

# Ligase Enzymes Market by Type (DNA, RNA), Source (Viral, Bacterial, Eukaryotic), Grade (RUO, GMP, Diagnostic), Molecular Biology Workflow (Cloning, Sequencing, Synthetic Biology), Application (Research, Diagnostic, Therapeutic) - Global Forecast 2030

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## Abstracts

The ligase enzymes market is expected to reach USD 0.36 billion in 2030 from USD 0.26 billion in 2025, at a CAGR of 6.8% during the forecast period. The growth of the ligase enzymes market is driven by the rising adoption of genomics and next-generation sequencing (NGS), the expansion of molecular diagnostics and personalized medicine, and the increasing use of synthetic biology. Ligases play a central role in NGS workflows by enabling adapter ligation & library construction, making them indispensable in large-scale genomics projects and precision medicine initiatives. Its growing application in molecular diagnostics and precision medicine is also expected to fuel the market growth.

By grade, the GMP-grade ligase enzymes segment is projected to register the highest CAGR during the forecast period.

By grade, the ligase enzymes market is segmented into Research Use Only (RUO), GMP-grade, and diagnostic-grade ligase enzymes. The GMP-grade ligase enzymes segment is expected to grow at the highest CAGR during the forecast period. The growth is supported by the rising demand for GMP-grade ligase enzymes in therapeutic manufacturing, gene therapy, and clinical applications where compliance with stringent quality and safety standards is essential. The increasing investments in cell & gene therapies, biopharmaceutical production, and diagnostic assay development are also

expected to fuel the market growth.

By source, the viral sources segment accounted for the largest share of the market in 2024.

Based on the source, the ligase enzymes market is segmented into viral, bacterial, archaeal, and eukaryotic sources. In 2024, the viral ligases segment accounted for the largest market share owing to its high adoption in applications such as molecular biology workflows, particularly in cloning, DNA repair studies, and next-generation sequencing (NGS) library preparation. Viral ligases, such as T4 DNA ligase, are considered industry standards because of their high efficiency in catalyzing the joining of DNA fragments, making them indispensable in research & industrial biotechnology.

By region, the Asia Pacific market is projected to grow at the highest CAGR during the forecast period.

By region, the market is segmented into North America, Europe, the Asia Pacific, Latin America, the Middle East, and Africa. The Asia Pacific region is projected to grow at the highest CAGR during the forecast period owing to the increasing investments in genomics research, expansion in biotechnology & pharmaceutical industries, and the rising focus on precision medicine. China, Japan, South Korea, and India are significantly scaling up their R&D capabilities through government funding, public-private partnerships, and international collaborations, creating strong demand for molecular biology tools, including ligase enzymes. The growing adoption of next-generation sequencing (NGS), synthetic biology, and molecular diagnostics for cancer, infectious diseases, and rare genetic disorders further supports market expansion.

The primary interviews conducted for this report can be categorized as follows:

By Company Type: Tier 1- 44%, Tier 2- 32%, and Tier 3- 24%

By Designation: (Managers)- 45%, (CXOs, Directors)- 30%, and (Executives)- 25%

By Region: North America- 40%, Europe- 25%, Asia Pacific- 20%, and the Rest of the World- 15%

Promega Corporation (US), New England Biolabs (UK), Thermo Fisher Scientific Inc.

(US), QIAGEN (Netherlands), and Takara Bio Inc. (Japan) are some of the key players in the ligase enzymes market.

The study includes an in-depth competitive analysis of these key players in the ligase enzymes market and their company profiles, recent developments, and key market strategies.

### **Research Coverage:**

This research report categorizes the ligase enzymes market by type (DNA, RNA, other ligases), by source (viral, bacterial, archaeal, eukaryotic), by grade (RUO, GMP, diagnostic), by molecular biology workflow (cloning & mutagenesis, synthetic biology, sequencing, nucleic acid amplification), by application (research, diagnostic, therapeutic development & manufacturing, other applications), by end user (academic & research institutes, pharmaceutical and biotechnology companies, hospital & diagnostic laboratories, medical device companies), and by region (North America, Europe, Asia Pacific, Latin America, Middle East, and Africa).

The report provides in-depth information on significant factors influencing the growth of the ligase enzymes market, including drivers, trends, challenges, and opportunities. A thorough analysis of leading industry players has been undertaken to provide insights into their business profiles, products, key strategies, collaborations, partnerships, and agreements. Additionally, the report encompasses recent developments such as new product launches and acquisitions within the ligase enzyme market.

### **Key Benefits of Buying the Report:**

The report will help market leaders/new entrants by providing the closest approximations of the revenue numbers for the ligase enzyme market and its subsegments. It will also help stakeholders better understand the competitive landscape & gain more insights to position their business better and make suitable go-to-market strategies. This report will enable stakeholders to understand the market's pulse and provide them with information on the key market drivers, restraints, opportunities, and challenges.

### **The report provides insights into the following pointers:**

Analysis of key drivers (rising genomics & NGS activities, growth of molecular diagnostics & personalized medicine, and increasing use in synthetic biology),

restraints (dependency on research funding), opportunities (development of thermostable/performance-engineered ligases, development of lyophilized/shelf-stable ligases for point-of-care testing and low-resource markets), and challenges (batch-to-batch variability & quality control, growing adoption of ligase independent cloning) influencing the growth of the market.

**Product Development/Innovation:** Detailed insights on newly launched products of the ligase enzyme market

**Market Development:** Comprehensive information about lucrative markets - the report analyses the market across varied regions.

**Market Diversification:** Exhaustive information about new products, untapped geographies, recent developments, and investments in the ligase enzyme market

**Competitive Assessment:** In-depth assessment of market share, growth strategies of leading players like New England Biolabs (UK), Danaher Corporation (US), Thermo Fisher Scientific Inc. (US), QIAGEN (Netherlands), and Promega Corporation (US), among others, in the ligase enzymes market.

## Contents

### 1 INTRODUCTION

- 1.1 STUDY OBJECTIVES
- 1.2 MARKET DEFINITION
- 1.3 STUDY SCOPE
  - 1.3.1 MARKET SEGMENTATION & REGIONAL SCOPE
  - 1.3.2 INCLUSIONS & EXCLUSIONS
  - 1.3.3 YEARS CONSIDERED
  - 1.3.4 CURRENCY CONSIDERED
- 1.4 STAKEHOLDERS

### 2 RESEARCH METHODOLOGY

- 2.1 RESEARCH DATA
  - 2.1.1 SECONDARY DATA
  - 2.1.2 PRIMARY DATA
- 2.2 MARKET ESTIMATION METHODOLOGY
  - 2.2.1 GLOBAL MARKET SIZE ESTIMATION, 2024
  - 2.2.2 SEGMENTAL MARKET ASSESSMENT
- 2.3 MARKET GROWTH RATE PROJECTIONS
- 2.4 DATA TRIANGULATION
- 2.5 RESEARCH ASSUMPTIONS
- 2.6 RESEARCH LIMITATIONS
- 2.7 RISK ASSESSMENT

### 3 EXECUTIVE SUMMARY

- 3.1 KEY INSIGHTS & MARKET HIGHLIGHTS
- 3.2 STRATEGIC IMPERATIVES FOR STAKEHOLDERS IN LIGASE ENZYMES MARKET
- 3.3 DISRUPTIVE TRENDS SHAPING LIGASE ENZYMES MARKET
- 3.4 HIGH-GROWTH SEGMENTS & EMERGING FRONTIERS

### 4 PREMIUM INSIGHTS

- 4.1 GLOBAL LIGASE ENZYMES MARKET SNAPSHOT
- 4.2 NORTH AMERICA: LIGASE ENZYMES MARKET, BY TYPE AND COUNTRY

(2024)

4.3 LIGASE ENZYMES MARKET, BY TYPE (2024)

4.4 LIGASE ENZYMES MARKET, BY END USER (2024)

4.5 LIGASE ENZYMES MARKET: GEOGRAPHIC GROWTH OPPORTUNITIES

4.6 UNMET NEEDS & WHITE SPACES

4.7 STRATEGIC ANALYSIS OF GROWTH OPPORTUNITIES

4.7.1 STRATEGIC ANALYSIS OF GROWTH OPPORTUNITIES

4.8 EMERGING BUSINESS MODELS & ECOSYSTEM SHIFTS

4.9 SUSTAINABILITY IMPACT & REGULATORY POLICY INITIATIVES

## **5 MARKET OVERVIEW**

5.1 INTRODUCTION

5.2 MARKET DYNAMICS

5.2.1 DRIVERS

5.2.1.1 Rising genomics & NGS activity

5.2.1.2 Growth of molecular diagnostics & personalized medicine

5.2.1.3 Growing use in synthetic biology

5.2.2 RESTRAINTS

5.2.2.1 Dependence on research funding

5.2.3 OPPORTUNITIES

5.2.3.1 Development of thermostable/performance-engineered ligases

5.2.3.2 Development of lyophilized/shelf-stable ligases for point-of-care testing

(POCT) and low-resource markets

5.2.4 CHALLENGES

5.2.4.1 Batch-to-batch variability & quality control

5.2.4.2 Growth in adoption of sequence and ligase-independent cloning (SLIC)

## **6 INDUSTRY TRENDS**

6.1 TRENDS/DISRUPTIONS IMPACTING CUSTOMERS' BUSINESSES

6.1.1 SHIFT TOWARD HIGH-THROUGHPUT & AUTOMATED WORKFLOWS

6.1.2 EXPANSION OF LIGASE APPLICATIONS IN RAPID & POINT-OF-CARE TESTING

6.2 VALUE CHAIN ANALYSIS

6.3 ECOSYSTEM ANALYSIS

6.4 TECHNOLOGY ANALYSIS

6.4.1 KEY TECHNOLOGIES

6.4.1.1 Precision fermentation

- 6.4.1.2 Enzyme engineering & protein design
- 6.4.2 COMPLEMENTARY TECHNOLOGIES
  - 6.4.2.1 Chromatography & purification technologies
  - 6.4.2.2 Cryopreservation & stabilization technologies
- 6.5 PATENT ANALYSIS
  - 6.5.1 METHODOLOGY
  - 6.5.2 PATENTS APPLIED & GRANTED, 2014–2024
- 6.6 TRADE ANALYSIS
  - 6.6.1 IMPORT DATA (HS CODE 350790)
  - 6.6.2 EXPORT DATA (HS CODE 350790)
- 6.7 PORTER'S FIVE FORCES ANALYSIS
  - 6.7.1 THREAT OF NEW ENTRANTS
  - 6.7.2 THREAT OF SUBSTITUTES
  - 6.7.3 BARGAINING POWER OF SUPPLIERS
  - 6.7.4 BARGAINING POWER OF BUYERS
  - 6.7.5 INTENSITY OF COMPETITIVE RIVALRY
- 6.8 TARIFF & REGULATORY LANDSCAPE
  - 6.8.1 TARIFF DATA (HS CODE 350790)
  - 6.8.2 REGULATORY BODIES, GOVERNMENT AGENCIES, AND OTHER ORGANIZATIONS
  - 6.8.3 REGULATORY FRAMEWORK
- 6.9 PRICING ANALYSIS
  - 6.9.1 AVERAGE SELLING PRICE TREND OF LIGASE ENZYMES, BY KEY PLAYER, 2022–2024
  - 6.9.2 AVERAGE SELLING PRICE OF LIGASE ENZYMES, BY REGION, 2024
- 6.10 KEY CONFERENCES & EVENTS, 2025–2026
- 6.11 KEY STAKEHOLDERS & BUYING CRITERIA
  - 6.11.1 KEY STAKEHOLDERS IN BUYING PROCESS
  - 6.11.2 ROLE OF STAKEHOLDERS IN BUYING PROCESS
  - 6.11.3 BUYING CRITERIA
- 6.12 INVESTMENT & FUNDING SCENARIO
- 6.13 IMPACT OF AI/GENERATIVE AI ON LIGASE ENZYMES MARKET
  - 6.13.1 AI USE CASES
  - 6.13.2 KEY COMPANIES IMPLEMENTING AI
  - 6.13.3 FUTURE OF AI
- 6.14 IMPACT OF 2025 US TARIFFS ON LIGASE ENZYMES MARKET
  - 6.14.1 INTRODUCTION
  - 6.14.2 KEY TARIFF RATES
  - 6.14.3 PRICE IMPACT ANALYSIS

#### 6.14.4 IMPACT ON COUNTRY/REGION

6.14.4.1 US

6.14.4.2 Europe

6.14.4.3 Asia Pacific

#### 6.14.5 END-USE INDUSTRY IMPACT

6.14.5.1 Pharmaceutical & biotechnology companies

6.14.5.2 Medical device companies

6.14.5.3 Academic & research institutes

6.14.5.4 Hospitals & diagnostic laboratories

### **7 LIGASE ENZYMES MARKET, BY TYPE**

#### 7.1 INTRODUCTION

#### 7.2 DNA LIGASES

7.2.1 HIGH ADOPTION OF DNA LIGASES TO SUPPORT MARKET GROWTH

#### 7.3 RNA LIGASES

7.3.1 GROWING ADOPTION OF RNA SEQUENCING AND DEVELOPMENT IN RNA THERAPEUTICS TO DRIVE MARKET GROWTH

#### 7.4 OTHER LIGASES

### **8 LIGASE ENZYMES MARKET, BY SOURCE**

#### 8.1 INTRODUCTION

#### 8.2 VIRAL LIGASES

8.2.1 WIDE COMMERCIAL USE OF VIRAL LIGASES BY COMPANIES TO SUPPORT MARKET GROWTH

#### 8.3 BACTERIAL LIGASES

8.3.1 HIGH SPECIFICITY AND COMPATIBILITY OF BACTERIAL LIGASES WITH CERTAIN APPLICATIONS TO SUPPORT MARKET GROWTH

#### 8.4 EUKARYOTIC LIGASES

8.4.1 EXPANDING ROLE OF EUKARYOTIC LIGASES IN DNA REPAIR ASSAYS AND CRISPR-MEDIATED GENOME EDITING TO BOOST MARKET

#### 8.5 ARCHAEAL LIGASES

8.5.1 RISING DEMAND FOR HIGH-TEMPERATURE LIGATION METHODS IN PCR CLONING TO FUEL GROWTH

### **9 LIGASE ENZYMES MARKET, BY GRADE**

#### 9.1 INTRODUCTION

## 9.2 RUO-GRADE LIGASES

9.2.1 LOW COST OF RUO-GRADE LIGASE ENZYMES TO SUPPORT MARKET GROWTH

## 9.3 GMP-GRADE LIGASES

9.3.1 GROWING PIPELINE FOR DNA AND RNA-BASED THERAPEUTICS TO SUPPORT MARKET GROWTH

## 9.4 DIAGNOSTIC-GRADE LIGASES

9.4.1 CONTINUOUS PRODUCT INNOVATION TO POSITION DIAGNOSTIC-GRADE LIGASES AS HIGH-OPPORTUNITY GROWTH SEGMENT

# 10 LIGASE ENZYMES MARKET, BY MOLECULAR BIOLOGY WORKFLOW

## 10.1 INTRODUCTION

### 10.2 CLONING & MUTAGENESIS

10.2.1 WIDE ADOPTION OF CLONING TECHNIQUES TO SUPPORT MARKET GROWTH

### 10.3 SYNTHETIC BIOLOGY

10.3.1 GROWING EXPANSION OF SYNTHETIC BIOLOGY IN HEALTHCARE TO DRIVE MARKET GROWTH

### 10.4 SEQUENCING

10.4.1 INCREASING DEMAND FOR LARGE-SCALE GENOME PROJECTS TO BOOST MARKET GROWTH

### 10.5 NUCLEIC ACID AMPLIFICATION

10.5.1 GROWING DEMAND FOR RAPID, ACCURATE, AND COST-EFFECTIVE MOLECULAR DIAGNOSTICS TO SUPPORT MARKET GROWTH

# 11 LIGASE ENZYMES MARKET, BY APPLICATION

## 11.1 INTRODUCTION

### 11.2 RESEARCH APPLICATIONS

11.2.1 GROWING RESEARCH STUDIES TO SUPPORT MARKET GROWTH

### 11.3 DIAGNOSTIC APPLICATIONS

11.3.1 GROWING DEMAND FOR MOLECULAR DIAGNOSTICS AND PERSONALIZED MEDICINE TO SUPPORT MARKET GROWTH

### 11.4 THERAPEUTIC DEVELOPMENT & MANUFACTURING

11.4.1 GROWING DEMAND FOR GMP-GRADE ENZYMES IN LARGE-SCALE MANUFACTURING TO PROPEL MARKET GROWTH

### 11.5 OTHER APPLICATIONS

## **12 LIGASE ENZYMES MARKET, BY END USER**

### 12.1 INTRODUCTION

### 12.2 ACADEMIC & RESEARCH INSTITUTES

#### 12.2.1 GROWING RESEARCH STUDIES TO SUPPORT MARKET GROWTH

### 12.3 PHARMACEUTICAL & BIOTECHNOLOGY COMPANIES

#### 12.3.1 GROWING DEMAND FOR PERSONALIZED MEDICINE TO BOOST MARKET GROWTH

### 12.4 HOSPITALS & DIAGNOSTIC LABORATORIES

#### 12.4.1 GROWING INTEGRATION OF LIGASE-BASED MOLECULAR DIAGNOSTIC TESTS INTO ROUTINE CARE TO SUPPORT MARKET GROWTH

### 12.5 MEDICAL DEVICE COMPANIES

#### 12.5.1 GROWING FOCUS ON RAPID, RELIABLE, AND USER-FRIENDLY DIAGNOSTIC DEVICES TO FUEL GROWTH

## **13 LIGASE ENZYMES MARKET, BY REGION**

### 13.1 INTRODUCTION

### 13.2 NORTH AMERICA

#### 13.2.1 MACROECONOMIC OUTLOOK FOR NORTH AMERICA

#### 13.2.2 US

##### 13.2.2.1 Increasing R&D investments and funding to drive market

#### 13.2.3 CANADA

##### 13.2.3.1 Supportive government policies to propel market growth

### 13.3 EUROPE

#### 13.3.1 MACROECONOMIC OUTLOOK FOR EUROPE

#### 13.3.2 GERMANY

##### 13.3.2.1 Strong healthcare infrastructure and government-backed genomics initiatives to support market

#### 13.3.3 UK

##### 13.3.3.1 Growing adoption of genomics and presence of advanced research infrastructure to drive demand

#### 13.3.4 FRANCE

##### 13.3.4.1 Growing government funding for R&D to propel market

#### 13.3.5 ITALY

##### 13.3.5.1 Growing research funding to drive market growth

#### 13.3.6 SPAIN

##### 13.3.6.1 Increasing number of biotechnology companies to drive demand

#### 13.3.7 REST OF EUROPE

## 13.4 ASIA PACIFIC

### 13.4.1 MACROECONOMIC OUTLOOK FOR ASIA PACIFIC

### 13.4.2 CHINA

#### 13.4.2.1 Increasing R&D expenditure to support market growth

### 13.4.3 JAPAN

13.4.3.1 Advanced biotechnology industry and strong research base to support market growth

### 13.4.4 INDIA

13.4.4.1 Growing government support in evolving biotechnology sector to boost market

### 13.4.5 SOUTH KOREA

#### 13.4.5.1 Increasing government support to boost market

### 13.4.6 AUSTRALIA

#### 13.4.6.1 Growing biotechnology sector to boost demand

### 13.4.7 REST OF ASIA PACIFIC

## 13.5 LATIN AMERICA

### 13.5.1 MACROECONOMIC OUTLOOK FOR LATIN AMERICA

### 13.5.2 BRAZIL

#### 13.5.2.1 Rising focus on biotechnology industry to support market

### 13.5.3 MEXICO

#### 13.5.3.1 Government support for biopharmaceutical production to drive market

### 13.5.4 REST OF LATIN AMERICA

## 13.6 MIDDLE EAST

### 13.6.1 MACROECONOMIC OUTLOOK IN MIDDLE EAST

### 13.6.2 GCC COUNTRIES

#### 13.6.2.1 Saudi Arabia

##### 13.6.2.1.1 Increasing investments in genomics to drive market

#### 13.6.2.2 United Arab Emirates

##### 13.6.2.2.1 Advancements in biopharmaceutical sector to drive demand

#### 13.6.2.3 Rest of GCC Countries

### 13.6.3 REST OF MIDDLE EAST

## 13.7 AFRICA

13.7.1 GROWING FUNDING FOR SUPPORTING RESEARCH INFRASTRUCTURE TO DRIVE MARKET

### 13.7.2 MACROECONOMIC OUTLOOK FOR AFRICA

## 14 COMPETITIVE LANDSCAPE

### 14.1 OVERVIEW

- 14.2 KEY PLAYER STRATEGIES/RIGHT TO WIN, 2021–2025
- 14.3 REVENUE ANALYSIS, 2020–2024
- 14.4 MARKET SHARE ANALYSIS, 2024
- 14.5 COMPANY EVALUATION MATRIX: KEY PLAYERS, 2024
  - 14.5.1 STARS
  - 14.5.2 EMERGING LEADERS
  - 14.5.3 PERVASIVE PLAYERS
  - 14.5.4 PARTICIPANTS
  - 14.5.5 COMPANY FOOTPRINT: KEY PLAYERS, 2024
    - 14.5.5.1 Company footprint
    - 14.5.5.2 Region footprint
    - 14.5.5.3 Type footprint
    - 14.5.5.4 Source footprint
    - 14.5.5.5 Application footprint
- 14.6 COMPANY EVALUATION MATRIX: STARTUPS/SMES, 2024
  - 14.6.1 PROGRESSIVE COMPANIES
  - 14.6.2 RESPONSIVE COMPANIES
  - 14.6.3 DYNAMIC COMPANIES
  - 14.6.4 STARTING BLOCKS
  - 14.6.5 COMPETITIVE BENCHMARKING: STARTUPS/SMES, 2024
    - 14.6.5.1 Detailed list of key startups/SMEs
    - 14.6.5.2 Competitive benchmarking of key startups/SMEs
- 14.7 COMPANY VALUATION & FINANCIAL METRICS
  - 14.7.1 FINANCIAL METRICS
  - 14.7.2 COMPANY VALUATION
- 14.8 BRAND/PRODUCT COMPARISON
  - 14.8.1 BRAND/PRODUCT COMPARATIVE ANALYSIS
- 14.9 COMPETITIVE SCENARIO
  - 14.9.1 DEALS

## **15 COMPANY PROFILES**

- 15.1 KEY PLAYERS
  - 15.1.1 NEW ENGLAND BIOLABS
    - 15.1.1.1 Business overview
    - 15.1.1.2 Products offered
    - 15.1.1.3 MnM view
      - 15.1.1.3.1 Key strengths
      - 15.1.1.3.2 Strategic choices

- 15.1.1.3.3 Weaknesses & competitive threats
- 15.1.2 THERMO FISHER SCIENTIFIC INC.
  - 15.1.2.1 Business overview
  - 15.1.2.2 Products offered
  - 15.1.2.3 MnM view
    - 15.1.2.3.1 Key strengths
    - 15.1.2.3.2 Strategic choices
    - 15.1.2.3.3 Weaknesses & competitive threats
- 15.1.3 QIAGEN N.V.
  - 15.1.3.1 Business overview
  - 15.1.3.2 Products offered
  - 15.1.3.3 MnM view
    - 15.1.3.3.1 Key strengths
    - 15.1.3.3.2 Strategic choices
    - 15.1.3.3.3 Weaknesses & competitive threats
- 15.1.4 PROMEGA CORPORATION
  - 15.1.4.1 Business overview
  - 15.1.4.2 Products offered
  - 15.1.4.3 MnM view
    - 15.1.4.3.1 Key strengths
    - 15.1.4.3.2 Strategic choices
    - 15.1.4.3.3 Weaknesses & competitive threats
- 15.1.5 TAKARA BIO INC.
  - 15.1.5.1 Business overview
  - 15.1.5.2 Products offered
  - 15.1.5.3 MnM view
    - 15.1.5.3.1 Key strengths
    - 15.1.5.3.2 Strategic choices
    - 15.1.5.3.3 Weaknesses & competitive threats
- 15.1.6 DANAHER CORPORATION
  - 15.1.6.1 Business overview
  - 15.1.6.2 Products offered
  - 15.1.6.3 MnM view
    - 15.1.6.3.1 Key strengths
    - 15.1.6.3.2 Strategic choices
    - 15.1.6.3.3 Weaknesses & competitive threats
- 15.1.7 AGILENT TECHNOLOGIES, INC.
  - 15.1.7.1 Business overview
  - 15.1.7.2 Products offered

- 15.1.8 F. HOFFMANN-LA ROCHE LTD.
  - 15.1.8.1 Business overview
  - 15.1.8.2 Products offered
  - 15.1.8.3 Recent developments
    - 15.1.8.3.1 Deals
- 15.1.9 MERCK KGAA
  - 15.1.9.1 Business overview
  - 15.1.9.2 Products offered
- 15.1.10 ARCTICZYMES TECHNOLOGIES
  - 15.1.10.1 Business overview
  - 15.1.10.2 Products offered
- 15.1.11 BIOSYNTH
  - 15.1.11.1 Business overview
  - 15.1.11.2 Products offered
- 15.1.12 HIMEDIA LABORATORIES
  - 15.1.12.1 Business overview
  - 15.1.12.2 Products offered
- 15.1.13 LGC BIOSEARCH TECHNOLOGIES
  - 15.1.13.1 Business overview
  - 15.1.13.2 Products offered
- 15.1.14 INSPIRALIS LIMITED
  - 15.1.14.1 Business overview
  - 15.1.14.2 Products offered
- 15.1.15 BIONEER CORPORATION
  - 15.1.15.1 Business overview
  - 15.1.15.2 Products offered
- 15.2 OTHER PLAYERS
  - 15.2.1 GENO TECHNOLOGY INC.
  - 15.2.2 MBR, INC.
  - 15.2.3 ABCLONAL, INC.
  - 15.2.4 NZYTECH
  - 15.2.5 JENA BIOSCIENCE GMBH
  - 15.2.6 CREATIVE ENZYMES.
  - 15.2.7 ENZYNOMICS CO., LTD.
  - 15.2.8 BIOCAT GMBH
  - 15.2.9 GENAXXON BIOSCIENCE
  - 15.2.10 MERIDIAN BIOSICENCE
  - 15.2.11 CANVAX
  - 15.2.12 BIOTECHRABBIT

15.2.13 MCLAB

## **16 APPENDIX**

16.1 DISCUSSION GUIDE

16.2 KNOWLEDGESTORE: MARKETSANDMARKETS' SUBSCRIPTION PORTAL

16.3 CUSTOMIZATION OPTIONS

16.4 RELATED REPORTS

16.5 AUTHOR DETAILS

## List Of Tables

### LIST OF TABLES

TABLE 1 LIGASE ENZYMES MARKET: INCLUSIONS & EXCLUSIONS

TABLE 2 IMPACT ANALYSIS OF SUPPLY-SIDE AND DEMAND-SIDE FACTORS

TABLE 3 LIGASE ENZYMES MARKET: RISK ASSESSMENT ANALYSIS

TABLE 4 LIGASE ENZYMES MARKET: STRATEGIC ANALYSIS OF GROWTH OPPORTUNITIES

TABLE 5 LIGASE ENZYMES MARKET: EMERGING BUSINESS MODELS & TARGET SEGMENTS

TABLE 6 LIGASE ENZYMES MARKET: IMPACT ANALYSIS

TABLE 7 LIGASE ENZYMES MARKET: RAW MATERIAL VENDORS

TABLE 8 PATENTS APPLIED & GRANTED, 2014–2024

TABLE 9 INNOVATIONS & PATENT REGISTRATIONS, 2024

TABLE 10 IMPORT VALUE OF HS CODE 350790-COMPLIANT PRODUCTS FOR TOP 20 COUNTRIES, 2020–2024 (USD THOUSAND)

TABLE 11 IMPORT VOLUME FOR HS CODE 350790-COMPLIANT PRODUCTS FOR TOP 20 COUNTRIES, 2020–2024 (TONS)

TABLE 12 EXPORT VALUE OF HS CODE 350790-COMPLIANT PRODUCTS FOR TOP 20 COUNTRIES, 2020–2024 (USD THOUSAND)

TABLE 13 EXPORT VOLUME FOR HS CODE 350790-COMPLIANT PRODUCTS FOR TOP 20 COUNTRIES, 2020–2024 (TONS)

TABLE 14 LIGASE ENZYMES MARKET: PORTER'S FIVE FORCES ANALYSIS

TABLE 15 NORTH AMERICA: REGULATORY BODIES, GOVERNMENT AGENCIES, AND OTHER ORGANIZATIONS

TABLE 16 EUROPE: REGULATORY BODIES, GOVERNMENT AGENCIES, AND OTHER ORGANIZATIONS

TABLE 17 ASIA PACIFIC: REGULATORY BODIES, GOVERNMENT AGENCIES, AND OTHER ORGANIZATIONS

TABLE 18 REST OF THE WORLD: REGULATORY BODIES, GOVERNMENT AGENCIES, AND OTHER ORGANIZATIONS

TABLE 19 LIGASE ENZYMES MARKET: REGULATORY GUIDELINES

TABLE 20 AVERAGE SELLING PRICE TREND OF LIGASE ENZYMES, BY KEY PLAYER, 2022–2024

TABLE 21 AVERAGE SELLING PRICE OF LIGASE ENZYMES, BY REGION, 2024 (USD)

TABLE 22 LIGASE ENZYMES MARKET: KEY CONFERENCES & EVENTS, 2025–2026

TABLE 23 INFLUENCE OF KEY STAKEHOLDERS ON BUYING PROCESS FOR

**LIGASE ENZYMES**

TABLE 24 BUYING CRITERIA FOR LIGASE ENZYMES, BY END USER

TABLE 25 KEY COMPANIES IMPLEMENTING AI IN LIGASE ENZYMES MARKET

TABLE 26 LIGASE ENZYMES MARKET, BY TYPE, 2023–2030 (USD MILLION)

TABLE 27 DNA LIGASE ENZYMES MARKET, BY REGION, 2023–2030 (USD MILLION)

TABLE 28 NORTH AMERICA: DNA LIGASE ENZYMES MARKET, BY COUNTRY, 2023–2030 (USD MILLION)

TABLE 29 EUROPE: DNA LIGASE ENZYMES MARKET, BY COUNTRY, 2023–2030 (USD MILLION)

TABLE 30 ASIA PACIFIC: DNA LIGASE ENZYMES MARKET, BY COUNTRY, 2023–2030 (USD MILLION)

TABLE 31 LATIN AMERICA: DNA LIGASE ENZYMES MARKET, BY COUNTRY, 2023–2030 (USD MILLION)

TABLE 32 MIDDLE EAST: DNA LIGASE ENZYMES MARKET, BY COUNTRY, 2023–2030 (USD MILLION)

TABLE 33 GCC COUNTRIES: DNA LIGASE ENZYMES MARKET, BY COUNTRY, 2023–2030 (USD MILLION)

TABLE 34 RNA LIGASE ENZYMES MARKET, BY REGION, 2023–2030 (USD MILLION)

TABLE 35 NORTH AMERICA: RNA LIGASE ENZYMES MARKET, BY COUNTRY, 2023–2030 (USD MILLION)

TABLE 36 EUROPE: RNA LIGASE ENZYMES MARKET, BY COUNTRY, 2023–2030 (USD MILLION)

TABLE 37 ASIA PACIFIC: RNA LIGASE ENZYMES MARKET, BY COUNTRY, 2023–2030 (USD MILLION)

TABLE 38 LATIN AMERICA: RNA LIGASE ENZYMES MARKET, BY COUNTRY, 2023–2030 (USD MILLION)

TABLE 39 MIDDLE EAST: RNA LIGASE ENZYMES MARKET, BY COUNTRY, 2023–2030 (USD MILLION)

TABLE 40 GCC COUNTRIES: RNA LIGASE ENZYMES MARKET, BY COUNTRY, 2023–2030 (USD MILLION)

TABLE 41 OTHER LIGASE ENZYMES MARKET, BY REGION, 2023–2030 (USD MILLION)

TABLE 42 NORTH AMERICA: OTHER LIGASE ENZYMES MARKET, BY COUNTRY, 2023–2030 (USD MILLION)

TABLE 43 EUROPE: OTHER LIGASE ENZYMES MARKET, BY COUNTRY, 2023–2030 (USD MILLION)

TABLE 44 ASIA PACIFIC: OTHER LIGASE ENZYMES MARKET, BY COUNTRY,

2023–2030 (USD MILLION)

TABLE 45 LATIN AMERICA: OTHER LIGASE ENZYMES MARKET, BY COUNTRY, 2023–2030 (USD MILLION)

TABLE 46 MIDDLE EAST: OTHER LIGASE ENZYMES MARKET, BY COUNTRY, 2023–2030 (USD MILLION)

TABLE 47 GCC COUNTRIES: OTHER LIGASE ENZYMES MARKET, BY COUNTRY, 2023–2030 (USD MILLION)

TABLE 48 LIGASE ENZYMES MARKET, BY SOURCE, 2023–2030 (USD MILLION)

TABLE 49 VIRAL LIGASE ENZYMES MARKET, BY REGION, 2023–2030 (USD MILLION)

TABLE 50 NORTH AMERICA: VIRAL LIGASE ENZYMES MARKET, BY COUNTRY, 2023–2030 (USD MILLION)

TABLE 51 EUROPE: VIRAL LIGASE ENZYMES MARKET, BY COUNTRY, 2023–2030 (USD MILLION)

TABLE 52 ASIA PACIFIC: VIRAL LIGASE ENZYMES MARKET, BY COUNTRY, 2023–2030 (USD MILLION)

TABLE 53 LATIN AMERICA: VIRAL LIGASE ENZYMES MARKET, BY COUNTRY, 2023–2030 (USD MILLION)

TABLE 54 MIDDLE EAST: VIRAL LIGASE ENZYMES MARKET, BY COUNTRY, 2023–2030 (USD MILLION)

TABLE 55 GCC COUNTRIES: VIRAL LIGASE ENZYMES MARKET, BY COUNTRY, 2023–2030 (USD MILLION)

TABLE 56 BACTERIAL LIGASE ENZYMES MARKET, BY REGION, 2023–2030 (USD MILLION)

TABLE 57 NORTH AMERICA: BACTERIAL LIGASE ENZYMES MARKET, BY COUNTRY, 2023–2030 (USD MILLION)

TABLE 58 EUROPE: BACTERIAL LIGASE ENZYMES MARKET, BY COUNTRY, 2023–2030 (USD MILLION)

TABLE 59 ASIA PACIFIC: BACTERIAL LIGASE ENZYMES MARKET, BY COUNTRY, 2023–2030 (USD MILLION)

TABLE 60 LATIN AMERICA: BACTERIAL LIGASE ENZYMES MARKET, BY COUNTRY, 2023–2030 (USD MILLION)

TABLE 61 MIDDLE EAST: BACTERIAL LIGASE ENZYMES MARKET, BY COUNTRY, 2023–2030 (USD MILLION)

TABLE 62 GCC COUNTRIES: BACTERIAL LIGASE ENZYMES MARKET, BY COUNTRY, 2023–2030 (USD MILLION)

TABLE 63 EUKARYOTIC LIGASE ENZYMES MARKET, BY REGION, 2023–2030 (USD MILLION)

TABLE 64 NORTH AMERICA: EUKARYOTIC LIGASE ENZYMES MARKET, BY

COUNTRY, 2023–2030 (USD MILLION)

TABLE 65 EUROPE: EUKARYOTIC LIGASE ENZYMES MARKET, BY COUNTRY, 2023–2030 (USD MILLION)

TABLE 66 ASIA PACIFIC: EUKARYOTIC LIGASE ENZYMES MARKET, BY COUNTRY, 2023–2030 (USD MILLION)

TABLE 67 LATIN AMERICA: EUKARYOTIC LIGASE ENZYMES MARKET, BY COUNTRY, 2023–2030 (USD MILLION)

TABLE 68 MIDDLE EAST: EUKARYOTIC LIGASE ENZYMES MARKET, BY COUNTRY, 2023–2030 (USD MILLION)

TABLE 69 GCC COUNTRIES: EUKARYOTIC LIGASE ENZYMES MARKET, BY COUNTRY, 2023–2030 (USD MILLION)

TABLE 70 ARCHAEOAL LIGASE ENZYMES MARKET, BY REGION, 2023–2030 (USD MILLION)

TABLE 71 NORTH AMERICA: ARCHAEOAL LIGASE ENZYMES MARKET, BY COUNTRY, 2023–2030 (USD MILLION)

TABLE 72 EUROPE: ARCHAEOAL LIGASE ENZYMES MARKET, BY COUNTRY, 2023–2030 (USD MILLION)

TABLE 73 ASIA PACIFIC: ARCHAEOAL LIGASE ENZYMES MARKET, BY COUNTRY, 2023–2030 (USD MILLION)

TABLE 74 LATIN AMERICA: ARCHAEOAL LIGASE ENZYMES MARKET, BY COUNTRY, 2023–2030 (USD MILLION)

TABLE 75 MIDDLE EAST: ARCHAEOAL LIGASE ENZYMES MARKET, BY COUNTRY, 2023–2030 (USD MILLION)

TABLE 76 GCC COUNTRIES: ARCHAEOAL LIGASE ENZYMES MARKET, BY COUNTRY, 2023–2030 (USD MILLION)

TABLE 77 LIGASE ENZYMES MARKET, BY GRADE, 2023–2030 (USD MILLION)

TABLE 78 RUO-GRADE LIGASE ENZYMES MARKET, BY REGION, 2023–2030 (USD MILLION)

TABLE 79 NORTH AMERICA: RUO-GRADE LIGASE ENZYMES MARKET, BY COUNTRY, 2023–2030 (USD MILLION)

TABLE 80 EUROPE: RUO-GRADE LIGASE ENZYMES MARKET, BY COUNTRY, 2023–2030 (USD MILLION)

TABLE 81 ASIA PACIFIC: RUO-GRADE LIGASE ENZYMES MARKET, BY COUNTRY, 2023–2030 (USD MILLION)

TABLE 82 LATIN AMERICA: RUO-GRADE LIGASE ENZYMES MARKET, BY COUNTRY, 2023–2030 (USD MILLION)

TABLE 83 MIDDLE EAST: RUO-GRADE LIGASE ENZYMES MARKET, BY COUNTRY, 2023–2030 (USD MILLION)

TABLE 84 GCC COUNTRIES: RUO-GRADE LIGASE ENZYMES MARKET, BY

COUNTRY, 2023–2030 (USD MILLION)

TABLE 85 GMP-GRADE LIGASE ENZYMES MARKET, BY REGION, 2023–2030 (USD MILLION)

TABLE 86 NORTH AMERICA: GMP-GRADE LIGASE ENZYMES MARKET, BY COUNTRY, 2023–2030 (USD MILLION)

TABLE 87 EUROPE: GMP-GRADE LIGASE ENZYMES MARKET, BY COUNTRY, 2023–2030 (USD MILLION)

TABLE 88 ASIA PACIFIC: GMP-GRADE LIGASE ENZYMES MARKET, BY COUNTRY, 2023–2030 (USD MILLION)

TABLE 89 LATIN AMERICA: GMP-GRADE LIGASE ENZYMES MARKET, BY COUNTRY, 2023–2030 (USD MILLION)

TABLE 90 MIDDLE EAST: GMP-GRADE LIGASE ENZYMES MARKET, BY COUNTRY, 2023–2030 (USD MILLION)

TABLE 91 GCC COUNTRIES: GMP-GRADE LIGASE ENZYMES MARKET, BY COUNTRY, 2023–2030 (USD MILLION)

TABLE 92 DIAGNOSTIC-GRADE LIGASE ENZYMES MARKET, BY REGION, 2023–2030 (USD MILLION)

TABLE 93 NORTH AMERICA: DIAGNOSTIC-GRADE LIGASE ENZYMES MARKET, BY COUNTRY, 2023–2030 (USD MILLION)

TABLE 94 EUROPE: DIAGNOSTIC-GRADE LIGASE ENZYMES MARKET, BY COUNTRY, 2023–2030 (USD MILLION)

TABLE 95 ASIA PACIFIC: DIAGNOSTIC-GRADE LIGASE ENZYMES MARKET, BY COUNTRY, 2023–2030 (USD MILLION)

TABLE 96 LATIN AMERICA: DIAGNOSTIC-GRADE LIGASE ENZYMES MARKET, BY COUNTRY, 2023–2030 (USD MILLION)

TABLE 97 MIDDLE EAST: DIAGNOSTIC-GRADE LIGASE ENZYMES MARKET, BY COUNTRY, 2023–2030 (USD MILLION)

TABLE 98 GCC COUNTRIES: DIAGNOSTIC-GRADE LIGASE ENZYMES MARKET, BY COUNTRY, 2023–2030 (USD MILLION)

TABLE 99 LIGASE ENZYMES MARKET, BY MOLECULAR BIOLOGY WORKFLOW, 2023–2030 (USD MILLION)

TABLE 100 LIGASE ENZYMES MARKET FOR CLONING & MUTAGENESIS, BY REGION, 2023–2030 (USD MILLION)

TABLE 101 NORTH AMERICA: LIGASE ENZYMES MARKET FOR CLONING & MUTAGENESIS, BY COUNTRY, 2023–2030 (USD MILLION)

TABLE 102 EUROPE: LIGASE ENZYMES MARKET FOR CLONING & MUTAGENESIS, BY COUNTRY, 2023–2030 (USD MILLION)

TABLE 103 ASIA PACIFIC: LIGASE ENZYMES MARKET FOR CLONING & MUTAGENESIS, BY COUNTRY, 2023–2030 (USD MILLION)

TABLE 104 LATIN AMERICA: LIGASE ENZYMES MARKET FOR CLONING & MUTAGENESIS, BY COUNTRY, 2023–2030 (USD MILLION)

TABLE 105 MIDDLE EAST: LIGASE ENZYMES MARKET FOR CLONING & MUTAGENESIS, BY COUNTRY, 2023–2030 (USD MILLION)

TABLE 106 GCC COUNTRIES: LIGASE ENZYMES MARKET FOR CLONING & MUTAGENESIS, BY COUNTRY, 2023–2030 (USD MILLION)

TABLE 107 LIGASE ENZYMES MARKET FOR SYNTHETIC BIOLOGY, BY REGION, 2023–2030 (USD MILLION)

TABLE 108 NORTH AMERICA: LIGASE ENZYMES MARKET FOR SYNTHETIC BIOLOGY, BY COUNTRY, 2023–2030 (USD MILLION)

TABLE 109 EUROPE: LIGASE ENZYMES MARKET FOR SYNTHETIC BIOLOGY, BY COUNTRY, 2023–2030 (USD MILLION)

TABLE 110 ASIA PACIFIC: LIGASE ENZYMES MARKET FOR SYNTHETIC BIOLOGY, BY COUNTRY, 2023–2030 (USD MILLION)

TABLE 111 LATIN AMERICA: LIGASE ENZYMES MARKET FOR SYNTHETIC BIOLOGY, BY COUNTRY, 2023–2030 (USD MILLION)

TABLE 112 MIDDLE EAST: LIGASE ENZYMES MARKET FOR SYNTHETIC BIOLOGY, BY COUNTRY, 2023–2030 (USD MILLION)

TABLE 113 GCC COUNTRIES: LIGASE ENZYMES MARKET FOR SYNTHETIC BIOLOGY, BY COUNTRY, 2023–2030 (USD MILLION)

TABLE 114 LIGASE ENZYMES MARKET FOR SEQUENCING, BY REGION, 2023–2030 (USD MILLION)

TABLE 115 NORTH AMERICA: LIGASE ENZYMES MARKET FOR SEQUENCING, BY COUNTRY, 2023–2030 (USD MILLION)

TABLE 116 EUROPE: LIGASE ENZYMES MARKET FOR SEQUENCING, BY COUNTRY, 2023–2030 (USD MILLION)

TABLE 117 ASIA PACIFIC: LIGASE ENZYMES MARKET FOR SEQUENCING, BY COUNTRY, 2023–2030 (USD MILLION)

TABLE 118 LATIN AMERICA: LIGASE ENZYMES MARKET FOR SEQUENCING, BY COUNTRY, 2023–2030 (USD MILLION)

TABLE 119 MIDDLE EAST: LIGASE ENZYMES MARKET FOR SEQUENCING, BY COUNTRY, 2023–2030 (USD MILLION)

TABLE 120 GCC COUNTRIES: LIGASE ENZYMES MARKET FOR SEQUENCING, BY COUNTRY, 2023–2030 (USD MILLION)

TABLE 121 LIGASE ENZYMES MARKET FOR NUCLEIC ACID AMPLIFICATION, BY REGION, 2023–2030 (USD MILLION)

TABLE 122 NORTH AMERICA: LIGASE ENZYMES MARKET FOR NUCLEIC ACID AMPLIFICATION, BY COUNTRY, 2023–2030 (USD MILLION)

TABLE 123 EUROPE: LIGASE ENZYMES MARKET FOR NUCLEIC ACID

AMPLIFICATION, BY COUNTRY, 2023–2030 (USD MILLION)

TABLE 124 ASIA PACIFIC: LIGASE ENZYMES MARKET FOR NUCLEIC ACID  
AMPLIFICATION, BY COUNTRY, 2023–2030 (USD MILLION)

TABLE 125 LATIN AMERICA: LIGASE ENZYMES MARKET FOR NUCLEIC ACID  
AMPLIFICATION, BY COUNTRY, 2023–2030 (USD MILLION)

TABLE 126 MIDDLE EAST: LIGASE ENZYMES MARKET FOR NUCLEIC ACID  
AMPLIFICATION, BY COUNTRY, 2023–2030 (USD MILLION)

TABLE 127 GCC COUNTRIES: LIGASE ENZYMES MARKET FOR NUCLEIC ACID  
AMPLIFICATION, BY COUNTRY, 2023–2030 (USD MILLION)

TABLE 128 LIGASE ENZYMES MARKET, BY APPLICATION, 2023–2030 (USD  
MILLION)

TABLE 129 LIGASE ENZYMES MARKET FOR RESEARCH APPLICATIONS, BY  
REGION, 2023–2030 (USD MILLION)

TABLE 130 NORTH AMERICA: LIGASE ENZYMES MARKET FOR RESEARCH  
APPLICATIONS, BY COUNTRY, 2023–2030 (USD MILLION)

TABLE 131 EUROPE: LIGASE ENZYMES MARKET FOR RESEARCH  
APPLICATIONS, BY COUNTRY, 2023–2030 (USD MILLION)

TABLE 132 ASIA PACIFIC: LIGASE ENZYMES MARKET FOR RESEARCH  
APPLICATIONS, BY COUNTRY, 2023–2030 (USD MILLION)

TABLE 133 LATIN AMERICA: LIGASE ENZYMES MARKET FOR RESEARCH  
APPLICATIONS, BY COUNTRY, 2023–2030 (USD MILLION)

TABLE 134 MIDDLE EAST: LIGASE ENZYMES MARKET FOR RESEARCH  
APPLICATIONS, BY COUNTRY, 2023–2030 (USD MILLION)

TABLE 135 GCC COUNTRIES: LIGASE ENZYMES MARKET FOR RESEARCH  
APPLICATIONS, BY COUNTRY, 2023–2030 (USD MILLION)

TABLE 136 LIGASE ENZYMES MARKET FOR DIAGNOSTIC APPLICATIONS, BY  
REGION, 2023–2030 (USD MILLION)

TABLE 137 NORTH AMERICA: LIGASE ENZYMES MARKET FOR DIAGNOSTIC  
APPLICATIONS, BY COUNTRY, 2023–2030 (USD MILLION)

TABLE 138 EUROPE: LIGASE ENZYMES MARKET FOR DIAGNOSTIC  
APPLICATIONS, BY COUNTRY, 2023–2030 (USD MILLION)

TABLE 139 ASIA PACIFIC: LIGASE ENZYMES MARKET FOR DIAGNOSTIC  
APPLICATIONS, BY COUNTRY, 2023–2030 (USD MILLION)

TABLE 140 LATIN AMERICA: LIGASE ENZYMES MARKET FOR DIAGNOSTIC  
APPLICATIONS, BY COUNTRY, 2023–2030 (USD MILLION)

TABLE 141 MIDDLE EAST: LIGASE ENZYMES MARKET FOR DIAGNOSTIC  
APPLICATIONS, BY COUNTRY, 2023–2030 (USD MILLION)

TABLE 142 GCC COUNTRIES: LIGASE ENZYMES MARKET FOR DIAGNOSTIC  
APPLICATIONS, BY COUNTRY, 2023–2030 (USD MILLION)

TABLE 143 LIGASE ENZYMES MARKET FOR THERAPEUTIC DEVELOPMENT & MANUFACTURING APPLICATIONS, BY REGION, 2023–2030 (USD MILLION)

TABLE 144 NORTH AMERICA: LIGASE ENZYMES MARKET FOR THERAPEUTIC DEVELOPMENT & MANUFACTURING APPLICATIONS, BY COUNTRY, 2023–2030 (USD MILLION)

TABLE 145 EUROPE: LIGASE ENZYMES MARKET FOR THERAPEUTIC DEVELOPMENT & MANUFACTURING APPLICATIONS, BY COUNTRY, 2023–2030 (USD MILLION)

TABLE 146 ASIA PACIFIC: LIGASE ENZYMES MARKET FOR THERAPEUTIC DEVELOPMENT & MANUFACTURING APPLICATIONS, BY COUNTRY, 2023–2030 (USD MILLION)

TABLE 147 LATIN AMERICA: LIGASE ENZYMES MARKET FOR THERAPEUTIC DEVELOPMENT & MANUFACTURING APPLICATIONS, BY COUNTRY, 2023–2030 (USD MILLION)

TABLE 148 MIDDLE EAST: LIGASE ENZYMES MARKET FOR THERAPEUTIC DEVELOPMENT & MANUFACTURING APPLICATIONS, BY COUNTRY, 2023–2030 (USD MILLION)

TABLE 149 GCC COUNTRIES: LIGASE ENZYMES MARKET FOR THERAPEUTIC DEVELOPMENT & MANUFACTURING APPLICATIONS, BY COUNTRY, 2023–2030 (USD MILLION)

TABLE 150 LIGASE ENZYMES MARKET FOR OTHER APPLICATIONS, BY REGION, 2023–2030 (USD MILLION)

TABLE 151 NORTH AMERICA: LIGASE ENZYMES MARKET FOR OTHER APPLICATIONS, BY COUNTRY, 2023–2030 (USD MILLION)

TABLE 152 EUROPE: LIGASE ENZYMES MARKET FOR OTHER APPLICATIONS, BY COUNTRY, 2023–2030 (USD MILLION)

TABLE 153 ASIA PACIFIC: LIGASE ENZYMES MARKET FOR OTHER APPLICATIONS, BY COUNTRY, 2023–2030 (USD MILLION)

TABLE 154 LATIN AMERICA: LIGASE ENZYMES MARKET FOR OTHER APPLICATIONS, BY COUNTRY, 2023–2030 (USD MILLION)

TABLE 155 MIDDLE EAST: LIGASE ENZYMES MARKET FOR OTHER APPLICATIONS, BY COUNTRY, 2023–2030 (USD MILLION)

TABLE 156 GCC COUNTRIES: LIGASE ENZYMES MARKET FOR OTHER APPLICATIONS, BY COUNTRY, 2023–2030 (USD MILLION)

TABLE 157 LIGASE ENZYMES MARKET, BY END USER, 2023–2030 (USD MILLION)

TABLE 158 LIGASE ENZYMES MARKET FOR ACADEMIC & RESEARCH INSTITUTES, BY REGION, 2023–2030 (USD MILLION)

TABLE 159 NORTH AMERICA: LIGASE ENZYMES MARKET FOR ACADEMIC & RESEARCH INSTITUTES, BY COUNTRY, 2023–2030 (USD MILLION)

TABLE 160 EUROPE: LIGASE ENZYMES MARKET FOR ACADEMIC & RESEARCH INSTITUTES, BY COUNTRY, 2023–2030 (USD MILLION)

TABLE 161 ASIA PACIFIC: LIGASE ENZYMES MARKET FOR ACADEMIC & RESEARCH INSTITUTES, BY COUNTRY, 2023–2030 (USD MILLION)

TABLE 162 LATIN AMERICA: LIGASE ENZYMES MARKET FOR ACADEMIC & RESEARCH INSTITUTES, BY COUNTRY, 2023–2030 (USD MILLION)

TABLE 163 MIDDLE EAST: LIGASE ENZYMES MARKET FOR ACADEMIC & RESEARCH INSTITUTES, BY COUNTRY, 2023–2030 (USD MILLION)

TABLE 164 GCC COUNTRIES: LIGASE ENZYMES MARKET FOR ACADEMIC & RESEARCH INSTITUTES, BY COUNTRY, 2023–2030 (USD MILLION)

TABLE 165 LIGASE ENZYMES MARKET FOR PHARMACEUTICAL & BIOTECHNOLOGY COMPANIES, BY REGION, 2023–2030 (USD MILLION)

TABLE 166 NORTH AMERICA: LIGASE ENZYMES MARKET FOR PHARMACEUTICAL & BIOTECHNOLOGY COMPANIES, BY COUNTRY, 2023–2030 (USD MILLION)

TABLE 167 EUROPE: LIGASE ENZYMES MARKET FOR PHARMACEUTICAL & BIOTECHNOLOGY COMPANIES, BY COUNTRY, 2023–2030 (USD MILLION)

TABLE 168 ASIA PACIFIC: LIGASE ENZYMES MARKET FOR PHARMACEUTICAL & BIOTECHNOLOGY COMPANIES, BY COUNTRY, 2023–2030 (USD MILLION)

TABLE 169 LATIN AMERICA: LIGASE ENZYMES MARKET FOR PHARMACEUTICAL & BIOTECHNOLOGY COMPANIES, BY COUNTRY, 2023–2030 (USD MILLION)

TABLE 170 MIDDLE EAST: LIGASE ENZYMES MARKET FOR PHARMACEUTICAL & BIOTECHNOLOGY COMPANIES, BY COUNTRY, 2023–2030 (USD MILLION)

TABLE 171 GCC COUNTRIES: LIGASE ENZYMES MARKET FOR PHARMACEUTICAL & BIOTECHNOLOGY COMPANIES, BY COUNTRY, 2023–2030 (USD MILLION)

TABLE 172 LIGASE ENZYMES MARKET FOR HOSPITALS & DIAGNOSTIC LABORATORIES, BY REGION, 2023–2030 (USD MILLION)

TABLE 173 NORTH AMERICA: LIGASE ENZYMES MARKET FOR HOSPITALS & DIAGNOSTIC LABORATORIES, BY COUNTRY, 2023–2030 (USD MILLION)

TABLE 174 EUROPE: LIGASE ENZYMES MARKET FOR HOSPITALS & DIAGNOSTIC LABORATORIES, BY COUNTRY, 2023–2030 (USD MILLION)

TABLE 175 ASIA PACIFIC: LIGASE ENZYMES MARKET FOR HOSPITALS & DIAGNOSTIC LABORATORIES, BY COUNTRY, 2023–2030 (USD MILLION)

TABLE 176 LATIN AMERICA: LIGASE ENZYMES MARKET FOR HOSPITALS & DIAGNOSTIC LABORATORIES, BY COUNTRY, 2023–2030 (USD MILLION)

TABLE 177 MIDDLE EAST: LIGASE ENZYMES MARKET FOR HOSPITALS & DIAGNOSTIC LABORATORIES, BY COUNTRY, 2023–2030 (USD MILLION)

TABLE 178 GCC COUNTRIES: LIGASE ENZYMES MARKET FOR HOSPITALS &

DIAGNOSTIC LABORATORIES, BY COUNTRY, 2023–2030 (USD MILLION)

TABLE 179 LIGASE ENZYMES MARKET FOR MEDICAL DEVICE COMPANIES, BY REGION, 2023–2030 (USD MILLION)

TABLE 180 NORTH AMERICA: LIGASE ENZYMES MARKET FOR MEDICAL DEVICE COMPANIES, BY COUNTRY, 2023–2030 (USD MILLION)

TABLE 181 EUROPE: LIGASE ENZYMES MARKET FOR MEDICAL DEVICE COMPANIES, BY COUNTRY, 2023–2030 (USD MILLION)

TABLE 182 ASIA PACIFIC: LIGASE ENZYMES MARKET FOR MEDICAL DEVICE COMPANIES, BY COUNTRY, 2023–2030 (USD MILLION)

TABLE 183 LATIN AMERICA: LIGASE ENZYMES MARKET FOR MEDICAL DEVICE COMPANIES, BY COUNTRY, 2023–2030 (USD MILLION)

TABLE 184 MIDDLE EAST: LIGASE ENZYMES MARKET FOR MEDICAL DEVICE COMPANIES, BY COUNTRY, 2023–2030 (USD MILLION)

TABLE 185 GCC COUNTRIES: LIGASE ENZYMES MARKET FOR MEDICAL DEVICE COMPANIES, BY COUNTRY, 2023–2030 (USD MILLION)

TABLE 186 LIGASE ENZYMES MARKET, BY REGION, 2023–2030 (USD MILLION)

TABLE 187 NORTH AMERICA: LIGASE ENZYMES MARKET, BY COUNTRY, 2023–2030 (USD MILLION)

TABLE 188 NORTH AMERICA: LIGASE ENZYMES MARKET, BY TYPE, 2023–2030 (USD MILLION)

TABLE 189 NORTH AMERICA: LIGASE ENZYMES MARKET, BY GRADE, 2023–2030 (USD MILLION)

TABLE 190 NORTH AMERICA: LIGASE ENZYMES MARKET, BY SOURCE, 2023–2030 (USD MILLION)

TABLE 191 NORTH AMERICA: LIGASE ENZYMES MARKET, BY MOLECULAR BIOLOGY WORKFLOW, 2023–2030 (USD MILLION)

TABLE 192 NORTH AMERICA: LIGASE ENZYMES MARKET, BY APPLICATION, 2023–2030 (USD MILLION)

TABLE 193 NORTH AMERICA: LIGASE ENZYMES MARKET, BY END USER, 2023–2030 (USD MILLION)

TABLE 194 NORTH AMERICA: MACROECONOMIC INDICATORS

TABLE 195 US: LIGASE ENZYMES MARKET, BY TYPE, 2023–2030 (USD MILLION)

TABLE 196 US: LIGASE ENZYMES MARKET, BY GRADE, 2023–2030 (USD MILLION)

TABLE 197 US: LIGASE ENZYMES MARKET, BY SOURCE, 2023–2030 (USD MILLION)

TABLE 198 US: LIGASE ENZYMES MARKET, BY MOLECULAR BIOLOGY WORKFLOW, 2023–2030 (USD MILLION)

TABLE 199 US: LIGASE ENZYMES MARKET, BY APPLICATION, 2023–2030 (USD

MILLION)

TABLE 200 US: LIGASE ENZYMES MARKET, BY END USER, 2023–2030 (USD MILLION)

TABLE 201 CANADA: LIGASE ENZYMES MARKET, BY TYPE, 2023–2030 (USD MILLION)

TABLE 202 CANADA: LIGASE ENZYMES MARKET, BY GRADE, 2023–2030 (USD MILLION)

TABLE 203 CANADA: LIGASE ENZYMES MARKET, BY SOURCE, 2023–2030 (USD MILLION)

TABLE 204 CANADA: LIGASE ENZYMES MARKET, BY MOLECULAR BIOLOGY WORKFLOW, 2023–2030 (USD MILLION)

TABLE 205 CANADA: LIGASE ENZYMES MARKET, BY APPLICATION, 2023–2030 (USD MILLION)

TABLE 206 CANADA: LIGASE ENZYMES MARKET, BY END USER, 2023–2030 (USD MILLION)

TABLE 207 EUROPE: LIGASE ENZYMES MARKET, BY COUNTRY, 2023–2030 (USD MILLION)

TABLE 208 EUROPE: LIGASE ENZYMES MARKET, BY TYPE, 2023–2030 (USD MILLION)

TABLE 209 EUROPE: LIGASE ENZYMES MARKET, BY GRADE, 2023–2030 (USD MILLION)

TABLE 210 EUROPE: LIGASE ENZYMES MARKET, BY SOURCE, 2023–2030 (USD MILLION)

TABLE 211 EUROPE: LIGASE ENZYMES MARKET, BY MOLECULAR BIOLOGY WORKFLOW, 2023–2030 (USD MILLION)

TABLE 212 EUROPE: LIGASE ENZYMES MARKET, BY APPLICATION, 2023–2030 (USD MILLION)

TABLE 213 EUROPE: LIGASE ENZYMES MARKET, BY END USER, 2023–2030 (USD MILLION)

TABLE 214 EUROPE: MACROECONOMIC INDICATORS

TABLE 215 GERMANY: LIGASE ENZYMES MARKET, BY TYPE, 2023–2030 (USD MILLION)

TABLE 216 GERMANY: LIGASE ENZYMES MARKET, BY GRADE, 2023–2030 (USD MILLION)

TABLE 217 GERMANY: LIGASE ENZYMES MARKET, BY SOURCE, 2023–2030 (USD MILLION)

TABLE 218 GERMANY: LIGASE ENZYMES MARKET, BY MOLECULAR BIOLOGY WORKFLOW, 2023–2030 (USD MILLION)

TABLE 219 GERMANY: LIGASE ENZYMES MARKET, BY APPLICATION, 2023–2030

(USD MILLION)

TABLE 220 GERMANY: LIGASE ENZYMES MARKET, BY END USER, 2023–2030

(USD MILLION)

TABLE 221 UK: LIGASE ENZYMES MARKET, BY TYPE, 2023–2030 (USD MILLION)

TABLE 222 UK: LIGASE ENZYMES MARKET, BY GRADE, 2023–2030 (USD MILLION)

TABLE 223 UK: LIGASE ENZYMES MARKET, BY SOURCE, 2023–2030 (USD MILLION)

TABLE 224 UK: LIGASE ENZYMES MARKET, BY MOLECULAR BIOLOGY WORKFLOW, 2023–2030 (USD MILLION)

TABLE 225 UK: LIGASE ENZYMES MARKET, BY APPLICATION, 2023–2030 (USD MILLION)

TABLE 226 UK: LIGASE ENZYMES MARKET, BY END USER, 2023–2030 (USD MILLION)

TABLE 227 FRANCE: LIGASE ENZYMES MARKET, BY TYPE, 2023–2030 (USD MILLION)

TABLE 228 FRANCE: LIGASE ENZYMES MARKET, BY GRADE, 2023–2030 (USD MILLION)

TABLE 229 FRANCE: LIGASE ENZYMES MARKET, BY SOURCE, 2023–2030 (USD MILLION)

TABLE 230 FRANCE: LIGASE ENZYMES MARKET, BY MOLECULAR BIOLOGY WORKFLOW, 2023–2030 (USD MILLION)

TABLE 231 FRANCE: LIGASE ENZYMES MARKET, BY APPLICATION, 2023–2030 (USD MILLION)

TABLE 232 FRANCE: LIGASE ENZYMES MARKET, BY END USER, 2023–2030 (USD MILLION)

TABLE 233 ITALY: LIGASE ENZYMES MARKET, BY TYPE, 2023–2030 (USD MILLION)

TABLE 234 ITALY: LIGASE ENZYMES MARKET, BY GRADE, 2023–2030 (USD MILLION)

TABLE 235 ITALY: LIGASE ENZYMES MARKET, BY SOURCE, 2023–2030 (USD MILLION)

TABLE 236 ITALY: LIGASE ENZYMES MARKET, BY MOLECULAR BIOLOGY WORKFLOW, 2023–2030 (USD MILLION)

TABLE 237 ITALY: LIGASE ENZYMES MARKET, BY APPLICATION, 2023–2030 (USD MILLION)

TABLE 238 ITALY: LIGASE ENZYMES MARKET, BY END USER, 2023–2030 (USD MILLION)

TABLE 239 SPAIN: LIGASE ENZYMES MARKET, BY TYPE, 2023–2030 (USD

MILLION)

TABLE 240 SPAIN: LIGASE ENZYMES MARKET, BY GRADE, 2023–2030 (USD MILLION)

TABLE 241 SPAIN: LIGASE ENZYMES MARKET, BY SOURCE, 2023–2030 (USD MILLION)

TABLE 242 SPAIN: LIGASE ENZYMES MARKET, BY MOLECULAR BIOLOGY WORKFLOW, 2023–2030 (USD MILLION)

TABLE 243 SPAIN: LIGASE ENZYMES MARKET, BY APPLICATION, 2023–2030 (USD MILLION)

TABLE 244 SPAIN: LIGASE ENZYMES MARKET, BY END USER, 2023–2030 (USD MILLION)

TABLE 245 REST OF EUROPE: LIGASE ENZYMES MARKET, BY TYPE, 2023–2030 (USD MILLION)

TABLE 246 REST OF EUROPE: LIGASE ENZYMES MARKET, BY GRADE, 2023–2030 (USD MILLION)

TABLE 247 REST OF EUROPE: LIGASE ENZYMES MARKET, BY SOURCE, 2023–2030 (USD MILLION)

TABLE 248 REST OF EUROPE: LIGASE ENZYMES MARKET, BY MOLECULAR BIOLOGY WORKFLOW, 2023–2030 (USD MILLION)

TABLE 249 REST OF EUROPE: LIGASE ENZYMES MARKET, BY APPLICATION, 2023–2030 (USD MILLION)

TABLE 250 REST OF EUROPE: LIGASE ENZYMES MARKET, BY END USER, 2023–2030 (USD MILLION)

TABLE 251 ASIA PACIFIC: LIGASE ENZYMES MARKET, BY COUNTRY, 2023–2030 (USD MILLION)

TABLE 252 ASIA PACIFIC: LIGASE ENZYMES MARKET, BY TYPE, 2023–2030 (USD MILLION)

TABLE 253 ASIA PACIFIC: LIGASE ENZYMES MARKET, BY GRADE, 2023–2030 (USD MILLION)

TABLE 254 ASIA PACIFIC: LIGASE ENZYMES MARKET, BY SOURCE, 2023–2030 (USD MILLION)

TABLE 255 ASIA PACIFIC: LIGASE ENZYMES MARKET, BY MOLECULAR BIOLOGY WORKFLOW, 2023–2030 (USD MILLION)

TABLE 256 ASIA PACIFIC: LIGASE ENZYMES MARKET, BY APPLICATION, 2023–2030 (USD MILLION)

TABLE 257 ASIA PACIFIC: LIGASE ENZYMES MARKET, BY END USER, 2023–2030 (USD MILLION)

TABLE 258 ASIA PACIFIC: MACROECONOMIC INDICATORS

TABLE 259 CHINA: LIGASE ENZYMES MARKET, BY TYPE, 2023–2030 (USD

MILLION)

TABLE 260 CHINA: LIGASE ENZYMES MARKET, BY GRADE, 2023–2030 (USD MILLION)

TABLE 261 CHINA: LIGASE ENZYMES MARKET, BY SOURCE, 2023–2030 (USD MILLION)

TABLE 262 CHINA: LIGASE ENZYMES MARKET, BY MOLECULAR BIOLOGY WORKFLOW, 2023–2030 (USD MILLION)

TABLE 263 CHINA: LIGASE ENZYMES MARKET, BY APPLICATION, 2023–2030 (USD MILLION)

TABLE 264 CHINA: LIGASE ENZYMES MARKET, BY END USER, 2023–2030 (USD MILLION)

TABLE 265 JAPAN: LIGASE ENZYMES MARKET, BY TYPE, 2023–2030 (USD MILLION)

TABLE 266 JAPAN: LIGASE ENZYMES MARKET, BY GRADE, 2023–2030 (USD MILLION)

TABLE 267 JAPAN: LIGASE ENZYMES MARKET, BY SOURCE, 2023–2030 (USD MILLION)

TABLE 268 JAPAN: LIGASE ENZYMES MARKET, BY MOLECULAR BIOLOGY WORKFLOW, 2023–2030 (USD MILLION)

TABLE 269 JAPAN: LIGASE ENZYMES MARKET, BY APPLICATION, 2023–2030 (USD MILLION)

TABLE 270 JAPAN: LIGASE ENZYMES MARKET, BY END USER, 2023–2030 (USD MILLION)

TABLE 271 INDIA: LIGASE ENZYMES MARKET, BY TYPE, 2023–2030 (USD MILLION)

TABLE 272 INDIA: LIGASE ENZYMES MARKET, BY GRADE, 2023–2030 (USD MILLION)

TABLE 273 INDIA: LIGASE ENZYMES MARKET, BY SOURCE, 2023–2030 (USD MILLION)

TABLE 274 INDIA: LIGASE ENZYMES MARKET, BY MOLECULAR BIOLOGY WORKFLOW, 2023–2030 (USD MILLION)

TABLE 275 INDIA: LIGASE ENZYMES MARKET, BY APPLICATION, 2023–2030 (USD MILLION)

TABLE 276 INDIA: LIGASE ENZYMES MARKET, BY END USER, 2023–2030 (USD MILLION)

TABLE 277 SOUTH KOREA: LIGASE ENZYMES MARKET, BY TYPE, 2023–2030 (USD MILLION)

TABLE 278 SOUTH KOREA: LIGASE ENZYMES MARKET, BY GRADE, 2023–2030 (USD MILLION)

TABLE 279 SOUTH KOREA: LIGASE ENZYMES MARKET, BY SOURCE, 2023–2030 (USD MILLION)

TABLE 280 SOUTH KOREA: LIGASE ENZYMES MARKET, BY MOLECULAR BIOLOGY WORKFLOW, 2023–2030 (USD MILLION)

TABLE 281 SOUTH KOREA: LIGASE ENZYMES MARKET, BY APPLICATION, 2023–2030 (USD MILLION)

TABLE 282 SOUTH KOREA: LIGASE ENZYMES MARKET, BY END USER, 2023–2030 (USD MILLION)

TABLE 283 AUSTRALIA: LIGASE ENZYMES MARKET, BY TYPE, 2023–2030 (USD MILLION)

TABLE 284 AUSTRALIA: LIGASE ENZYMES MARKET, BY GRADE, 2023–2030 (USD MILLION)

TABLE 285 AUSTRALIA: LIGASE ENZYMES MARKET, BY SOURCE, 2023–2030 (USD MILLION)

TABLE 286 AUSTRALIA: LIGASE ENZYMES MARKET, BY MOLECULAR BIOLOGY WORKFLOW, 2023–2030 (USD MILLION)

TABLE 287 AUSTRALIA: LIGASE ENZYMES MARKET, BY APPLICATION, 2023–2030 (USD MILLION)

TABLE 288 AUSTRALIA: LIGASE ENZYMES MARKET, BY END USER, 2023–2030 (USD MILLION)

TABLE 289 REST OF ASIA PACIFIC: LIGASE ENZYMES MARKET, BY TYPE, 2023–2030 (USD MILLION)

TABLE 290 REST OF ASIA PACIFIC: LIGASE ENZYMES MARKET, BY GRADE, 2023–2030 (USD MILLION)

TABLE 291 REST OF ASIA PACIFIC: LIGASE ENZYMES MARKET, BY SOURCE, 2023–2030 (USD MILLION)

TABLE 292 REST OF ASIA PACIFIC: LIGASE ENZYMES MARKET, BY MOLECULAR BIOLOGY WORKFLOW, 2023–2030 (USD MILLION)

TABLE 293 REST OF ASIA PACIFIC: LIGASE ENZYMES MARKET, BY APPLICATION, 2023–2030 (USD MILLION)

TABLE 294 REST OF ASIA PACIFIC: LIGASE ENZYMES MARKET, BY END USER, 2023–2030 (USD MILLION)

TABLE 295 LATIN AMERICA: LIGASE ENZYMES MARKET, BY COUNTRY, 2023–2030 (USD MILLION)

TABLE 296 LATIN AMERICA: LIGASE ENZYMES MARKET, BY TYPE, 2023–2030 (USD MILLION)

TABLE 297 LATIN AMERICA: LIGASE ENZYMES MARKET, BY GRADE, 2023–2030 (USD MILLION)

TABLE 298 LATIN AMERICA: LIGASE ENZYMES MARKET, BY SOURCE, 2023–2030

(USD MILLION)

TABLE 299 LATIN AMERICA: LIGASE ENZYMES MARKET, BY MOLECULAR BIOLOGY WORKFLOW, 2023–2030 (USD MILLION)

TABLE 300 LATIN AMERICA: LIGASE ENZYMES MARKET, BY APPLICATION, 2023–2030 (USD MILLION)

TABLE 301 LATIN AMERICA: LIGASE ENZYMES MARKET, BY END USER, 2023–2030 (USD MILLION)

TABLE 302 LATIN AMERICA: MACROECONOMIC INDICATORS

TABLE 303 BRAZIL: LIGASE ENZYMES MARKET, BY TYPE, 2023–2030 (USD MILLION)

TABLE 304 BRAZIL: LIGASE ENZYMES MARKET, BY GRADE, 2023–2030 (USD MILLION)

TABLE 305 BRAZIL: LIGASE ENZYMES MARKET, BY SOURCE, 2023–2030 (USD MILLION)

TABLE 306 BRAZIL: LIGASE ENZYMES MARKET, BY MOLECULAR BIOLOGY WORKFLOW, 2023–2030 (USD MILLION)

TABLE 307 BRAZIL: LIGASE ENZYMES MARKET, BY APPLICATION, 2023–2030 (USD MILLION)

TABLE 308 BRAZIL: LIGASE ENZYMES MARKET, BY END USER, 2023–2030 (USD MILLION)

TABLE 309 MEXICO: LIGASE ENZYMES MARKET, BY TYPE, 2023–2030 (USD MILLION)

TABLE 310 MEXICO: LIGASE ENZYMES MARKET, BY GRADE, 2023–2030 (USD MILLION)

TABLE 311 MEXICO: LIGASE ENZYMES MARKET, BY SOURCE, 2023–2030 (USD MILLION)

TABLE 312 MEXICO: LIGASE ENZYMES MARKET, BY MOLECULAR BIOLOGY WORKFLOW, 2023–2030 (USD MILLION)

TABLE 313 MEXICO: LIGASE ENZYMES MARKET, BY APPLICATION, 2023–2030 (USD MILLION)

TABLE 314 MEXICO: LIGASE ENZYMES MARKET, BY END USER, 2023–2030 (USD MILLION)

TABLE 315 REST OF LATIN AMERICA: LIGASE ENZYMES MARKET, BY TYPE, 2023–2030 (USD MILLION)

TABLE 316 REST OF LATIN AMERICA: LIGASE ENZYMES MARKET, BY GRADE, 2023–2030 (USD MILLION)

TABLE 317 REST OF LATIN AMERICA: LIGASE ENZYMES MARKET, BY SOURCE, 2023–2030 (USD MILLION)

TABLE 318 REST OF LATIN AMERICA: LIGASE ENZYMES MARKET, BY

MOLECULAR BIOLOGY WORKFLOW, 2023–2030 (USD MILLION)

TABLE 319 REST OF LATIN AMERICA: LIGASE ENZYMES MARKET, BY APPLICATION, 2023–2030 (USD MILLION)

TABLE 320 REST OF LATIN AMERICA: LIGASE ENZYMES MARKET, BY END USER, 2023–2030 (USD MILLION)

TABLE 321 MIDDLE EAST: LIGASE ENZYMES MARKET, BY COUNTRY, 2023–2030 (USD MILLION)

TABLE 322 MIDDLE EAST: LIGASE ENZYMES MARKET, BY TYPE, 2023–2030 (USD MILLION)

TABLE 323 MIDDLE EAST: LIGASE ENZYMES MARKET, BY GRADE, 2023–2030 (USD MILLION)

TABLE 324 MIDDLE EAST: LIGASE ENZYMES MARKET, BY SOURCE, 2023–2030 (USD MILLION)

TABLE 325 MIDDLE EAST: LIGASE ENZYMES MARKET, BY MOLECULAR BIOLOGY WORKFLOW, 2023–2030 (USD MILLION)

TABLE 326 MIDDLE EAST: LIGASE ENZYMES MARKET, BY APPLICATION, 2023–2030 (USD MILLION)

TABLE 327 MIDDLE EAST: LIGASE ENZYMES MARKET, BY END USER, 2023–2030 (USD MILLION)

TABLE 328 MIDDLE EAST: MACROECONOMIC INDICATORS

TABLE 329 GCC COUNTRIES: LIGASE ENZYMES MARKET, BY COUNTRY, 2023–2030 (USD MILLION)

TABLE 330 GCC COUNTRIES: LIGASE ENZYMES MARKET, BY TYPE, 2023–2030 (USD MILLION)

TABLE 331 GCC COUNTRIES: LIGASE ENZYMES MARKET, BY GRADE, 2023–2030 (USD MILLION)

TABLE 332 GCC COUNTRIES: LIGASE ENZYMES MARKET, BY SOURCE, 2023–2030 (USD MILLION)

TABLE 333 GCC COUNTRIES: LIGASE ENZYMES MARKET, BY MOLECULAR BIOLOGY WORKFLOW, 2023–2030 (USD MILLION)

TABLE 334 GCC COUNTRIES: LIGASE ENZYMES MARKET, BY APPLICATION, 2023–2030 (USD MILLION)

TABLE 335 GCC COUNTRIES: LIGASE ENZYMES MARKET, BY END USER, 2023–2030 (USD MILLION)

TABLE 336 SAUDI ARABIA: LIGASE ENZYMES MARKET, BY TYPE, 2023–2030 (USD MILLION)

TABLE 337 SAUDI ARABIA: LIGASE ENZYMES MARKET, BY GRADE, 2023–2030 (USD MILLION)

TABLE 338 SAUDI ARABIA: LIGASE ENZYMES MARKET, BY SOURCE, 2023–2030

(USD MILLION)

TABLE 339 SAUDI ARABIA: LIGASE ENZYMES MARKET, BY MOLECULAR BIOLOGY WORKFLOW, 2023–2030 (USD MILLION)

TABLE 340 SAUDI ARABIA: LIGASE ENZYMES MARKET, BY APPLICATION, 2023–2030 (USD MILLION)

TABLE 341 SAUDI ARABIA: LIGASE ENZYMES MARKET, BY END USER, 2023–2030 (USD MILLION)

TABLE 342 UAE: LIGASE ENZYMES MARKET, BY TYPE, 2023–2030 (USD MILLION)

TABLE 343 UAE: LIGASE ENZYMES MARKET, BY GRADE, 2023–2030 (USD MILLION)

TABLE 344 UAE: LIGASE ENZYMES MARKET, BY SOURCE, 2023–2030 (USD MILLION)

TABLE 345 UAE: LIGASE ENZYMES MARKET, BY MOLECULAR BIOLOGY WORKFLOW, 2023–2030 (USD MILLION)

TABLE 346 UAE: LIGASE ENZYMES MARKET, BY APPLICATION, 2023–2030 (USD MILLION)

TABLE 347 UAE: LIGASE ENZYMES MARKET, BY END USER, 2023–2030 (USD MILLION)

TABLE 348 REST OF GCC COUNTRIES: LIGASE ENZYMES MARKET, BY TYPE, 2023–2030 (USD MILLION)

TABLE 349 REST OF GCC COUNTRIES: LIGASE ENZYMES MARKET, BY GRADE, 2023–2030 (USD MILLION)

TABLE 350 REST OF GCC COUNTRIES: LIGASE ENZYMES MARKET, BY SOURCE, 2023–2030 (USD MILLION)

TABLE 351 REST OF GCC COUNTRIES: LIGASE ENZYMES MARKET, BY MOLECULAR BIOLOGY WORKFLOW, 2023–2030 (USD MILLION)

TABLE 352 REST OF GCC COUNTRIES: LIGASE ENZYMES MARKET, BY APPLICATION, 2023–2030 (USD MILLION)

TABLE 353 REST OF GCC COUNTRIES: LIGASE ENZYMES MARKET, BY END USER, 2023–2030 (USD MILLION)

TABLE 354 REST OF MIDDLE EAST: LIGASE ENZYMES MARKET, BY TYPE, 2023–2030 (USD MILLION)

TABLE 355 REST OF MIDDLE EAST: LIGASE ENZYMES MARKET, BY GRADE, 2023–2030 (USD MILLION)

TABLE 356 REST OF MIDDLE EAST: LIGASE ENZYMES MARKET, BY SOURCE, 2023–2030 (USD MILLION)

TABLE 357 REST OF MIDDLE EAST: LIGASE ENZYMES MARKET, BY MOLECULAR BIOLOGY WORKFLOW, 2023–2030 (USD MILLION)

TABLE 358 REST OF MIDDLE EAST: LIGASE ENZYMES MARKET, BY

APPLICATION, 2023–2030 (USD MILLION)

TABLE 359 REST OF MIDDLE EAST: LIGASE ENZYMES MARKET, BY END USER, 2023–2030 (USD MILLION)

TABLE 360 AFRICA: LIGASE ENZYMES MARKET, BY TYPE, 2023–2030 (USD MILLION)

TABLE 361 AFRICA: LIGASE ENZYMES MARKET, BY GRADE, 2023–2030 (USD MILLION)

TABLE 362 AFRICA: LIGASE ENZYMES MARKET, BY SOURCE, 2023–2030 (USD MILLION)

TABLE 363 AFRICA: LIGASE ENZYMES MARKET, BY MOLECULAR BIOLOGY WORKFLOW, 2023–2030 (USD MILLION)

TABLE 364 AFRICA: LIGASE ENZYMES MARKET, BY APPLICATION, 2023–2030 (USD MILLION)

TABLE 365 AFRICA: LIGASE ENZYMES MARKET, BY END USER, 2023–2030 (USD MILLION)

TABLE 366 MACROECONOMIC OUTLOOK FOR AFRICA

TABLE 367 LIGASE ENZYMES MARKET: OVERVIEW OF STRATEGIES ADOPTED BY KEY PLAYERS, 2021–2025

## List Of Figures

### LIST OF FIGURES

FIGURE 1 LIGASE ENZYMES MARKET SEGMENTATION & REGIONAL SCOPE

FIGURE 2 RESEARCH DESIGN METHODOLOGY

FIGURE 3 LIGASE ENZYMES MARKET: BREAKDOWN OF PRIMARY INTERVIEWS

FIGURE 4 GLOBAL LIGASE ENZYMES MARKET SIZE ESTIMATION (SUPPLY-SIDE ANALYSIS), 2024

FIGURE 5 GLOBAL MARKET SIZE ESTIMATION: COMPANY REVENUE ANALYSIS (BOTTOM-UP APPROACH), 2024

FIGURE 6 ILLUSTRATIVE EXAMPLE OF THERMO FISHER SCIENTIFIC INC.: REVENUE ANALYSIS (2024)

FIGURE 7 MARKET SIZE VALIDATION FROM PRIMARY SOURCES

FIGURE 8 SEGMENTAL MARKET SIZE ESTIMATION: TOP-DOWN APPROACH

FIGURE 9 LIGASE ENZYMES MARKET: CAGR PROJECTIONS, 2025-2030

FIGURE 10 LIGASE ENZYMES MARKET: GROWTH ANALYSIS OF MARKET DYNAMICS

FIGURE 11 DATA TRIANGULATION METHODOLOGY

FIGURE 12 LIGASE ENZYMES MARKET, BY TYPE, 2025 VS. 2030 (USD MILLION)

FIGURE 13 LIGASE ENZYMES MARKET, BY SOURCE, 2025 VS. 2030 (USD MILLION)

FIGURE 14 LIGASE ENZYMES MARKET, BY GRADE, 2025 VS. 2030 (USD MILLION)

FIGURE 15 LIGASE ENZYMES MARKET, BY MOLECULAR BIOLOGY WORKFLOW, 2025 VS. 2030 (USD MILLION)

FIGURE 16 LIGASE ENZYMES MARKET, BY APPLICATION, 2025 VS. 2030 (USD MILLION)

FIGURE 17 LIGASE ENZYMES MARKET, BY END USER, 2025 VS. 2030 (USD MILLION)

FIGURE 18 REGIONAL SNAPSHOT OF LIGASE ENZYMES MARKET

FIGURE 19 RISING GENOMICS & NGS ACTIVITIES TO PROPEL MARKET GROWTH

FIGURE 20 US AND DNA LIGASES COMMANDED LARGER MARKET SHARES IN 2024

FIGURE 21 DNA LIGASES ACCOUNTED FOR LARGEST SHARE OF LIGASE ENZYMES MARKET IN 2024

FIGURE 22 ACADEMIC & RESEARCH INSTITUTES SEGMENT HELD LARGEST MARKET SHARE IN 2024

FIGURE 23 CHINA TO REGISTER HIGHER CAGR DURING FORECAST PERIOD

FIGURE 24 LIGASE ENZYMES MARKET: DRIVERS, RESTRAINTS, OPPORTUNITIES, AND CHALLENGES

FIGURE 25 TRENDS/DISRUPTIONS IMPACTING CUSTOMERS' BUSINESSES

FIGURE 26 LIGASE ENZYMES MARKET: VALUE CHAIN ANALYSIS

FIGURE 27 LIGASE ENZYMES MARKET: ECOSYSTEM ANALYSIS

FIGURE 28 PATENT APPLICATIONS IN LIGASE ENZYMES MARKET, JANUARY 2014–DECEMBER 2024

FIGURE 29 LIGASE ENZYMES MARKET: PORTER'S FIVE FORCES ANALYSIS

FIGURE 30 AVERAGE SELLING PRICE TREND OF LIGASE ENZYMES, BY KEY PLAYER, 2022–2024

FIGURE 31 AVERAGE SELLING PRICE OF LIGASE ENZYMES, BY REGION, 2024

FIGURE 32 INFLUENCE OF STAKEHOLDERS ON BUYING PROCESS FOR LIGASE ENZYMES

FIGURE 33 KEY BUYING CRITERIA FOR END USERS

FIGURE 34 AI USE CASES

FIGURE 35 NORTH AMERICA: LIGASE ENZYMES MARKET SNAPSHOT

FIGURE 36 ASIA PACIFIC: LIGASE ENZYMES MARKET SNAPSHOT

FIGURE 37 REVENUE ANALYSIS OF KEY PLAYERS IN LIGASE ENZYMES MARKET, 2020–2024

FIGURE 38 MARKET SHARE ANALYSIS OF KEY PLAYERS IN LIGASE ENZYMES MARKET, 2024

FIGURE 39 LIGASE ENZYMES MARKET: COMPANY EVALUATION MATRIX (KEY PLAYERS), 2024

FIGURE 40 LIGASE ENZYMES MARKET: COMPANY FOOTPRINT

FIGURE 41 LIGASE ENZYMES MARKET: COMPANY EVALUATION MATRIX (STARTUPS/SMES), 2024

FIGURE 42 EV/EBITDA OF KEY VENDORS

FIGURE 43 YEAR-TO-DATE (YTD) PRICE TOTAL RETURN AND 5-YEAR STOCK BETA OF KEY VENDORS

FIGURE 44 LIGASE ENZYMES MARKET: BRAND/PRODUCT COMPARATIVE ANALYSIS

FIGURE 45 THERMO FISHER SCIENTIFIC INC.: COMPANY SNAPSHOT (2024)

FIGURE 46 QIAGEN N.V.: COMPANY SNAPSHOT (2024)

FIGURE 47 TAKARA BIO INC.: COMPANY SNAPSHOT (2024)

FIGURE 48 DANAHER CORPORATION: COMPANY SNAPSHOT (2024)

FIGURE 49 AGILENT TECHNOLOGIES, INC.: COMPANY SNAPSHOT (2024)

FIGURE 50 F. HOFFMANN-LA ROCHE LTD.: COMPANY SNAPSHOT (2024)

FIGURE 51 MERCK KGAA: COMPANY SNAPSHOT (2024)

FIGURE 52 ARCTICZYMES TECHNOLOGIES: COMPANY SNAPSHOT (2024)

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