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China’s 2027 innovative drug R&D guidelines set priorities for original innovation and clinical translation

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Over the past decade, multidisciplinary convergence has reshaped drug discovery¹, while China’s pharmaceutical industry has increasingly shifted toward greater emphasis on original innovation². Between 2021 and 2025, the global share of novel molecular entities and new biologics by Chinese pharmaceutical enterprises rose by 4.14 percentage points compared with 2016–2020³, while out-licensing deals involving Chinese innovative drugs reached approximately US\$110 billion in the first half of 2026, accounting for about 80% of the total deal value recorded in 2024⁴. These developments reflect China’s expanding innovative drug research and development (R&D) capacity and international engagement.

Against this backdrop of evolving drug-discovery paradigms and industrial upgrading, the Technology and Education of the National Health Commission of the People’s Republic of China has officially promulgated the 2027 Application Guidelines for the National Science and Technology Major Project on Innovative Drug Research and Development⁵. Closely aligned with the Healthy China strategy and centered on unmet clinical needs, the Guidelines delineate 43 designated research directions through multiple organizational mechanisms, including open competition, targeted merit-based selection, commissioned assignment, and emergency-initiated mechanisms. The framework orchestrates a comprehensive innovation chain spanning chemical drugs, biologics, traditional medicines and ethnic pharmaceuticals, as well as enabling technologies and translational platforms. The Guidelines place particular emphasis on major clinical bottlenecks, including diseases lacking effective therapies, suboptimal therapeutic efficacy, and drug resistance or disease relapses, while spanning disease categories, drug modalities, enabling technologies, and industrial translation. Taken together, these priorities suggest a continued policy emphasis on strengthening original innovation and clinical translation, and may contribute to China’s gradual transition from predominantly follow-on development toward more independently originated drug innovation.

A STRUCTURALLY COHERENT FIVE-DOMAIN R&D FRAMEWORK

The 43 research directions outlined in the Guidelines can be broadly grouped into five functionally interrelated domains, collectively spanning major therapeutic areas, drug modalities, enabling technologies, and clinical translation (Fig. 1).

Oncology and radiotherapeutic targeting modalities

Concentrating on major challenges of resistance and immune evasion, this domain encompasses radionuclide-based therapeutics, refractory hematological malignancies, solid-tumor antibody-drug conjugate (ADC) constructs, and dendritic cell interventions. A differentiated co-funding framework is applied, with selected industry-led projects requiring matching funds of at least 5:1 (non-public to central government funds), while project-specific evaluation indicators include progression to Phase II/III trials or market authorization, reflecting a strong clinical-translation orientation.

Neurological, cardiovascular, cerebrovascular, metabolic, and renal disease agents

Targeting prevalent and difficult-to-treat conditions such as Alzheimer’s disease, Parkinson’s disease, heart failure, ischemic cardiovascular and cerebrovascular diseases, metabolic disorders, and severe kidney diseases, this domain

pursues the development of precision single-target inhibitors and multitarget small molecules, alongside stem-cell-based reparative therapies, gene therapies, and ischemia-reperfusion protective approaches. In selected neurological directions, the Guidelines encourage the co-development of positron emission tomography (PET) molecular imaging probes alongside therapeutic candidates to facilitate the integration of disease subtyping, diagnosis, and targeted intervention.

Infectious disease and emergency countermeasure portfolio

Spanning functional cures for hepatitis B, broad-spectrum antiviral agents, drug-resistant tuberculosis, arboviral diseases, pediatric respiratory viral infections, and the development of new vaccines such as those against serogroup B meningococcal disease, this portfolio includes a dedicated two-year emergency project for Ebola virus. It therefore addresses both sustained therapeutic and preventive development for major infectious diseases and the development of countermeasures against emerging and highly pathogenic infectious threats.

Pediatric and monogenic orphan disease therapeutics

To address areas with substantial unmet therapeutic needs, this domain targets Kawasaki disease, neuroblastoma, and a range of rare and monogenic disorders, including hereditary myopathies, cardiomyopathies, cardiac channelopathies, retinopathies, and lysosomal storage disorders, through approaches including small-molecule development, gene therapy, gene repair, and precision editing. Concurrently, standardized clinical resource repositories and integrated target-discovery platforms for rare diseases are to be established, thereby helping to address the pervasive bottlenecks of limited target identification and insufficient clinical sampling.

Traditional medicines, natural products, and enabling technology platforms

This domain supports innovative traditional medicines development for nephropathy, rheumatic and osteoarticular diseases, respiratory diseases, and gynecological inflammation, alongside polysaccharide-based therapeutics, germplasm conservation for scarce medicinal materials, and bioactive natural-product lead discovery. It also includes pharmaceuticals for special environments, particularly the prevention and treatment of acute and chronic high-altitude diseases. Complementing these efforts, enabling and cutting-edge technologies, including advanced drug delivery systems, AI-assisted natural-product discovery, and general anesthesia recovery agents, are advanced in parallel. Two strategic support platforms are further instituted to address higher-order challenges in translation policy, regulatory science, and industrial internationalization, thus bridging the entire arc from fundamental discovery to institutional and policy infrastructure.

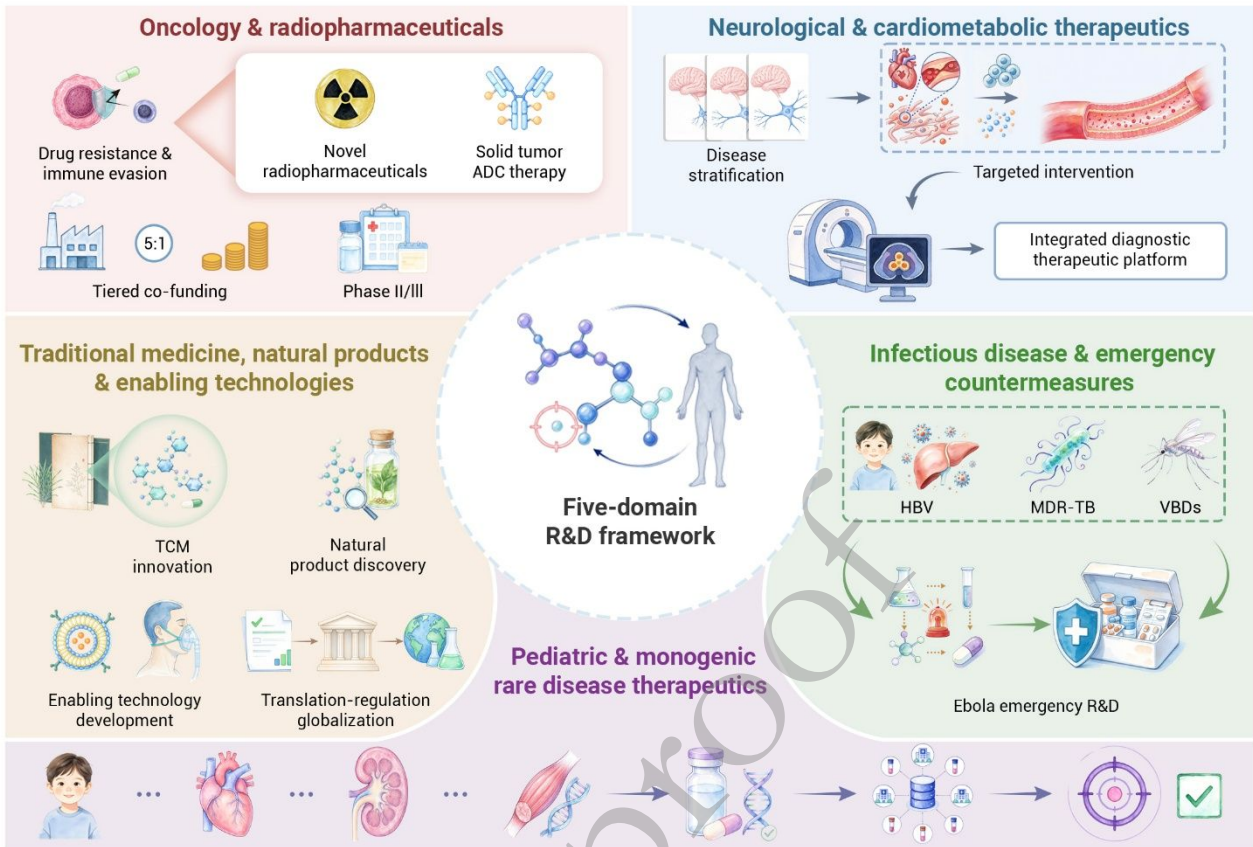


Figure 1 Five major R&D domains synthesized from the research directions of China’s 2027 National Science and Technology Major Project on Innovative Drug Research and Development.

CORE INNOVATION LOGIC AND EMERGING SHIFTS IN R&D PARADIGMS

The Guidelines present a comprehensive strategy that places greater emphasis on original innovation, interdisciplinary integration, differentiated funding, and clinically oriented development, with these four dimensions discussed below.

Novel target and mechanism discovery is prioritized

Many research directions emphasize the identification and validation of novel disease targets and pathogenic mechanisms, leveraging approaches such as multi-omics, single-cell transcriptomics, spatial omics and functional screening. In several directions, new or original targets and mechanisms are explicitly incorporated into the research objectives and evaluation indicators, supporting a stronger orientation toward mechanistically differentiated and, in selected directions, first-in-class innovation.

Interdisciplinary technological convergence supports a new intelligent R&D paradigm

By integrating frontline biotechnologies including targeted protein degradation, gene editing, induced pluripotent stem cell (iPSC) lineage differentiation, organoid modeling, and radionuclide labeling, the Guidelines promote technological integration across multiple stages from molecular design to clinical evaluation. Artificial intelligence (AI) is incorporated across drug discovery and development, including generative molecular design, virtual screening, target prediction, pharmacokinetic evaluation, and imaging-based patient stratification. These AI-enabled approaches complement hypothesis-driven and experimental research and have substantial potential to accelerate drug discovery by improving data integration, predictive modeling, candidate prioritization, and decision-making. Concomitantly, the construction of a genome-wide pan-receptor target bank centered on G protein-coupled receptors (GPCRs)

furnishes a systematic framework for dissecting the multi-component, multi-target synergistic mechanisms inherent in traditional medicine formulae, thereby supporting a shift in traditional medicine development toward more mechanistically validated and target-anchored therapeutics.

A differentiated funding and stratified governance mechanism is deployed

A dual-component financing model combines upfront and post-funding support, while matching-fund requirements vary across project directions. AI-driven and selected oncology biologic projects require a minimum matching ratio of 5:1; many project directions require at least 3:1, while the matching requirements for selected pediatric, natural-product, and strategic-platform projects are moderately relaxed to 2:1 or 1:1. Governance mechanisms also vary across directions, including open competition, targeted competitive selection, and commissioned assignment. Directly commissioned projects are concentrated in recognized centers of excellence, such as the Chinese Academy of Sciences, national medical centers, and leading pharmaceutical enterprises, whereas targeted competitive selection tracks preferentially engage industry consortia with Phase III-ready pipelines. Together, these arrangements reflect differentiated resource allocation and governance across project types and development stages.

A quantitatively defined clinical-milestone accountability system is instituted

Many directions specify discrete and quantitative clinical milestones, including IND approval, progression through Phase I/II/III trials and market authorization as evaluation indicators. For projects evaluated by completion of Phase II/III trials or market approval, post-funding is released upon achievement of the specified milestones. This framework reinforces a continuous evidentiary chain spanning fundamental biology, preclinical pharmacology, human proof-of-concept and later-stage development.

CONCLUSIONS

Viewed collectively, the 43 research directions span five broad R&D domains and reflect a policy-driven shift toward greater original innovation, interdisciplinary convergence, differentiated governance, and clinically oriented drug development. With AI-empowered drug discovery and mechanistic elucidation of traditional medicines, complemented by differentiated resource allocation and stratified governance, the initiative is intended to support a robust portfolio of independently developed innovative therapeutics, including first-in-class candidates. Looking ahead, sustained progress will require robust validation of emerging technologies and AI models, efficient translation of novel mechanisms into clinically meaningful therapeutics, feasible clinical recruitment, and closer coordination across regulatory and commercialization pathways. Overall, the program is expected to strengthen China's end-to-end drug innovation ecosystem and enhance the global competitiveness of Chinese innovative drugs.

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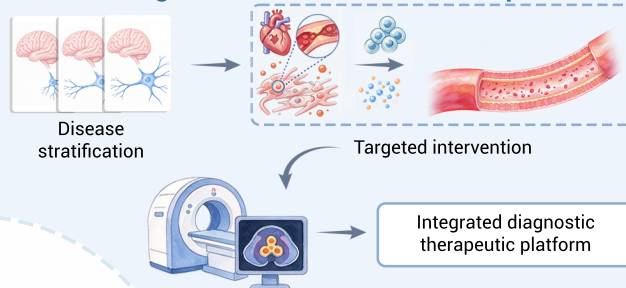
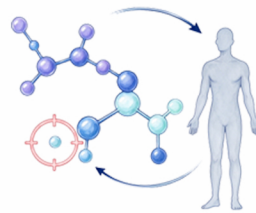
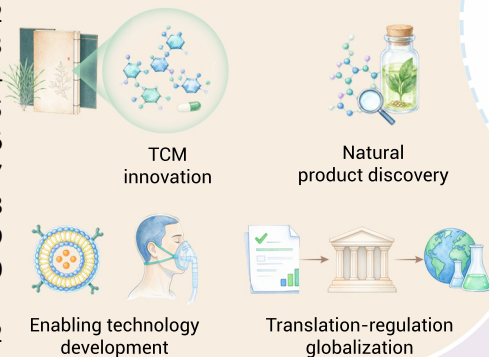
AUTHOR CONTRIBUTIONS

All authors contributed to the manuscript and approved the final version.

DECLARATION OF INTERESTS

The authors declare no conflicts of interest.

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