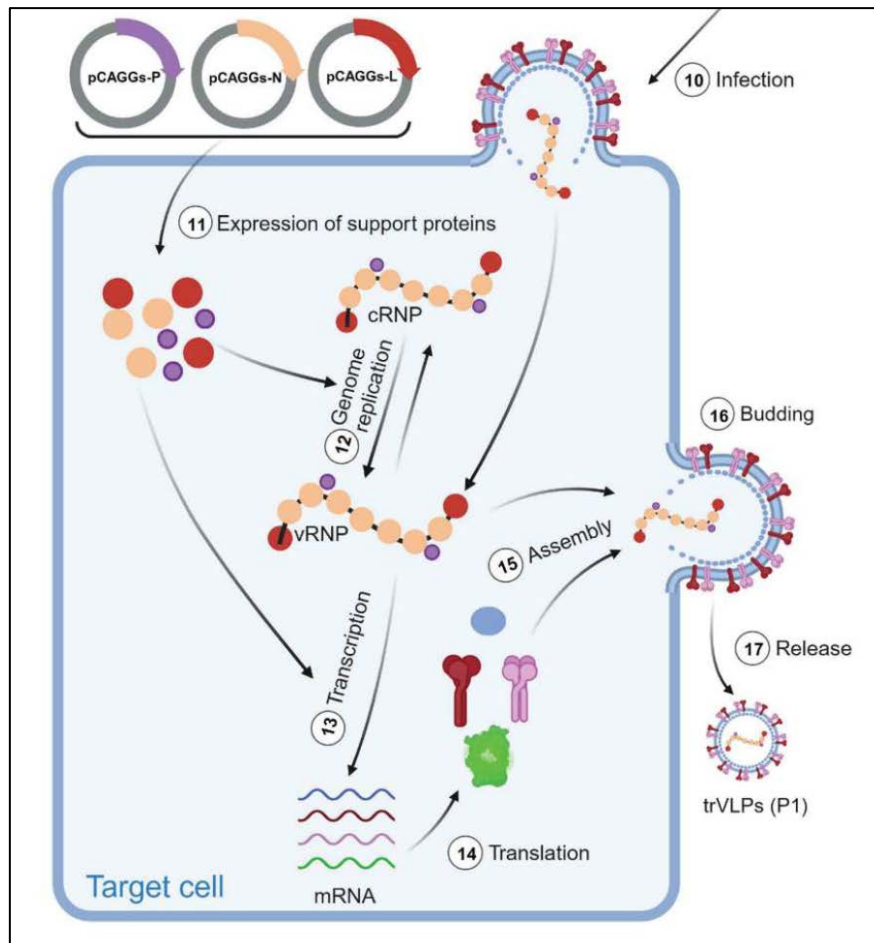


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The authors believe the above trVLPs could then be used in serial passage only in cells that have the three helper plasmids, as shown here:

Figure 3



The authors seem to be aware of the grave danger that a fully infectious Nipah virus would be constructed if the three support plasmid genes were to recombine during particle replication. They note:

“Another inescapable concern with an extremely low possibility for trVLP-NiV is that the excised genes back integrated spontaneously into MG after serial passages, leading to the emergence of a pathogenic virus. To eliminate this concern, the MG sequence of P5 trVLP-NiV was determined by Sanger sequencing. The result confirmed that the MG length of P5 trVLP-NiV was consistent with that of the reference MG sequence (7488 bp), indicating that no exogenous RNA was inserted into the MG of trVLP-NiV.”⁶⁶

This is the wrong test for a rare event like reintegration of the full-length virus. The proper test would be repeated serial passage into cells that did not have the plasmids with the support genes. In this experiment, the rare virus that had recombined properly would be the only virus

⁶⁶ Ibid.

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Quay SC, Clarke R, Lin XS, McCreight R, Eads LJ, Asher D, Bomgaars W to grow. **If this lab focuses on this method, they would be predicted to be the first lab to have a Nipah virus acquired infection in a lab worker.**

Joint Sino-Pakistani Scientific Teams Use Cutting Edge, Advanced Immunoinformatics Techniques to Create Vaccines for Langya Viruses

The ability to use only computer simulations to find the most immunogenic epitopes from a virus, to stitch them together, and to express them in cloning vectors is the most advanced approach to vaccine development in the year 2024. This paper focuses on a Langya virus vaccine, the new virus seen in 35 patients from eastern China over the period 2018 to 2022 discussed earlier.⁶⁷ While not itself lethal, it is a member of the Hendra virus family, that can have a 40-75% lethality. The article has an interesting group of collaborators:

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Chimeric vaccine design against the epidemic Langya Henipavirus using immunoinformatics and validation via immune simulation approaches

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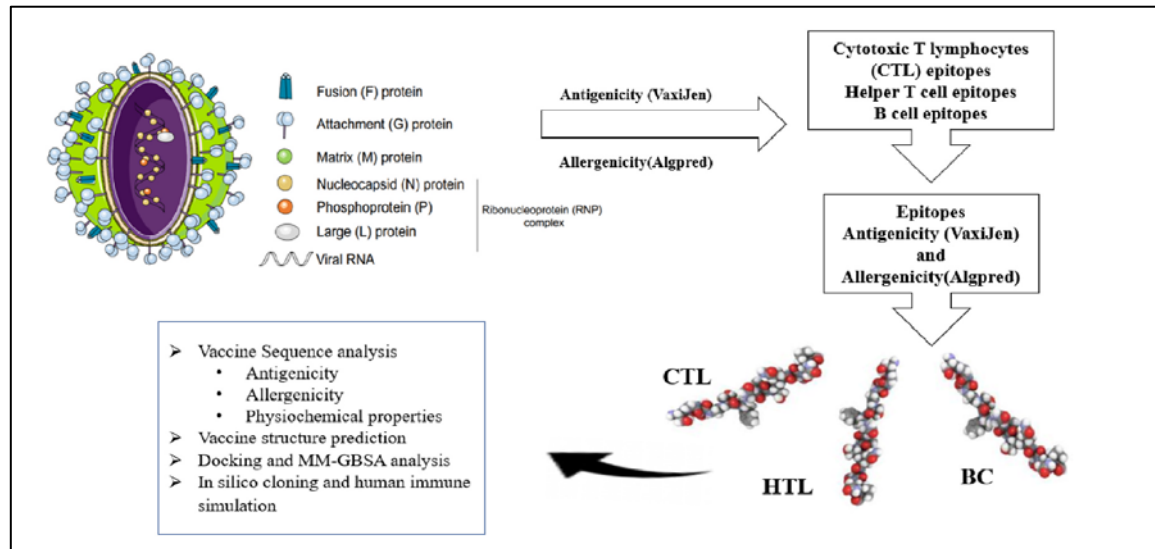
Note both Shanghai- and Punjab (Pakistan)-based scientists are collaborating, as well as one scientist from Saudi Arabia and Taylor, Texas. The processing steps are shown in this text-figure:

⁶⁷ Adesola, R.O., Miranda, A.V., Tran, Y.S.J. *et al.* Langya virus outbreak: current challenges and lesson learned from previous henipavirus outbreaks in China, Australia, and Southeast Asia. *Bull Natl Res Cent* **47**, 87 (2023). <https://doi.org/10.1186/s42269-023-01064-3>.

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Figure 4



The proteins of the virus are first examined with the VaxiJen software that measures antigenicity. This is a freely available software on the Jenner Institute website, an Oxford University affiliate. The epitopes that are most antigenic are identified, as shown in this table:

Table 2

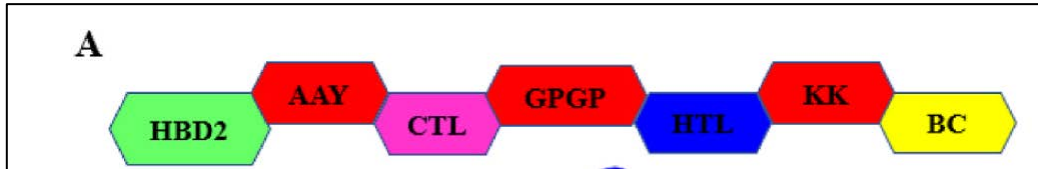
| Protein Name | Pos | Peptide | Score | Antigenicity Score | Allertop | epitopes |
|-------------------------|------|-------------------|-------|--------------------|--------------|----------|
| attachment glycoprotein | 573 | EEIWCIATVEGRKQKE | 0.88 | 1.50 | NON-ALLERGEN | BC |
| C protein | 27 | LGCQQKTEPQHGSCS | 0.92 | 1.09 | NON-ALLERGEN | BC |
| fusion protein | 193 | SVGIKLTQYYSEILTA | 0.94 | 0.81 | NON-ALLERGEN | BC |
| nucleocapsid protein | 348 | NRSYLEPIYFKLGQNA | 0.9 | 0.95 | NON-ALLERGEN | BC |
| P phosphoprotein | 61 | TRPEELSLEERNGTIS | 0.88 | 1.67 | NON-ALLERGEN | BC |
| polymerase | 516 | PYEIHIDYVLSGKYKTD | 0.96 | 0.74 | NON-ALLERGEN | BC |
| V protein | 61 | TRPEELSLEERNGTIS | 0.88 | 1.69 | NON-ALLERGEN | BC |
| W protein | 61 | TRPEELSLEERNGTIS | 0.88 | 1.69 | NON-ALLERGEN | BC |
| attachment glycoprotein | 174 | DTTIKPVEY | 1.93 | 1.40 | NON-ALLERGEN | CTL |
| fusion protein | 288 | VQELMPISY | 1.12 | 1.15 | NON-ALLERGEN | CTL |
| nucleocapsid protein | 102 | ITDISEFDH | 0.92 | 0.72 | NON-ALLERGEN | CTL |
| P phosphoprotein | 259 | GTEIHNLTI | 1.32 | 1.08 | NON-ALLERGEN | CTL |
| polymerase | 3 | FSDVSISDI | 1.48 | 1.81 | NON-ALLERGEN | CTL |
| V protein | 259 | GTEIHNLTI | 1.32 | 1.08 | NON-ALLERGEN | CTL |
| W protein | 319 | ESDITIFDL | 0.96 | 0.96 | NON-ALLERGEN | CTL |
| attachment glycoprotein | 557 | NYYSITSATISCFMY | 0.49 | 0.99 | NON-ALLERGEN | HTL |
| C protein | 144 | LRLIRLMCPAYSRAV | 0.25 | 0.62 | NON-ALLERGEN | HTL |
| fusion protein | 471 | KSEEFKGINPSIIT | 0.99 | 0.46 | NON-ALLERGEN | HTL |
| P phosphoprotein | 184 | APAFQMNPNAKEYYP | 0.44 | 0.81 | NON-ALLERGEN | HTL |
| polymerase | 1381 | TNLIQQVMLLGLSA | 0.74 | 0.70 | NON-ALLERGEN | HTL |
| V protein | 182 | KTAPAFQMNPNAKEY | 0.8 | 0.93 | NON-ALLERGEN | HTL |
| W protein | 184 | APAFQMNPNAKEYYP | 0.44 | 0.81 | NON-ALLERGEN | HTL |

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They are then assembled into a chimeric protein with spacers to form a multi-antigen protein, symbolically shown as blocks:

Figure 5



This paper and the use of this technology indicates China is trying to develop vaccines with the most advanced technologies for this rare, newly emerged virus.

The Demonstrated Geospatial Distribution of Nipah Virus Indicates China is an Unlikely Location for a Natural Human Outbreak

One approach to speculating on the motivations of China in putting together such a large effort on the Nipah virus is to examine the potential for a human outbreak to occur in China. After all, if the natural environments of the reservoir host bat and intermediate host pig suggested China could suffer a catastrophic spillover outbreak, one might understand and justify such a large effort on a national public health policy basis.

Such a study of the potential outbreak locations for Nipah was conducted and published in 2024.⁶⁸ In this geospatial modelling analysis, the authors developed an integrated database containing information on the distribution of Nipah virus infections in humans and animals from 1998 to 2021. They conducted phylodynamic analysis to examine the evolution and migration pathways of the virus and meta-analyses to estimate the adjusted case-fatality rate.

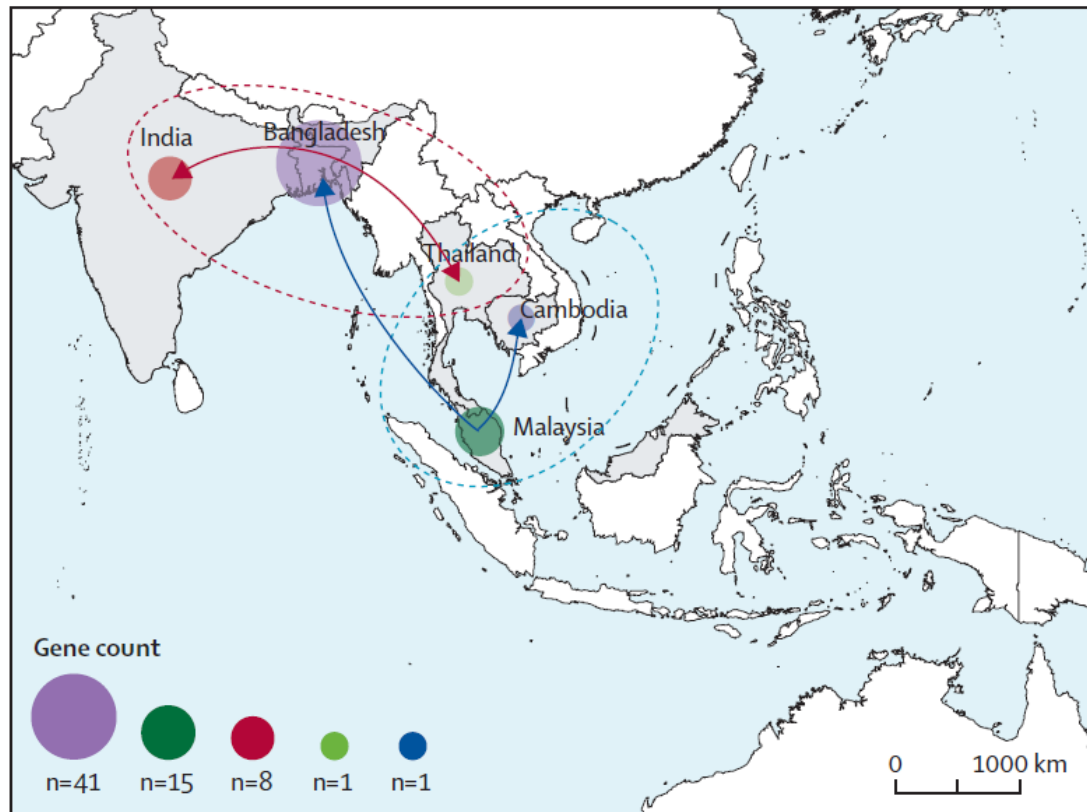
Their first effort was to map the past human cases and then determine if the phylogeny of the viruses matched the geography. This was testing if the non-human hosts had a hyper-local distribution or was there evidence of long-range migration. The map of cases and their phylogeny is shown in the following figures.

⁶⁸ Mapping the distribution of Nipah virus infections: a geospatial modelling analysis. Sun, Yan-Qun et al. The Lancet Planetary Health, Volume 8, Issue 7, e463 - e475.
[https://www.thelancet.com/journals/lanplh/article/PIIS2542-5196\(24\)00119-0/fulltext](https://www.thelancet.com/journals/lanplh/article/PIIS2542-5196(24)00119-0/fulltext)

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Figure 6



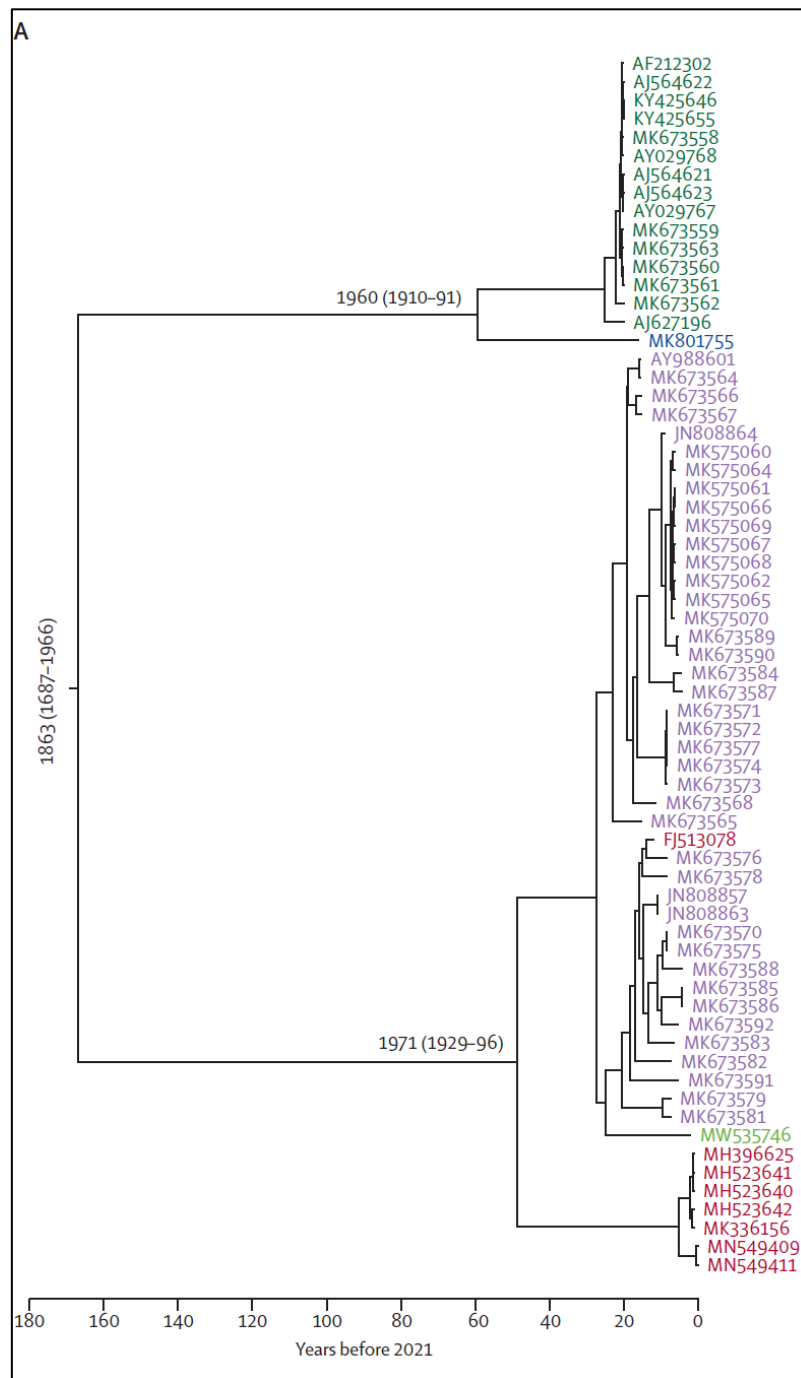
This map of historical cases showcases the Bangladesh cases and the Malaysian cases and the fact that these countries represent 85% of the cases, with minor cases in India, Thailand, and Cambodia. **No cases were from China.**

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Using the same color code for countries, the phylogeny of the cases is shown in the next figure.

Figure 7



There is a strong correlation of the genetic diversity of the virus genomes and the country of origin, with minor exceptions. The time to the most recent common ancestor of 1960 for the case in Thailand and the Malaysian strain and the date of 1971 between the Bangladesh strain and the outbreak in India are both well before the first clinically documented case of Nipah virus in October 1998 in Malaysia.⁶⁹

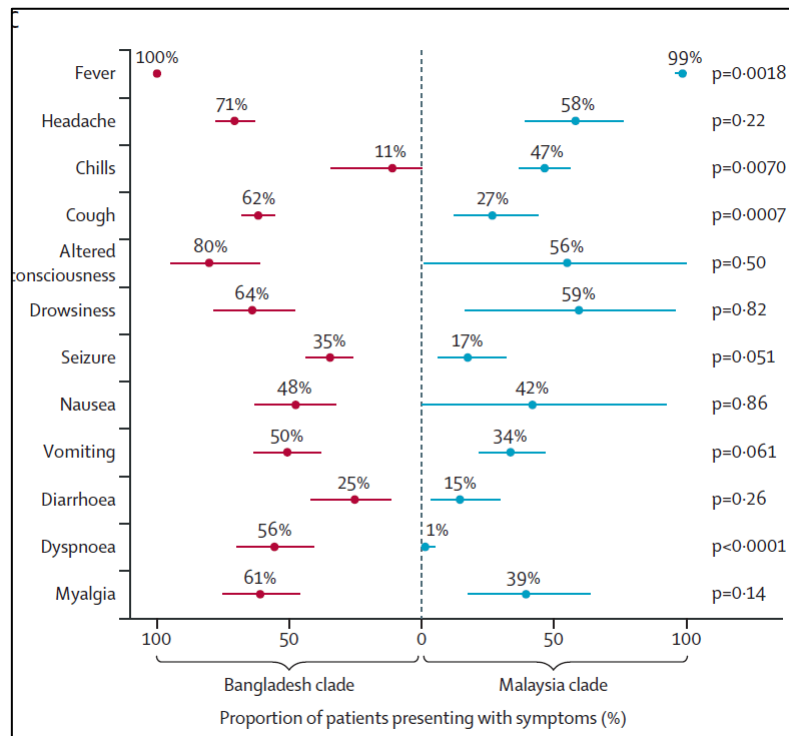
⁶⁹ CDC. Outbreak of Hendra-like virus -- Malaysia and Singapore, 1998-1999. MMWR 1999;48:265-9. <https://www.cdc.gov/mmwr/preview/mmwrhtml/00057012.htm>

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An examination of the case signs and symptoms for patients shows the increased pathogenicity of the Bangladesh strain is largely a function of a more substantial pulmonary infection, with cough and dyspnea significantly increased. Other clinical parameters were not significantly different.

Figure 8



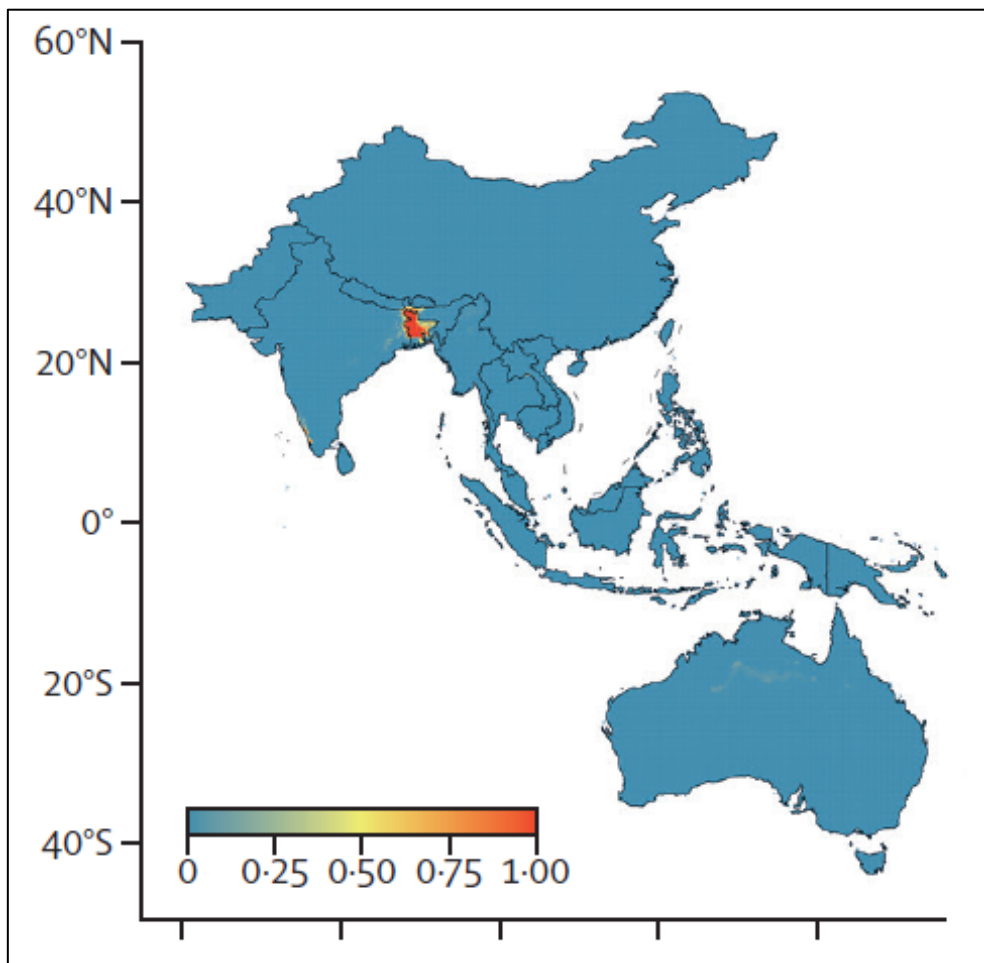
The multivariate analysis of what lead to a fatal versus non-fatal outcome had four significant variables: viral clade and country of origin (which are themselves highly related), proportion of male patients, and time to get to a medical facility. The overall difference in lethality was 77% for the Bangladesh clade and 37% for the Malaysian clade.

Based on both human cases, intermediate host cases, and the host range of bats that have been shown to carry the Nipah virus, the authors performed a calculation of the likelihood of spillover. The color-coded map with their conclusions is shown here.

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Figure 9



As noted, only Bangladesh and its border with India have a likelihood above zero for a Nipah virus spillover.

Three conclusions can be drawn:

1. China's extensive network of laboratories and collaborators studying the Nipah virus is not justified on the basis of public health policy for China, as there is no real or theoretical risk to the Chinese nation of a Nipah virus spillover.
2. China's collaboration with labs in Pakistan is also not justified based on public health policy, since there has never been a single case of Nipah virus in Pakistan and there is no theoretical basis for predicting a spillover in the future in Pakistan.
3. Chinese collaboration with labs in Pakistan and Bangladesh does provide the classic 'two-front' belligerent approach with respect to India.

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The WIV and Shi Zhengli (At Least) Officially Acknowledged Clear Interest in the Nipah Virus in December 2019

At the large international Nipah virus conference held in Singapore December 9-10, 2019,⁷⁰ researchers from around the world gave presentations on what had been learned, and what still needed to be learned, over the 20 years since the discovery of Nipah virus. Abstracts of the presentations are still available in a 67-page online document. One of the final abstracts (on page 65 of 67) was by the renowned virologist at the Wuhan Institute of Virology and Editor-in-Chief of the journal *Virologica Sinica*, Dr. Shi Zhengli. This abstract included the following statements:

Nipah represents a priority pathogen for the Wuhan facility, due to 1) its ability to infect animals and humans; 2) its high mortality in humans; and 3) the prevalence of henipaviruses and henipa-like viruses in countries of Southeast Asia, including China. Work on Nipah is divided into six work packages: 1) NiV pathogenesis; 2) Epidemiology; 3) Development of a DC-based prophylactic mucosal vaccine; 4) Therapeutics development; 5) Diagnostics development; 6) Biostatistics analyses.⁷¹

As was known at the time by the WIV, this virus had no potential for impact in China. This explains the use of the broader taxonomic term, henipavirus, to obfuscate the lack of relevance of Nipah to China.

The Langya Virus and the 2014 Mojiang Virus Isolate *Tongguan1* Have Unusual Homologies, Consistent with Recombination (Either Naturally or in a Laboratory)

A comparison of the nucleocapsid proteins from the Langya virus (GenBank OM101125.1; top sequence, Query) with the same protein from the 2014 Mojiang mine virus (Genbank KF278639.1; bottom sequence, Sbjct) shows the pattern of being recombinants of each other.

Figure 10

| Range 1: 1 to 539 | | Graphics | | | | | Next Match | Pr |
|-------------------|--------|--|--------------|--|--------------|--|------------|----|
| Score | Expect | Method | Identities | | Positives | | Gaps | |
| 969 bits(2505) | 0.0 | Compositional matrix adjust. | 462/539(86%) | | 507/539(94%) | | 0/539(0%) | |
| Query 1 | 1 | MFSTLKNETEFREYQANLGRQKPLASTATLTTKIIVYNPSNKSPALRWEITKFAMRLI | | | | | 60 | |
| Sbjct 1 | 1 | .Y...H...R.....G..... | | | | | 60 | |
| Query 61 | 61 | WSPAASHSVKVGAAITLLSAHAENPGAMIRSLVNDPDIEVVITDISEFDHGVPRLERRGE | | | | | 120 | |
| Sbjct 61 | 61 | | | | | | 120 | |
| Query 121 | 121 | KAEQQMSYRRILDRAPQENLFYNPEVDDLEILDSGTFLFAIATVLAQVWILVAKAVTAP | | | | | 180 | |
| Sbjct 121 | 121 |E.K...N.T.....I..... | | | | | 180 | |
| Query 181 | 181 | DTAEESENKRWAKYVQKRVNPDYLVSNRWITAMRSLISIDLSVRKYMVEILIEVKKSGV | | | | | 240 | |
| Sbjct 181 | 181 |D.....M..... | | | | | 240 | |
| Query 241 | 241 | ARGRLNEMIADIGNYIEETGMAGFFLTIKYGLEMKFPVIVINEFQADLLTLQTLMRTYMD | | | | | 300 | |
| Sbjct 241 | 241 | S..... | | | | | 300 | |
| Query 301 | 301 | LGPRAPYMVLLDSIQTKFAPGNYPLLSFAMGVGTTLDMSGALNINRSYLEPIYFKLG | | | | | 360 | |
| Sbjct 301 | 301 | | | | | | 360 | |
| Query 361 | 361 | QNAARKNAGSIDRKLAEEELGLTQEANEIKEMMQEVTTQRHETNVQAREGKFVNAAGGIE | | | | | 420 | |
| Sbjct 361 | 361 |ISP...D.....I.V..... | | | | | 420 | |
| Query 421 | 421 | SLLTNDDEITSSRYFSETADSLFNLAGLGRDYDNARTTQRETSRGRDMSVRDRLMSL | | | | | 480 | |
| Sbjct 421 | 421 | ...DE..D..N...M...T.TM...VRPT...ESSKVSPK.SKNKS.....N..... | | | | | 480 | |
| Query 481 | 481 | RDEEARKAEQMLGLMDLGSKRSTAPNQVADDSVRKQADTSAGNSFQTVNDLDALNS | | | | | 539 | |
| Sbjct 481 | 481 | .E.....S.....I...AF.KTSAGQTPSTSATA...S.VDISASNI.....DN..... | | | | | 539 | |

⁷⁰ Daniel R. Lucey, 2023. 4 Origin Scenarios if a Nipah Virus outbreak occurs outside South/SE Asia, Medical Research Archives, [online] 11(6). <https://doi.org/10.18103/mra.v11i6.3942>

⁷¹ Ibid.

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There is almost complete amino acid identity from the beginning, residue 1 to residue 424. From there to the end, residue 539, there are almost 50% changes. This is a sign of a recombination event.

The fusion proteins show a similar asymmetry with respect to amino acid substitutions, but here it is the beginning of the protein that shows the most changes.

Figure 11

| Score | Expect | Method | Identities | Positives | Gaps |
|----------------|--|------------------------------|--------------|--------------|-----------|
| 972 bits(2512) | 0.0 | Compositional matrix adjust. | 487/539(90%) | 518/539(96%) | 0/539(0%) |
| Query 7 | MFSSFLGYLLVYATTQSSIHYDSLKVGVIKGLTNYKIKGSPSTKLMVVKLIPNIDS | | | | 66 |
| Sbjct 3 | FLK.AIIC...F.PHI.K..L.....I.....G | | | | 62 |
| Query 67 | VKNCTQKQYDEYKNLVRKALEPVKMAIDTMLNNVKSNNKYRFAGAIMAGVALGVATAAT | | | | 126 |
| Sbjct 63 | .R.....F.....KNV.....L.LNA..D..... | | | | 122 |
| Query 127 | VTAGIALHRSNENAQAIANMKSIAIQTNEAVKQLQLANKQTLAVIDTIRGEINNIIIPVI | | | | 186 |
| Sbjct 123 |N..... | | | | 182 |
| Query 187 | NQLSCDTIGLSVGIRLTQYYSEIITAFGPALQNPVNTRITQAISSVFNGNFDLLKIMG | | | | 246 |
| Sbjct 183 |K.....L.....R..... | | | | 242 |
| Query 247 | YTSGLYEILHSELIRGNIIDVDVDAGYIALEIEFPNLTLPNAVQELMPISYNIDGDE | | | | 306 |
| Sbjct 243 |G.....E.....V..... | | | | 302 |
| Query 307 | WVTLVPRFVLTRTLLSNIDTSRCTITDSSVICNDYALPMSHELIGCLQGDTSKCAREK | | | | 366 |
| Sbjct 303 |V.E.....Y..... | | | | 362 |
| Query 367 | VVSSYVPKFALSDGLVYANCLNTICRCMDTDPISQSLGATVSLLDNKRCVYQVGDVLI | | | | 426 |
| Sbjct 363 |R.....T.....K.L.....I... | | | | 422 |
| Query 427 | SVGSYLGDEYNADNVELGPPIVIDKIDIGNQLAGINQTLQEAEDYIEKSEEFKGVNPS | | | | 486 |
| Sbjct 423 |E..S.....V.....N.....I... | | | | 482 |
| Query 487 | IITLGSMMVLYIFMILIAIVSVIALVLSIKLTVKGNVVRQQFTYTQHVPSMENINYVSH | | | | 545 |
| Sbjct 483 |A.....V..VI.I.....A.....V..... | | | | 541 |

The PLA's Academy of Military Medical Sciences Actively Patented Therapies for SARS-CoV-2, Ebola, Marburg, and Nipah Viruses

The following patent applications by Inventor-Major General Wei Chen and The Academy of Military Medical Sciences show a pattern of work on antibody therapies for deadly viruses. These could be used prophylactically by an army just before releasing a deadly virus as an offensive weapon. The full applications can be found by following the URL embedded in the titles.

- [MONOCLONAL ANTIBODY 2G1 FOR BROAD-SPECTRUM NEUTRALIZATION OF EBOLA VIRUSES AND APPLICATION THEREOF](#)

Publication number: 20240254201

Abstract: Disclosed is a monoclonal antibody 2G1 against an Ebola glycoprotein GP2 subunit. The monoclonal antibody has binding activity to EBOV GP, BDBV GP, SUDV GP, and RESTV GP, and can play a neutralizing role.

Type: Application

Filed: May 10, 2019

Publication date: August 1, 2024

Applicant: Academy of Military Medical Sciences, PLA

Weaponizing the Nipah Virus

Quay SC, Clarke R, Lin XS, McCreight R, Eads LJ, Asher D, Bomgaars W

Inventors: Wei Chen, Changming Yu, Pengfei Fan, Xiangyang Chi, Guanying Zhang, Jianmin Li, Lihua Hou, Junjie Xu, Ting Fang, Shipo Wu, Yi Chen, Zhengshan Chen, Yujiao Liu, Meirong Wang

- **ANTI-HENIPAVIRUS MONOCLONAL ANTIBODY HAVING BROAD SPECTRUM NEUTRALIZATION ACTIVITY AND USE THEREOF**

Publication number: 20240294614

Abstract: Provided is an anti-Henipavirus monoclonal antibody having broad spectrum neutralization activity, wherein the antibody comprises a macaque variable region and a human constant region. The antibody of the present invention has good binding activity to both Nipah virus glycoprotein G and Hendra virus glycoprotein G, can effectively neutralize Nipahpseudovirus and Hendra pseudovirus, and can be used for preparing drugs for treating Henipavirus diseases.

Type: Application

Filed: June 27, 2021

Publication date: September 5, 2024

Applicant: Academy of Military Medical Sciences, PLA

Inventors: Wei Chen, Changming Yu, Yujiao Liu, Pengfei Fan, Guanying Zhang, Yaohui Li, Jianmin Li, Xiangyang Chi, Meng Hao, Ting Fang, Yunzhu Dong, Xiaohong Song, Yi Chen, Shuling Liu

- **ANTI-NIPAH VIRUS MONOCLONAL ANTIBODY HAVING NEUTRALIZATION ACTIVITY AND APPLICATION**

Publication number: 20240158480

Abstract: Disclosed in the present invention is an anti-Nipah virus monoclonal antibody having neutralization activity. The antibody consists of a monkey-derived variable region and a human constant region, and both light and heavy chains of the monkey-derived variable region have unique CDR regions. The antibody provided by the present invention has an excellent antigen binding capability, and has good binding activity with Bangladesh Nipah virus and Malaysia Nipah virus glycoprotein G. The antibody can effectively neutralize the Nipahpseudovirus. Moreover, the neutralization activity of the antibody is enhanced as the concentration of the antibody increases, and nearly 100% neutralization of the Nipahpseudovirus can be achieved at a concentration of 1g/mL. Also disclosed in the present invention is an application of the monoclonal antibody against the Nipah virus glycoprotein G in preparation of a Nipah virus treatment drug.

Type: Application

Filed: June 26, 2021

Publication date: May 16, 2024

Applicant: Academy of Military Medical Sciences, PLA

Inventors: Wei Chen, Changming Yu, Yujiao Liu, Pengfei Fan, Guanying Zhang, Yaohui Li, Jianmin Li, Xiangyang Chi, Meng Hao, Ting Fang, Yunzhu Dong, Xiaohong Song, Yi Chen, Shuling Liu

Weaponizing the Nipah Virus

Quay SC, Clarke R, Lin XS, McCreight R, Eads LJ, Asher D, Bomgaars W

- RECOMBINANT NOVEL CORONAVIRUS VACCINE USING REPLICATION-DEFICIENT HUMAN ADENOVIRUS AS VECTOR

Publication number: 20230022109

Abstract: Provided is a novel coronavirus vaccine using replication-deficient human type 5 adenovirus as a vector. The vaccine takes the replication-deficient human type 5 adenovirus that is lack of E1 and E3 in a combined mode as a vector, and HEK293 cells that integrate adenovirus E1 genes serve as a packaging cell line, and protective antigenic genes carried are optimized COVID-19 (SARS-CoV-2) S protein genes (Ad5-nCoV). The vaccine has good immunogenicity in both mouse and guinea pig models and can induce the body to produce a strong cellular and humoral immune responses in a short time. Research on the protective effect of hACE2 transgenic mice shows that 14 days after a single Ad5-nCoV immunization, the viral load in lung tissues can be significantly reduced. It shows that the vaccine has a good immune protection effect against COVID-19.

Type: Application

Filed: June 15, 2020

Publication date: January 26, 2023

Applicants: Academy of Military Medical Sciences, PLA, Cansino Biologics Inc.

Inventors: Wei Chen, Shipo Wu, Lihua Hou, Zhe Zhang, Busen Wang, Qiang Guo, Jinlong Zhang, Xiaohong Song, Ling Fu, Jun Zhang, Yi Chen, Zhenghao Zhao, Tao Zhu, Jin Li, Chunlin Xin

- Ebola virus disease vaccine taking human replication deficient adenovirus as vector

Patent number: 10172932

Abstract: Provided are an Ebola virus envelope glycoprotein (that is GP protein) codon optimized nucleotide sequence, a human replication deficient recombinant adenovirus capable of expressing the nucleotide sequence, and applications in preparing a vaccine for preventing Ebola virus diseases. The nucleotide sequence takes a replication deficient 5 type adenovirus that is lack of E1 and E3 in a combined mode as a vector. HEK293 cells that integrate adenovirus E1 genes serve as a packaging cell line, and carried protective antigenic genes are codon optimized Zaire type Ebola virus Makona strain envelope glycoprotein genes. After the envelope glycoprotein genes are optimized by codon, the expression level in transfection cells is obviously improved.

Type: Grant

Filed: October 24, 2016

Date of Patent: January 8, 2019

Assignee: Institute of Biotechnology, Academy of Military Medical Sciences, PLA

Inventors: Wei Chen, Shipo Wu, Lihua Hou, Xiaohong Song, Jinlong Zhang, Ling Fu

- Recombinant human replication-deficient adenovirus comprising a modified nucleic acid encoding the Marburg virus envelope glycoprotein

Patent number: 11453704

Abstract: The present invention relates to a nucleotide sequence as shown in SEQ ID NO: 1 for encoding a Marburg virus envelope glycoprotein, and to a human replication-deficient recombinant adenovirus capable of expressing the nucleotide sequence and a preparation method therefor, as well as an application thereof in the preparation of a vaccine against Marburg virus disease. The vaccine uses an E1 and E3 deleted replication-deficient human

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type-5 adenovirus as a vector, and HEK293 cells integrating an adenovirus E1 gene as a packaging cell line, and a protective antigen gene carried is a codon-optimized Marburg virus Angola strain envelope glycoprotein gene. After codon optimization of the envelope glycoprotein gene, significant expression of envelope glycoprotein can be detected in transfected cells.

Type: Grant

Filed: August 27, 2018

Date of Patent: September 27, 2022

Assignee: Academy of Military Medical Sciences, PLA

Inventors: Wei Chen, Shipo Wu, Lihua Hou, Yanbo Wen, Zhe Zhang, Busen Wang, Xiaohong Song, Jinlong Zhang, Ling Fu

- **Application of substituted aminopropionate compound in treatment of 2019-nCoV infection**⁷²

This patent application was filled first as a Chinese application by Wei Chen and the AMMS of the PLA on January 21, 2020, 10 days after the claimed first sequencing of the SARS-CoV-2 virus. It is directed to the use of remdesivir for the treatment of SARS-CoV-2. A simple timeline analysis of the activities described in the patent application suggests strongly that the work must have been started earlier than January 11, 2020, the timing of the sequencing of the virus.

WuXi AppTech and WuXi Biologics: The Commercialization/Operationalization Arm of the CCP's Next-Generation of High-Risk Nipah Research? A Direct Pathway into the United States?

WuXi AppTec (and its subsidiary WuXi Biologics) is a leading global pharmaceutical, biotechnology, and medical device company headquartered in China. Its extensive research and development (R&D) activities span critical areas such as drug discovery, molecular engineering, biotechnology, and pharmaceutical manufacturing. With collaborations that stretch across academic institutions, multinational pharmaceutical companies, and governmental bodies, WuXi AppTec's role in global healthcare innovation is profound. However, these relationships and research activities introduce potential risks regarding intellectual property (IP) theft, geopolitical power shifts, and the potential for dual-use technologies.

WuXi Biologics has also recently established its own WuXi Vaccines, which operates under a Contract Development and Manufacturing Organization (CDMO) model. Under this CDMO model, WuXi Vaccines is likely able to strategically leverage its cost competitiveness and strong clinical/scientific reputation simultaneously to achieve a global 'gravitational effect' on the world's leading vaccine developers in the West, Japan, and elsewhere. It should be noted that under China's own National Security Law, once any corporate data interacts with a WuXi system, it becomes the sovereign property of Beijing. In addition, there is a high degree of scientific overlap between vaccine development and bioweapons research. It is the final 1-2% that make the final determination.

⁷² [Remdesivir SARS-CoV-2 patent files January 20, 2020 by Wei Chen & AMMS](#)

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Beyond the above, this section assesses WuXi AppTec's research outputs and collaborations while examining potential risks in terms of data security, intellectual property, ethical considerations, and strategic geopolitical concerns.

Key Research Areas and Collaborations:

1. **Drug Discovery and Organic Synthesis:** WuXi AppTec has been involved in the development of novel compounds, such as 4-ethoxy-1,3-benzenedisulfonamides with anti-platelet aggregation properties. This research, conducted in collaboration with Tianjin University's Chemical Engineering and Life Sciences departments, focuses on screening compounds with potential therapeutic applications in cardiovascular diseases. While these advancements are essential for medical progress, concerns arise regarding IP leakage and the transfer of critical pharmaceutical innovations to China's government-backed institutions. Such risks could undermine global pharmaceutical competitiveness and concentrate power in China's biotechnology sector.⁷³

Similarly, WuXi's research on the application of organic synthesis in innovative drug development underlines the company's strategic efforts to enhance drug development pipelines through chemical innovation. This approach highlights WuXi's capability to support global pharmaceutical companies but introduces potential risks of IP misappropriation in an industry highly reliant on proprietary knowledge.⁷⁴

2. **Natural Products and Biopharmaceutical Research:** WuXi AppTec has explored the chemical composition and antioxidant activity of essential oils from *Rubus sachalinensis* Lévl., a plant known for its potential anticancer properties. Collaboration with domestic research bodies, such as the Hubei Provincial Key Laboratory for Anticancer Active Substances, accelerates WuXi's footprint in biopharmaceuticals. The development of new anticancer therapies using plant-based compounds is promising, but it also highlights the risk of strategic technological transfer to Chinese-controlled entities, especially if these advancements are not shared equitably with global partners.⁷⁵

Additionally, WuXi's work in the antioxidant activity of peach blossom extracts and preparation of natural medicines reflects the company's engagement in both traditional and modern pharmaceutical practices. While leveraging Traditional Chinese Medicine (TCM) is a key strength of WuXi's strategy, this raises potential concerns about the broader control over therapeutic innovations and the transparency of international collaborations.⁷⁶

3. **AI-Driven Drug Development and Metabolic Testing:** The company's research on AI-driven predictions of metabolic stability for low-clearance drugs represents a significant advancement in pharmaceutical innovation. WuXi's collaborations with Jiangsu's Key Laboratory of Drug Metabolism indicate its integration of artificial intelligence into

⁷³ Liu, Xiu-Jie & Li, Xu. "Synthesis and Anti-Platelet Aggregation Activities in Vitro of Novel 4-Ethoxy-1,3-Benzenedisulfonamides." Chinese Journal of Medicinal Chemistry, February 2020.

⁷⁴ Li, Ya-Feng. "Application Research of Organic Synthesis in the Development of Innovative Drugs." Biological Chemical Engineering, March 2019. Doi: 10.999999/SWHG201903043.

⁷⁵ Wen, Lu & Tan, Fen. "Chemical Composition and Antioxidant Activity of Essential Oils of *Rubus sachalinensis* Lévl." Traditional Chinese Drug Research, August 2019. Doi: 10.999999/ZYXY201908012.

⁷⁶ Chen, Qiong & Wang, Ning. "Antioxidant Activity Analysis of Different Solvent Extracts from Peach Blossom and Preparation of Peach Blossom Soft Candy." Cereals & Oils, March 2023. Doi: 10.999999/LSYY202303028.

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drug discovery processes, streamlining drug development pipelines for more efficient outcomes. However, this creates concerns about the potential misuse of AI models in non-medical applications, such as cyber surveillance, given China's track record of utilizing advanced technologies for dual-use purposes.⁷⁷

The exploration of biomarkers and AI-driven cancer treatment highlights WuXi's involvement in advanced genomic medicine, such as driver gene matching in lung cancer models. This research supports personalized medicine but introduces risks concerning the security of sensitive genomic data, particularly in a geopolitical context where data privacy and IP security are critical concerns.⁷⁸

4. Antimalarial and Tuberculosis (TB) Research: WuXi has focused on developing artemisinin-based dimeric compounds for tackling drug-resistant malaria, a critical issue in global health. Artemisinin, derived from Traditional Chinese Medicine, has been central to malaria treatment. However, as resistance to this drug increases, WuXi's efforts to create more effective derivatives are crucial. The potential for dual-use applications in biological warfare or bioterrorism remains a concern, especially as this research deals with global infectious diseases.⁷⁹ Additionally, the company's research on pyridine-based compounds for treating multidrug-resistant TB showcases its continued investment in combating major infectious diseases but also raises concerns about the concentration of critical medical research within Chinese institutions.⁸⁰
5. Research and Resistance: WuXi AppTec's involvement in the development of antibacterial agents, such as non-quinolone inhibitors for DNA gyrase and topoisomerase IV, underscores its commitment to addressing antibiotic resistance. This research, aimed at treating drug-resistant bacterial infections, highlights the global health risks posed by superbugs. Yet, such critical advancements may be strategically controlled by China, reducing global access to novel antibiotics. This could lead to significant global health security risks if these treatments are not made widely available in response to rising resistance levels.⁸¹

Collaborations and Institutional Risks:

1. Academic Partnerships with Chinese Institutions: WuXi AppTec has established extensive collaborations with several leading Chinese academic institutions, such as Tianjin University, Wuhan University, and Jiangnan University. These partnerships enable WuXi to leverage the research capabilities of top-tier universities to accelerate its innovation pipeline in areas such as drug discovery, biotechnology, and molecular engineering. For instance, WuXi's collaboration with Jiangnan University has led to advancements in enzyme research, such as molecular truncation of hyperthermophilic β -glucanase from *Aspergillus niger*, which has applications in industrial biotechnology

⁷⁷ Jiang, Lifang & Xu, Yue. "Advances in Methodologies for Predicting Metabolic Stability for Low-Clearance Drugs." Journal of China Pharmaceutical University, February 2019. Doi: 10.999999/ZGYD201902006.

⁷⁸ Fernando, H. C., & Chan, D. Prediction of driver gene matching in lung cancer NOG/PDX models based on artificial intelligence. *Engineering (English)*. (2022, January 31).

⁷⁹ Zhao, Feng & Xie, Xiaobing. "Dimeric Compounds Based on Artemisinin and Their Anti-Drug-Resistant Malaria Activity." World Notes on Antibiotics, June 2019. Doi: 10.13461/j.cnki.wna.005267.

⁸⁰ Guan, Jian-Guo & Xie, Zhi. "Research on Pyridine-Based Compounds for Multi-Drug Resistant Tuberculosis." World Notes on Antibiotics, January 2018. Doi: 10.13461/j.cnki.wna.005101.

⁸¹ Ren Qingcheng, Takakawa, Xu Zhi. "Research progress on non-quinolone inhibitors of bacterial gyrase and topoisomerase IV.", World Notes on Antibiotics., April 2018. DOI: 10.13461/j.cnki.wna.005143

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and animal feed production. Another notable partnership involves Hubei Second Normal University and its Key Laboratory for Anticancer Active Substances, where WuXi has collaborated on the isolation and evaluation of anticancer compounds from plants, contributing to potential breakthroughs in oncology.⁸²

While these collaborations are crucial for accelerating pharmaceutical innovations, they raise concerns about potential technology and knowledge transfer risks. China's strategic push to dominate the biopharmaceutical sector, as outlined in its national development goals, often involves leveraging cutting-edge research from private sector companies like WuXi AppTec. Collaborative research in critical fields such as cancer therapies, infectious disease treatments, and biotechnology could be vulnerable to exploitation by Chinese state-backed entities, potentially undermining global competitiveness and limiting access to innovative medical solutions. This risk is heightened in areas like anticancer research and antibiotic development, where WuXi has focused significant efforts in collaboration with universities.

2. International Collaborations and Data Security: WuXi AppTec is a key partner for numerous multinational pharmaceutical companies, providing contract research organization (CRO) services in drug discovery, development, and manufacturing. These partnerships include major collaborations with companies such as Pfizer,⁸³ AstraZeneca,⁸⁴ and Johnson & Johnson,⁸⁵ which rely on WuXi for clinical trials, drug testing, and manufacturing support. WuXi's involvement in the global supply chain for pharmaceuticals positions it as a critical intermediary between Western pharmaceutical companies and the Chinese regulatory system. For instance, WuXi collaborated with Pfizer in the development of gene therapies and was involved in AstraZeneca's drug trials for oncology treatments.

However, the sheer volume of sensitive data managed by WuXi AppTec raises significant data security concerns. The company's access to proprietary drug development information, clinical trial data, and AI-driven drug discovery technologies makes it a prime target for cyber-espionage. China's track record in state-sponsored cyberattacks exacerbates the risk of IP theft, particularly in high-stakes fields like biologics and AI-driven healthcare innovations. In fact, WuXi's role in low-clearance drug metabolic stability testing, in collaboration with Jiangsu's Key Laboratory of Drug Metabolism, highlights how advanced computational models and AI could be misused if this data were compromised.

⁸² Shan, Y., & Shen, W. Molecular truncation of a hyperthermophilic glucanase from *Aspergillus niger* and optimization of its preparation conditions. *Food and Fermentation Industries*. (2023, April 30). <https://doi.org/10.13995/j.cnki.11-1802/ts.031705>

⁸³ Michelle R. Garnsey et al. ,Discovery of SARS-CoV-2 papain-like protease (PLpro) inhibitors with efficacy in a murine infection model.Sci. Adv.10,eado4288(2024).DOI:10.1126/sciadv.ado4288

⁸⁴ Carl J. Mallia, Peter R. Moore, Simon Hardy, Christopher D. Parsons, Paul A. J. Cronin, Andrew Ikin, Carl-Johan Aurell, Kuangchu Dai, and Baoquan Sun
Organic Process Research & Development 2024 28 (5), 1838-1847
DOI: 10.1021/acs.oprd.3c00409

⁸⁵ Koen Vandyck, Geert Rombouts, Bart Stoops, Abdellah Tahri, Ann Vos, Wim Verschuere, Yiming Wu, Jingmei Yang, Fuliang Hou, Bing Huang, Karen Vergauwen, Pascale Dehertogh, Jan Martin Berke, and Pierre Raboisson
Journal of Medicinal Chemistry 2018 61 (14), 6247-6260
DOI: 10.1021/acs.jmedchem.8b00654

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Furthermore, WuXi AppTec's adherence to Good Laboratory Practice (GLP) standards for nonclinical studies ensures compliance with international safety protocols, which helps facilitate its collaborations with Western pharmaceutical companies. However, integrating international research and development into China's regulatory framework increases the risk of unauthorized access to sensitive information. Multinational companies collaborating with WuXi may inadvertently expose proprietary data to Chinese state-run institutions through regulatory loopholes or cyber vulnerabilities. This is particularly concerning in fields such as cancer immunotherapy, where WuXi has supported global trials for checkpoint inhibitors and antibody-based treatments, placing critical innovation at risk.⁸⁶

Additionally, WuXi's partnerships with global biotech companies, such as Moderna⁸⁷ and Bristol Myers Squibb⁸⁸, on mRNA technologies and biologics manufacturing introduce further risks. These collaborations could provide the Chinese government with strategic insights into novel vaccine platforms, particularly in the wake of the COVID-19 pandemic, where vaccine development has become a focal point of national security concerns. The potential misuse of this knowledge in geopolitical maneuvers, such as controlling access to life-saving vaccines, could have profound global repercussions.

Moreover, the recent focus on AI-driven drug discovery, such as WuXi's research in lung cancer genomics, where driver gene mutations are predicted using AI algorithms, exemplifies the risks in sharing AI-driven healthcare technologies. These algorithms, developed in collaboration with U.S. institutions like the University of Colorado Anschutz Medical Campus, could be vulnerable to cyberattacks or IP theft, further intensifying concerns about the misuse of these technologies beyond healthcare applications.⁸⁹

In summary, while WuXi AppTec's collaborations with both domestic and international institutions foster significant advancements in biotechnology, pharmaceuticals, and drug discovery, they also present heightened risks of IP theft, cyber-espionage, and geopolitical manipulation. The company's dual role as a critical R&D partner and a key player in China's biopharmaceutical ambitions necessitates careful scrutiny of its partnerships to mitigate potential risks and safeguard sensitive innovations.

Concerns and Risks:

1. Intellectual Property and Geopolitical Control: With WuXi AppTec's extensive R&D network, the risk of IP misappropriation is significant, particularly in areas where the company collaborates with both Chinese and foreign entities. Sensitive pharmaceutical

⁸⁶ WuXi AppTec, Safety Assessment Services, <https://labtesting.wuxiapptec.com/safety-assessment-services/general-toxicology/>, Date Accessed: 2024-09-17

⁸⁷ Freezing of Biologicals Revisited: Scale, Stability, Excipients, and Degradation Stresses
Authelin, Jean-Rene et al.

Journal of Pharmaceutical Sciences, Volume 109, Issue 1, 44 - 61

⁸⁸ Zhuangrong Huang, Jianlin Xu, Jun Tian, et al. Mechanistic understanding of CHO cell culture improvement by rosmarinic acid through multi-omics analysis. *Authorea*. June 23, 2021.
DOI: 10.22541/au.162443293.37537837/v1

⁸⁹ Fernando, H. C., & Chan, D. Prediction of driver gene matching in lung cancer NOG/PDX models based on artificial intelligence. *Engineering (English)*. (2022, January 31).

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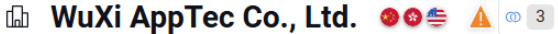
innovations, such as AI-driven drug development algorithms, could be siphoned off or used by state-backed entities to gain geopolitical or economic advantage.

2. **Dual-Use Technology and Ethical Concerns:** Many of the biotechnologies developed by WuXi AppTec, particularly in genomics, AI, and molecular engineering, have dual-use potential, raising concerns about their possible application in areas beyond healthcare. The Chinese government's focus on military and defense innovation adds further risks, as these technologies could be repurposed for strategic gains.
3. **Global Supply Chain Dependencies:** WuXi's prominent role in global drug development and manufacturing introduces risks related to supply chain dependencies. As the company consolidates its position in critical areas such as biologics and pharmaceutical manufacturing, there is a risk that global access to essential drugs and technologies could be leveraged in geopolitical negotiations.

WuXi AppTec's rapid expansion and integration into global pharmaceutical and biotechnology sectors present significant risks, particularly in terms of intellectual property security, dual-use technologies, and the consolidation of healthcare innovation in China. Its deep collaborations with Chinese academic institutions and international pharmaceutical companies create vulnerabilities, with potential for IP leakage, cybersecurity breaches, and strategic misuse of biotechnologies.

Given these concerns, it is imperative for international partners to implement robust IP protection measures and closely scrutinize the implications of sharing sensitive technologies. Regulatory oversight should be enhanced to ensure transparency and mitigate the risks of unethical biotechnological manipulation or dual-use applications.

WuXi AppTec Shareholding and Ownership Structure⁹⁰

| | | | | | |
|---|---|--|------------------|---------------|--|
| <div><div></div></div> | | | | | |
| Identifiers | Hong Kong Stock Code - 02359 | | Business Purpose | Liquid biopsy | |
| | China Unified Social Credit Code - 91320200724183068U | | Address | Wuxi City | |
| | Legal Entity Identifier - 2549000EPQLZSPLN9175 | | Contact | 021-50463093 | |
| | USA SEC CIK Number - 0001775585 | | Sources | 19 Sources | |
| | EDI Global Issuer ID - 203555 | | | | |
| Names | Funding | | | | |
| | Wuxi AppTech Co., Ltd. | | | | |
| | WuXi AppTec Co., Ltd. | | | | |
| Status | Active | | | | |
| Registration / Incorporation Date | Incorporated 2000-12-01 | | | | |
| Company Type | Financing | | | | |

WuXi AppTecCo., Ltd has 469 connections in Sayari Graph with the following breakdown.

⁹⁰ Corporate data pulled from Sayari Databases and Sayari Graph.

<https://sayari.com/>

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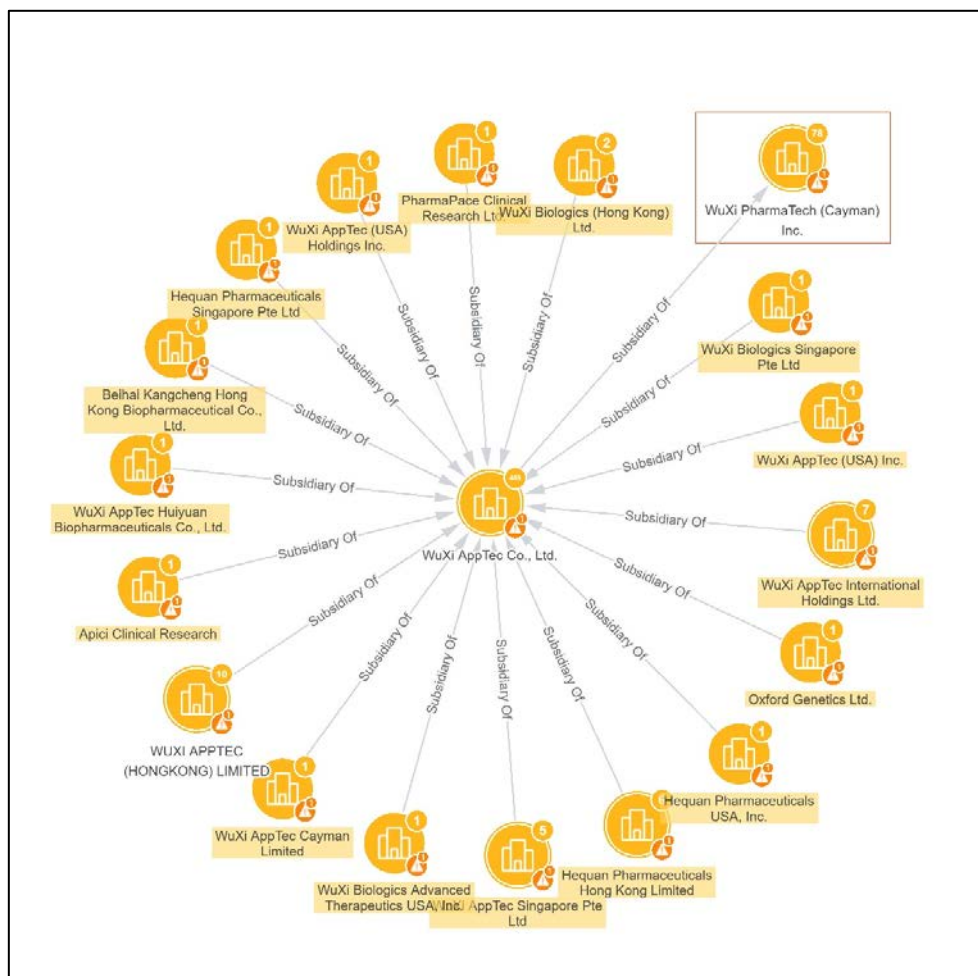
Quay SC, Clarke R, Lin XS, McCreight R, Eads LJ, Asher D, Bomgaars W

Table 3

| Relationship | Number of Connections |
|--------------------------|-----------------------|
| Linked to | 3 |
| Has Branch | 1 |
| Has Beneficial Owner | 11 |
| Has Officer | 8 |
| Has Manager | 6 |
| Shareholder Of | 18 |
| Has Shareholder | 240 |
| Has Director | 37 |
| Has Supervisor | 5 |
| Owner of | 154 |
| Has Subsidiary | 17 |
| Has Legal Representative | 4 |
| Issuer Of | 4 |
| Subsidiary Of | 1 |

The following graph shows WuXi AppTec's subsidiary companies as well as highlighting them as a subsidiary of WuXi PharmaTech (Cayman) Inc.

Figure 12

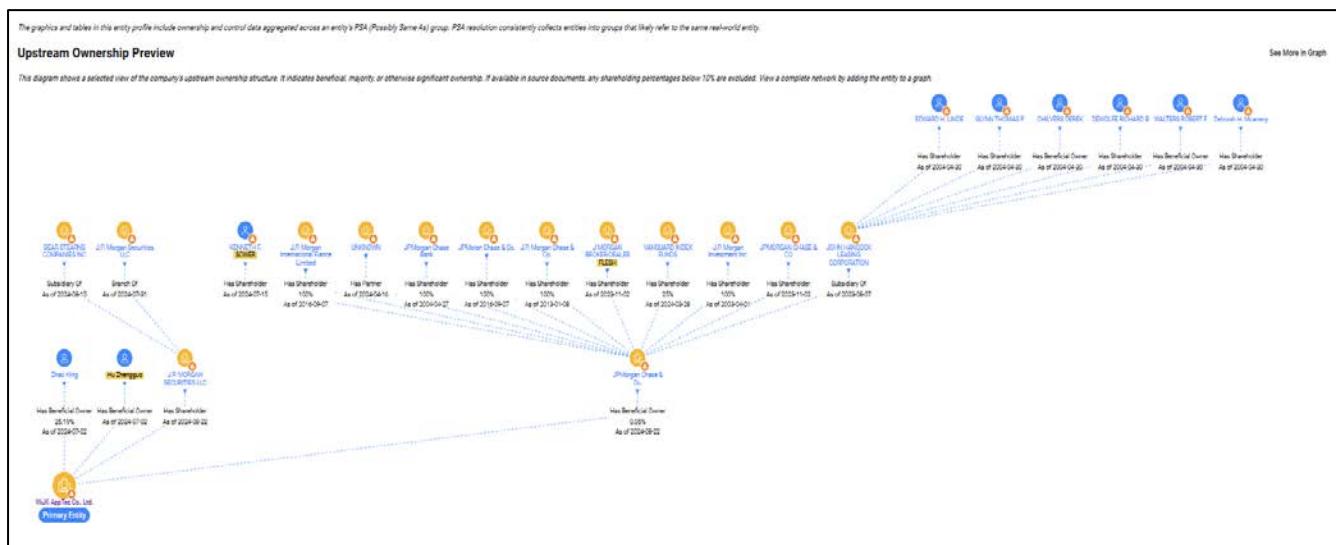


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When looking at the upstream ownership of WuXi AppTec, Sayari shows J.P. Morgan Chase & Co. as well as J.P. Morgan Securities LLC (potentially past relationship) as beneficial owners of WuXi AppTec.

Figure 13



Pairing Weaponized Pathogens (Like Nipah) with Nanoweapons: China's Invisible Arsenals and the Emergence of Next-Generation Biowarfare

China's invisible arsenals encompass a wide array of advanced and covert weaponry developed using next-generation technologies, particularly nanotechnology platforms. These weapons are designed to be discreet, hard to detect, and capable of inflicting significant damage on adversaries while avoiding direct confrontation. China's invisible arsenals encompass a range of advanced weaponry that are distinctly focused on providing the CCP with a range of asymmetric warfare options, including the delivery of biological, biochemical and neurobiological weapons on target populations. These developments present enormous new challenges to global security that are without historical precedent in human history.⁹¹

Nanotechnology-enabled weapons utilize highly sophisticated nanomaterials to enhance performance, stealth capabilities, and overall attack efficacy in military applications. Additionally, China's advancements in biotechnology raise concerns about potential dual-use applications, as there are fears they may be exploring genetically engineered pathogens for use in biological warfare, while obfuscating the original point of origins. While the CCP's attempts to obfuscate the Wuhan Institute of Virology's role in the SARS-CoV-2/COVID-19 pandemic

⁹¹ For more in-depth analysis of these programs, please see the following CCP BioThreats Initiative Reports: [China's International Military-Civilian Virology Fusion: High-Risk Pathogen Research, Global Linkages and Strategic Implications: Clarke, Dr. Ryan, Lin, Dr. Xiaoxu Sean, Eads, LJ: 9789869777483: Amazon.com: Books](#) [Guardians of the Invisible Arsenal - Weapons Research at the Research Institute of Chemical Defense — The CCP BioThreats Initiative](#) [State-Backed Synthetic Narcotics Trafficking Syndicates and the Vectored Threat to the Five Eyes — The CCP BioThreats Initiative](#) [The International Frontier of the CCP's Bioweapons Program — The CCP BioThreats Initiative](#) [Precision Targeting Bioweapons Facilities in a Post-CCP Regime Collapse Scenario — The CCP BioThreats Initiative](#) [Enumerating, Targeting and Collapsing the Chinese Communist Party's NeuroStrike Program — The CCP BioThreats Initiative](#)

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were unsuccessful, nanotechnology delivery systems would make future investigations and determinations of specific attribution more challenging.

If China had in its possession a stockpile of biological warfare agents such as Nipah, coupled with advancements in nanotechnology, they would be able to development advanced nano-enhanced stealth bioweapons. Furthermore, their expertise in electromagnetic and cyber warfare allows them to disrupt critical infrastructure and defense networks without direct military engagement, making traditional countermeasures obsolete and ineffective.

China's focus on hypersonic technology and AI-driven warfare enables the delivery of their invisible arsenal with unprecedented speed and precision, further complicating defense strategies. Their emphasis on psychological and information warfare through 'The Three Warfares' underscores their understanding of the power of controlling narratives and manipulating public opinion to achieve strategic goals without overt military actions.⁹²

One of the most concerning aspects of China's invisible arsenals is their distributed and potentially decentralized nature, as weapons may be concealed within civilian infrastructure, posing challenges for traditional intelligence and surveillance methods. This evolving landscape necessitates a deeper understanding and awareness of these threats to devise effective countermeasures and safeguard global security.

It is essential for the international community to closely monitor China's advancements in these areas and engage in open discussions to define the boundaries of what constitutes a chemical weapon, biological weapon, or any other type of invisible arsenals. By understanding and addressing these challenges, nations can collectively work to strengthen arms control regimes and maintain global security in the face of rapidly evolving threats. If the CCP refuses to engage

⁹² [Enumerating, Targeting and Collapsing the Chinese Communist Party's NeuroStrike Program — The CCP BioThreats Initiative](#) For additional information, please see Robert McCreight, 'Neuro-Cognitive Warfare: Inflicting Strategic Impact via Non-Kinetic Threat', *Small Wars Journal*, 16 September 2022. For more in-depth Chinese discussions on psychological warfare, please see Tianliang Xiao [肖天亮], eds., *The Science of Military Strategy* [战略学]. PLA National Defense University Press, Beijing, 2015. Jieming Wu [吴杰明] and Zhifu Liu [刘志富], *An Introduction to Public Opinion Warfare, Psychological Warfare, [and] Legal Warfare* [舆论战心理战法律战概论], PLA National Defense University Press, Beijing, 2014. Academy of Military Science Military Strategy Research Department [军事科学院军事战略研究部], eds., *The Science of Military Strategy* [战略学]. Military Science Press, Beijing, 2013. Baocun Wang and Fei Li, "Information Warfare," *Liberation Army Daily by Federation of American Scientists*, June 1995. For more in-depth international discussions on Chinese psychological warfare, please see Kerry Gershanek, *Political Warfare: Strategies for Combatting China's Plan to "Win without Fighting"*, Marine Corps University Press, 2020. Michael Clarke, "China's Application of the 'Three Warfares' in the South China Sea and Xinjiang", *Orbis*, January 2019. Matthew Brazil and Peter Mattis, *Chinese Communist Espionage: An Intelligence Primer*, Naval Institute Press, 2019. Doug Livermore, "China's 'Three Warfares' In Theory and Practice in the South China Sea", *Georgetown Security Studies Review*, 25 March 2018. Jason Fritz, *China's Cyber Warfare: The Evolution of Strategic Doctrine*, Lexington Books, 2017. Elsa Kania, "The PLA's Latest Strategic Thinking on the Three Warfares", *China Brief*, Vol. 16, Iss. 13, 22 August 2016. United States Department of Defense, "Annual Report to Congress: Military and Security Developments Involving the People's Republic of China 2011", 2011. For an authoritative discussion on Soviet methods of psychological warfare that formed the foundation of China's own capabilities, please see Tomas Schuman (Yuri Bezmenov), *Bezmenov World Thought Police*, Facsimile Publisher, 1986.

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in these discussions, that is also information and should then generate precision targeting plans to eliminate these threats.

Emerging Nanotechnology and Biological Warfare Fusion: Evidence from the PLA and CCP-Run ‘Civilian’ Institutions

The report ‘Core-shell quantum dot-nano-gold particle assembly for efficient detection of nerve agent mimics’ discusses the development of a simple method for the efficient detection of nerve agent mimics. The study was conducted by researchers from the Institute of Chemical Defense, Chinese Academy of Military Sciences, the State Key Laboratory of National Nuclear, Biological and Chemical Protection, and the Technical Institute of Physics and Chemistry, Chinese Academy of Sciences. The research aimed to establish a simple and fast detection method for nerve agent mimics, which are highly toxic organophosphates with potential threats to human health and security.⁹³

The experimental design involved creating a composite structure of 12 layers of zinc sulfide-coated cadmium selenide core-shell quantum dots (CdSe/12ZnS QDs) and gold nanoparticles (Au NPs). The fluorescence resonance energy transfer (FRET) between QDs and Au NPs was utilized for detection purposes. The hydrolysis of thioacetylcholine chloride (ATC) by acetylcholinesterase (AChE) generated thiocholine, which replaced the quantum dots, leading to the restoration of fluorescence. The presence of the nerve agent mimic diethyl cyanophosphate (DCNP) inhibited AChE activity, resulting in reduced fluorescence recovery efficiency of QDs. By measuring the fluorescence recovery efficiency of quantum dots, DCNP could be detected within a concentration range of 5.0 nM to 0.5 mM, with a detection limit of 5.0 nM.⁹⁴

The core-shell structure of CdSe/12ZnS QDs offered improved luminous efficiency and stability, enhancing the fluorescence recovery rate. The coordination effect between quantum dots and Au NPs improved the FRET fluorescence quenching efficiency. The system demonstrated good anti-interference properties, showing potential for practical applications in detecting nerve agent mimics. Additionally, the aggregation degree of gold particles under different DCNP concentrations caused observable color changes in the solution, providing a possibility for naked eye detection of DCNP.⁹⁵

Overall, the study presents an approach to detect nerve agent mimics using nanotechnology, showcasing the potential of core-shell quantum dot-nano-gold particle assemblies for efficient and sensitive detection of toxic agents. This research has potential applications not only in defense and counterterrorism but also in offensive military capabilities. Some offensive ways this research could be utilized by the PLA include:

Advanced Chemical Warfare: The research findings could be used to develop more efficient and sophisticated chemical weapons. By understanding the mechanisms of fluorescence quenching and recovery, the PLA could design chemical agents that inhibit acetylcholinesterase activity, leading to severe nerve agent-like effects on the nervous system

⁹³ Li Shengsong , Zheng Yongchao , Meng Shulin, Wu Lizhu, Zhong Jinyi, Zhao Chonglin, ‘Core-shell quantum dot-nano-gold particle assembly for efficient detection of nerve agent mimics (核壳型量子点-纳米金颗粒组装体高效检测神经性毒剂模拟剂)’, *Journal of Inorganic Materials*, Issue 8, 2019, 2019-09-12.

⁹⁴ Ibid.

⁹⁵ Ibid.

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of the targeted individuals or populations with a nearly undetectable method of delivery.

Covert Surveillance and Assassination: The development of core-shell quantum dot-nano-gold particle assemblies could enable the creation of highly sensitive detection systems. These systems might be used for covert surveillance, detecting trace amounts of nerve agent mimics or other chemical substances associated with enemy activities. Additionally, the technology could facilitate targeted assassinations, as the detection systems might be used to identify and track specific individuals or groups exposed to toxic agents in a covert manner.

Non-Conventional Attacks: The research's focus on nanoscale detection and advanced stealth materials could open up possibilities for unconventional attacks. Invisible delivery methods, such as drones or other nanoscale devices, could be equipped with nerve agent mimics and used to infiltrate enemy territories without detection, leading to devastating consequences.

Cyber-Biological Attacks: The combination of nanotechnology with cyber and biological domains could lead to the creation of sophisticated hybrid weapons. Nanoscale devices could be deployed to infiltrate computer systems, disrupt communication networks, and remotely control biological agents, blurring the lines between traditional military and cyber warfare.

Targeted Biological Warfare: While the research primarily focuses on nerve agent mimics, it could also provide insights into the manipulation of biological data and the creation of genetically modified organisms, such as Nipah. The PLA might explore the development of genetically engineered pathogens with specific virulence or drug resistance profiles, allowing for targeted biological attacks against enemy forces or populations. Nipah is ideally suited for this purpose, both because of its extensive asymptomatic phase, and initial mental confusion.

The research's primary intent might be focused on defense and civilian applications. However, given the dual-use nature of many technologies, offensive military applications cannot be entirely ruled out. The potential misuse of such research highlights the need for international cooperation and stringent safeguards to prevent the proliferation and use of these technologies for harmful purposes.

Combined Biological and Cyber Weapon Swarms: 'Frontier Research' Conducted at Shanghai Jiao Tong University and the State Grid Electric Power Research Institute

The PLA has been at the forefront of leveraging nanoscale electronics and cyber warfare, capitalizing on the convergence of nanotechnology and information warfare to gain a significant advantage in the digital realm. Nanoscale electronics allows the PLA, specifically the PLA's Information Support Force (PLA ISF), to develop miniature yet high-performance electronic components and sensors, providing them with enhanced computing power, data processing, and communication capabilities.⁹⁶ The PLA Daily quoted that the members of the PLASSF (the predecessor of the PLA ISF) should always prepare for 'tomorrow's warfare'. These nanoelectronics find applications not only in consumer electronics but also in military equipment, enabling the PLA to stay at the cutting edge of technological advancements thus preparing the PLA for tomorrow's war.

In the realm of cyber warfare, the PLA has a well-established track record of harnessing nanotechnology to develop advanced and stealthy nano-devices with various espionage and

⁹⁶ Zhao Lei, "Xi Calls New PLA Branch a Key Pillar," China Daily, August 30, 2016.

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data theft capabilities. These nano-devices are deployed covertly to infiltrate secure networks, gather sensitive information, and monitor communications without raising any suspicion. Their small size and sophisticated design allow them to evade conventional security measures, making them formidable tools for cyber-espionage and the full range of sabotage.

The offensive potential of China's nanotechnology research in cyber warfare is particularly concerning. Nano-devices can be employed to carry out cyber-attacks on critical infrastructure and networks, leaving little to no traces behind. These attacks could lead to blackouts, communication failures, or financial disruptions, posing severe threats to national security and stability. Moreover, with the integration of AI into nano-devices, the PLA can create autonomous AI-driven nano-weapons capable of making real-time decisions and executing cyber-attacks and/or bioweapons attacks with unparalleled sophistication and unpredictability. This AI-nanotechnology synergy presents significant challenges for traditional defense mechanisms and raises questions about accountability in the event of cyber conflicts.

The conference paper 'Communication Modeling for Targeted Delivery under Bio-DoS Attack in 6G Molecular Networks' published by the Institute of Cyber Science and Technology at Shanghai Jiao Tong University and the State Grid Electric Power Research Institute discusses the use of molecular communication, a nanonetwork paradigm in 6G networks, for targeted delivery. However, it raises concerns about the vulnerability of this communication method to Bio-Denial of Service (Bio-DoS) attacks, where the delivery process can be compromised. The Bio-DoS attack could disrupt the biochemical reaction between the targeted molecule and the Information Molecule (IM), affecting the effectiveness of targeted delivery.⁹⁷

The risks and implications of the PLA using nanotechnology-enabled bioweapons weapons to conduct Bio-DoS attacks are significant. If the CCP gains access to nanotech capable of conducting Bio-DoS attacks, it could exploit vulnerabilities in molecular communication networks to disrupt targeted delivery systems, causing potential chaos in critical systems and services. The compromised nanotech could be used for harmful purposes, targeting specific individuals or even entire populations with precision and causing harm to their biological systems. Moreover, the involvement of Shanghai Jiao Tong University, known for conducting cyber-attacks on the United States with PLA military units, raises additional concerns. It suggests a potential link between academic research and military applications, indicating the risk of (at least) dual-use technology for military purposes.⁹⁸

Overall, the implications of the PLA utilizing nanotechnology-enabled weapons to conduct Bio-DoS attacks pose a serious threat to communication networks and targeted delivery systems, potentially disrupting critical services and causing harm to individuals or organizations. Close monitoring and stringent controls on the development and deployment of such technology are essential to mitigate these risks and protect against potential misuse.

The blurring line between the physical and digital realms in nanoscale electronics, cyber warfare and biowarfare demands robust cybersecurity measures and defense strategies. As China's capabilities in these areas continue to advance, it is crucial for other nations, organizations, and cybersecurity experts to remain vigilant and develop effective safeguards to

⁹⁷ Shen, Q., Wu, J., Li, J., Zhang, X., Wang, K., 'Communication Modeling for Targeted Delivery under Bio-DoS Attack in 6G Molecular Networks (Conference Paper)', 2021 IEEE International Conference on Communications, June 2021

⁹⁸ China Defense Universities Track, Shanghai Jiao Tong University, Australian Strategic Policy Institute, <https://unitracker.aspi.org.au/universities/shanghai-jiaotong-university/>

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detect, prevent, and respond to emerging threats posed by China's nanotechnology-enabled cyber weapons and bioweapons.

Hefei Institute of Physical Science (Chinese Academy of Sciences) Develops Nanorobot Capable of Conducting Biological Sieges

With China's rapid strides in nanotechnologies, concerns rise over their potential use in chemical and biological warfare, posing serious risks and implications for global security. The convergence of nanotechnology with various military domains presents unprecedented challenges. The PLA could exploit these technologies to enhance chemical and biological weapons to alarming levels of potency and sophistication. Nanoparticles integrated into traditional chemical agents could increase their stability and dispersal, while nanoscale drug delivery systems might transport biological agents directly to target cells with deadly precision. Moreover, nanorobots could navigate the human body, delivering lethal payloads while evading conventional biological defenses.

Researchers from the Hefei Institute of Physical Science, Chinese Academy of Sciences, have made a breakthrough in DNA nanotechnology, developing a smart DNA molecular nanorobot model. This model innovatively proposes a non-linear gathering 'siege' of biological targets, allowing for advanced signal amplification and intelligent targeted drug delivery.

The nanorobot model consists of multifunctional robotic arms with optional accessories (such as drugs and signal tags), target validators, intelligent swarm path controllers, and self-assembling motors. It responds only to specific biological targets, forming a large aggregate through cooperative operations and achieving nonlinear cascade amplification or amplification of target signals.

The article suggests that this technology has potential applications in biosensing, bioimaging, and drug delivery. However, there are risks associated with this advancement. The ability of nanorobots to transport biological agents directly to target cells with deadly precision could be exploited by the CCP for harmful purposes. It could be used to deliver biological agents with precision, making it a potential threat for biological warfare. Additionally, the close collaboration between the Hefei Institute of Physical Science and the PLA raises concerns about potential dual-use applications of this technology for military purposes.⁹⁹

China's military could leverage nanosensors for covert monitoring, detecting even minute traces of chemical and biological agents to assess the success of their attacks. In the realm of cyber-biological warfare, the integration of nanotechnology with cyber capabilities might lead to the development of hybrid nanobots capable of infecting both computer systems and biological organisms, causing widespread chaos and disruption. Through genetic engineering using nanotechnology, China could create pathogens that are more virulent, resistant to treatments, or tailored to target specific genetic traits, exponentially increasing their destructive potential.

Additionally, China could employ nanomaterials to create stealth materials, rendering military equipment nearly invisible to conventional detection methods. While these advancements raise serious concerns, it is imperative to emphasize that employing nanotechnology for developing

⁹⁹ China News Network, The Chinese scientific research team proposes a model of intelligent nano-robots gathered to "siege" biological targets, <http://www.chinanews.com.cn/sh/2022/05-19/9758568.shtml>, 2022-05-19

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chemical and biological weapons is strictly prohibited under international law, including the Chemical Weapons Convention (CWC) and the Biological Weapons Convention (BWC). To safeguard global security and stability, robust non-proliferation efforts, strong arms control agreements, and international cooperation are essential to prevent the misuse of nanotechnologies for harmful purposes. Vigilance and collective action are crucial in ensuring that China's capabilities in this field are not utilized to undermine international security. If the CCP resists these measures, this is highly informational.

The Student Becomes the Master: The CCP's Bioweapons and Nanoweapons Programs Are Now Domestically Self-Sufficient

While China previously required intensive and targeted international connectivity to obtain the technology and specialized knowledge required to make advancements in fields such as virology and nanotechnology, recent evidence suggests that this is no longer the case. China now has robust domestic capabilities that potentially provide Beijing with a range of asymmetric options against perceived adversaries. These developments have occurred while many strategic and intelligence analysts have focused more heavily on China's conventional military assets such as its aircraft carriers, submarine fleet, rocket forces and space assets.

However, when arrayed against aggregated American and Allied capabilities, the PLA has virtually no prospect for establishing any form of strategic parity, let alone overmatch. As such, Chinese advancements in the unconventional and dual-use technology areas of virology and nanotechnology assume an even greater degree of criticality. China's continued high-risk pathogen research on SARS-CoV-2 is particularly problematic. This demonstrates that Beijing assigns a high degree of strategic importance to serial passaging experiments continuing to be done in China despite being banned across the West. This is also in spite of the fact that the SARS-CoV-2 virus is directly responsible for the deaths of tens of millions of people across the world.

No SARS-CoV-2 serial passaging experiment has been credibly linked to any existing vaccine, therapeutic, prophylactic or diagnostic. The fact that this work continues, including in Wuhan itself, likely demonstrates that there is a broader strategic logic underpinning this continued high-risk pathogen research.

Chinese advancements in nanotechnology also generates a new set of risks and strategic uncertainties. Nanotechnologies serve as a 'horizontal layer' that can miniaturize, massively decentralize and obfuscate origins across the full range of asymmetric capabilities. This includes, but is not limited to:

- Nanomedicine as a Weapon
- Nanorobotics and Autonomous Weapons
- Nano-Bioinformatics for Biowarfare
- Nano-Scale Chemical Sensors
- Nano-Cyber Biological Weapons
- Advanced Chemical Warfare
- Covert Surveillance and Assassination
- Non-Conventional Attacks
- Cyber-Biological Attacks
- Targeted Biological Warfare

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The above areas have the potential to fundamentally and irreversibly transform the nature of the next generation of dual-use research in China. The deliberate national prioritization of dual-use pathogen research and nanotechnology provides insight into where Beijing assesses its own unique strengths to lie and, possibly, where Beijing has assessed its adversaries to have weaknesses in their own systems.

The New Master Trains New Students: Current Status of the CCP-Led WIV-DESTO Bioweapons Program in Pakistan

Investigative reporting has surfaced a newly operational Gain-of-Function (GoF)-capable virology lab facility that is jointly run by China's Wuhan Institute of Virology (WIV) and the Defense Science and Technology Organization (DESTO), which is under the direct control of the Pakistan Army.¹⁰⁰ In addition to these international developments, within China itself WIV was instrumental in establishing new GoF-capable pathogen research infrastructure. This includes a relatively unknown Biosafety Level 4 (BSL4) lab in Kunming that is designed to handle the world's most dangerous pathogens and conduct high-risk experiments on them.

This BSL4 lab in Kunming falls under the official administration of the Chinese Academy of Medical Sciences (CAMS), thereby concretely linking the bioweapons research activities of CAMS with that of WIV (which officially falls under the Chinese Academy of Sciences). This has substantial implications for the joint WIV-DESTO facility in Pakistan in that CAMS has a direct mechanism to 'plug into' Pakistani bioweapons research via WIV.

What is CAMS? Like WIV, It Is Not a Civilian Operation

While the past several years has shed light on the GoF research being done on bat coronaviruses (such as SARS-CoV-2) at WIV,¹⁰¹ equally (if not more) dangerous pathogen research has continued at CAMS unabated and away from international scrutiny. CAMS presents itself as a nationwide network operating along an American-style biomedical research and hospital network system with interlinking research institutes, laboratories, clinical facilities, medical education (including the Peking Union Medical College), and technology commercialization operations.

While the base structure of CAMS resembles an American-style system, material differences have emerged over time. For one, all members of the CAMS leadership team and leading clinicians and scientists are strongly encouraged, if not outright required, to be CCP members and carry out Party functions in addition to their clinical/scientific work. While CCP control over CAMS is not unique under China's system of governance, this marks a substantial divergence from its American counterparts.

¹⁰⁰ Anthony Klan, 'EXCLUSIVE: China's Wuhan lab operating "covert operations" in Pakistan, handling "anthrax-like" pathogens', *The Klaxon*, 23 July 2020.

<https://www.theklaxon.com.au/home/xdx17f6auh0tew0g57ubqrzxkdeux9>

Dipanjan Roy Chaudhury, 'China & Pakistan enter 'secret deal' to expand bio-warfare tools, says an Australian investigative journalist' *Economic Times*, 25 July 2020

<https://economictimes.indiatimes.com/news/defence/china-pakistan-enter-secret-deal-to-expand-bio-warfare-tools-says-an-australian-investigative-journalist/articleshow/77164486.cms?from=mdr>

¹⁰¹ Ryan Clarke and Lam Peng Er, 'Coronavirus Research Networks in China: Origins, International Linkages and Consequences', Centre for Non-Traditional Security Studies, May 2020, Singapore.

<https://rsis-ntsasia.org/wp-content/uploads/2021/06/NTS-Asia-Monograph-Coronavirus-Research-in-China-by-Ryan-Clarke-and-Lam-Peng-Er-May2021-1.pdf>

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Second, under China's Civil-Military Fusion Law, it is unclear as to whether CAMS can be quickly repurposed and put under the direct control of the CCP and/or People's Liberation Army (PLA) under specific contingencies, including lab accidents. While it is important not to over emphasize this dynamic without evidence, the Civil-Military Fusion Law objectively represents an overarching legal framework which CAMS must operate within.

The joint WIV-DESTO operation in Pakistan is not a bilateral biomedical research partnership between two civilian institutes focused on advancing human and animal health. It represents a dangerous platform for CAMS and multiple other CCP-run institutions, including those with People's Liberation Army (PLA) links, to conduct bioweapons research under Pakistan Army cover. This structural reality combines with Pakistan's decades-long proven track record of utilizing home-grown terrorist groups, such as Lashkar-e-Taiba (LeT), to carry out terrorist operations in India. The net result is an extraordinarily high-risk geostrategic situation that has been virtually ignored by most analysts.

CCP's 'Lift and Drop' Bioweapons Options for DESTO: GoF Research on SARS-CoV-2/Zika/MERS Viruses, Developing Purely Synthetic Viruses in the Lab

Zika

Dr. Shi Pei-Yong, who currently holds a position at University of Texas Medical Branch (UTMB) has conducted controversial research involving the manipulation of spike proteins of the SARS-CoV-2 virus to make the pathogen more infectious than the variants that were circulating naturally.¹⁰² Shi has also worked extensively with the PLA's Academy of Military Medical Sciences (AMMS) as well as CAMS on other infectious disease projects involving the manipulation of viruses, such as chimeric Zika vaccine development and Zika GoF studies using mouse models. One of Shi's key collaborators, Qi Chen, is the Director of the Virology Lab at the Institute of Microbiology and Epidemiology (AMMS).¹⁰³ All of these outputs and technical knowhow are now directly transferable to the Pakistan Army via WIV.

Another UTMB scientist, Dr. Chao Shan, has actually held a dual appointment at WIV. Chao has several joint publications with Shi and others demonstrating GoF research. In one 2020 PNAS study, Chao, Shi and colleagues took a pre-epidemic Asian Zika virus strain (FSS13025 isolated in Cambodia in 2010) and inserted the 'V473M' substitution that significantly increased neurovirulence¹⁰⁴ in neonatal mice and produced higher viral loads in the placenta and fetal heads in pregnant mice. In addition, this E-V473M mutant strain was further studied in competition experiments in cynomolgus macaques. The results showed that this human-

¹⁰² For example, please see Pei-Yong Shi, 'Spike mutation D614G alters SARS-CoV-2 fitness', *Nature*, Vol. 592, 2021. <https://www.nature.com/articles/s41586-020-2895-3.pdf>

¹⁰³ Qi Chen et al., 'Treatment of Human Glioblastoma with a Live Attenuated Zika Virus Vaccine Candidate', *mBio*, Vol. 9, Iss. 5, 2018. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6143740/pdf/mBio.01683-18.pdf>
Xiao Feng I, et al., 'Development of a chimeric Zika vaccine using a licensed live-attenuated flavivirus vaccine as backbone', *Nature Communications*, Vol. 9, No. 673, 2018. <https://www.nature.com/articles/s41467-018-02975-w.pdf>

Chao Shan, et. al., 'An Infectious cDNA Clone of Zika Virus to Study Viral Virulence, Mosquito Transmission, and Antiviral Inhibitors', *Cell Host Microbe*, Vol. 19, No. 6, 8 June 2016.

<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5206987/pdf/nihms787340.pdf>

¹⁰⁴ Neurovirulence refers to infection of the brain.

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inserted mutation increased Zika's fitness for viral generation in macaques, a clear demonstration of GoF that was based on highly dangerous reverse genetics techniques.¹⁰⁵

SARS-CoV-2 (Natural and Lab-Made)

In October 2021, researchers from the CAMS-run Christophe Merieux Laboratory in Beijing developed their own synthetic SARS-CoV-2 virus in the lab, which they refer to as the 'SARS-CoV-2-GFP replicon', with the logic that experimentation on this synthetic virus would more fully inform treatment options.¹⁰⁶ Despite titling their paper 'Construction of Non-infectious SARS-CoV-2 Replicons and Their Application in Drug Evaluation', they note that their synthetic virus did in fact replicate over the course of their experiment.¹⁰⁷

In September 2020, He Yuxian from CAMS and a joint team of researchers from the PLA's AMMS, Beijing Institute of Lifeomics, and the Institute of Military Cognition and Brain Sciences published a study that describes their use of SARS-CoV-2 serial passaging. This is a well-known GoF technique focused on the respiratory tract of mice. The rationale for this study was that this GoF research using live SARS-CoV-2 virus would improve the efficacy of vaccines.¹⁰⁸

This rationale can be assessed to be questionable, especially considering the use of serial passaging. This technique involves continuously selecting for the most infectious viral strains, isolating them, and then combing and reinserting them back into mice thereby producing human-directed engineered viruses that are more infectious, lethal, and/or drug/vaccine-resistant than even the most dangerous SARS-CoV-2 viruses found in nature. The fact that the majority of He Yuxian's co-authors on this study come from overtly PLA-run institutions further solidifies this assessment.

CAMS is now a world leader in the development of synthetic viruses in the lab, including SARS-CoV-2 viruses, as well as engineering dangerous pathogens found in nature. This marks a major development in that CAMS has the independent capability to engineer a range of viruses for various applications, even if it is not possible to acquire a sufficient number of natural samples. Access to samples is no longer a scientific bottleneck and is no longer a source of Western leverage against Chinese institutes such as CAMS and, by extension, the joint WIV-DESTO facility in Pakistan.

¹⁰⁵ Chao Shan, et. al., 'A Zika virus envelope mutation preceding the 2015 epidemic enhances virulence and fitness for transmission', *PNAS*, Vol. 117, No. 33., 18 August 2020.

<https://www.pnas.org/doi/pdf/10.1073/pnas.2005722117>

For additional GoF work conducted by Galveston/UTMB's Pei-Yong Shi and colleagues at AMMS involving Zika viruses in mice, please also see Ling Yuan, et. al., 'A single mutation in the prM protein of Zika virus contributes to fetal microcephaly', *Science*, Vol. 17, No. 358, 17 November 2017.

<https://www.science.org/doi/epdf/10.1126/science.aam7120>

¹⁰⁶ Bei Wang, Chongyang Zhang, Xiaobo Lei, Lili Ren, Zhendong Zhao, and He Huang, 'Construction of Non-infectious SARS-CoV-2 Replicons and Their Application in Drug Evaluation', *Virologica Sinica*, Vol. 36, No. 5, October 2021. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8034055/>

¹⁰⁷ Bei Wang, Chongyang Zhang, Xiaobo Lei, Lili Ren, Zhendong Zhao, and He Huang, 'Construction of Non-infectious SARS-CoV-2 Replicons and Their Application in Drug Evaluation', *Virologica Sinica*, Vol. 36, No. 5, October 2021. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8034055/>

¹⁰⁸ Gu Hongjing, et. al. 'Adaptation of SARS-CoV-2 in BALB/c mice for testing vaccine efficacy', *Science*, Vol. 369, No. 6511, 25 September 2020. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7574913/>

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MERS

The MERS virus emerged in the Eastern Province in Saudi Arabia in 2012 and generated modest outbreak clusters across the Middle East as well as limited clusters in Southeast and South Asia. As the MERS virus was not well adapted for continuous human-to-human transmission, its pandemic potential remained limited and, at present, does not represent a major international security risk in nature. Critically, even during the early stages of the outbreak Dromedary Camels were identified as the key intermediary animal species between bats (MERS is a bat-borne virus) and humans thereby enabling multiple controls and preventative measures to be put in place.¹⁰⁹

MERS represents a well-characterized virus that has a fully adjudicated outbreak investigation profile that enables continuous surveillance and control operations to be conducted. This is evidenced by the lack of any additional outbreaks of this specific bat-borne coronavirus in recent years. Given this stable situation, why would researchers deliberately infect non-human primates with the MERS coronavirus? This is exactly what a group of CAMS researchers did in 2014.

In a 2014 study titled, ‘An animal model of MERS produced by infection of rhesus macaques with MERS coronavirus’, Yao Yanfeng, Bao Linlin, Deng Wei and Qin Chuan from CAMS set out to determine if monkey models were effective to study the pathogenesis of MERS infections. This is despite the fact that monkeys had previously had no natural link with MERS and the full chain of infection of MERS had already been fully determined. As such, it can be assessed that the scientific/public health rationale of this study was flawed from the outset. These researchers also appear to have possibly worked with controversial Dutch GoF scientist, Ron Fouchier, at Erasmus University in Holland, whose own research has been periodically ceased under EU regulations related to weapons of mass destruction.

In this CAMS study, the research team sourced their MERS samples from Erasmus and utilized them to directly infect the lungs of Rhesus Macaques and observed their physiological responses. The researchers reported that infected monkeys showed clinical signs of disease, virus replication, histological lesions, and neutralizing antibody production. They also reported that they could confirm that the monkey model supports viral growth and also manifests respiratory and generalized illness along with tissue pathology. Lastly, these CAMS researchers claim to have conducted similar experiments on mouse, ferret, and guinea pig models but decided not to publish the data.¹¹⁰

Dr. Bao Linlin of the Institute of Animal Laboratory Sciences (CAMS) is of particular interest in this MERS study as well her multiple studies on H7N9 and other GoF research on avian influenza viruses. Some of Bao’s GoF research is virtually identical to the research conducted

¹⁰⁹ For example, please see Chantal B E M Reusken, et. al., ‘Middle East respiratory syndrome coronavirus neutralising serum antibodies in dromedary camels: a comparative serological study’, *Lancet Infectious Diseases*, Vol. 13, No. 10, October 2013.

[https://www.thelancet.com/journals/laninf/article/PIIS1473-3099\(13\)70164-6/fulltext](https://www.thelancet.com/journals/laninf/article/PIIS1473-3099(13)70164-6/fulltext)

N Nowotny and J Kolodziejek, ‘Middle East respiratory syndrome coronavirus (MERS-CoV) in dromedary camels, Oman, 2013’, *Euro Surveillance*, Vol. 19, No. 16, 24 April 2014.

<https://www.eurosurveillance.org/content/10.2807/1560-7917.ES2014.19.16.20781>

¹¹⁰ Yao Yanfeng, et. al., ‘An Animal Model of MERS Produced by Infection of Rhesus Macaques With MERS Coronavirus’, *Journal of Infectious Diseases*, Vol. 209, No. 2, 15 January 2014.

<https://academic.oup.com/jid/article/209/2/236/829418>

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by Ron Fouchier¹¹¹ in that both have engineered avian influenza (H7N9 and H5N1) viruses to be able to transmit between ferrets via droplets.¹¹² However, while Fouchier's research was criticized internationally and disrupted, Bao's research has continued uninterrupted and with no apparent restrictions. When Bao's low domestic and international profile is contrasted with that of, for example, Shi Zheng-Li at WIV, this becomes even more apparent.

In summary, these specific studies clearly demonstrate a strong set of network linkages between CAMS, WIV, the PLA, and even UTMB in Texas along with the willingness and capability to conduct extraordinarily high-risk GoF experiments on some of the world's most dangerous pathogens. This network also has a proven capability to develop highly pathogenic synthetic viruses, the implications of which are difficult to overstate in terms of strategic significance. The CCP has the option to 'lift and drop' all of these known capabilities from CAMS into the joint WIV-DESTO military facility in Pakistan.

The Pakistan Army's Use of Terrorist Groups Generates Bioweapons Down-Streaming Risks, especially with Lashkar-e-Taiba

The Pakistan Army's use of irregular Islamist groups as a core component of its strategy towards India can be traced all the way back to the country's founding in 1947. Pakistan created a kaleidoscope of Islamist terrorist groups to carry out attacks initially in the Indian state of Jammu and Kashmir and eventually across India. Groups such as the Allah Tigers, Jaish-e-

¹¹¹ For example, please see Ron Fouchier, et. al., "Airborne transmission of influenza A/H5N1 virus between ferrets", *Science*, 22;336:6088, June 2012.

<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4810786/pdf/nihms764094.pdf> Ron Fouchier, et. al., "The potential for respiratory droplet-transmissible A/H5N1 influenza virus to evolve in a mammalian host", *Science*, 22;336:6088, June 2012. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3426314/pdf/nihms397318.pdf> Martin Enserink, "Flu Researcher Ron Fouchier Loses Legal Fight Over H5N1 Studies", *American Association for the Advancement of Science (ScienceMag)*, 25 September 2013. <https://www.science.org/content/article/flu-researcher-ron-fouchier-loses-legal-fight-over-h5n1-studies> Jocelyn Kaiser, "EXCLUSIVE: Controversial experiments that could make bird flu more risky poised to resume", *American Association for the Advancement of Science (ScienceMag)*, 8 February 2019. <https://www.science.org/content/article/exclusive-controversial-experiments-make-bird-flu-more-risky-poised-resume>

¹¹² For example, please see Linlin Bao, et. al., 'Novel Avian-Origin Human Influenza A(H7N9) Can Be Transmitted Between Ferrets via Respiratory Droplets', *Journal of Infectious Diseases*, Volume 209, Issue 4, 15 February 2014. <https://academic.oup.com/jid/article/209/4/551/2192836> Linlin Bao, et. al., 'Transmission of H7N9 influenza virus in mice by different infective routes', *Virology Journal*, Vol. 11, Article No. 185, 2014. <https://virologyj.biomedcentral.com/articles/10.1186/1743-422X-11-185> Ron Fouchier, et. al., 'Airborne Transmission of Influenza A/H5N1 Virus Between Ferrets', *Science*, Vol. 336, Iss. 6088, June 2012. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3426314/pdf/nihms397318.pdf> Ron Fouchier et. al., 'Gain-of-Function Experiments on H7N9', *Science*, 3 August 2013.

<https://www.science.org/doi/full/10.1126/science.1243325> Ron Fouchier, et. al., 'The Potential for Respiratory Droplet-Transmissible A/H5N1 Influenza Virus to Evolve in a Mammalian Host', *Science*, Vol. 336, Iss. 6088, 22 June 2012. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3426314/pdf/nihms397318.pdf> Martin Enserink, 'Flu Researcher Ron Fouchier Loses Legal Fight Over H5N1 Studies: Dutch court confirms that export license is needed to publish certain influenza paper', *Science*, 25 September 2013. <https://www.science.org/content/article/flu-researcher-ron-fouchier-loses-legal-fight-over-h5n1-studies> Robert Roos, 'Fouchier study reveals changes enabling airborne spread of H5N1', Center for Infectious Disease Research and Policy, University of Minnesota, 21 June 2012. <https://www.cidrap.umn.edu/news-perspective/2012/06/fouchier-study-reveals-changes-enabling-airborne-spread-h5n1> Jocelyn Kaiser, 'EXCLUSIVE: Controversial experiments that could make bird flu more risky poised to resume: Two "gain of function" projects halted more than 4 years ago have passed new U.S. review process', *Science*, 8 February 2019. <https://www.science.org/content/article/exclusive-controversial-experiments-make-bird-flu-more-risky-poised-resume> Martin Enserink, 'Scientists Brace for Media Storm Around Controversial Flu Studies', *Science*, 23 November 2011. <https://www.science.org/content/article/scientists-brace-media-storm-around-controversial-flu-studies>

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Mohammed, Harakat-ul-Jihad-i-Islami, and even the Muttahida Quami Movement (which is now an actual Karachi-centered political party) were all originally established, structured, armed, trained, and operationalized by the Pakistan Army's Inter-Services Intelligence (ISI). This is in addition to the ISI's formation and operationalization of the Taliban in Afghanistan and Pakistan's tribal areas as well. However, none of these terrorist groups have grown and expanded along the same trajectory as Lashkar-e-Taiba (LeT).

LeT was an originally Jammu and Kashmir-focused terrorist group that has carried out the most complex, bold, and lethal attacks in India, including the 2008 Mumbai massacre. LeT has also operated at the behest of ISI to arrest uncooperative members of the Pakistani Taliban within Pakistan itself and they have also operated in Afghanistan alongside the Pakistan Army's Special Services Group (SSG). LeT operators (especially technical specialists such as bombmakers) have been arrested as far away as France.

LeT also has the demonstrated capability to carry out special forces-type operations either independently (2008 Mumbai attacks) or jointly with Pakistan SSG and/or other units (Afghanistan in 2021). These advanced operational capabilities, LeT's autonomous status within Pakistan, and its continued focus on carrying out terrorist attacks in India make it a critical free variable in the CCP-Pakistan Army bioweapons development nexus.¹¹³ It is possible that even the CCP has not fully appreciated and factored in these risks.

The Pakistani Army and Navy have both experienced multiple successful penetrations by Islamist groups, including in the senior officer corps. It should also be noted that despite LeT's official designation as an international terrorist group, the organization is now viewed as an unconventional extension of the Pakistan Army (and ISI in particular). LeT's founder and leader, Hafiz Saeed, lives freely in Pakistan despite his decades-long track record of killing thousands of innocent people, mostly in India.

As such, there is a material risk of any jointly developed bioweapons being down-streamed to LeT (or another Islamist group) to carry out mass-casualty atrocities while providing Pakistan with the same type of plausible deniability that the CCP has sought to maintain. This is despite overwhelming evidence that SARS-CoV-2 was the result of a lab leak at the 'old' WIV in central Wuhan.¹¹⁴ These are not risks that can in any way be managed, mitigated, or tolerated

¹¹³ Ryan Clarke, *Lashkar-i-Taiba: The Fallacy of Subservient Proxies and the Future of Islamist Terrorism in India*, Strategic Studies Institute, United States Army War College Press, 2010.

https://press.armywarcollege.edu/articles_editorials/72/ Ryan Clarke, *Crime-Terror Nexus in South Asia: States, Security, and Non-State Actors*, Routledge, London/New York, 2011. <https://www.routledge.com/Crime-Terror-Nexus-in-South-Asia-States-Security-and-Non-State-Actors/Clarke/p/book/9780415724036>

¹¹⁴ Steven Quay, 'Bayesian analysis concludes beyond a reasonable doubt that SARS-CoV-2 is not a natural zoonosis but instead is laboratory derived', Zenodo, 29 January 2021.

<https://www.scienceopen.com/document?vid=23853f40-72f5-443a-8f87-89af7fce1a92>

The following studies conducted at WIV demonstrate, in aggregate, how to engineer a bat coronavirus to directly infect humans without the need for an intermediate mammalian host for the first time in history: Shi Zheng-Li, Ralph Baric, et. al., "A SARS-like cluster of circulating bat coronaviruses shows potential for human emergence", *Nature Medicine*, Vol. 21, No. 12, December 2015.

https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4797993/pdf/41591_2015_Article_BFnm3985.pdf

Joanna Mazet, Peter Daszak, Shi Zheng-Li, et. al., "Isolation and characterization of a bat SARS-like coronavirus that uses the ACE2 receptor", *Nature*, Vol. 503, No.28, November 2013.

<https://www.nature.com/articles/nature12711.pdf> Li, Fang, Wang Linfa, Shi Zheng-Li, et. al, "Angiotensin-converting enzyme 2 (ACE2) proteins of different bat species confer variable susceptibility to SARS-CoV entry", *Archive of Virology*, 155, 22 June 2010.

https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7086629/pdf/705_2010_Article_729.pdf

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- they must be eliminated. ISI is subjected to even fewer constraints than their counterparts at WIV and CAMS who at least officially report to China's State Council. The ISI reports to no one, not even to the Prime Minister of Pakistan.

The Full Investigation, Assessment, and Elimination of the joint WIV-DESTO Program Needs to be a Top International Priority

As catastrophic as SARS-CoV-2 has been with millions of deaths and global disruption, in certain respects its roughly 1% fatality rate represents a 'near miss' event that could have been much worse, even if this rate was only slightly higher, about 2-3%. GoF work by WIV and CAMS on Zika, enhanced SARS-CoV-2 viruses (natural and synthetic), MERS, avian influenza viruses, Nipah (which has an 80% fatality rate) and others would all undoubtedly prove more lethal than the currently circulating SARS-CoV-2 pathogen. This bioweapons development is proven, documented, and in the case of CAMS in particular, has appeared to actually speed up over the course of the SARS-CoV-2 global pandemic. This overlays on top of Pakistan's proven, documented use of Islamist terrorist groups as a core component of state policy, especially LeT.

There is the real prospect of this type of CCP bioweapons development capability being directly transferred to a laboratory environment that is run by an Army that is unaccountable to anyone and has extensive links with Islamist groups who continue to carry out special forces-style terrorist operations. This cannot be tolerated. Whether through error or malicious intent, if the joint WIV-DESTO bioweapons program is left unchecked, we will be facing exponentially accelerating risks that many will find impossible to comprehend until they occur. Also, if this foundational component of the CCP's internationalization of its bioweapons program is not stopped in Pakistan, there will be no limiting principle to prevent the CCP from replicating this process elsewhere. Under such circumstances, our current world could become instantly unrecognizable without warning and could make the events of recent years seem relatively minor, much as many now view the SARS-CoV-1 outbreak in 2002.

Existential Risks Escalating within the CCP System: Historically Unprecedented Threats Emerging

Looking back over the full multi-domain spectrum related to the CCP's weaponization of Nipah, it is clear that a calculated and strategically comprehensive series of next-generation WMD research and development initiatives are being pursued aggressively by Beijing to acquire and retain global influence after 2025. New military forms and convergent arrangements by the CCP of Nipah and other bioweapons programs have carved out insidious inroads at prestigious academic institutions. This spells ominous existential threats unfolding behind the scenes which shift and destabilize the status of global security and are without historical precedent. In addition, evidence has emerged of serious CCP interest in further WMD research in other areas deemed non-kinetic in nature where the emphasis is on exploiting the entire synthetic biology spectrum. This signals a strategic shift into platforms and systems which symbolize a covert first strike capability as a foundation for onward kinetic aggression. Subtle subversion of Western academic institutions and industry to engage in technology theft and targeted illicit transfer of high-tech research, trade secrets and novel emerging technologies in artificial intelligence and nanotechnology underscores the determination and tenacity of a regime which seeks to impose its will and dictate the balance of power in ways favorable to Beijing at any cost.

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In some ways, this echoes classical Chinese strategy as articulated by Sun Tzu where he noted that the ‘acme of skill is to win the war and subdue the enemy without firing a shot.’¹¹⁵ Likewise, there are elements of the ‘assassins mace’ approach to indirect, hybrid, gray-zone long-term efforts to undermine and weaken the resolve, morale and social cohesion of societies and nations whose strategic interests and goals diverge from the sentiments of the ruling CCP.¹¹⁶ Also understanding the applicability of its various forays into international influence, leverage and dominance we must consider:

- The 36 Stratagems and their application towards undermining Western key infrastructure
- The application of ‘peaceful panda propaganda’ perpetually via TikTok and other social media
- Sustained information operations and influence campaigns to distort public media messaging
- Leveraging Belt and Road programs to wrest control of telecommunications infrastructure
- COVID origins at WIV as a likely source of a global pandemic
- Vulnerabilities in defense and military supply chain resources and critical materials
- Persistent intellectual property theft and copyright infringement actions
- Research and engineering on electric grid destabilization, weather modification and agrosecurity threats

The education of senior military leaders, academic experts in Asian studies, students of geopolitics, vigilant watchers of public news media, and the absorption of messaging and images in the public square are arenas of key influence and widening awareness of the next generation of the CCP bioweapons threat. Global media and news sources which negate or diffuse facts and information about the gross reduction of freedom and maximum state control over ordinary Chinese citizens, as well as CCP efforts to curtail open discussion of their destructive actions within China, must be reviewed with resolute focus and keen awareness.

¹¹⁵ Sun Tzu (English Translation by Thomas Cleary), *The Art of War*, Shambhala Publications, Boston, 1988.

¹¹⁶ For additional discussions, please see Robert Spalding, *War Without Rules: China's Playbook for Global Domination*, Sentinel, 2022.

Rush Doshi, *The Long Game: China's Grand Strategy to Displace American Order*, Oxford University Press, 2021.

Michael Pillsbury, *The Hundred-Year Marathon: China's Secret Strategy to Replace America as the Global Superpower*, St. Martin's Griffin, 2015.

Andrew Erickson, William Murray and Lyle Goldstein, *Chinese mine warfare: a PLA Navy 'assassin's mace' capability*, China Maritime Studies Institute, U.S. Naval War College, 2009.

Michael Pillsbury, *China Debates the Future Security Environment*, National Defense University Press, January 2000.

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In addition, serious attention must be paid by Western scholars and those intent on grasping the changes in global security about widely published documents by China which signal and underscore a relentless campaign of global influence and the pursuit of military dominance with particular emphasis on gaining leverage in bioweapons and other WMDs. Such publications include the following as exemplary of their overall aims and strategy:

- Qili Shen, Jun Wu, Jianhua Li, Xiaofei Zhang, Kuan Wang, ‘Communication Modeling for Targeted Delivery under Bio-DoS Attack in 6G Molecular Networks (Conference Paper)’, 2021 IEEE International Conference on Communications, June 2021.
- Li Shengsong , Zheng Yongchao , Meng Shulin, Wu Lizhu, Zhong Jinyi, Zhao Chonglin, ‘Core-shell quantum dot-nano-gold particle assembly for efficient detection of nerve agent mimics’ [核壳型量子点-纳米金颗粒组装体高效检测神经性毒剂模拟剂], Journal of Inorganic Materials, Issue 8, 2019.
- The Science of Military Strategy 2017, National Defense University, People’s Liberation Army, Beijing, 2017.
- Tianliang Xiao [肖天亮], eds., The Science of Military Strategy [战略学]. PLA National Defence University Press, Beijing, 2015.
- Jieming Wu [吴杰明] and Zhifu Liu [刘志富], An Introduction to Public Opinion Warfare, Psychological Warfare, [and] Legal Warfare [舆论战心理战法律战概论], PLA National Defence University Press, Beijing, 2014.
- Academy of Military Science Military Strategy Research Department [军事科学院军事战略研究部], eds., The Science of Military Strategy [战略学]. Military Science Press, Beijing, 2013.

Those serious about discovering more details and facts about the growing arsenal of weaponized Nipah and other WMD research which the CCP advocates, funds, and promotes should take heed that this momentum towards global influence and dominance by leaders in Beijing shows no sign of a slowdown. Instead, greater sustained attention should be focused by Western leaders, military commanders, scholars, media personalities, news organizations, educators and ordinary citizens on the ultimate picture of CCP acquisition and possession of cutting-edge bioweapons such as Nipah. China faces no discernable ongoing threat to its territorial sovereignty and national security which would support and justify this headlong quest for such an extraordinarily high-risk bioweapon. So those intent on knowing more and discovering more should consider the following:

- Why is CCP leadership pursuing expanded and sophisticated forms of Nipah bioweapons and pairing them with nanotechnology delivery platforms?
- Why is CCP leadership intent on subverting, influencing and destabilizing Western nations?
- Why is China’s CCP leadership seeking rampant technology theft, espionage and technology dominance, specifically in synthetic biology and Nipah in particular?

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- Why is WIV, the core institution that was clearly the point of origin of the COVID-19 pandemic, now serving as the national ‘Center of Excellence’ for high-risk Nipah research? Why does WIV appear to have a uniquely dominant domestic market position via its commercialization arrangements with WuXi AppTech?
- Does WuXi Biologics provide WIV and its high-risk Nipah research and direct pathways into key countries of strategic consequence, including the United States? Can the WuXi group of companies be assessed to be purely private sector entities?