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Ligase Market - A Global and Regional Analysis: Focus on Product, Source, Application, End User, and Country - Analysis and Forecast, 2025-2035

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Abstracts

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This report will be delivered in 7-10 working days.Global Ligase Market Industry Overview

The global ligase market is expected to grow at a CAGR of 5.61% during the forecast period from 2025 to 2035. The growth in the global ligase market is expected to be driven by factors such as the increasing prevalence of infectious and genetic diseases on a global level, rising awareness of enzyme based diagnostic testing and significant number of funding for executing research and development.

Market Lifecycle Stage

The global ligase market is progressing rapidly with a significant increase in the research and development activities pertaining to a wide range of ligase product for disease detection, accentuating their criticality in healthcare. Ligase enzyme has a critical role in the molecular diagnostics approach, as it ensures the safe and effective application of targeted therapeutics. Most of the players in the global ligase market offer products encompassing the ligation kits and enzymes.

Increasing investments in the R&D for enzyme-based molecular diagnostics is one of the major opportunities in the ligase market. Several diagnostics and pharmaceutical companies are working collaboratively on drug development and using ligase as a therapeutic means for applications in several disease indications in order to enable

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efficient diagnosis, treatment selection, dosage selection, and treatment monitoring.

Impact

Several techniques are employed in the development of ligase utilization to detect and quantify specific DNA or RNA sequences. This ligase market space has been segmented into applications that includes ligase chain reaction (LCR), ligase detection reaction (LDR), next-generation sequencing (NGS), repeat expansion detection (RED), rolling circle amplification (RCA), proximity ligation assay (PLA), molecular cloning, ligation mediated PCR, mutation detection, and other application such as drug target. Some of these technologies are described briefly as follows:

Ligase chain reaction (LCR): LCR is an amplification process that contrasts with polymerase chain reaction (PCR), which includes a thermostable ligase to join two probes or different particles together, which can then be amplified by standard PCR cycling.

Ligase detection reaction (LDR): LDR is a ligase chain reaction (LCR) dependent methodology which that involves a single pair of complementary probes to one strand of targeted DNA. This technique utilizes a high fidelity based thermostable DNA ligase that can distinguish against the ligation of mismatched probes.

Next-generation sequencing (NGS): In next-generation sequencing, DNA ligase is used to identify the presence of the nucleotide at a specific position in a DNA sequence. The role of this sequencing depends upon the ability of DNA ligase to identify and consolidate bases in an unmistakable way.

Ligation mediated PCR: The process of ligation mediated PCR allows to generate prototypical sequencing templates without subcloning from huge molecules, for example-., amplified yeast artificial chromosomes (YACs).

Market Segmentation:

Segmentation 1: by Product

Quick Ligase

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T4 DNA ligase

E. coli DNA Ligase

Tth DNA Ligase

T4 RNA Ligase

Pfu DNA Ligase

Others

The global ligase market in the products segment is expected to be dominated by T4 DNA ligase. This is due to an increased usage of T4 DNA ligase, and it is the most commonly used ligase type among suppliers offering kits and enzymes to their end users.

Segmentation 2: by Source

Archaebacterium

Escherichia coli

Thermus thermophilus

Pyrococcus furiosus

Others

The global ligase market is dominated by the Escherichia coli source as it is a commonly used ligase to join recombinant ends of molecules before they are introduced into the cell. Products like T4 RNA ligase, T4 DNA ligase, E. coli DNA ligase, and salt T4 DNA ligase are obtained from Escherichia coli in abundance.

Segmentation 3: by Application

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Ligase Chain Reaction (LCR)

Ligase Detection Reaction (LDR)

Next-Generation Sequencing (NGS)

Repeat Expansion Detection (RED)

Rolling Circle Amplification (RCA)

Proximity Ligation Assay (PLA)

Molecular Cloning

Ligation Mediated PCR

Mutation Detection

Others

The molecular cloning process dominates the application segment and NGS is the emerging diagnostic application in the global ligase market. The increase in the utilization of this procedure is due to various cloning techniques that have been created that fall under molecular cloning to improve the ease and speed at which DNA fragments can be recombined.

Segmentation 4: by End User

Research Laboratories and Institutions

Pharmaceutical and Biopharmaceutical Companies

Diagnostic Laboratories

Others

The research laboratories and institutions dominate the end-user segment in the global

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ligase market as research laboratories, particularly are most involved in carrying out the research studies that are focused on the identification of understanding the diagnostic application of ligase enzyme.

Recent Developments in Global Ligase Market

In January 2022, ArcticZymes Technologies launched new products such as ArcticZymes R2DTM Ligase, IsoPol BST+ High Concentration Glycerol FREE and M-SAN HQ ELISA Kit and M-SAN HQ

In April 2022, Codexis, Inc. and Molecular Assemblies, Inc., partnered to engineer enzymes and deliver differentiated and cost-effective solutions for the enzymatic synthesis of DNA.

In May 2022, QIAGEN acquired majority stake of 96% in BLIRT e.u.., a manufacturer of recombinant enzymes for the life science industry based in Gdansk, Poland. The acquisition was carried out to bring companies capabilities to create additional growth prospects to their enzymes and reagents business.

In July 2021, Merck invested $282.5 million at its global headquarters in Darmstadt. Company is involved in building a new translational science center for its healthcare business sector as well as a new learning center.

Demand – Drivers and Limitations

Following are the demand drivers for the global ligase market:

Growing need for Ligases in Disease Treatment

Rising Incidence of Diseases such as Cancer and Genetic Disorders

Rising Focus of Researchers on Non-Toxic Biocatalyst

The market is expected to face some limitations too due to the following challenges:

High Reception Costs Involving Small and Medium Enterprises

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Variation in the Ability of Ligase to Repair

How Can This Report Add Value to an Organization?

Product/Innovation Strategy: The report considers ligase kits and enzymes both from the product-based companies. These companies are actively involved in undertaking significant business strategies to translate success in research and development into the commercial clinical setting.

Growth/Marketing Strategy: Owing to the explosion of massively parallel sequencing and its applications, all areas of healthcare have been affected, particularly enzyme-based molecular diagnostics. The key components in the ligase market consists of diverse range of ligase-based products and ligation kits, generally purchased by the testing companies and the testing services themselves. The entire workflow is well explained in the report along with pricing analysis considering the applications that are used in testing.

Competitive Strategy: Key players in the global ligase market analysed and profiled in the study, consisting of both products-based companies as well as few emerging companies. Moreover, a detailed competitive benchmarking of the players operating in the global ligase market has been done to help the reader understand how players stack against each other, presenting a clear market landscape. Additionally, comprehensive competitive strategies such as partnerships, agreements, and collaborations will aid the reader in understanding the untapped revenue pockets in the market.

Key Market Players and Competition Synopsis

The companies that are profiled have been selected based on inputs gathered from primary experts and analyzing company coverage, product portfolio, and market penetration.

The leading top segment players include ligase enzyme manufacturers that offers major products such as T4 DNA ligase, and E.coli DNA ligase, quick ligase, Pfu DNA ligase, T4 RNA ligase in the market.

Some of the prominent names established in this market are:

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Agilent Technologies, Inc.

ArcticZymes Technologies ASA

BD

Bio-Rad Laboratories, Inc.

Codexis, Inc.

F. Hoffmann-La Roche Ltd.

Merck KGaA

New England Biolabs (UK) Ltd.

Promega Corporation

QIAGEN N.V.

SBS Genetech

Takara Bio Inc.

Thermo Fisher Scientific, Inc.

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Contents

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4. GLOBAL LIGASE MARKET (BY PRODUCT TYPE), ($MILLION), 2023-2035

4.1 Overview
4.2 Quick Ligase
4.3 T4 DNA Ligase
4.4 E. coli DNA Ligase
4.5 Tth DNA Ligase
4.6 T4 RNA Ligase
4.7 Pfu DNA Ligase
4.8 Others

5. GLOBAL LIGASE MARKET (BY SOURCE TYPE), ($MILLION), 2023-2035

5.1 Overview
5.2 Archaebacterium
5.3 Escherichia coli
5.4 Thermus thermophilus
5.5 Pyrococcus furiosus
5.6 Others

6. GLOBAL LIGASE MARKET (BY APPLICATION), ($MILLION), 2023-2035

6.1 Overview
6.2 Ligase Chain Reaction (LCR)
6.3 Ligase Detection Reaction (LDR)
6.4 Next-Generation Sequencing (NGS)
6.5 Repeat Expansion Detection (RED)
6.6 Rolling Circle Amplification (RCA)
6.7 Proximity Ligation Assay (PLA)
6.8 Molecular Cloning
6.9 Ligation Mediated PCR
6.10 Mutation Detection
6.11 Others

7. GLOBAL LIGASE MARKET (BY END USER), ($MILLION), 2023-2035

7.1 Overview
7.2 Research Laboratories and Institutions

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8. GLOBAL LIGASE MARKET (BY REGION), ($MILLION), 2023-2035

9. COMPANY PROFILES

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List Of Figures

LIST OF FIGURES

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List Of Tables

LIST OF TABLES

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