

Global Circular RNA Drugs Market Growth (Status and Outlook) 2026-2032

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Abstracts

The global Circular RNA Drugs market size is predicted to grow from US\$ 46.96 million in 2025 to US\$ 530 million in 2032; it is expected to grow at a CAGR of 41.0% from 2026 to 2032.

Circular RNA drugs are an emerging class of RNA therapeutics that use engineered circular RNA as the core active ingredient or expression vector. These products are generally developed through sequence design, in vitro transcription, circularization, purification, delivery formulation development, and GMP scale-up manufacturing to form drug candidates. Key application areas include therapeutic vaccines, protein-expression therapies, in vivo CAR-T, cancer immunotherapy, ischemic disease repair, and rare disease treatment. Upstream materials mainly include nucleotide raw materials, modified nucleosides, enzymes, plasmid templates, buffers, chromatography media, single-use bioprocessing consumables, lipid nanoparticle materials, analytical testing reagents, and sterile filling and packaging materials. Downstream customers mainly include innovative pharmaceutical companies, RNA drug platform companies, vaccine companies, CRO/CDMO providers, hospital clinical research centers, and collaborative projects with large pharmaceutical companies.

The current circular RNA drugs market remains at an early stage of clinical translation, with industry activity mainly focused on platform validation, candidate selection, circularization process optimization, delivery system development, and clinical safety evaluation. Compared with traditional small-molecule drugs, antibody drugs, and some commercialized mRNA vaccines, circular RNA drugs have not yet established a large-scale end-market sales model. Company value is still mainly reflected in technology platforms, pipeline progress, patent coverage, collaborative R&D capability, and CMC scale-up capability. At this stage, the number of core global players remains limited,

with major participants concentrated in the United States and China, while European companies are more active in virus-vector-based circular RNA expression and gene therapy-related directions. Overall, the industry remains an emerging field with high R&D intensity, high technical barriers, and significant uncertainty.

Future development will be centered on the transition from platform concept to clinical validation. Early-stage companies have mainly emphasized the theoretical advantages of circular RNA in stability, expression duration, and programmability, while the next phase of competition will focus more on safety, efficacy, immunogenicity control, and dose-response performance in human studies. As more candidates enter clinical development, the industry is expected to gradually form application clusters around therapeutic vaccines, in vivo cell therapy, local tissue repair, protein-expression therapy, and rare disease treatment. At the same time, circularization efficiency, RNA purity, impurity control, tissue selectivity of LNP or other delivery systems, and consistency in GMP scale-up manufacturing will become key factors determining whether a company can evolve from a research platform into a drug developer.

Market growth is mainly driven by the evolution of RNA drug technologies, unmet clinical needs, capital support, large-pharma collaboration, accumulating regulatory experience, and progress in biomanufacturing processes. Compared with linear mRNA, circular RNA may offer a longer expression window and potentially lower dosing frequency, giving it differentiated value in scenarios that require sustained therapeutic protein expression or localized release of functional factors. Cancer immunotherapy, autoimmune diseases, ischemic cardiovascular diseases, rare diseases, and in vivo CAR-T are likely to become important early validation areas. The growing interest of large pharmaceutical companies in next-generation RNA platforms may also support more licensing deals, acquisitions, and co-development programs, providing small and mid-sized platform companies with funding, clinical development resources, and global registration capabilities.

The main barriers lie in the still-evolving technical maturity, clinical validation, and industrialization pathway. Although circular RNA has potential advantages in molecular stability, its in vivo translation efficiency, delivery efficiency, immune response, long-term safety, and controllability of expression across different tissues still require systematic validation. On the manufacturing side, companies also face challenges related to circularization yield, removal of linear RNA and by-products, batch-to-batch consistency, quality standard development, and cost control. Regulatory review pathways for circular RNA drugs are still being shaped, and differences among technical routes may affect clinical filing and quality-control requirements. Therefore,

while the industry has strong long-term growth potential, it is likely to remain R&D-driven in the near term, with significant project differentiation and a high attrition rate.

This report presents a comprehensive overview, market shares, and growth opportunities of Circular RNA Drugs market by product type, application, key players and key regions and countries.

Segmentation by Type:

Protein Expression Therapeutics

Therapeutic Vaccines

Other

Segmentation by Delivery Technology:

Lipid Nanoparticle Delivery

Local Direct Delivery

Other

Segmentation by Route of Administration:

Intravenous Administration

Local Injection

Other

Segmentation by Application:

Pharmaceutical and Biotechnology Companies

Research Institutes

Other

This report also splits the market by region:

United States

China

Europe

Other regions

Japan

South Korea

Southeast Asia

Rest of world

The report also presents the market competition landscape and a corresponding detailed analysis of the major players in the market. The key players covered in this report:

Orna Therapeutics

RiboX Therapeutics

Sail Biomedicines

Chimerna Therapeutics

Torque Bio

Circurna

Shanghai CirCode Biomed

Therorna

Circio Holding

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