

Exomics Internship

Advanced Focussed Areas for Interns in Exomics Internships

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• Fundamentals of Exomics

- Introduction to Exosomes and Extracellular Vesicles
- Biogenesis and Secretion of Exosomes
- Composition and Cargo of Exosomes
- Exosomal RNA, DNA, and Proteins
- Exosome Isolation and Characterization Techniques
- Functional Roles of Exosomes in Cell Communication
- Exosomes in Immune Modulation
- Exosome Uptake and Mechanisms of Action
- Applications of Exomics in Research
- Clinical Relevance of Exosomes

• Exosome Isolation and Characterization

- Techniques for Exosome Isolation
- Ultracentrifugation and Filtration Methods
- Immunoaffinity Capture and Precipitation
- Characterization of Exosomal Cargo
- Nanoparticle Tracking Analysis (NTA)
- Transmission Electron Microscopy (TEM)
- Flow Cytometry and Western Blotting
- Mass Spectrometry and Proteomics
- RNA Sequencing and Transcriptomics
- Future Trends in Exosome Characterization

• Biological Functions of Exosomes

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- Role of Exosomes in Immune Response
- Exosomes in Cancer and Tumor Microenvironment
- Exosomes in Neurodegenerative Diseases
- Cardiovascular Functions of Exosomes
- Exosomes in Regenerative Medicine
- Stem Cell-Derived Exosomes
- Pathological Roles of Exosomes
- Exosomes as Biomarkers for Diseases
- Future Directions in Exosome Biology

• Exosomes in Diagnostics and Therapeutics

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- Exosome Engineering and Modification
- Exosome-Based Vaccines and Immunotherapies
- Regulatory and Safety Considerations
- Clinical Trials and Applications
- $\circ~$ Challenges and Opportunities in Exosome Therapy
- $\circ\,$ Future Trends in Exosome-Based Therapeutics

• Future Directions and Emerging Trends

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- Impact of Exomics on Society
- Public Engagement and Education in Exomics
- Integration of Exomics with Artificial Intelligence

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