TECHNICAL MANUAL

SEVENTEENTH EDITION

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Advancing Transfusion and Cellular Therapies Worldwide

Technical Manual

17TH EDITION

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Glossary of Abbreviations

AATB	American Association of Tissue Banks
ACD	acid-citrate-dextrose
ACE	angiotensin-converting enzyme
ACOG	American College of Obstetricians and Gynecologists
ADP	adenosine diphosphate
AET	2-aminoethylisothiouronium
AHF	antihemophilic factor
AHG	antihuman globulin
AHTR	acute hemolytic transfusion reaction
AIDS	acquired immune deficiency syndrome
AIHA	autoimmune hemolytic anemia
ALDH	aldehyde dehydrogenase
ALT	alanine aminotransferase
AML	acute myelogenous leukemia
AMR	antibody-mediated rejection
ANH	acute normovolemic hemodilution
AORN	Association of periOperative Registered Nurses
APC	antigen-presenting cell
aPTT	activated partial thromboplastin time
ARDP	American Rare Donor Program
AS	additive solution
ASFA	American Society for Apheresis
ASHI	American Society for Histocompatibility and Immunogenetics
ATP	adenosine triphosphate
BCR	B-cell receptor
BLA	biologics license application
BPD	biological product deviation
BSA	bovine serum albumin or body surface area
BSC	biological safety cabinet
BSL-1	Biosafety Level 1
CAP	College of American Pathologists
CAS	cold agglutinin syndrome
CBER	Center for Biologics Evaluation and Research
CCI	corrected count increment
CD	clusters of differentiation
CDC	Centers for Disease Control and Prevention
cDNA	complementary deoxyribonucleic acid
CDRH	Center for Devices and Radiological Health
CFR	Code of Federal Regulations
CFU	colony-forming unit
CGD	chronic granulomatous disease
cGMP	current good manufacturing practice
cGTP	current good tissue practice
cGy	centiGray
CI	confidence interval
CIDP	chronic inflammatory demyelinating polyneuropathy
CJD	Creutzfeldt-Jakob disease
CLIA	Clinical Laboratory Improvement Amendments
CLSI	Clinical and Laboratory Standards Institute
CML	chronic myelogenous leukemia
CMS	Centers for Medicare and Medicaid Services
CMV	cytomegalovirus
CNS	central nervous system
CP2D	citrate-phosphate-dextrose-dextrose
CPD	citrate-phosphate-dextrose
CPDA-1	citrate-phosphate-dextrose-adenine-1
CR	complement receptor
CREG	cross-reactive group
CRYO	cryoprecipitate (Cryoprecipitated AHF)
C/T	crossmatch/transfusion
CV	coefficient of variation
DAF	decay-accelerating factor
DAT	direct antiglobulin test
DDAVP	deamino-D-arginine vasopressin
DHQ	donor history questionnaire
DHTR	delayed hemolytic transfusion reaction

DIC	disseminated intravascular coagulation
DMSO	dimethylsulfoxide
DNA	deoxyribonucleic acid
DOT	(US) Department of Transportation
2,3-DPG	2,3-diphosphoglycerate
DRG	diagnosis-related group
DSTR	delayed serologic transfusion reaction
DTT	dithiothreitol
EACA	epsilon aminocaproic acid
EBAA	Eye Bank Association of America
ECMO	extracorporeal membrane oxygenation
ECV	extracorporeal volume
EDTA	ethylenediaminetetraacetic acid
EIA	enzyme immunoassay
ELBW	extremely low birthweight
ELISA	enzyme-linked immunosorbent assay
EMAs	emergency management agencies
EPO	erythropoietin
FACT	Foundation for the Accreditation of Cellular Therapy
FcR	Fc gamma receptor
FDA	Food and Drug Administration
FFP	Fresh Frozen Plasma
FMH	fetomaternal hemorrhage
FNAIT	fetal/neonatal alloimmune thrombocytopenia
FNHTR	febrile nonhemolytic transfusion reaction
FTA-ABS	fluorescent treponemal antibody absorption test
G-CSF	granulocyte colony-stimulating factor
GalNAc	N-acetylgalactosamine
GM-CSF	granulocyte-macrophage colony-stimulating factor
GMP	good manufacturing practice
GPIa	glycoprotein Ia
GPA	glycophorin A
GPB	glycophorin B
GPC	glycophorin C
GPD	glycophorin D
GTP	good tissue practice
GVHD	graft-vs-host disease
Gy	Gray
HAV	hepatitis A virus
HAZMAT	hazardous material
Hb	hemoglobin
HBc	hepatitis B core antigen
HBsAg	hepatitis B surface antigen
HBV	hepatitis B virus
Hct	hematocrit
HCT/Ps	human cells, tissues, and cellular and tissue-based products
HCV	hepatitis C virus
HDFN	hemolytic disease of the fetus and newborn
HES	hydroxyethyl starch
HHS	(US) Department of Health and Human Services
HIT	heparin-induced thrombocytopenia
HIV	human immunodeficiency virus
HNA	human neutrophil antigen
HPA	human platelet antigen
HPC	hematopoietic progenitor cell
HPC(A)	HPCs from apheresis (HPC, Apheresis)
HPC(C)	HPCs from cord blood (HPC, Cord Blood)
HPC(M)	HPCs from marrow (HPC, Marrow)
HSC	hematopoietic stem cell
HSCT	hematopoietic stem cell transplantation
HTLV-I	human T-cell lymphotropic virus, type I
HTR	hemolytic transfusion reaction
HUS	hemolytic uremic syndrome
IAT	indirect antiglobulin test
IATA	International Air Transport Association
ICAM-1	intercellular adhesion molecule-1
ID	indentification or individual donation
Ig	immunoglobulin
IL-1α	interleukin-1 alpha
IL-1β	interleukin-1 beta
IL-2	interleukin-2
IM	intramuscular
IND	investigational new drug
INR	international normalized ratio
IRL	immunohematology reference laboratory
IS	immediate spin
ISBT	International Society of Blood Transfusion
ISO	International Organization for Standardization
ITP	immune thrombocytopenia
IU	international unit
IV	intravenous
IVIG	intravenous immune globulin
LDH	lactate dehydrogenase

LDL	low-density lipoprotein
LISS	low-ionic-strength saline
LN_2	liquid nitrogen
LR	leukocyte-reduced
MAC	membrane attack complex
2-ME	2-mercaptoethanol
MF	mixed field
MHC	major histocompatibility complex
MNC	mononuclear cell
MoAb	monoclonal antibody
MPHA	mixed passive hemagglutination assay
mRNA	messenger ribonucleic acid
MSDS	material safety data sheet
MSM	males who have sex with other males
NAIT	neonatal alloimmune thrombocytopenia
NAN	neonatal alloimmune neutropenia
NAT	nucleic acid testing
NHLBI	National Heart, Lung, and Blood Institute
NIH	National Institutes of Health
NIPA	nonimmunologic protein adsorption
NK	natural killer
NMDP	National Marrow Donor Program
NRC	Nuclear Regulatory Commission
NRF	National Response Framework
OSHA	Occupational Safety and Health Administration
p	probability
PAD	preoperative autologous (blood) donation
PBS	phosphate-buffered saline
PCH	paroxysmal cold hemoglobinuria
PCR	polymerase chain reaction
PEG	polyethylene glycol
PF24	Plasma Frozen Within 24 Hours After Phlebotomy
PPE	personal protective equipment
PRA	panel-reactive antibody
PRCA	pure red cell aplasia
PRP	platelet-rich plasma
PRT	pathogen reduction technology
PT	prothrombin time or proficiency testing
PTP	posttransfusion purpura
PTT	partial thromboplastin time
PVC	polyvinyl chloride
QA	quality assessment or quality assurance
QC	quality control
QSE	Quality System Essential
RBCs	Red Blood Cells (blood donor unit)
RFLP	restriction fragment length polymorphism
rFVIIa	recombinant Factor VIIa
Rh	Rhesus factor
RHAG	Rh-associated glycoprotein
RhIG	Rh Immune Globulin
RIBA	recombinant immunoblot assay
RIPA	radioimmunoprecipitation assay
RNA	ribonucleic acid
RPR	rapid plasma reagin (serologic test for syphilis)
RT	room temperature or reverse transcriptase
SCF	stem cell factor
SD	standard deviation or solvent/detergent
SNP	single nucleotide polymorphism
SOP	standard operating procedure
SPRCA	solid-phase red cell adherence
TA	transfusion-associated
TACO	transfusion-associated circulatory overload
TCR	T-cell receptor
TMA	transcription-mediated amplification
TNCs	total nucleated cells
TNF-α	tumor necrosis factor alpha
TPE	therapeutic plasma exchange
TPO	thrombopoietin
TRALI	transfusion-related acute lung injury
TSE	transmissible spongiform encephalopathy
TTP	thrombotic thrombocytopenic purpura
UCB	umbilical cord blood
UDP	uridine diphosphate
UNOS	United Network for Organ Sharing
USC	United States Code
vCJD	variant Creutzfeldt-Jakob disease
VLBW	very low birthweight
vWD	von Willebrand disease
vWF	von Willebrand factor
WAIHA	warm autoimmune hemolytic anemia
WB	whole blood or Western blot
WBC	white blood cell
WHO	World Health Organization
WNV	West Nile virus

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Finally, we would like to thank the editors, authors, and program unit members of the 16th and earlier editions of the *Technical Manual* for selected tables, figures, methods, and written sections of the chapters that could not be improved upon, and thus were used again in the 17th edition.

John D. Roback, MD, PhD
Chief Editor

Preface

THE EDITORS ARE pleased to present the 17th edition of the *Technical Manual*. This is the second edition to use the revised format, which includes listing authorship for each chapter. In preparing the 17th edition, we carefully considered the comments received after publication of the 16th edition, both from readers and from authors. Many believed that the new format was successful in bringing the necessary levels of expertise to the preparation of each chapter. However, they also suggested a number of changes that have now been incorporated into the present edition. For example, Chapter 10 was expanded through the addition of several pages of basic and applied immunology as a primer for later immunohematology chapters. A section on hemovigilance was added to Chapter 27 in keeping with AABB's expanding commitment to this important quality and safety activity. Another significant change was the inclusion of several "Key Points" at the end of each chapter, which should be useful for both students and experienced readers alike.

We believe that with the revised format a modest amount of author rotation is beneficial. Thus, for the 17th edition we recruited new authors for three chapters; additional authorship changes were also made for five other chapters. These changes should help to keep the text of the 17th edition fresh while also maintaining continuity with earlier editions.

One aspect of the *Technical Manual* that has not changed is the commitment of the AABB and the editors to extensive, multi-layered technical review. Each chapter was reviewed and revised at least twice by an editor. The chapters were also submitted to subject matter-appropriate committees for detailed content review (see list in Acknowledgments). All chapters were then subjected to additional regulatory, AABB standards, legal, and editorial review prior to publication. Finally, as noted above, many highly knowledgeable readers functioned as an ad hoc "post-publication" review committee for the 16th edition by bringing errors and omissions to the editors' notice. We have carefully considered each of the issues that was raised and where appropriate included revised text in the 17th edition. Because the field of blood banking, transfusion medicine, and cellular therapy is complex, detail-oriented, and continues to evolve, we once again invite all readers to contact us if they should find omissions, errors, and inconsistencies in the 17th edition, or if they would like to suggest ways to improve the next edition of the *Technical Manual*. We value your opinions and look to the readership for assistance in keeping this valuable resource up to date with our dynamically evolving field.

It is important for readers to realize that, in the opinions of the chapter authors and the editors, the methods chosen for inclusion in the 17th edition represent best technical practices. However, these methods are not the only approaches that fulfill the requirements of AABB *Standards*; readers may choose to use other approaches. Furthermore, should you find that any method or statement in the *Technical Manual* is in conflict with the *Standards*, the authority of the *Standards* supersedes that of the *Technical Manual*.

John D. Roback, MD, PhD
Chief Editor

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