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Cutting-edge protocols developed by leading research scientists

currentprotocols.com

The Current Protocols collection includes over 25,000 step-by-step techniques, procedures, and practical overviews that provide researchers with reliable, efficient methods to ensure reproducible results and pave the way for critical scientific discovery.

Protocols Topics List

- Bioinformatics
- Cell Biology
- Chemical Biology
- Clinical and Diagnostic Methods
- Cytometry
- Essential Laboratory Techniques
- Field-Based Ecology
- Human Genetics
- Imaging
- Immunology
- Mammalian Systems and Disease Models
- Microbiology
- Molecular Biology
- Multi-Omics
- Nucleic Acid Chemistry
- Neuroscience
- Pharmacology
- Plant Biology
- Protein Science
- Stem Cell Biology
- Toxicology

25,000 peer-reviewed, regularly updated laboratory procedures

Cutting-edge protocols developed by leading research scientists

Indexed in **PubMed and Scopus**

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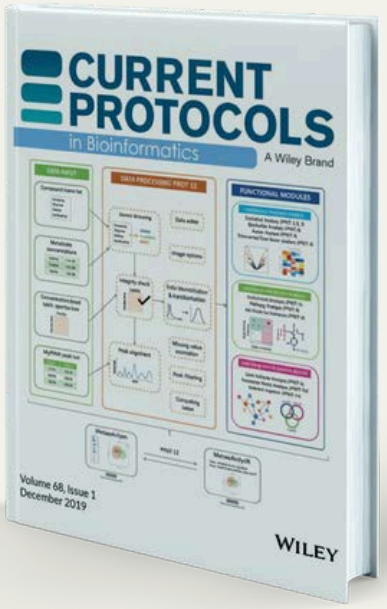
Current Protocols in Bioinformatics

Designed specifically for life scientists, **Current Protocols in Bioinformatics** is the number one resource for mastering the vast array of computational tools needed to not only decipher the tremendous amounts of information provided by today's research techniques, but also to present the results in a meaningful way. From the computer-shy to the most advanced super user, this title is a must for the modern laboratory.

- Features step-by-step instructions for working with hundreds of applications and databases from research groups around the globe
- Shows how to select the correct software parameters, analyze data, interpret results, generate hypotheses, and advance research to new levels
- Provides detailed screenshots so researchers know exactly what they should be seeing
- Explains the basis of algorithms and statistical sampling to ensure understanding of the results and limitations
- Includes a valuable appendix on user fundamentals and a glossary of bioinformatics terms



EDITED BY:
Alesandro Cestaro, Minji Jeon, Avi Ma'ayan, Ph.D., Philipp C. Münch, Dr. rer. nat

Areas Covered

- Analyzing Expression Patterns
- Analyzing Molecular Interactions
- Analyzing RNA Sequence and Structure
- Annotating Genes
- Assembling and Mapping Large Sequence Sets
- Building and Using Biological Databases
- Cheminformatics and Metabolomics
- Comparing Genomes
- Finding Similarities and Inferring Homologies
- Inferring Evolutionary Relationships
- Modeling Structure from Sequence
- Recognizing Functional Domains
- Understanding Genome Variation
- Using Proteomics Techniques

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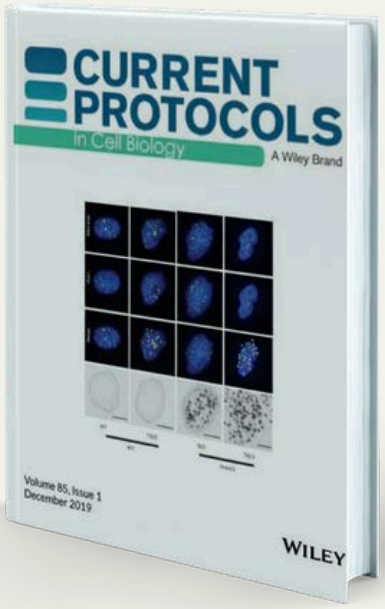
Current Protocols in Cell Biology

Developed by leading scientists in the field and including contributions from scientists internationally, **Current Protocols in Cell Biology** is a continuously updating essential reference for researchers who study the cell, its internal and external environment, and its relationships to other cells. This title includes detailed methods for analysis of the relationship between specific molecules and genes, and their locations, functions, and structure at the cellular level.

- Offers expert research tips and guidelines for isolating and culturing cells in two and three dimensional cultures, analyzing the morphology of the cell, and characterizing the functions of molecules and organelles in the cell and its environment
- Provides methods for a broad spectrum of microscopic techniques, including the use of fluorescent proteins and nanomaterials, as well as antibodies
- Covers methods for investigation of major pathways in the differentiation and function of cells
- Includes special appendices on the use of inhibitors and pharmacologic agents, protein motifs, excitation and emission maxima for common fluorophores, and common molecular biology methods



EDITED BY:
David Bryant, Jennifer Lippincott-Schwartz, Ph.D., Sara Wickström, M.D., Ph.D., Kenneth Yamada, M.D, Ph.D.

Areas Covered

- Antibodies as Cell Biological Tools
- Cell Adhesion
- Cell Biology of Chromosomes and Nuclei
- Cell Cycle Analysis
- Cell Culture
- Cell Motility
- Cellular Aging and Death
- Characterization of Cellular Proteins
- Electrophoresis and Immunoblotting
- Expression and Introduction of Macromolecules into Cells
- Extracellular Matrix
- Fluorescent Protein Technology
- In Vitro Reconstitution
- Lipids
- Macromolecular Interactions in Cells
- Microscopy
- Nanotechnology
- Organelle Motility
- Preparation and Isolation of Cells
- Protein Labeling and Immunoprecipitation
- Protein Trafficking
- Signal Transduction
- Stem Cells
- Subcellular Fractionation and Isolation of Organelles
- Whole Organism and Tissue Analysis
- Viruses

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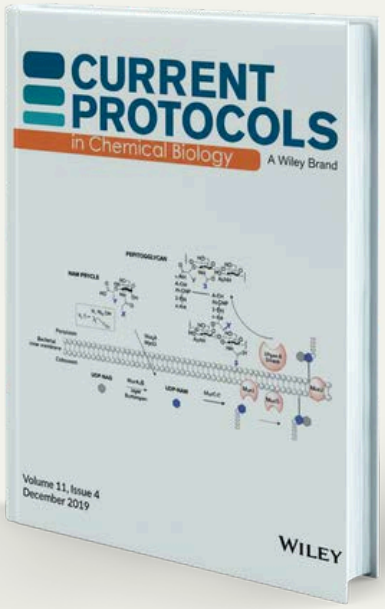
Current Protocols
in Chemical Biology

Chemical Biology involves the application of chemistry to the investigation of biology and drug design. Investigators in this diverse field study biological questions using chemical techniques and tools, often involving small molecules designed for a specific purpose or identified on the basis of biochemical or cell-based screens. **Current Protocols in Chemical Biology**:

- Describes advances in laboratory automation and robotics, statistical analysis, and medicinal chemistry as they apply to high-throughput screening (HTS) methods
- Includes methods for modification of proteins, nucleic acids, carbohydrates and lipids for their use as tools in the study of particular biological systems
- Suitable for researchers working in the fields of medicinal chemistry, combinatorial chemistry, proteomics, pharmacology, biochemistry, glycobiology, chemical genetics, molecular biology, cell biology, and cytometry



EDITED BY:
Bryan Dickinson, Amanda E. Hargrove, Ph.D., Lara Mahal, Ph.D., Daniel Nomura, Ph.D., Gregory Weiss, Ph.D., Kavita Shah, Ph.D.

Areas Covered

- Carbohydrate Modifications, Engineering and Applications
- Chemical Tools for Probing Small Molecule - Macromolecule Interactions
- Lipid Modifications, Engineering and Applications
- Nanotechnology Applications for Chemical Biology
- Nucleic Acid Modifications, Engineering, and Applications
- Protein Modifications, Engineering, and Applications
- Strategies for Bioactive Small Molecule Discovery
- Translational Chemical Biology

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Current Protocols in Clinical and Diagnostic Methods

The **Clinical Methods** section of **Current Protocols** serves as a comprehensive resource offering detailed methodologies and in-depth overviews for both foundational and advanced approaches in clinical and research diagnostics. This section covers a wide range of topics including molecular and cellular diagnostic techniques, imaging-based diagnostics, biomarker discovery and validation, assay development, and integration of diagnostic data with clinical decision-making.

Techniques featured include:

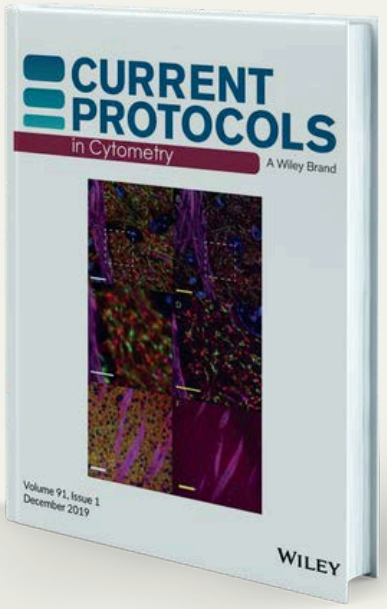
- Polymerase Chain Reaction (PCR) and quantitative PCR (qPCR) for nucleic acid detection
- Next-Generation Sequencing (NGS) for genomic diagnostics
- Enzyme-Linked Immunosorbent Assay (ELISA) and lateral flow assays for protein and antigen detection
- Flow cytometry and immunohistochemistry (IHC) for cellular and tissue analysis
- Mass spectrometry for metabolomic and proteomic profiling
- Magnetic Resonance Imaging (MRI) and Computed Tomography (CT) for structural and functional imaging
- CRISPR-based diagnostics for rapid and specific detection of genetic material
- Point-of-care (POC) testing platforms for rapid diagnostics in clinical and field settings

Emphasis is placed on reproducibility, sensitivity, specificity, and the application of diagnostics in personalized medicine, infectious disease detection, oncology, and other critical healthcare domains.

Current Protocols in Cytometry

Current Protocols in Cytometry distills and organizes the latest techniques from the top cytometry labs and specialists worldwide. It is the most complete set of peer-reviewed protocols for flow cytometry and in vivo imaging.

- Provides complete coverage of flow cytometry, with hundreds of elementary to advanced techniques, from instrumentation to interpretation, fluorescence to antigen density, and basic research to clinical applications
- Offers in-depth coverage of microscopy and in vivo imaging, including detailed discussion of objectives and expert guidelines on image interpretation, confocal microscopy, and illumination sources
- Includes valuable data, plus descriptions of stock solutions, equipment, common techniques featured protocol on how to use MyFlowCyt



EDITED BY:
Uttara Chakraborty, Florian Mair, Helen McGuire, T. Vincent Shankey, Ph.D., William Telford, Ph.D., Rachael Walker, Ph.D., Simon C. Watkins

ISAC
International Society for Advancement of Cytometry

Published in affiliation with The International Society for Advancement of Cytometry

Areas Covered

- Carbohydrate Modifications, Engineering and Applications
- Chemical Tools for Probing Small Molecule-Macromolecule Interactions
- Lipid Modifications, Engineering and Applications
- Nanotechnology Applications for Chemical Biology
- Nucleic Acid Modifications, Engineering, and Applications
- Protein Modifications, Engineering, and Applications
- Strategies for Bioactive Small Molecule Discovery
- Translational Chemical Biology

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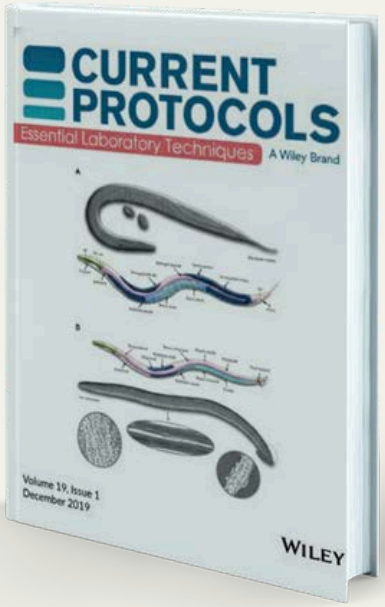
Current Protocols
Essential Laboratory Techniques

Suitable for novice and expert alike, **Current Protocols Essential Laboratory Techniques** is the ultimate all-in-one fundamentals guide for life scientists. **Essential Laboratory Techniques** provides in-depth information for experienced researchers looking for fresh insight into fundamental techniques, while remaining accessible to young scientists preparing to run an electrophoresis gel for the first time.

Covering basic and complex procedures—from weight and volume measurement to real-time PCR and bioinformatics—and including appendices on ethics and data presentation, this expanding resource gives access to the expertise, skills, and understanding required for superior success at the bench. It also:

- Describes solution chemistry and preparation
- Provides instruction on the care and use of common equipment such as pH meters, spectrophotometers, centrifuges, and microscopes
- Details modern bioinformatics techniques
- Provides practical guides to outsourcing



EDITED BY:
Sean R. Gallagher and Emily A. Wiley

Areas Covered

- General techniques, such as blotting, electrophoresis, and real-time PCR
- Skills such as measurement of mass, volume, pH, radioactivity, etc.

- Cell culture techniques
- Detailed explanations of image manipulation, including common file formats and when to use them Instructions for creating posters from programs such as PowerPoint

- Preparation of reagents, including recipes for common reagents and guides to buffers
- Proper keeping of a laboratory notebook, including information regarding intellectual property issues

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Current Protocols
in Field-Based Ecology

The **Field-Based Ecology Protocols** section of **Current Protocols** serves as a comprehensive resource offering detailed methodologies and in-depth overviews for both foundational and advanced approaches in ecological field research. This section covers a wide range of topics including experimental design in natural environments, species monitoring, habitat assessment, environmental sampling, and data integration across ecological scales.

Techniques featured include:

- Population and community surveys using transects, quadrats, and mark-recapture methods
- Remote sensing and GIS mapping for landscape-level ecological analysis
- Telemetry and GPS tracking for animal movement and behavior studies
- Soil and water sampling protocols for chemical and microbial analysis
- Phenological monitoring to assess seasonal biological events
- Biodiversity indexing and metrics for conservation and ecosystem health
- Climate data integration with ecological observations
- Longitudinal field studies for ecosystem change and resilience
- Citizen science engagement for large-scale data collection and outreach

Protocols emphasize reproducibility, scalability, and practical applications in conservation, climate research, land management, and ecosystem services. Designed for diverse environments, from forests to urban areas, they support both academic and applied ecological research.

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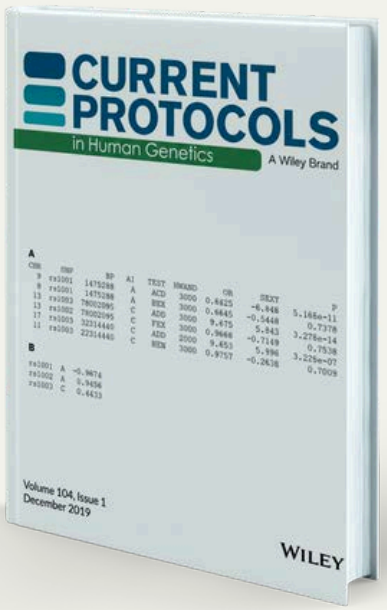
Current Protocols in Human Genetics

Current Protocols in Human Genetics is the comprehensive resource for all types of research and clinical laboratory approaches pertaining to human genetics. It covers disease gene mapping, generation and use of induced pluripotent stem cells, linkage and association studies, and analysis of sequence variants and larger-scale genomic structure.

- Features methods in all areas of genetic research, including expression analysis, clinical genetics, cancer genetics, analysis of sequence variants, cytogenetics, gene therapy, forensic genetics, biochemical genetics, next generation sequencing, and more
- Offers basic to sophisticated methods—many of them equally applicable to other eukaryotic organisms, such as the mouse



EDITED BY:
Jessica N. Cooke Bailey, Ph.D., Jonathan L. Haines, Ph.D., Madhuri Hegde, Ph.D., Bruce Korf, Cynthia C. Morton, Ph.D., Badri N. Vardarajan, Ph.D., Olivia Veatch

Areas Covered

- Biochemical Genetics
- Cancer Genetics
- Clinical Cytogenetics
- Clinical Molecular Genetics
- Conventional and Molecular Genetics
- Detecting Mutations and Variants
- Epigenetics
- Expression Profiling
- Forensic Genetics
- Gene Therapy
- Genetic Association Studies
- Genetic Linkage Studies
- Genome Structure Analysis
- Genotyping
- High-throughput Sequencing
- Identifying Candidate Genes in Genomic DNA
- Induced Pluripotent Stem Cells
- Mitochondrial Genetics
- Model Systems for the Analysis of Human Disease

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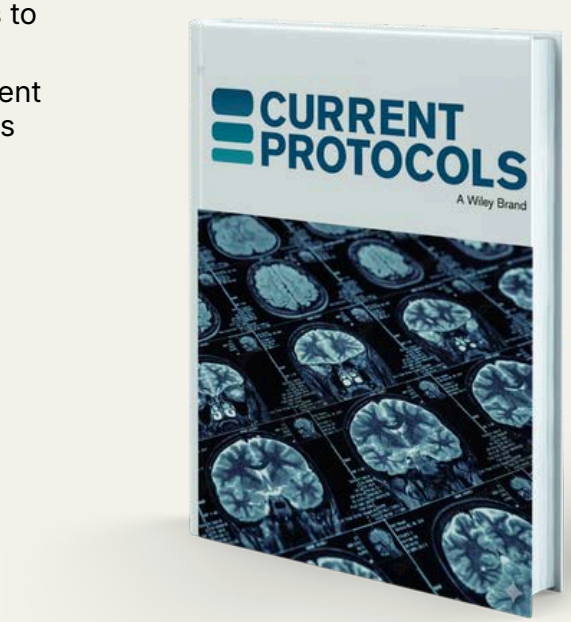
Current Protocols
in Imaging

Over the past two decades, **scientific imaging** has transformed from a primarily descriptive tool into a powerful, innovative suite of technologies that drive nearly every facet of bench-based biomedical research. Today, imaging is often the first approach used to test emerging hypotheses. However, as these technologies have evolved, so has their complexity—encompassing advancements in probes, optics, robotics, and computational analysis, as well as the challenges of integrating these elements to address specific scientific questions effectively.

The aim of this new publication area in **Current Protocols** is to demystify, clarify, and simplify these approaches, enabling researchers at all levels of expertise to successfully implement them in their own laboratories. These protocols also serve as fundamental training for graduate programs and frequently feature in advanced graduate coursework.

EDITED BY:
Sean R. Gallagher, Antentor Hinton, Bryan Millis, Katti Prasanna, Simon C. Watkins, Alan Watson, Shili Xu, Meng Yang



Areas Covered

- Scientific Imaging Evolution
- Imaging Technologies
- Integration Solutions

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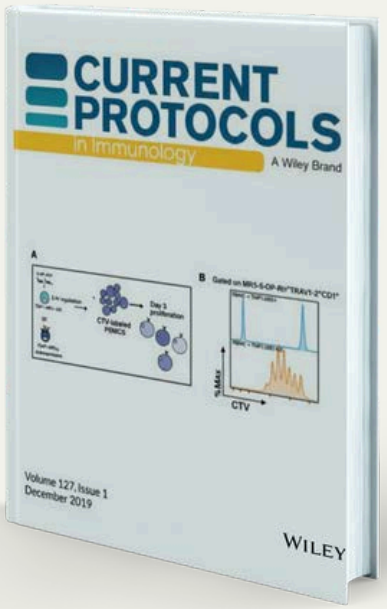
Current Protocols in Immunology

Current Protocols in Immunology is a collection that provides comprehensive coverage of immunological methods—from classic to the most cutting edge— and contains the most sophisticated protocols in immunology today.

- Covers the latest in antibody detection and preparation, molecular immunology, innate immunity, tumor immunology, engineering immune molecules and receptors, and more
- Includes chapters on sources and proven methods for isolation and characterization of all types of lymphoid cells, non-lymphoid cells involved in immune responses, stem and progenitor cells
- Contains a massive array of animal models for studying immunological conditions and infectious diseases
- Offers valuable reference information in five extensive "best practices" appendices, including commonly used reagents, equipment and techniques, and a full appendix devoted to the CD system of leukocyte surface molecules



EDITED BY:
Andrew Brooks, Ph.D., John E. Coligan, Ph.D., David H. Margulies, M.D., Ph.D., Ethan M. Shevach, M.D, Warren Strober, M.D., James Wing

Areas Covered

- Animal Health and Husbandry
- Animal Models for Autoimmune and Inflammatory Disease
- Animal Models for Infectious Diseases
- Animal Models for Tumor Immunology
- Antigen Processing and Presentation
- Biochemistry of Cell Activation Complement
- Cytokines and Their Cellular Receptors
- Detection and Analysis of HIV
- Engineering Immune Molecules and Receptors
- Immunofluorescence and Cell Sorting
- Immunologic Studies in Humans
- In Vitro Assays for Mouse Lymphocyte Function
- In Vivo Assays for Lymphocyte Function
- Induction of Immune Responses
- Innate Immunity
- Isolation and Analysis of Proteins
- Isolation and Differentiation of Stem and Progenitor Cells
- Ligand-Receptor Interactions in the Immune System
- Microscopy
- Molecular Biology
- Peptides

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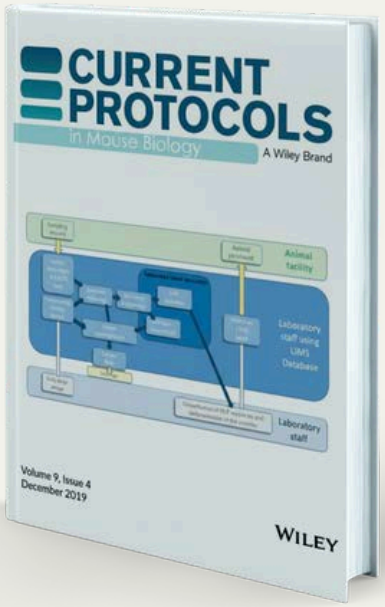
Current Protocols in Mammalian Systems and Disease Model

Current Protocols in Mammalian Systems and Disease Models was developed by leading scientists in the field and brings together resources in mouse biology and genetics. This title satisfies a great and growing need for a compilation of peer- reviewed step-by-step protocols used in all areas of research involving mice.

Current Protocols in Mammalian Systems and Disease Models is regularly updated to meet the needs of investigators in this rapidly evolving specialty, making the very latest techniques available at the click of a mouse.

- Covers mouse methods in the areas of mouse husbandry and analysis, including breeding and maintenance of colonies, generation of mouse models, as well as clinical and molecular phenotyping of mice
- Detailed protocols and in-depth overviews for in vivo, ex vivo, and in vitro mouse methods applicable across diverse fields of biomedical research
- Suitable for investigators in all areas of research using mice, including academic, government, biopharmaceutical, and veterinary sciences



EDITED BY:
Ruth Arkell, Ph.D., Stephen D. Brown, Ph.D., Yann Herault, Ph.D., Atsushi Yoshiki

Areas Covered

- Autopsy and Collection of Tissues
- Behavior Assessment
- Breeding, Colony Management and Archiving
- Clinical and Molecular Phenotyping of Mice
- Collection of Body Fluids
- CNS and PNS Exploration
- Ethical Considerations for Working with Mice
- Exploration of the Cardiac System
- Exploration of the Liver and the Gastrointestinal Tract
- Hearing
- Hematology and Immunology
- Metabolic Exploration of the Mouse
- Neuromuscular Assessment
- The Respiratory System in the Mouse
- The Skeletal System
- Strains and Nomenclature
- Studying Cancer in the Mouse
- Surgical Techniques, Both Fundamental and Advanced
- Techniques to Generate Mouse Models and Analyze Genetic Variation

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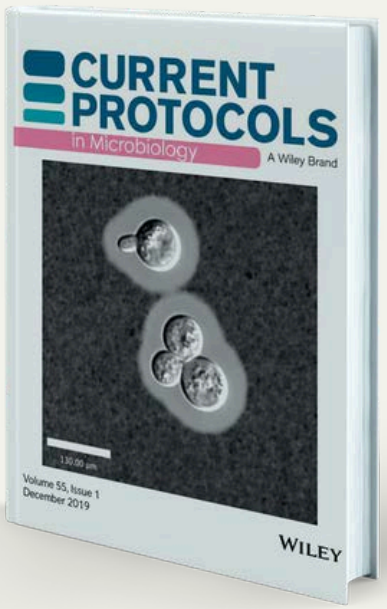
Current Protocols in Microbiology

Current Protocols in Microbiology details the best procedures for analyzing bacteria and viruses, including pathogens affecting animals and plants. Written by leading experts and reviewed meticulously by a distinguished Editorial Board as well as inhouse scientific editors, this title offers continually updated coverage of emerging technologies and concepts such as biofilms, quorum sensing, quantitative PCR, and proteomics and genomics, as well as basic and advanced methodology for specific microorganisms. It is the first comprehensive source of high-quality microbiology protocols to reflect and incorporate the new mandates and capabilities of this rapidly evolving discipline.

- Provides detailed, step-by-step instructions for isolation, growth, and analysis of a wide variety of specific bacteria and viruses, as well as basic culture and staining techniques
- Features a chapter on anti-infectives
- Coverage expanding to include mycology
- Increased coverage of metagenomics and microbiomes



EDITED BY:
Leah E. Cowen, Ph.D., Maureen Ferran, Ph.D., Michael Grigg, Ph.D., John Parkinson, Ph.D., Brian Stevenson, Ph.D.

Areas Covered

- Actinobacteria (High G+C Gram Positive)
- Alpha Proteobacteria
- Animal DNA Viruses
- Animal RNA Viruses
- Anti-Infectives
- Beta Proteobacteria
- Chlamydia
- Delta Protobacteria
- Emerging Technologies
- Enteric Gamma Proteobacteria
- Epsilon Proteobacteria
- Firmicutes (Low G+C Gram Positive)
- Fungi Microbial Communities
- Microscopy and Imaging
- Nonenteric Gamma Proteobacteria
- Other Eubacteria
- Plant RNA Viruses
- Protists
- Spirochetes

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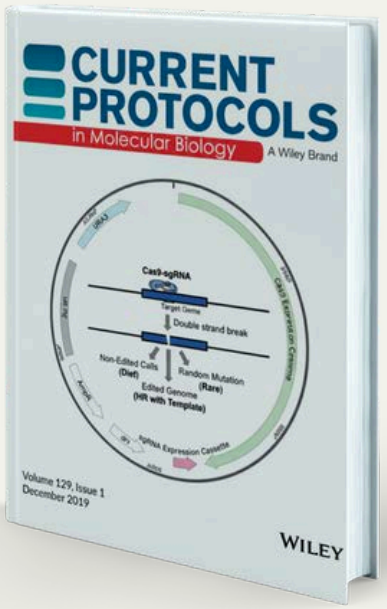
Current Protocols
in Molecular Biology

An essential tool for anyone at the forefront of molecular biology research, **Current Protocols in Molecular Biology**, remains the benchmark by which all other protocol resources are judged. With an extensive range of information, from basic methods to advanced procedures, **Current Protocols in Molecular Biology** provides incomparable coverage of this ever expanding field.

- Contains updated information and protocols on rapidly changing areas such as genome editing, next generation sequencing, RNAi and zinc finger nucleases
- Covers basic methods, such as nucleic acid isolation, purification, and quantitation
- Offers advanced procedures for microarray analysis, chromatin assembly and analysis, single-cell analysis and gene silencing, among others
- Explores specialized areas, including mouse phenotyping and metabolomics



EDITED BY:
Phillip Cole, M.D., Ph.D., Koen Venken, Ph.D., Jin Zhang, Ph.D.

Areas Covered

- Analysis of Proteins
- Analysis of Protein Interactions
- Analysis of Protein Phosphorylation
- Chromatin Assembly and Analysis
- Construction and Screening of Recombinant DNA Libraries
- Discovery and Analysis of Differentially Expressed Genes
- DNA and RNA: Enzymatic Manipulation
- DNA and RNA: Preparation and Analysis
- DNA and RNA: Protein Interactions
- DNA Sequencing
- Escherichia coli, Plasmids, and Bacteriophages
- Genome Editing
- Gene Silencing
- Generation and Use of Combinatorial Libraries
- Immunology
- In Situ Hybridization and Immunohistochemistry
- Informatics for Molecular Biologists
- Introduction of DNA into Mammalian Cells
- Mammalian Cell Culture
- Manipulating the Mouse Genome
- Metabolomics
- Mouse Phenotyping
- Mutagenesis of Cloned DNA
- Nucleic Acid Arrays
- The Polymerase Chain Reaction
- Preparation and Analyses of Glycoconjugates Protein Expression
- Yeast

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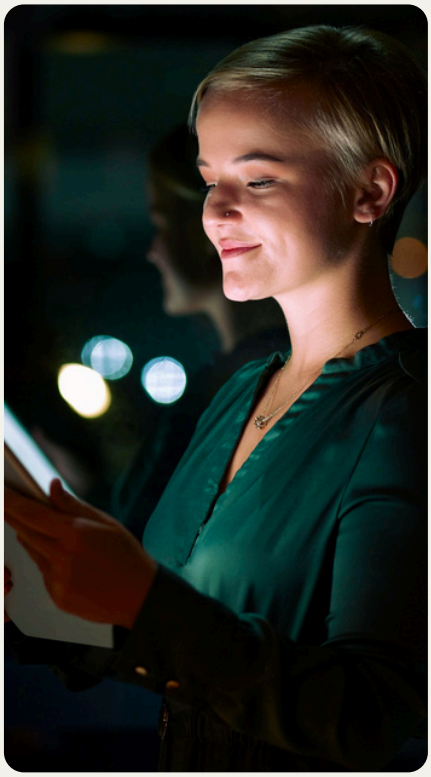
Current Protocols
in Multi-Omics

The **Multi-Omics Protocols** section of **Current Protocols** serves as an extensive resource offering detailed protocols and comprehensive overviews for both fundamental and advanced experimental design, scientific research methods, and analyses in the interdisciplinary field of multi-omics. This section encompasses areas such as integrating genomic, transcriptomic, proteomic, and metabolomic data, pathway and network analysis, identifying biomarkers, and constructing and utilizing multi-omics databases.

Techniques featured include:



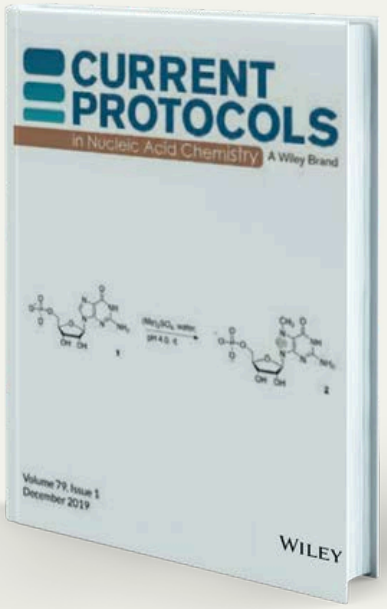
- Single-cell multi-omics for simultaneous profiling of transcriptomic, epigenomic, and proteomic data
- Spatial transcriptomics for mapping gene expression within tissue architecture
- Chromatin accessibility assays (ATAC-seq) paired with RNA-seq for regulatory network reconstruction
- Mass spectrometry-based proteomics and metabolomics for molecular profiling
- Microfluidics and droplet-based platforms for high-throughput single-cell isolation and analysis
- Genomic cytometry for cell-by-cell measurement of DNA, RNA, protein, and epigenetic states
- Computational pipelines for dimensionality reduction, clustering, and trajectory analysis of multi-modal datasets
- Integration of multi-platform data for harmonized analysis across diverse biological samples
- Biomarker discovery and validation using multi-layered omics data
- Longitudinal cell atlas construction

These protocols are designed to support both experimentalists and computational biologists in navigating the complexity of multi-modal data and translating it into actionable biological insights.

Current Protocols in Nucleic Acid Chemistry

Current Protocols in Nucleic Acid Chemistry is the resource for designing and running successful research projects in the rapidly growing and changing field of nucleic acid, nucleotide, and nucleoside research. Developed by an international group of editors and authors, the methods draw from a unique set of chemistries to synthesize modified nucleic acids, which can be used in structure function studies, as therapeutic agents, and as tools for molecular biology.

- Covers basic to advanced techniques for the synthesis, modification, purification, protection, analysis, and utilization of nucleic acids, nucleotides, and nucleosides
- Includes methods for analysis of structure-function, binding, and cross-linking
- Includes growing coverage of therapeutic agents, including anticancer and antiviral compounds



EDITED BY:

Martin Egli, Ph.D., Piet Herdewijn, Ph.D., Claudia Hobartner, Akira Matsuda, Ph.D., Yogesh S. Sanghvi, Ph.D., Chaoyong Yang

Published in Affiliation with the International Society for Nucleosides, Nucleotides & Nucleic Acids (IS3NA)

Areas Covered

- Biologically Active Nucleosides
- Biophysical Analysis of Nucleic Acids
- Chemical and Enzymatic Probes for Nucleic Acid Structure
- Combinatorial Methods in Nucleic Acid Chemistry
- Methods for Cross-Linking Nucleic Acids
- Nucleic Acid-Based Microarrays and Nanostructures
- Nucleoside Phosphorylation and Related Modifications
- Nucleoside Prodrugs and Delivery Strategies
- Protection of Nucleosides for Oligonucleotide Synthesis
- Purification and Analysis of Synthetic Nucleic Acids and Components
- Quadruplex Formation
- RNA Silencing
- Synthesis of Modified Nucleosides
- Synthesis of Modified Oligonucleotides and Conjugates
- Synthesis of Unmodified Oligonucleotides Developed by pharmacologists and medicinal

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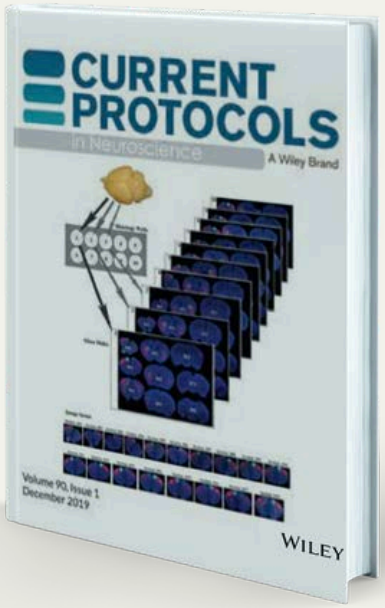
Current Protocols in Neuroscience

Current Protocols in Neuroscience is the most comprehensive collection of validated methods and preclinical models for researchers investigating the nervous system. Neuroscience is an exceptionally broad discipline and ranges from the study of the action of single ion channels up through wholeanimal behaviors and complex diseases. As a result, neuroscientists tend to be particularly collaborative in their research efforts to understand how the nervous system works and how to modify it. **Current Protocols in Neuroscience** brings together all levels of the discipline in one extensive collection.

- Collects hundreds of core techniques in all branches of neuroscience from leading scientists around the world
- Draws from molecular neurobiology, neurophysiology, neuroanatomy, neuropharmacology, and behavioral neuroscience
- Includes both in vitro and in vivo models, prepared, edited, and tailored specially for neuroscience research



EDITED BY:

Charles R. Gerfen, Ph.D., Andrew Holmes, Ph.D., Linnaea Ostroff, Pinar Ozbay, Mehmet Kurt

Areas Covered

- Behavioral Neuroscience
- Cellular and Developmental Neuroscience
- Construction of Custom Electrophysiology Tools
- Human Neuroscience
- Imaging
- Molecular Neuroscience
- Neuroanatomical Methods
- Neurochemistry / Neuropharmacology
- Neurophysiology
- Preclinical Models of Neurologic and Psychiatric
- Disorders

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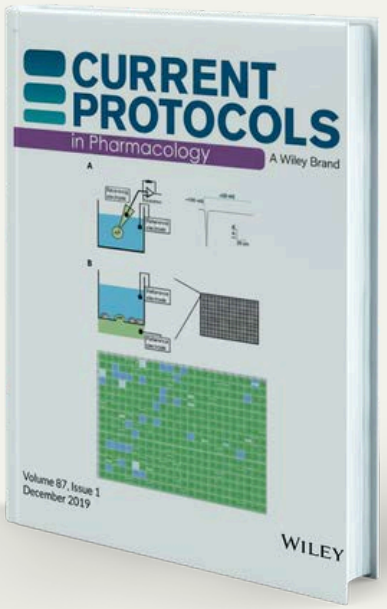
Current Protocols in Pharmacology

Developed by pharmacologists and medicinal chemists from academia and industry, **Current Protocols in Pharmacology** is a key reference work that documents the broad spectrum of integrative techniques used in drug discovery and in the study of disease pathophysiology. The individual units present basic pharmacological techniques, from an assessment of the efficacy of new compounds to the safety pharmacology studies necessary for the regulatory filing of an Investigational New Drug (IND) application. Accompanying expert overviews provide perspective and context, making it easy for newcomers and professionals alike to profitably use **Current Protocols in Pharmacology** to its fullest extent.

- Covers the full range of molecular, cellular, and in vivo pharmacological techniques used in the discovery and study of drugs and NCEs in the antiinfective, cardiovascular, inflammatory (including respiratory and arthritis), neurological, oncological, pain, and psychiatric therapeutic areas
- Presents state-of-the-art techniques for characterizing the interaction of known drugs and NCEs with receptors and enzymes at the molecular and functional levels together with proven preclinical models of the human disease state to assess efficacy, selectivity, and side effect liabilities
- Provides timely and authoritative overviews on receptor theory and the drug discovery process, from target identification and compound screening to the preclinical IND process



EDITED BY:

Matthew Brody, Ph.D., Amandine Chaix, Ali Mobasheri, Ph.D., Samba Reddy, Ph.D., Bruce Ruggeri, Ph.D., Amy Wesa

Areas Covered

- ADME/Pharmacodynamics
- Animal Models of Human Disease States
- Anti-Infectives
- Electrophysiological Techniques
- Enzyme Assays
- G Protein-Coupled Receptors
- Ligand-Gated Ion Channels; Isolated Tissue Preparations
- Ligand-Gated Ion Channels
- Molecular Pharmacology
- Oncology Models
- Receptor Binding and Function
- Receptor Theory
- Safety Pharmacology
- Toxicology

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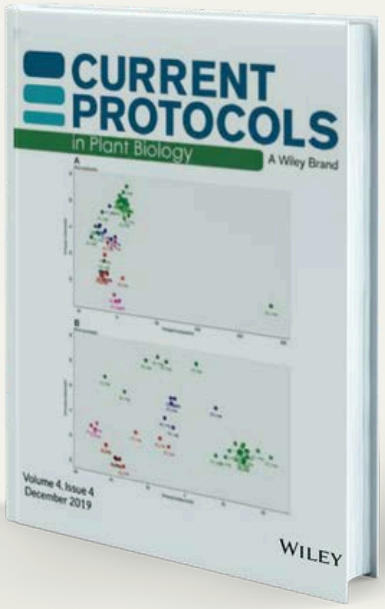
Current Protocols in Plant Biology

Plants provide, either directly or indirectly, all of our food, as well as the clothes on our backs, the material for our homes and the energy that fuels our society. The progress in plant science research has been spectacular over the past 50 years, with many fundamental discoveries occurring only in the last few years. The advancements cannot come too soon because the planet faces significant challenges with respect to increasing population, climate change, and limitations of natural resources. In most areas of science, advancement in knowledge is driven largely by the development and application of new methods, either invented de novo or adapted from other disciplines. Plants clearly provide their own challenges, as well as unique characteristics that require, at a minimum, modification of current methods to optimize their utility. Indeed, it is often necessary to develop unique methods that are applicable to one or a select group of plant species.

The aims and scope of **Current Protocols in Plant Biology** are to provide a curated compilation of current methods that cover all aspects of plant biology with the goal of advancing the progress of plant science research. As with all of the Current Protocols titles, experts from around the globe, many of whom have invented the methods described, will provide their step-by-step protocols and expert advice to ensure that even novice plant biologist can confidently apply these methods to their own research.



EDITED BY:

Federica Brandizzi, Ph.D., Yiliang Ding, Alisdair Fernie, DPhil, Hailing Jin, Ph.D.

Published jointly with The American Society of Plant Biologists

Areas Covered

- Extraction of DNA, RNA, Proteins
- Chromosome Analysis
- Transcriptional Analysis
- Protein Expression Analysis
- Metabolite Analysis
- Plant Enzymology
- Epigenetics
- Plant Genetic Transformation

Species Covered

- Arabidopsis
- Maize
- Poplar
- Rice
- Soybean

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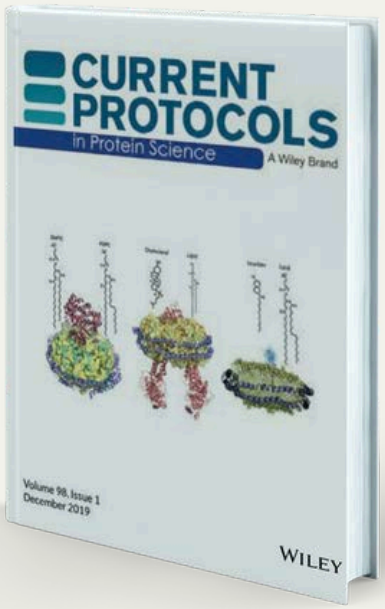
Current Protocols in Protein Science

Proteins are one of the fundamental elements of life, along with nucleic and fatty acids, carbohydrates, and a few other types of molecules. **Current Protocols in Protein Science** provides the most comprehensive collection of methods for the study of all aspects of proteins, and includes both classic and state-of-the-art methods for protein purification, identification, modification, engineering, structure determination, interaction studies, and proteomic analysis. All aspects of the study of proteins are accounted for in this unparalleled series.

- Presents a vast array of methods for studying and quantifying protein interactions, as well as many protocols for proteomics analysis and protein engineering
- Suitable for expert protein researchers as well as scientists with little prior experience in protein isolation and characterization, including scientists trained in other biological disciplines

EDITED BY:
Mark A. Arbing, Ph.D., John E. Coligan, Ph.D.,
Xu Dong, Yang Zhang, Ph.D.



Areas Covered

- Affinity Purification
- Characterization of Recombinant Proteins
- Chemical Modification of Proteins
- Computational Analysis
- Conventional Chromatographic Separations
- Detection and Assay Methods
- Electrophoresis Extraction, Stabilization, and Concentration
- Gel-Based Proteome Analysis
- Identification of Protein Interactions
- Mass Spectrometry
- Membrane Proteins
- Non-Gel-Based Proteome Analysis
- Peptidases
- Post-Translational Modification: Glycosylation
- Post-Translational Modification: Phosphorylation and Phosphatases
- Post-Translational Modification: Specialized Applications
- Production of Recombinant Proteins
- Protein Engineering
- Protein Folding
- Proteome Bioinformatics
- Purification of Recombinant Proteins
- Quantitation of Protein Interactions
- Strategies of Protein Purification and Characterization
- Structural Biology
- Targeted Proteomics

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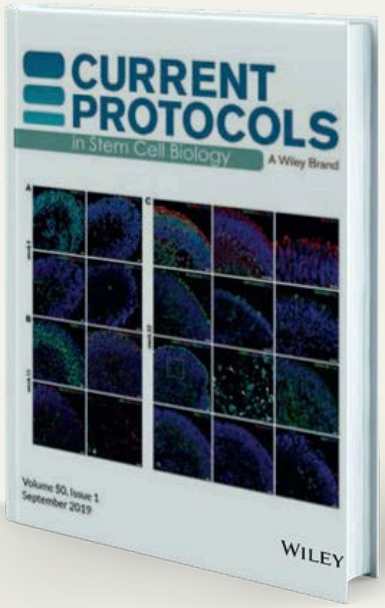
Current Protocols
in Stem Cell Biology

Produced in association with the ISSCR, **Current Protocols in Stem Cell Biology** provides experimental methods established by leading investigators from all over the world. Designed to help researchers realize the potential of stem cells for improving human health, the protocols include basic and emerging technologies for the analysis of stem cells, as well as the processes underlying differentiation and development. **Current Protocols in Stem Cell Biology** also includes detailed methodologies for isolating, propagating, differentiating, and performing genetic manipulation of stem cells from a variety of organisms, including humans; alternative methodologies for the generation of stem cells; experimental procedures to assist scientists in discovering methods to control differentiation; and promising genomic and proteomic approaches to the study of embryonic development.

- Isolation, characterization, and differentiation of stem cells from embryonic and extraembryonic tissues from a variety of organisms
- Isolation and characterization of somatic stem cells
- Isolation and characterization of cancer stem cells
- Manipulation of the potency of cells
- Genetic manipulation of stem cells



EDITED BY:
Laura Batlle Morera, Ph.D., Abdul Mazid, Axel Schambach, M.D., Evan Snyder, M.D., Ph.D.

ISSCR International Society for Stem Cell Research

Published in affiliation with The International Society of Stem Cell Research

Areas Covered

- Cancer Stem Cells
- Cardiovascular Stem Cells
- Characterization of Embryonic Stem Cells
- Culture and Maintenance of Undifferentiated
- Embryonic Stem Cells
- Ectodermal Lineages
- Endodermal Stem Cells
- Extraembryonic Lineages
- Genetic Manipulation of Stem Cells
- Germ Layer Induction/Differentiation of Embryonic Stem Cells
- Germline Stem Cells
- Gut Stem Cells
- Hematopoietic Stem Cells
- Homologous Recombination in Stem Cells
- iPS Cells
- Isolation of Embryonic Stem Cells
- Lineage Tracers in Stem Cells
- Mesodermal Lineages
- Manipulation of Potency
- Neural Stem Cells
- Non-Hematopoietic Bone Marrow- Derived Stem Cells
- Nuclear Transfer

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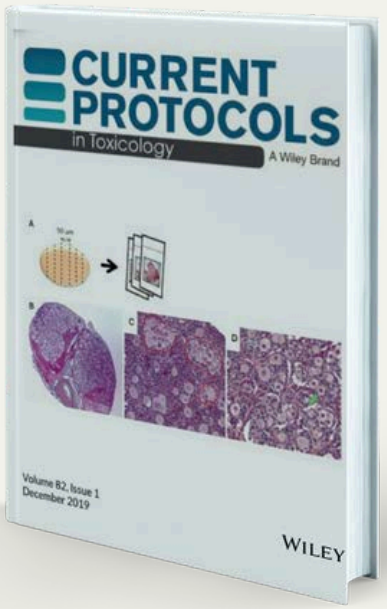
Current Protocols in Toxicology

Current Protocols in Toxicology is the best updated methods resource for accurate, efficient assessment of toxicity in whole organisms, organs and tissues, cells, and biochemical pathways. Including contributions from scientists globally, this title provides step-by-step protocols for the molecular analysis of the pathways, processes, and phenomena associated with toxic insults.

- Provides the latest models and methods from molecular biology, cell biology, biochemistry, and genetics as they are applied in a toxicology context
- Includes methods for analysis of the major pathways associated with responses to toxicants
- Describes whole-animal and in vitro model systems for testing and characterizing the responses to toxic agents
- New units focused on modern techniques for drug transporters, regulatory toxicology, and developmental and environmental studies



EDITED BY:
Lucio G. Costa, PharmD., Julio Davila, Ph.D., Natasha Kovalova, David A. Lawrence, Ph.D., Judit Marsillach, Menghang Xia, Ph.D.

Areas Covered

- Alternative Methodologies in Toxicology
- Assessment of Cell Toxicity
- Assessment of the Activity of Antioxidant Enzymes
- Biochemical and Molecular Neurotoxicology
- Drug Transporters
- Gastrointestinal Toxicology
- Gene Targeting
- Genetic Toxicology: Mutagenesis and Adduct Formation
- The Glutathione Pathway
- Heme Degradation Pathway
- Heme Synthesis Pathway
- Hepatotoxicology
- Immunotoxicology
- Male Reproductive Toxicology
- Neurotoxicology
- The Nitric Oxide/Guanylate Cyclase Pathway
- Oxidative Stress
- Regulatory Testing
- Respiratory Toxicology
- Techniques for Analysis of Chemical Biotransformation
- Teratology and Developmental Toxicology
- Toxicokinetics
- Toxicological Models

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Supporting the researcher at every step

Here's how we can help

1 **INTRODUCTION AND OVERVIEW**
Where should I begin?

2 **BACKGROUND INFORMATION**
I have an idea for an experiment!

3 **BASIC PROTOCOLS**
Steps I should followfor a successful and reproducible experiment

4 **ALTERNATE PROTOCOLS**
Isthere a differentapproachthat works better with my sample?

5 **SUPPORT PROTOCOLS**
What else do I need to prepare for this experiment?

6 **RECIPES AND SOLUTIONS**
Clear and precise recipes to ensure reproducibility

7 **EXPERT ADVICE**
Things I should watch for during the experiment

- Helpful hints
- Expected results along the way
- Cautions
- Time considerations

8 **ANALYSIS OF RESULTS/TROUBLESHOOTING**
What can I infer from the experimental results?

- How can I further optimize the experiment?
- Why is there an outlier?

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