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# Basic and Advanced Laboratory Techniques in Histopathology and Cytology

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Pranab Dey

Basic and Advanced  
Laboratory Techniques  
in Histopathology  
and Cytology

 Springer

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*Dedicated to  
Shree Shree Satyananda Giri,  
Rini and Madhumanti*

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## Preface

Laboratory techniques in histopathology and cytology are the foundation of the diagnostic pathology. It is extremely essential to know all the basic and advanced techniques in laboratory. This book discusses the principles, steps, and troubleshooting areas of all the essential laboratory techniques in both histology and cytology laboratories. It contains multiple illustrations, microphotographs, tables, and boxes that explain the techniques. In addition to the various advanced techniques, microscopy and quality control in the laboratory have been discussed. I hope that the book will help all the postgraduate students in pathology, practising pathologists, and laboratory technologists.

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Pranab Dey

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## Abbreviations

ACEP	3Aminopropyltriethoxysilane
APAAP	Alkaline phosphatase–antialkaline phosphatase
APC	Allophycocyanin
Ab	Antibody
AR	Antigen retrieval
Acgh	Array based CGH
CEA	Carcinoembryonic antigen
CEP	Chromosome enumeration probe
CI	Colour index
CGH	Comparative genomic hybridization
CT	Computerized tomography
CFM	Confocal microscopy
CLM	Conventional light microscopy
CP	Conventional preparation
CYM	Cyan, yellow, and magenta
CK	Cytokeratin
DNA	Deoxyribonucleic acid
DSRT	Desmoplastic small round cell tumor
ddNTP	Dideoxynucleotides phosphates
DIA	Digital image analysis
EM	Electron microscope
EUS-FNAC	Endoscopic ultrasound guided FNAC
EA	Eosin Azure
EMA	Epithelial membrane antigen
ER	Estrogen receptors
EDTA	Ethylenediaminetetraacetic acid
EWS	Ewing’s sarcoma
FOV	Field of view
FNAC	Fine needle aspiration cytology
FNS	Fine needle sampling
FCI	Flow cytometric immunophenotyping
FCM	Flow cytometry
FITC	Fluorescein Iso-thiocyanate
FRAP	Fluorescence recovery after photobleaching
FISH	Fluorescent in situ hybridization
FPGS	FocalPoint GS Imaging System
FFPE	Formalin fixed paraffin embedded section

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GMS	Gomori methenamine silver
GLCM	Gray level co-occurrence of matrix
GFP	Green fluorescence protein
H&E	Hematoxylin and Eosin
HRP	Horseradish peroxidase
HIS	Hue saturation intensity
HCG	Human chorionic gonadotropin
ICC	Immunocytochemistry
IHC	Immunohistochemistry
Ppi	Inorganic pyrophosphate
LIS	Laboratory information service
LBC	Liquid based cytology
LSI	Locus-specific identifier probe
MRI	Magnetic resonance image
MGG	May Grunwald Giemsa
MRD	Minimal residual disease
nM	Nano micrometer
NB	Neuroblastoma
NGS	Next generation sequencing
NHL	Non-Hodgkin lymphoma
OCT	Optimum cutting temperature
OG	Orange G
PAP	Papanicolaou
PerCP	Peridinin Chlorophyll
PAS	Periodic Acid Schiff
PNET	Peripheral neuroectodermal tumor
PTAH	Phosphotungstic acid haematoxylin
PMT	Photomultiplier tube
PE	Phycocerythrin
PLAP	Placental alkaline phosphatase
PCR	Polymerase chain reaction
PR	Progesterone receptors
PSA	Prostate specific antigen
QA	Quality assurance
QC	Quality control
QI	Quality improvement
RGB	Red green blue
RCF	Relative centrifugal force
RMS	Rhabdomyosarcoma
RNA	Ribonucleic acid
SEM	Scanning electron microscope
SSCP	Single strand conformation polymorphism
ssDNA	Single stranded DNA
SOP	Standard operating protocol
TIP	ThinPrep image processor
TTF-1	Thyroid transcription factor-1
TMA	Tissue microarray
TEM	Transmission electron microscope

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TSA	Tyramine signal amplification
USG	Ultrasonography
VS	Virtual slides
WT	Wilms' tumor
WT 1	Wilms' tumor gene 1
Z N	Ziehl Neelsen