

# **Molecular Biology Internship**

# **Advanced Focussed Areas for Interns in Molecular Biology Internships**

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## • Fundamentals of Molecular Biology

- Introduction to Molecular Biology
- DNA Structure and Function
- o RNA and its Types
- o Protein Synthesis and Function
- Gene Structure and Expression
- Molecular Genetics
- Genetic Engineering Techniques
- Applications of Molecular Biology in Research
- o Ethics and Safety in Molecular Biology Research

# • Techniques in Molecular Biology

- Polymerase Chain Reaction (PCR) and Variants
- DNA Sequencing Technologies
- Gene Cloning and Recombinant DNA Technology
- Gel Electrophoresis and Blotting Techniques
- Gene Editing and CRISPR-Cas9
- o Protein Expression and Purification
- Western Blotting and Immunodetection
- Next-Generation Sequencing (NGS)
- Bioinformatics Tools and Data Analysis
- Future Trends in Molecular Biology Techniques

#### • Applications in Health and Medicine

- Molecular Diagnostics and Biomarkers
- Cancer Biology and Molecular Oncology
- Genetic Diseases and Gene Therapy
- o Infectious Diseases and Molecular Pathogenesis
- Pharmacogenomics and Personalized Medicine
- Stem Cell Research and Regenerative Medicine
- Clinical Applications of Molecular Biology
- o Biotechnology in Medicine
- Case Studies in Medical Molecular Biology
- Future Directions in Molecular Medicine

## • Environmental and Industrial Applications

- Environmental DNA (eDNA) and Biodiversity Monitoring
- Molecular Ecology and Evolutionary Biology
- Biotechnology in Agriculture and Food Security
- Industrial Biotechnology and Bioprocessing
- Bioremediation and Environmental Cleanup
- Microbial Biotechnology and Synthetic Biology
- o Genetic Modification in Plants and Animals
- Regulatory Aspects of Molecular Biotechnology
- o Case Studies in Environmental and Industrial Molecular Biology
- Future Trends in Industrial Biotechnology

## • Future Directions and Emerging Trends

- Innovations in Molecular Biology and Biotechnology
- o Role of Molecular Biology in Precision Medicine
- Emerging Applications in Genetic Research
- o Global Trends in Molecular Biology Research
- Future of Molecular Biology in Healthcare and Industry
- Ethics and Regulation in Molecular Biology Research
- o Future Research Priorities in Molecular Biology
- o Impact of Molecular Biology on Society
- Public Engagement and Education in Molecular Sciences
- Integration of Molecular Biology with AI and Data Science

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