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How China's Biotech Is Changing Global Ecosystems

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Licensing deals are surging

The cross-Pacific deal-making boom is a perfect supply-and-demand handshake.[1] Western Big Pharma needs fresh pipeline assets to offset USD 250 billion in patents that will soon expire and mounting US price controls, while many Chinese biotechs – hit by a venture-funding drought and efforts to control healthcare expenditure – need hard currency and late-stage development partners. The result was a record USD 41.5 billion in China-to-West licensing value in 2024, a 66 percent jump on 2023, with large pharma sourcing 28 percent of all innovative assets from China.[2] In other words, the West is buying time, and China is buying runway.

The Chinese state has supported biotech research for decades. This began reaping significant results after 2016, when Beijing shifted from protectionism to global competition. The Healthy China 2030 policy prioritized the life expectancy of Chinese citizens and other public health goals, leading to a gradual reduction of entry barriers for foreign drug makers. China also set itself up to participate in global clinical trials. After joining the International Council for Harmonisation (ICH) in 2017, its National Medical Products Administration (NMPA) adopted more than 100 ICH guidelines, overhauled chemistry, manufacturing, and controls (CMC) rules and introduced priority-review and conditional-approval pathways. Data regulations were also adjusted to enable participation in global trials.

This regulatory convergence has enabled China to benefit from its cost-speed advantages. Phase I studies in China cost roughly one third of those in the US and recruit in weeks, providing decision-ready data early. That is accelerating a "deal before Phase II" model, with 71 percent of 2024 licenses involving pre-clinical or Phase I assets.[3]

Additionally, Chinese pharma startups are driven into the hands of global investors due to a domestic capital squeeze. Private biotech investment fell to a seven-year low in 2024; licensing out is now the cheapest non-dilutive financing route.[4] A key factor is that China does not have a large enough domestic market to support the development of expensive, cutting-edge treatments on its own. China made up about 4.8 percent of the global biotech market in 2024, whereas the US accounted for 35 percent and Europe 31 percent.[5] The Chinese leadership has indicated that it wants to prevent national healthcare expenditure from ballooning. Growing insecurity over access to global markets, the US market in particular, is hampering investment and further

[1] https://merics.org/en/report/lab-leader-market-ascender-chinas-rise-biotechnology

[2] https://www.pharmaceutical-technology.com/analyst-comment/large-pharma-drug-licensing-china-2024/ citing GlobalData's Pharma Intelligence Center Deals Database

[3] https://www.nature.com/articles/d41573-025-00068-0

[4] https://www.economist.com/business/2025/02/16/its-not-just-ai-chinas-medicines-are-surprising-the-world-too

[5] https://merics.org/en/report/lab-leader-market-ascender-chinas-rise-biotechnology

incentivizes Chinese firms to find global investors or partners who can help navigate the regulatory and political challenges.

This arrangement sets up China as a location for affordable and fast early-stage exploration across a broad range of pharmaceuticals. Recent deals are oncology-heavy but are less monolithic than a decade ago. In 2024, cancer still accounted for 54 percent of transactions and 63 percent of upfront payments, but immunology/inflammation reached 25 percent, while obesity–cardiometabolic assets grew to 10 percent – fueled by GLP-1 and dual-agonist programs aimed at Ozempic-size markets.[6] Complex biologics led the charge: antibody–drug conjugates (ADCs), bispecifics, and T-cell engagers formed 44 percent of all licenses and two thirds of cash paid.[7] This shows that Western firms are shopping China not for cheaper copies but for modality depth.

Yet the portfolio is still skewed toward so-called super me-too molecules – an enhanced, second-generation version of existing therapies – rather than first-in-class breakthrough treatments. A recent pharmacological research survey tagged only 10.5 percent of Chinese out-licensed products as first-in-class versus 89.5 percent that refine known targets; the mirror statistic for China's in-licensing was 25 percent.[8] The balance is roughly one part frontier science to four parts fast follower. Even incremental drugs can be disruptive when they hit price–performance sweet spots, as seen with BeiGene's BTK inhibitor, which treats B cell cancers at 30-40 percent of the price of its first-in-class predecessor (Imbruvica), produced in the US market by AbbVie.

Overall, China is progressing toward more advanced innovative drugs, including occasional first-in-class treatments. Tracking this progress would consider:

- Deal flow velocity and value (number and upfront/milestone totals of cross-border licenses per quarter).
- Origin of innovation (share of first-in-class NDAs and FDA Breakthrough designations awarded to China-origin drugs each year).
- Clinical-cycle time (median months from first-in-human to pivotal read-out as registered on ClinicalTrials.gov).
- R&D intensity (biotech R&D spend-to-revenue ratio versus global peers).
- Capital formation (venture and IPO dollars raised by Chinese therapeutics firms, adjusted for exchange-rate and policy risk).
- Patent-citation quality (average forward citations per Chinese-origin patent family in the top ten therapeutic areas).
- Global talent flow (net migration of returnee scientists and percentage of first-author publications with China-based corresponding authors).

Monitoring that composite set tells us not just how many drugs are being licensed, but whether China is moving from incremental to architectural innovation – and whether Western firms remain willing partners in that transition.

China's biotech ecosystem has several advantages

China's most striking advantages include public support for biotech R&D, recruitment times for clinical trials and the comprehensiveness of its biotech clusters, including talent, start-ups and contract research organizations.

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[6] https://www.nature.com/articles/d41573-025-00068-0, https://www.scmp.com/tech/tech-trends/article/3305124/chinas-biotech-firms-record-surge-overseas-licensing-deals-first-quarter

[7] https://www.nature.com/articles/d41573-025-00068-0

[8] https://www.sciencedirect.com/science/article/pii/S104366182400433X , https://www.ft.com/content/f76c2e6b-dcc4-4e2c-a007-b53330226a5f

China's total R&D spending reached RMB 3.6 trillion in 2024 (2.68 percent of GDP), of which about 12 percent –around RMB 430 billion – is estimated to flow to life-science research and clinical development. This is based on the assessment of a cascading scaffold of state programs that China has built over the past decades and the relative importance of biotech and healthcare R&D to them. These include:

- The National Natural Science Foundation of China (NSFC), created in 1986, professionalized peer review and still seeds basic discovery; its 2024 budget for life sciences alone exceeded RMB 8 billion, about a third of its budget and a 10 percent jump on 2023.[9]
- The Science and Technology Megaprojects in the period 2006-2020 included two healthcare related missions, each of which channeled multi-billion-RMB tranches into translational platforms over this 15-year period.[10] A new batch of 16 megaprojects aimed at 2030 was announced in 2016, and includes brain science, seeds, and health protection. However, budgets, pathways and other specifics are not public.
- National Key R&D Projects, including yearly funding rounds for synthetic biology and biomacromolecules and microbiome projects.
- State Key Labs, of which a fifth focus on biology.[11]
- Made in China 2025, which recasts biopharma as a strategic manufacturing pillar: tax holidays, low-interest loans and land discounts have flowed to producers of bioreactors, single-use suites and mRNA inputs.[12]
- Beijing's designation of "Strategic Emerging Industries" and, under the 14th Five-Year Plan (2021-2025), "Future Industries" have steered government guidance funds and other state resources toward cell therapies, synthetic biology and brain-computer interfaces. For instance, Shanghai set up an RMB 100 billion (USD 13.8 billion) fund-of-funds for semiconductors, biotech and AI in 2024.[13]

Additionally, China's nationwide public-hospital network supplies trial sponsors an unrivalled pool of treatment-naïve patients, centralized electronic records and state-salaried investigators, dramatically compressing study timelines and budgets.[14] The advantage is amplified by the National Medical Products Administration's (NMPA) "silent approval" rule: if no questions are raised within 60 working days, a clinical-trial application is automatically cleared, letting studies launch inside three months of protocol finalization.[15] More generally, NMPA overhauled its review system in 2017 and introduced priority-review channels at its Center for Drug Evaluation. By 2023, 29 percent of all new global clinical trials involved a Chinese site, against 17 percent for North America and 16 percent for Europe.[16]

Once molecules show promise, developers can tap a vast domestic contract-development and manufacturing ecosystem. Replacing Chinese production capacity would impose a USD 18 billion one-off cost, Jefferies estimated in 2022, and USD 12 billion more in annual labor outlays for US

[9] https://www.nature.com/articles/d41586-024-03120-y
[10] https://ucigcc.org/wp-content/uploads/2022/06/Naughton2021_Industrial_Policy_in_China_Chapter-3.pdf
[11] https://skl-map.cset.tech/
[12] https://rhg.com/research/was-made-in-china-2025-successful/
[13] https://www.reuters.com/world/china/shanghai-launches-138-bln-funds-boost-integrated-circuit-biomedicine-ai-sectors-2024-07-26/, https://merics.org/en/report/lab-leader-market-ascender-chinas-rise-biotechnology
[14] https://www.clinicaltrialsarena.com/sponsored/clinical-trial-challenges-china-sharp-clinschain/, https://www.languageconnections.com/clinical-trial-boom-in-china/
[15] https://clinregs.niaid.nih.gov/country/china/united-states
[16] https://www.efpia.eu/news-events/the-efpia-view/statements-press-releases/60-000-fewer-clinical-trial-places-for-europeans-despite-global-surge-in-research-projects/

pharma, which corresponds with China's 30-40 percent unit-cost edge on biologics.[17] Flagship contract research, development and manufacturing organizations (CRDMOs) such as WuXi Biologics offer single-use capacity at prices that undercut European plants. The result is lower costs and the cash headroom to run multiple shots on goal, lifting pipeline productivity.

The role of Western-trained talent in China's biotech

US biomedicine long drew strength from a "hidden subsidy" of Chinese graduate students and post-docs. In 2023, 36 percent of all foreign recipients of US science-and-engineering doctorates – 15,800 people – were Chinese nationals; eight in ten stayed for at least three years,[18] populating Boston and San Francisco Bay Area labs with low-cost, highly productive researchers. Chinese authors have contributed greatly, appearing on 29 percent of the top 10 percent most-cited biomedical papers produced at US addresses.[19]

However, Beijing has gradually turned this to its advantage, benefiting from the general vibrancy of its biotech sector, push factors in the US that limit career prospects for China-born researchers, and targeted talent programs. Zooming in on the latter, the Thousand Talents and Young Thousand Talents programs offer fast-track professorships, start-up grants, and subsidized lab space, causing young awardees to publish 27 percent more papers than peers who stayed abroad.[20] Local governments sweeten the package with housing, equity and tax rebates. Shanghai's Zhangjiang park, for example, provides free land leases and has pledged RMB 4 billion (about USD 550 million) in trial subsidies through 2027.[21]

Industry surveys quoted by ION Analytics note that the quality leap in Chinese biotech "has been largely thanks to the 'sea-turtles' phenomenon of returnee scientists and engineers who studied abroad."[22] This is supported by anecdotal evidence: the co-discoverers of high-profile Chinese advances such as BeiGene's BTK inhibitor, Junshi's PD-1 antibody and Legend's CAR-T have all earned PhDs or tenure in the US before returning to lead China's first blockbuster trials. Another indicator of China's success in this regard is that between 2019 and 2023, Chinese universities employed roughly 30 percent of the world's most-cited life-science researchers, ahead of 27 percent for the US and 12 percent for the EU.[23]

China is likely to reap the benefits of global talent flows for at least another decade, partly because Chinese citizens still play a major role in US life-science doctoral pipelines – 17 percent of all 2020 US science and engineering doctorates went to Chinese students.[24] But also because further slowdown in US-China talent exchange is likely to be offset by Chinese access to other Western countries and by the progress in China's domestic education systems. On China's domestic programs: CSET projects that Chinese universities will award 77,000 STEM PhDs annually by 2025, nearly double the US total, and life sciences account for roughly one fifth of that pool.[25]

Chinese capital markets can now better support healthcare innovation

[17] https://www.reuters.com/breakingviews/china-biotech-has-bitter-us-pill-swallow-2022-09-14/
[18] https://ncses.nsf.gov/pubs/nsf25325/table/1
[19] https://stories.springernature.com/global-research-pulse-china/index.html
[20] https://sccei.fsi.stanford.edu/china-briefs/evaluating-success-chinas-young-thousand-talents-stem-recruitment-program
[21] https://merics.org/en/report/lab-leader-market-ascender-chinas-rise-biotechnology
[22] https://ionanalytics.com/insights/mergermarket/avcj/pe-and-china-biotech-global-ma-on-the-agenda/
[23] https://stories.springernature.com/global-research-pulse-china/index.html
[24] https://sccei.fsi.stanford.edu/china-briefs/reverse-brain-drain-exploring-trends-among-chinese-scientists-us
[25] https://cset.georgetown.edu/publication/china-is-fast-outpacing-u-s-stem-phd-growth/

China's leaders have reorganized the country's capital markets over the past decade to compress the "valley of death" between scientific research and commercial sales. China's stock exchanges, in particular Shanghai's STAR Market and Hong Kong's Chapter 18A regime, have greatly improved the speed of fundraising, tolerance for pre-revenue listings, and the breadth of state back-stop capital. That does not mean money is plentiful, but it does mean the financing conveyor belt has become an enabler of China's drug development.[26]

China's overall VC investment hit a post-pandemic low of USD 33 billion in 2024, down 32 percent year-on-year and the weakest since 2014.[27] Biotech felt the chill more acutely: sector-specific private funding slid to about USD 4.2 billion – just 28 percent of the 2021 peak.[28]

The state has directed provincial and central guidance funds to step in. National-level appropriations for strategic emerging industries rose 12 percent in real terms between 2019 and the 2025 budget.[29] These funds act as quasi-LPs for domestic VCs and as cornerstone investors in IPOs, lowering the cost of capital and anchoring valuations when foreign investors stay on the sidelines. However, these ultimately are a poor replacement of venture capital, often bringing in additional requirements on generating local jobs and tax revenue, and less tolerance for failure and restructuring. When Beijing issued policies to support biotech R&D in October 2024, Chinese industry leaders said they would rather have a market than subsidies.[30]

This means that foreign investments and licensing deals remain critical. The uptick in China's biotech investments in spring 2025 rides on foreign licensing and partnership deals, which inject more confidence into the market.[31] The Chinese government has facilitated this, implicitly endorsing a model where domestic equity pays for discovery and Phase I and the next steps are funded through licensing deals. Proposed US scrutiny could disrupt this trend, forcing Chinese firms either to accept deeper state ownership or seek alternative partners.[32]

Measured by the speed at which firms find funding across successive stages, China's capital stack has so far been relatively effective. Venture droughts are somewhat cushioned by state guidance funds; public markets tolerate pre-revenue science; and Western licensors monetize late-stage risk. Efficiency, however, increasingly relies on a delicate three-leg balance – domestic retail investors, provincial fiscal firepower, and continued Western appetite for Chinese IP. Should geopolitics kick away the third leg, China's laboratory-to-launch conveyor may still run, but it will grind rather than glide.

Global biotech ecosystem poses numerous risks to US economic security

The current global biotech eco-system includes several economic risks for the U.S., particularly in supply chain security, competitive hollowing-out and capability drift.

In their supply chains, US drug makers rely on Chinese contract development and manufacturing organizations (CDMOs) for both research reagents and clinical-grade biologics. In October 2024, a survey found 79 percent of American companies have at least one program whose cell banks or plasmids are stored in China and would need two-to-eight years to duplicate capacity

[26] https://english.sse.com.cn/news/newsrelease/digest/c/c_20250509_10778554.shtml, https://www.skadden.com/insights/publications/2024/06/2024-report-on-hong-kong-listed-biotech-companies

[27] https://news.crunchbase.com/venture/china-leads-asia-downturn-ai-ev-data-centers/

[28] https://www.nature.com/articles/d41573-025-00068-0

[29] https://merics.org/en/report/lab-leader-market-ascender-chinas-rise-biotechnology, https://www.ft.com/content/1e9e7544-974c-4662-a901-d30c4ab56eb7

[30] https://m.yicai.com/news/102340386.html

[31] https://m.21jingji.com/article/20250514/herald/73fae2bcf8023ce4801cb35936dca1be.html

[32] https://regandtrade.com/2024/09/biosecure-act-us-to-target-chinese-biotechnology-companies/

elsewhere.[33] Europe's figure is only slightly lower at 73 percent, reflecting its somewhat broader network of Indian suppliers. Any export curb, cyber event or calibration dispute in China therefore threatens to stall discovery on both sides of the Atlantic.[34]

Another risk is the erosion of the US biotech R&D base. Licensing deals involving China-origin treatments translate into fewer dollars for domestic science. Capital investment in US biotech is trending toward companies nearing commercialization.[35] Moreover, EU pharmaceutical R&D spending grew just 4.4 percent annually between 2010 and 2022, versus 5.5 percent in the US and a blistering 20.7 percent in China – evidence that both Western regions have been losing velocity.[36] If corporate boards keep filling gaps by "shopping China," the next generation of platform scientists will drift toward Shanghai or Boston's China-facing subsidiaries, hollowing out discovery clusters in New Jersey and the Rhineland alike.

Western teams risk losing tacit skills over time, as Chinese partners now run many pivotal trials and own the scale-up know-how for complex modalities, including bispecifics, mRNA, and CAR-T. America still houses the world's largest pool of discovery talent, but China is closing the gap. Re-shoring critical infrastructure and rebuilding domestic CDMOs are therefore not just resilience measures; they are investments in retaining the competencies that underpin long-term scientific leadership.[37]

Finally, there are also risks in decoupling US-China collaboration. If Washington were to restrict licensing or tighten access to Chinese CDMOs, drug discovery economics would change considerably. Chinese licensing, contract research and manufacturing are major drivers for the uptick in novel drug approvals of the last decade. The FDA averaged 47 novel drug approvals a year between 2015 and 2024, almost double that of the early 2000s.[38] At the same time, R&D cost has been rising in recent decades, to reach USD 3.5 billion per novel drug,[39] which has increased risks and eroded returns on investments for pharma firms.[40] Adding reshoring premiums would almost certainly force companies to trim pre-clinical bets and extend timelines – precisely the opposite of pandemic-era lessons, when cross-border tie-ups such as BioNTech-Fosun's mRNA alliance shortened lab-to-launch to ten months. Without the cost advantage that China offers, global pharma innovation would slow down, affecting the economic outlook of US biotech companies, as well as patient outcomes.

Dual-use spillovers are the main national security risk

Beijing's bio-economy blueprint treats every civilian breakthrough as a potential military asset under its "military-civil fusion" (MCF) doctrine. The 14th Five-Year Plan for the Bio-economy lists DNA sequencing, gene editing and synthetic biology as "strategic edge" technologies and calls for stronger "national bio-security risk controls," signaling an official intent to channel commercial

33 https://www.reuters.com/business/healthcare-pharmaceuticals/trade-association-survey-shows-79-us-biotech-companies-contract-with-chinese-2024-05-08/
34 https://www.ft.com/content/e23117c0-3fe6-4b89-b1fc-c99f49976dc0
35 https://www.pharmaceutical-technology.com/analyst-comment/biopharma-venture-financing-q1-2025/?cf-view
36 https://www.efpia.eu/news-events/the-efpia-view/statements-press-releases/despite-a-decade-of-gradual-growth-rd-spending-in-europe-outpaced-by-the-us-with-increasing-competition-from-china-new-data-shows/
37 https://www.ft.com/content/e23117c0-3fe6-4b89-b1fc-c99f49976dc0
38 https://www.fda.gov/media/184967/download?attachment=&utm_
39 https://www.sciencedirect.com/science/article/pii/S135964462400285X
40 https://www.deloitte.com/ch/en/Industries/life-sciences-health-care/research/measuring-return-from-pharmaceutical-innovation.html

advances toward defense ends.[41] Earlier, the 13th Five-Year MCF S&T Plan set up shared laboratories and dual-use standards so that PLA researchers could tap state-subsidized civilian platforms on demand.[42] Complementing this, the 2016 plan for a high-biosafety laboratory network (BSL-3/4) created a nationally funded grid of facilities able to handle dangerous pathogens for either public-health or biodefence experiments.[43]

Progress is tangible: Chinese CDMOs advertising cut-price antibody production also boast contracts with People's Liberation Army (PLA) hospitals; provincial incubators host dual-registered companies that list both the National Medical Products Administration and the Equipment Development Department among their clients.[44] These arrangements allow the military to "borrow" industry capacity for surge production of antidotes or, in darker scenarios, novel bio-agents.

Additionally, if US biotechnology expertise keeps drifting to China, Washington's ability to deter, detect and defeat biological coercion will erode on three linked fronts.

First, Beijing could increase control over medical supply chains. China's 2020 Export-Control Law and 2021 Biosecurity Law explicitly empower the state to halt shipments of "dual-use pathogens, toxins and related equipment" whenever "national security" is threatened, giving legal cover for a medicine export pause.[45] If US know-how has migrated offshore, restarting mothballed plants or validating substitute processes would take months – time an adversary could exploit.

Second, a thinner domestic science base hampers attribution and threat assessment. Authoritative PLA writings – including a 2017 edition of *Science of Military Strategy* – discuss "specific ethnic genetic attacks" as a future option.[46] Without a deep bench of American virologists and bioinformaticians fluent in the latest CRISPR and AI-design tools, intelligence agencies may struggle to parse genomic telemetry quickly enough to name, shame and deter.

Third, slower replacement capacity undercuts credible response. If Beijing paired an export squeeze with even a rumor of engineered pathogens, allies might question US guarantees, weakening coalition cohesion at the very moment unified action is vital.

In sum, erosion of domestic biotech know-how magnifies China's legal, technical and supply-chain levers, stretching US response times and blurring attribution – twin failures that could turn biological threats, or even the mere menace of a medicine embargo, into effective instruments of coercion.

Worst-case scenario for American reliance on Chinese supply chains

The worst possible case, not just for the US but for the world, would be the deliberate or accidental release of a novel pathogen, for instance as part of a military conflict. The erosion of US-based capabilities, as outlined above, could complicate and slow a US response. To begin with, attribution of such an outbreak would be murky. Its Center for Disease Control (CDC) needs real-time genomic data from the epicenter, but Chinese law bars cross-border transfer of "human genetic resources." Lacking access to samples and with a diminished cadre of in-house virologists, the US may struggle to quickly determine whether it faces a natural spillover or a tailored agent.

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41 https://www.ndrc.gov.cn/xxgk/zcfb/ghwb/202205/P020220510324220702505.pdf, https://media.defense.gov/2024/Dec/18/2003615520/-1/-1/0/MILITARY-AND-SECURITY-DEVELOPMENTS-INVOLVING-THE-PEOPLES-REPUBLIC-OF-CHINA-2024.PDF

42 https://kjt.yn.gov.cn/html/2018/kejitongji_0102/5397.html

43 https://www.most.gov.cn/xxgk/xinxifenlei/fdzdgknr/gjkjgh/index_2.html

44 https://www.phirda.com/artilce_28621.html?cId=1 , https://kjt.yn.gov.cn/html/2018/kejitongji_0102/5397.html

45 https://www.npc.gov.cn/englishnpc/c2759/c23934/202112/t20211209_384804.html, https://www.chinalawtranslate.com/en/biosecurity-law/

46 https://jamestown.org/program/chinas-military-biotech-frontier-crispr-military-civil-fusion-and-the-new-revolution-in-military-affairs/

The Pentagon would hesitate to deploy troops overseas without guaranteed prophylactics; allies would start doubting US biological defense promises; deterrence would fray.

Barring an extreme event, China could simply meet its industrial goals and become the dominant global player in biotechnology, a position it would leverage to gain influence in a range of other areas. It is possible that by 2035 its CDMOs control half of the total global biologics capacity, while home-grown bispecifics and cell therapies win FDA approval at Chinese price points, and China's volume-based-procurement template is adopted across emerging markets. On this timeline, margins on legacy US blockbuster treatments compress 30 percent and Wall Street rewards share buy-backs over risky early research, shrinking the venture funnel that feeds Boston and San Diego start-ups. Chinese state support and overall cost benefits could persuade multinational firms to site AI-driven drug-design centers in Shanghai. Regulators in ASEAN and Africa, keen for affordable oncology drugs, endorse Chinese clinical-data packages as their de-facto standard, sidelining FDA norms. Without firing a shot, China becomes the rule-setter and indispensable hub, while any US sanction risks boomeranging as critical medicines disappear from pharmacy shelves at home.

Preventing these scenarios would require non-proliferation rules for dual-use biotech, diversified CDMO sourcing, and multilateral stockpiles of key inputs. Global norms and diversification in particular will require multilateral collaboration. As with nuclear weapons, dialogue with China may be necessary to at least keep misunderstandings from escalating. It may help that Beijing is also focusing on worst case scenarios. Xi Jinping called for "bottom-line thinking" and risk awareness in a 2021 Politburo study session on biosafety, ordering stockpiles, whole-chain surveillance, and rapid-response plants in case of "extreme circumstances."[47] Subsequent state security circulars repeat that phrasing, embedding worst-case drills into every high-risk biotech program.[48]

Washington's gaze should widen beyond headline licensing statistics

There are several fast-moving fronts where China is quietly reshaping the rules of biotech competition.

First, on standards and research ethics, Beijing's 2022 call for "a scientific-ethics system with Chinese characteristics" lets Chinese labs run animal, gene-editing and data experiments that are off-limits in the West.[49] This could put China out of step with the rest of the world, yet it could also accelerate its discovery timelines. This is also salient in brain-computer interfaces, where China has clear ambitions.[50]

Second, China's pursuit of "new-style whole-of-nation mobilization" disrupts the global scientific community, and global biotech and healthcare networks in particular.[51] Beijing set up a Central Science and Technology Commission (CSTC) to orchestrate an Olympic-style campaign in which self-reliance and export volume are the primary indicators of success. Local branches have been set up, enabling the swift mobilization across levels of government of institutes, hospitals and CDMOs for mission-driven life-science programs.

Third, although Chinese uptake of biotech solutions in chemical and other manufacturing sectors has been relatively modest, this will quickly change when biotech solutions become cost-effective. China is already well-positioned to scale up technology roll-out and gain first-mover advantage.

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[47] https://www.gov.cn/xinwen/2021-09/29/content_5640153.htm

[48] https://www.gov.cn/zhengce/202502/content_7005637.htm, https://zjsys.wsjkw.zj.gov.cn/xxinfo?uuid=1717449447683272706

[49] https://cset.georgetown.edu/publication/china-science-ethics-opinions/

[50] https://www.wired.com/story/china-brain-computer-interfaces-neuralink-neucyber-neurotech/ , https://merics.org/en/merics-briefs/data-security-industrial-internet-labelling-high-tech-healthcare

[51] https://merics.org/en/report/whole-nation-innovation-does-chinas-socialist-system-give-it-edge-science-and-technology

Finally, the internationalization of China's model could erode the profits for US biotech and pharma firms. China's biotech firms are operating worldwide. Although the US domestic market is much larger than China's, the rest of the world still represents 60 percent of the pie. Chinese state-sponsored oversupply will make it hard for US firms to compete and for countries to cultivate diversified supply chains, which, for instance, India is experiencing. China's volume-based procurement and similar instruments to control drug prices are also generating interest in other countries, especially in Southeast Asia. Together, these trends could further erode the profit pools that finance US basic research in biotech.

Recommendations for US legislative or administrative action

In as far as this is not already happening, the US could consider steps that aim to reduce the leverage that Chinese policy tools—its Export-Control Law, Biosecurity Law and price-slashing volume-based procurement (VBP)—already give Beijing.[52] Concretely, steps could address three tracks:

- Securing the material base, for instance with tax credits modeled on the CHIPS Act for bioreactors and other biomanufacturing facilities; steps to guarantee minimum on-shore surge capacity of at-risk antibiotics and viral-vector inputs; and a five-year rolling inventory of APIs whose import share from China exceeds 50 percent.
- Closing the legal and data loopholes Beijing exploits, in particular barring federal contracts with firms subject to China's Human Genetic Resources Regulation, which forbids unvetted cross-border sample sharing; and possibly a mandatory supply-chain mapping for every FDA-licensed drug.
- Rebuild the domestic innovation funnel, with Advanced Research Awards earmarked for first-in-class antibiotics and pandemic counter-measures, joint loan guarantees with the EU, Canada and Australia for new CDMOs, and steps to attract and retain global biotech talent, for instance with preferential visas.

To start this, there are a few administrative quick wins, most notably:

- A half yearly "dependency red-list" compiled by the FDA.
- Biennial "China-off" readiness drills—48-hour simulations of a total API export halt.
- Voluntary but auditable cyber-biosecurity standards for private CDMOs, drafted by the National Institute of Standards and Technology (NIST).

Finally, none of these steps aim to sever science links. They are insulation: even if over-reliance never escalates to a crisis, shrinking China's structural price and capacity advantage is the only way to keep US firms profitable enough to fund the next wave of lifesaving drugs—on terms the United States, not Beijing, sets.

52 https://www.gov.cn/xinwen/2020-10/18/content_5552108.htm, https://www.nhsa.gov.cn/art/2024/11/28/art_14_14889.html, https://npcobserver.com/wp-content/uploads/2023/10/2020-Biosecurity-Law_Gazette.pdf