

# **-: EDITORS :-**

## **PROF (DR.) MANISHA KHANDAIT, MD**

Professor & HOD,  
Department of Microbiology  
Faculty of Medicine & Health Sciences  
SGT University India

## **PROF (DR.) RUCHI KANT (PH.D. FSOE)**

Head & Research Coordinator  
Department of Medical Lab Techniques  
College of Paramedical Sciences  
Teerthanker Mahaveer University, India

## **DR. SANDHYA (PH.D.)**

Assistant Professor  
Department of Microbiology  
Faculty of Allied Health Sciences  
SGT University, India

## **DR. SUCHANDRA GUPTA**

Assistant Professor  
Department of Paramedical Sciences  
Faculty of Allied Health Sciences  
SGT University, India

# SPJ PUBLICATION

Regd. Office: SPJ House-48 Narayanpur Begusarai, Bihar India, 848202

Dear Researchers, Academicians, and Professionals,

SPJ Publication invites you to contribute a chapter to our upcoming book, *“Medical Laboratory Science in Practice”*. This book aims to serve as a comprehensive reference covering fundamental principles, techniques, and emerging trends in the field of Medical Laboratory Science.

We welcome contributions from subject experts, researchers, and educators who wish to share their insights and advancements with the academic and scientific community. Each accepted chapter will be published with an **ISBN and DOI**, ensuring global recognition and accessibility.

## Targeted Audience

- Academicians and Researchers
- Medical Laboratory Professionals
- Healthcare Professionals
- Students and Early-Career Professionals
- Industry Experts and Innovators, etc.

## Submission Guidelines

- **Word Limit:** 8,000 – 12,000 words per chapter.
- **Maximum Authors per Chapter:** 5 authors.
- **Formatting:**
  - **Font:** Times New Roman, Size 12, single spacing, side margin-1.5
  - **References:** APA or Vancouver style
  - **Figures and tables** should be clear, high-resolution, and appropriately labeled.
- **Originality:** The submitted chapter must be original and free from plagiarism (less than 10% similarity).
- **Review Process:** All chapters will undergo a Single-blind peer-review for quality assessment.

**Publication Charges:** INR 2,000 per chapter (including ISBN, DOI, and indexing in Google Scholar & CrossRef). *Maximum 5 Authors can be included in one chapter.*

## Important Dates

- **Abstract Submission Deadline: 15 June 2025 (Extended)**
- **Full Chapter Submission Deadline: 25 July 2025 (Extended)**
- **Abstract/Chapter Acceptance: 30 June 2025 (Extended)**
- **Tentative date of publication: August 2025. (Extended)**

## Full Chapter Submission

- Full Chapter should be submit online through given link,  
<https://omp.spjinternational.co/index.php/spjp/about/submissions>
- Abstract Submission: ✉ [editor@spjinternational.co](mailto:editor@spjinternational.co), [ms@spjinternational.co](mailto:ms@spjinternational.co)
- 

For queries, contact us at ✉ [info@spjinternational.co](mailto:info@spjinternational.co), Phone: +91-3369029647

We look forward to your valuable contributions!

# SPJ PUBLICATION

Regd. Office: SPJ House-48 Narayanpur Begusarai, Bihar India, 848202

## VOLUME 1: FOUNDATIONS OF MEDICAL LABORATORY SCIENCE

### Chapter 1: Introduction to Medical Laboratory Science

- 1.1 Definition and Scope of Medical Laboratory Science
- 1.2 Roles and Responsibilities of Laboratory Professionals
- 1.3 History of Medical Laboratory Science
- 1.4 Professional Bodies and Certification
- 1.5 Ethical and Legal Considerations in Medical Laboratory Practice
- 1.6 Overview of Laboratory Disciplines: Hematology, Microbiology, Biochemistry, and Immunology

### Chapter 2: Laboratory Safety and Occupational Health

- 2.1 Safety Standards and Guidelines (OSHA, CLSI)
- 2.2 Personal Protective Equipment (PPE)
- 2.3 Safe Handling of Biological Specimens
- 2.4 Hazardous Waste Disposal and Environmental Safety
- 2.5 Laboratory Ventilation Systems and Fume Hoods
- 2.6 Health and Safety Regulations for Lab Technicians

### Chapter 3: Laboratory Instrumentation and Equipment

- 3.1 Types of Laboratory Instruments and Their Functions
- 3.2 Basic Instruments: Microscopes, Centrifuges, and Balances
- 3.3 Advanced Instruments: Spectrophotometers, HPLC, and Analyzers
- 3.4 Calibration, Maintenance, and Troubleshooting
- 3.5 Automation in Laboratories: Robotic Systems and Data Management
- 3.6 Emerging Laboratory Technologies

### Chapter 4: Laboratory Techniques and Procedures

- 4.1 Collection, Handling, and Processing of Specimens
- 4.2 Types of Sample Collection and Processing
- 4.2 Preparation of Reagents and Solutions
- 4.3 Routine Laboratory Techniques: Pipetting, Centrifugation, and Filtration
- 4.4 Advanced Techniques: PCR, Gel Electrophoresis, and Flow Cytometry
- 4.5 Quality Control Measures in Laboratory Procedures
- 4.6 Troubleshooting Common Laboratory Errors

### Chapter 5: Introduction to Clinical Chemistry

- 5.1 Overview of Clinical Chemistry
- 5.2 Biochemical Principles: Enzymes, Electrolytes, and Metabolites
- 5.3 Routine Clinical Chemistry Tests: Glucose, Lipids, Liver Function, etc.
- 5.4 Blood Gas Analysis and Acid-Base Balance
- 5.5 Interpretation of Laboratory Results in Clinical Chemistry
- 5.6 Emerging Trends in Clinical Chemistry

### Chapter 6: Hematology and Blood Disorders

- 6.1 Structure and Function of Blood Components
- 6.2 Hematopoiesis and Disorders of Blood Cell Production
- 6.3 Common Hematological Disorders: Anemia, Leukemia, etc.

# SPJ PUBLICATION

Regd. Office: SPJ House-48 Narayanpur Begusarai, Bihar India, 848202

6.4 Techniques in Hematology: Blood Smears, Cell Counting, and Hemoglobinometry

6.5 Coagulation Studies and Platelet Function

6.6 Case Studies in Hematology

## **Chapter 7: Introduction to Clinical Microbiology**

7.1 Overview of Microbiology and its Role in Diagnostics

7.2 Classification and Morphology of Microorganisms: Bacteria, Viruses, Fungi, and Parasites

7.3 Microbial Cultivation Methods: Media Preparation, Incubation, and Isolation

7.4 Staining Techniques: Gram Staining, Acid-Fast Staining, Fluorescence Staining

7.5 Antimicrobial Susceptibility Testing

7.6 Diagnostic Microbiological Tests and Their Interpretation

## **Chapter 8: Introduction to Immunology**

8.1 Basic Principles of Immunology

8.2 Components of the Immune System: Antibodies, Antigens, and Immuno-cytes

8.3 Immune Response and Immunopathology

8.4 Diagnostic Immunology: ELISA, Western Blot, Immunofluorescence

8.5 Autoimmunity and Immuno-deficiencies

8.6 Immunization and Vaccine Development

## **Chapter 9: Molecular Biology Techniques**

9.1 Basics of DNA, RNA, and Protein Synthesis

9.2 DNA Extraction, Purification, and Quantification

9.3 Polymerase Chain Reaction (PCR)

9.4 Gel Electrophoresis and DNA Sequencing

9.5 Gene Expression Analysis and Southern/Northern Blotting

9.6 Applications of Molecular Biology in Medical Diagnostics

## **Chapter 10: Introduction to Histology and Cytology**

10.1 Basics of Tissue Preparation: Fixation, Embedding, and Sectioning

10.2 Staining Techniques: Hematoxylin and Eosin, Special Stains

10.3 Cytological Smears and Techniques

10.4 Microscopic Examination of Tissue and Cells

10.5 Diagnosis of Cancer and Other Diseases

10.6 Role of Histology in Disease Diagnosis

## **Chapter 11: Laboratory Quality Control and Assurance**

11.1 Definition and Importance of Quality Control

11.2 Internal and External Quality Control Programs

11.3 Standard Operating Procedures (SOPs) and Documentation

11.4 Control Charts and Statistical Quality Control

11.5 Accreditation and Laboratory Audits

11.6 Troubleshooting in Quality Control

## **Chapter 12: Laboratory Information Systems and Data Management**

12.1 Introduction to Laboratory Information Systems (LIS)

12.2 Data Entry, Management, and Reporting

12.3 Integration with Electronic Health Records (EHR)

12.4 Data Security and Confidentiality

# SPJ PUBLICATION

Regd. Office: SPJ House-48 Narayanpur Begusarai, Bihar India, 848202

12.5 Data Analysis and Laboratory Statistics

12.6 Future Trends in Laboratory Informatics

## **Chapter 13: Ethics and Professionalism in Laboratory Medicine**

13.1 Ethical Principles in Laboratory Science

13.2 Confidentiality and Patient Rights

13.3 Conflict Resolution and Professional Relationships

13.4 Regulatory and Legal Requirements in Laboratory Practice

13.5 Ethical Dilemmas in Clinical Diagnostics

13.6 Professional Development and Continuing Education

## **Chapter 14: Laboratory Waste Management and Environmental Impact**

14.1 Types of Laboratory Waste: Biological, Chemical, Radioactive

14.2 Waste Segregation and Disposal

14.3 Environmental Impact of Laboratory Practices

14.4 Sustainability and Green Lab Practices

14.5 Legal Framework for Waste Management

14.6 Recycling and Waste Minimization Techniques

## **Chapter 15: Emerging Trends in Medical Laboratory Science**

15.1 Advances in Laboratory Automation

15.2 Point-of-Care Testing (POCT)

15.3 Role of Artificial Intelligence and Machine Learning in Diagnostics

15.4 Molecular Diagnostics and Genomic Medicine

15.5 Telemedicine and Remote Diagnostics

15.6 Future of Laboratory Science and Technology

# SPJ PUBLICATION

Regd. Office: SPJ House-48 Narayanpur Begusarai, Bihar India, 848202

## VOLUME 2: ADVANCED LABORATORY TECHNIQUES AND DIAGNOSTICS

### Chapter 16: Advanced Clinical Chemistry

- 16.1 Advanced Biochemical Markers and Their Clinical Significance
- 16.2 Testing for Liver, Kidney, and Cardiac Disorders
- 16.3 Hormonal and Metabolic Disorders: Diagnosing Diabetes, Thyroid, and Adrenal Issues
- 16.4 Advanced Techniques in Enzyme Assays and Electrophoresis
- 16.5 Lipid and Lipoprotein Testing in Cardiovascular Risk Assessment
- 16.6 Emerging Diagnostic Techniques in Clinical Chemistry

### Chapter 17: Advanced Hematology

- 17.1 Coagulation Studies and Clotting Disorders
- 17.2 Blood Grouping and Crossmatching
- 17.3 Hemoglobinopathies and Sickle Cell Disease
- 17.4 Flow Cytometry in Hematology
- 17.5 Leukemia and Lymphoma Diagnosis
- 17.6 Genetic Testing in Hematology

### Chapter 18: Advanced Microbiology Techniques

- 18.1 Advanced Bacterial Culture Techniques
- 18.2 Nucleic Acid-Based Diagnostics in Microbiology
- 18.3 Antimicrobial Resistance Testing and Mechanisms
- 18.4 Microbial Genomics and Metagenomics
- 18.5 Laboratory Diagnosis of Emerging Infectious Diseases

### Chapter 19: Advanced Immunology and Serology

- 19.1 Immunoassay Techniques in Disease Diagnosis
- 19.2 Monoclonal Antibodies in Diagnostics
- 19.3 Autoimmunity: Detection of Autoantibodies
- 19.4 Immunohistochemistry and Immunofluorescence Techniques
- 19.5 Immuno-phenotyping in Cancer and Leukemia
- 19.6 HIV, Hepatitis, and Other Serological Tests

### Chapter 20: Blood Banking and Transfusion Medicine

- 20.1 Blood Donor Screening and Blood Grouping
- 20.2 Blood Component Therapy and Storage
- 20.3 Transfusion Reactions and Management
- 20.4 Hemovigilance and Monitoring of Blood Transfusion
- 20.5 Pediatric and Neonatal Transfusion Requirements
- 20.6 Ethical Issues in Blood Donation and Transfusion

### Chapter 21: Urinalysis and Renal Function Testing

- 21.1 Routine Urinalysis Techniques
- 21.2 Kidney Function Tests: Serum Creatinine, GFR, and Urea
- 21.3 Urine Microscopy and Sediment Examination
- 21.4 Proteinuria and Glucoseuria
- 21.5 Renal Diseases and Their Laboratory Diagnosis



# SPJ PUBLICATION

Regd. Office: SPJ House-48 Narayanpur Begusarai, Bihar India, 848202

21.6 Urinary Tract Infections (UTI) Diagnostics

## **Chapter 22: Toxicology and Clinical Pharmacology**

22.1 Toxicological Screening Techniques

22.2 Drug Monitoring and Toxicology Testing

22.3 Poisons and Their Detection in the Laboratory

22.4 Therapeutic Drug Monitoring (TDM)

22.5 Pharmacogenomics and Drug Metabolism

22.6 Forensic Toxicology: Legal and Medical Aspects

## **Chapter 23: Molecular Pathology**

23.1 Principles of Molecular Pathology in Diagnostics

23.2 DNA/RNA Extraction and Quantification

23.3 Molecular Diagnostic Techniques in Cancer

23.4 Genetic Mutations and Tumor Profiling

23.5 PCR and Next-Generation Sequencing in Pathology

23.6 Case Studies: Molecular Pathology in Clinical Settings

## **Chapter 24: Cancer Biomarkers and Laboratory Diagnosis**

24.1 Types of Cancer Biomarkers: Protein, Genetic, and Epigenetic

24.2 Tumor Markers in Early Detection

24.3 Role of Laboratory in Cancer Diagnosis and Prognosis

24.4 Immunohistochemistry in Cancer Diagnosis

24.5 Liquid Biopsy and Molecular Diagnostics

24.6 Emerging Trends in Cancer Diagnostics

## **Chapter 25: Endocrinology and Hormonal Assays**

25.1 Role of Laboratory in Endocrinology

25.2 Thyroid Function Tests: TSH, T3, T4

25.3 Hormonal Assays for Reproductive Health

25.4 Cortisol, Insulin, and Other Metabolic Hormones

25.5 Diabetes and Obesity: Diagnostic Approaches

25.6 Emerging Trends in Endocrine Disorder Diagnostics

## **Chapter 26: Genetic Testing and Counseling**

26.1 Genetic Testing Methods: PCR, Microarray, and Sequencing

26.2 Applications of Genetic Testing in Disease Diagnosis

26.3 Role of Laboratory in Genetic Counseling

26.4 Ethical Considerations in Genetic Testing

26.5 Genetic Testing for Inherited Disorders

26.6 Personalized Medicine and Pharmacogenomics

## **Chapter 27: Advanced Cytology and Histopathology**

27.1 Histological Techniques for Tissue Preparation

27.2 Cytological Smears and Fine Needle Aspiration (FNA)

27.3 Staining Techniques in Histopathology

27.4 Diagnosis of Cancer through Histopathological Techniques

27.5 Molecular Pathology and Cytogenetics in Cancer

27.6 Digital Pathology and Imaging Techniques

# SPJ PUBLICATION

Regd. Office: SPJ House-48 Narayanpur Begusarai, Bihar India, 848202

## **Chapter 28: Laboratory Informatics**

- 28.1 Overview of Laboratory Information Systems (LIS)
- 28.2 Data Integration and Electronic Health Records (EHR)
- 28.3 Digital Imaging and Analysis in Laboratory Medicine
- 28.4 Interfacing with Hospital Information Systems
- 28.5 Data Security, Privacy, and Confidentiality in the Laboratory
- 28.6 Future Directions of Laboratory Informatics

## **Chapter 29: Laboratory Quality Management**

- 29.1 Quality Control and Quality Assurance in the Laboratory
- 29.2 Accreditation Standards (ISO 15189, CAP, etc.)
- 29.3 Internal and External Quality Audits
- 29.4 Statistical Methods for Quality Improvement
- 29.5 Proficiency Testing and Lab Performance Monitoring
- 29.6 Achieving Laboratory Accreditation

## **Chapter 30: Laboratory Management and Leadership**

- 30.1 Laboratory Organizational Structure and Workflow
- 30.2 Human Resource Management in Laboratories
- 30.3 Financial Management and Budgeting
- 30.4 Risk Management and Emergency Preparedness
- 30.5 Leadership and Team Management Skills
- 30.6 Legal and Ethical Aspects of Laboratory Management



# SPJ PUBLICATION

Regd. Office: SPJ House-48 Narayanpur Begusarai, Bihar India, 848202

## VOLUME 3: ADVANCED DIAGNOSTICS AND EMERGING TECHNOLOGIES

### Chapter 31: Advanced Molecular Diagnostics

- 31.1 Principles of Molecular Diagnostics in Medicine
- 31.2 Techniques: PCR, qPCR, RT-PCR, and PCR-ELISA
- 31.3 Nucleic Acid-Based Diagnostics in Infectious Diseases
- 31.4 Next-Generation Sequencing (NGS) and its Clinical Applications
- 31.5 Genomic Medicine: Personalized Treatment Plans
- 31.6 Case Studies: Molecular Diagnostics in Cancer and Infectious Diseases

### Chapter 32: Diagnostic Applications of Mass Spectrometry

- 32.1 Basics of Mass Spectrometry and Its Role in Medicine
- 32.2 Application of Mass Spectrometry in Clinical Biochemistry
- 32.3 Proteomics and Biomarker Discovery
- 32.4 Mass Spectrometry in Clinical Toxicology
- 32.5 Advanced Applications: Metabolomics and Lipidomics
- 32.6 Mass Spectrometry in Microbial Identification and Antibiotic Resistance

### Chapter 33: Nanotechnology in Medical Diagnostics

- 33.1 Introduction to Nanotechnology in Medicine
- 33.2 Nanomaterials and Their Applications in Diagnostics
- 33.3 Nanodiagnosics: Point-of-Care Devices
- 33.4 Role of Nanotechnology in Cancer Detection and Monitoring
- 33.5 Nanobiosensors for Infectious Disease Detection
- 33.6 Future Directions and Challenges of Nanotechnology in Diagnostics

### Chapter 34: Point-of-Care Testing (POCT) and Home Diagnostics

- 34.1 Principles and Importance of Point-of-Care Testing
- 34.2 Technologies Used in POCT: Glucometers, Pregnancy Tests, and COVID-19 Tests
- 34.3 POCT for Infectious Diseases: Rapid Testing for HIV, Hepatitis, etc.
- 34.4 Clinical Applications and Regulatory Issues of POCT
- 34.5 Impact of POCT on Healthcare Delivery in Resource-Limited Settings
- 34.6 Future Trends and Innovations in Home Diagnostic Devices

### Chapter 35: Emerging Infectious Diseases and Laboratory Response

- 35.1 Overview of Emerging Infectious Diseases (EIDs)
- 35.2 Laboratory Diagnosis of Viral Infections: HIV, Hepatitis, Influenza, etc.
- 35.3 Antimicrobial Resistance and Its Impact on Diagnostics
- 35.4 Laboratory Preparedness for EIDs: Surveillance and Early Detection
- 35.5 Molecular Techniques for EID Identification
- 35.6 Case Studies: Laboratory Response to Recent Pandemics (e.g., COVID-19)

### Chapter 36: Metabolomics in Disease Diagnosis

- 36.1 Basics of Metabolomics and Its Role in Medicine
- 36.2 Techniques in Metabolomic Analysis: Mass Spectrometry and NMR
- 36.3 Clinical Applications: Diagnosing Metabolic Disorders
- 36.4 Metabolomic Biomarkers in Cancer Diagnosis and Prognosis

# SPJ PUBLICATION

Regd. Office: SPJ House-48 Narayanpur Begusarai, Bihar India, 848202

36.5 Metabolomics in Cardiovascular and Neurological Diseases

36.6 Future Directions of Metabolomics in Precision Medicine

## **Chapter 37: Clinical Proteomics**

37.1 Principles of Proteomics in Medicine

37.2 Techniques: 2D-Gel Electrophoresis, Mass Spectrometry, and Western Blotting

37.3 Protein Biomarkers in Disease Diagnosis and Prognosis

37.4 Role of Proteomics in Cancer, Cardiovascular, and Neurological Diseases

37.5 Clinical Applications of Proteomics in Drug Development

37.6 Challenges and Future Prospects of Clinical Proteomics

## **Chapter 38: Bioinformatics and Computational Biology in Laboratory Medicine**

38.1 Introduction to Bioinformatics and Its Role in Diagnostics

38.2 Databases and Software Tools for Gene Sequencing Analysis

38.3 Clinical Applications: Genome-Wide Association Studies (GWAS)

38.4 Machine Learning and Artificial Intelligence in Diagnostic Medicine

38.5 Role of Bioinformatics in Precision Medicine and Personalized Healthcare

38.6 Challenges and Ethical Issues in Computational Diagnostics

## **Chapter 39: Telemedicine and Remote Diagnostics**

39.1 The Role of Telemedicine in Modern Healthcare

39.2 Remote Laboratory Diagnostics and Monitoring

39.3 Application of Telemedicine in Rural and Remote Areas

39.4 Ethical and Legal Considerations in Remote Diagnostics

39.5 Integration of Telemedicine with Laboratory Information Systems (LIS)

39.6 Future Trends in Telemedicine and Remote Health Monitoring

## **Chapter 40: Stem Cell Technology and Regenerative Medicine**

40.1 Introduction to Stem Cells and Their Types: Embryonic, Adult, and iPSCs

40.2 Stem Cell Therapies: Principles and Applications

40.3 Stem Cells in Disease Treatment: Hematology, Neurology, etc.

40.4 Laboratory Techniques for Stem Cell Culture and Differentiation

40.5 Ethical Considerations in Stem Cell Research

40.6 Future of Stem Cell Technology in Medicine and Diagnostics

## **Chapter 41: The Human Microbiome and Its Impact on Health**

41.1 Overview of the Human Microbiome and Its Role in Health

41.2 Techniques for Microbiome Analysis: Metagenomics and Microarray

41.3 Microbiome and Its Relationship to Immune System Function

41.4 Microbiome in Disease: Diabetes, Obesity, and Cancer

41.5 Therapeutic Potential of Microbiome Modulation

41.6 Challenges in Microbiome Research and Diagnostics

## **Chapter 42: Clinical Applications of Molecular Imaging**

42.1 Introduction to Molecular Imaging in Medicine

42.2 Imaging Techniques: PET, SPECT, MRI, and CT in Molecular Diagnostics

42.3 Role of Molecular Imaging in Cancer Diagnosis and Monitoring

42.4 Molecular Imaging of Cardiovascular and Neurological Diseases

42.5 Future Directions in Molecular Imaging

# SPJ PUBLICATION

Regd. Office: SPJ House-48 Narayanpur Begusarai, Bihar India, 848202

42.6 Ethical Considerations in Molecular Imaging Techniques

## **Chapter 43: Pharmacogenomics and Personalized Medicine**

43.1 Basics of Pharmacogenomics

43.2 Genetic Variations and Their Impact on Drug Response

43.3 Case Studies: Pharmacogenomic Testing in Cancer and Cardiovascular Diseases

43.4 Personalized Medicine: Tailoring Drug Therapy Based on Genetic Makeup

43.5 Ethical and Social Implications of Pharmacogenomics

43.6 Future of Pharmacogenomics in Healthcare

## **Chapter 44: Biomedical Ethics and Laboratory Practice**

44.1 Overview of Biomedical Ethics in Laboratory Medicine

44.2 Ethical Principles: Beneficence, Autonomy, Justice, and Confidentiality

44.3 Ethical Issues in Genetic Testing and Personalized Medicine

44.4 Informed Consent in Laboratory Procedures

44.5 Ethical Dilemmas in Medical Research and Diagnostic Testing

44.6 Legal and Regulatory Considerations in Laboratory Practice

## **Chapter 45: Laboratory Business and Entrepreneurship**

45.1 Overview of the Laboratory Business Environment

45.2 Setting Up and Managing a Medical Laboratory

45.3 Laboratory Cost Analysis and Budgeting

45.4 Marketing and Client Relations in Laboratory Services

45.5 Regulatory and Accreditation Requirements for Lab Businesses

45.6 Entrepreneurial Opportunities in Medical Laboratory Science

# SPJ PUBLICATION

Regd. Office: SPJ House-48 Narayanpur Begusarai, Bihar India, 848202

## VOLUME 4: ADVANCED TOPICS, CLINICAL APPLICATIONS, AND FUTURE DIRECTIONS

### Chapter 46: Laboratory Diagnostics in Pediatrics

- 46.1 Pediatric Hematology: Blood Disorders in Children
- 46.2 Pediatric Microbiology: Diagnosing Infections in Neonates
- 46.3 Pediatric Endocrinology: Diagnosing Hormonal Disorders
- 46.4 Genetic Disorders and Screening in Pediatrics
- 46.5 Neonatal Screening and Early Diagnosis
- 46.6 Pediatric Laboratory Medicine: Special Considerations

### Chapter 47: Laboratory Diagnostics in Geriatrics

- 47.1 Age-Related Changes in Laboratory Parameters
- 47.2 Diagnostic Approach in Geriatric Hematology and Oncology
- 47.3 Laboratory Evaluation of Chronic Diseases in the Elderly
- 47.4 Geriatric Nutrition and Biochemical Analysis
- 47.5 Bone Health and Osteoporosis Diagnostics
- 47.6 Geriatric Pharmacology and Laboratory Monitoring

### Chapter 48: Cardiovascular Disease and Laboratory Diagnostics

- 48.1 Biomarkers in Cardiovascular Disease Diagnosis
- 48.2 Lipid Profiling and Cholesterol Testing
- 48.3 Advanced Cardiac Troponin and B-Type Natriuretic Peptide Testing
- 48.4 Role of the Laboratory in Hypertension Management
- 48.5 Diagnostic Imaging and Tests in Cardiovascular Diseases
- 48.6 Emerging Biomarkers for Early Detection of Cardiovascular Risk

### Chapter 49: Diagnostic Cytogenetics and Molecular Genetics

- 49.1 Cytogenetic Testing Techniques: Karyotyping, FISH
- 49.2 Molecular Techniques in Cytogenetic Disorders
- 49.3 Genetic Testing for Inherited Disorders: Cystic Fibrosis, Hemophilia
- 49.4 Role of Cytogenetics in Cancer Diagnostics
- 49.5 Chromosomal Abnormalities and Prenatal Diagnostics
- 49.6 Ethical and Legal Implications of Genetic Testing

### Chapter 50: Laboratory Management in Healthcare Systems

- 50.1 Leadership in Laboratory Medicine
- 50.2 Laboratory Operations: Workflow, Supply Chain, and Resource Management
- 50.3 Laboratory Budgeting and Financial Management
- 50.4 Quality Control and Assurance in Healthcare Laboratories
- 50.5 Accreditation and Compliance in Laboratory Management
- 50.6 Future of Laboratory Management in Evolving Healthcare Systems

### Chapter 51: Diagnostic Imaging and Laboratory Correlation

- 51.1 Introduction to Diagnostic Imaging Modalities
- 51.2 Imaging Techniques and Their Role in Diagnosis
- 51.3 Correlation Between Laboratory Tests and Imaging Results
- 51.4 Multidisciplinary Approach: Radiologists and Laboratory Technicians

# SPJ PUBLICATION

Regd. Office: SPJ House-48 Narayanpur Begusarai, Bihar India, 848202

51.5 Imaging in Cancer Diagnosis and Staging

51.6 Emerging Trends in Molecular Imaging and Laboratory Collaboration

## **Chapter 52: Laboratory-based Clinical Trials and Research**

52.1 Overview of Clinical Trials in Laboratory Medicine

52.2 Ethical Considerations in Laboratory-Based Research

52.3 Role of Laboratories in Drug Development and Trials

52.4 Laboratory Techniques in Clinical Research: Biopsy, Histology, and Blood Testing

52.5 Good Clinical Practice (GCP) in Laboratory Research

52.6 Emerging Clinical Research Trends in Laboratory Medicine

## **Chapter 53: Advanced Techniques in Tissue Engineering**

53.1 Principles of Tissue Engineering

53.2 Stem Cells and Scaffold Technologies in Tissue Engineering

53.3 Applications of Tissue Engineering in Regenerative Medicine

53.4 Role of Laboratories in Culturing Cells and Tissues

53.5 3D Bioprinting and Its Clinical Applications

53.6 Ethical and Regulatory Considerations in Tissue Engineering

## **Chapter 54: Diagnostic Approaches to Infectious Diseases**

54.1 Diagnostic Methods for Bacterial Infections

54.2 Viral Infections: Molecular Diagnostics and Immunoassays

54.3 Fungal and Parasitic Infections in Clinical Diagnostics

54.4 Emerging Infectious Diseases and Diagnostic Challenges

54.5 Antimicrobial Resistance Testing and Stewardship

54.6 Diagnostic Technologies for Infectious Disease Surveillance

## **Chapter 55: Advances in Blood Disorders Diagnostics**

55.1 Genetic Testing in Blood Disorders: Thalassemia, Sickle Cell Anemia

55.2 Hemophilia and Coagulation Disorders: Diagnostics and Management

55.3 Leukemia and Lymphoma Diagnosis: Cytogenetics and Flow Cytometry

55.4 Myeloproliferative and Myelodysplastic Syndromes

55.5 Bone Marrow Transplantation and Hematopoietic Stem Cell Therapy

55.6 Future Directions in Hematology Diagnostics

## **Chapter 56: Environmental and Occupational Health in Laboratory Settings**

56.1 Risk Assessment and Hazard Management in Laboratory Environments

56.2 Workplace Safety Regulations in Healthcare Laboratories

56.3 Occupational Health and Laboratory Worker Protection

56.4 Environmental Monitoring and Waste Management

56.5 Lab Safety Culture and Training

56.6 Environmental Health and Safety Standards for Laboratories

## **Chapter 57: Laboratory Diagnostic Techniques in Dermatology**

57.1 Skin Disorders: Diagnostic Techniques and Laboratory Tests

57.2 Role of Microbiology and Histopathology in Dermatology

57.3 Diagnostic Approaches in Skin Cancer

57.4 Dermatopathology: Techniques and Interpretation

57.5 Genetic Testing in Dermatological Conditions

# SPJ PUBLICATION

Regd. Office: SPJ House-48 Narayanpur Begusarai, Bihar India, 848202

57.6 Future Trends in Dermatology Laboratory Diagnostics

## **Chapter 58: Laboratory Techniques in Forensic Medicine**

58.1 Role of the Laboratory in Forensic Medicine

58.2 DNA Analysis in Forensic Investigations

58.3 Toxicology Testing in Forensic Cases

58.4 Forensic Pathology and Histopathological Examination

58.5 Forensic Anthropology and Identification of Human Remains

58.6 Legal and Ethical Considerations in Forensic Testing

## **Chapter 59: Clinical Laboratory in Global Health**

59.1 Role of Laboratories in Public Health and Disease Surveillance

59.2 Diagnostic Approaches to Global Health Threats

59.3 Laboratories in Developing Countries: Challenges and Solutions

59.4 Vaccination Programs and Laboratory's Role in Disease Prevention

59.5 Mobile and Portable Laboratories in Crisis Response

59.6 Global Health Initiatives and Laboratory Capacity Building

## **Chapter 60: Future Trends in Laboratory Science and Technology**

60.1 Emerging Laboratory Technologies and Innovations

60.2 Artificial Intelligence and Machine Learning in Diagnostics

60.3 Precision Medicine and its Impact on Laboratory Medicine

60.4 Evolution of Point-of-Care Testing and At-Home Diagnostics

60.5 Ethical, Legal, and Social Implications of Advancements in Laboratory Medicine

60.6 The Future Workforce in Laboratory Science: Skills, Education, and Training