

## LIST OF ABBREVIATIONS

Abbreviation or symbol	Term
%	percent
°C	degree(s) Celsius
μg	microgram(s)
μl	microliter(s)
μm	micron(s), micrometer(s)
Ab	antibody(-ies)
AbPC	antibody producing cell(s)
Ace	accessory cholera toxin
ACF	accessory colonization factor
ADP	adenosine diphosphate
AMP	adenosine monophosphate
APC	antigen presenting cell(s)
APW	alkaline peptone water
ASC	antibody secreting cell(s)
ATP	adenosine triphosphate
BCIP-NBT	bromochloroindolyl phosphate/nitroblue tetrazolium
bp	base pair(s)
<i>B. pertussis</i>	<i>Bordetella pertussis</i>
BSA	bovine serum albumin
cAMP	cyclic adenosine monophosphate
CD	cluster of differentiation
<i>cep</i>	core encoded pilin gene
CHA	cell-bound hemagglutinin
CF	crude fimbrial extract
CFU	colony forming unit(s)
Cl <sup>-</sup>	chloride ions
cm	centimeter(s)
CMI	cellular mediated immunity
CMV	cytomegalovirus

<b>Abbreviation or symbol</b>	<b>Term</b>
CSF-1	colony stimulating factor-1
CT	cholera toxin
CTL	cytotoxic T lymphocyte(s)
CTX $\phi$	cholera toxin-encoding phage
DCs	dendritic cell(s)
DEAE	diethylaminoethyl
DNA	deoxyribonucleic acid
DW	distilled water
<i>E. coli</i>	<i>Escherichia coli</i>
EDTA	ethylenediaminetetraacetic acid
<i>e.g.</i>	<i>exempli gratia</i>
ELISA	enzyme-linked immunosorbent assay(s)
<i>et al.</i>	<i>et alli</i>
F	fimbriae
FCA	Freund's complete adjuvant
FIA	Freund's incomplete adjuvant
$\times g$	relative centrifugal force (acceleration gravity)
g	gram(s)
GALT	gut-associated lymphoid tissue(s)
GDP	Guanosine diphosphate
GTP	Guanosine triphosphate
GM1	Ganglioside membrane-1
GM-CSF	granulocyte monocyte-colony stimulating factor
GMDP	<i>N</i> -acetylglucosaminy-muramyl dipeptide
HA	hemagglutinin
HBV	hepatitis B virus
HCl	hydrochloric acid
HCO <sub>3</sub> <sup>-</sup>	bicarbonate ions
HEV	high endothelial venules(s)
HIV	immunodeficiency virus
HPLC	high pressure liquid chromatography

<b>Abbreviation or symbol</b>	<b>Term</b>
hr	hour(s)
HSV	herpes simplex virus
ICAM-1	intercellular adhesion molecule-1
IEL	intraepithelial lymphocyte(s)
IF	immunofluorescence
IFA	immunofluorescence assay
Ig	immunoglobulins
IgA	immunoglobulin A
IgD	immunoglobulin D
IgE	immunoglobulin E
IgG	immunoglobulin G
IgM	immunoglobulin M
<i>i.e.</i>	<i>id est</i>
IKK	I $\kappa$ B kinase
IL	interleukin(s)
IFN	interferon
IRAK	interleukin-1 receptor-associated kinase
ISCOMs	immune stimulating complex (es)
kDa	kilodalton(s)
kHz	kiloHertz(es)
KIA	Kligler's iron agar
L	liter(s)
LB	Luria-Bertani
Log	logarithm (to base 10; common logarithm)
LPB	lipopolysaccharide-binding protein
LPS	lipopolysaccharide
LRR	leucine-rich repeat(s)
LSD	least significant difference
LT	heat-labile enterotoxin
LUV	large unilamellar vesicle(s)
M	molar(s)

<b>Abbreviation or symbol</b>	<b>Term</b>
MAb	monoclonal antibody (-ies)
MAdCAM-1	mucosal addressin cell adhesion molecule-1
MALT	mucosal-associated lymphoid tissue
MDP	muramyl dipeptide
MFRH	mannose-fucose-resistant hemagglutinin
mg	milligram(s)
MHC	major histocompatibility complex
min	minute(s)
ml	milliliter(s)
MLV	multilamellar vesicle(s)
mM	millimolar(s)
mm	millimeter(s)
MPL	monophosphoryl lipid A
MSHA	mannose-sensitive hemagglutinin
MTP-PE	muramyl tripeptide-phosphatidylethanolamine
MyD88	myeloid differentiation factor-88
N	normality (normal)
Na <sub>2</sub> HPO <sub>4</sub>	disodium hydrogen phosphate
NaCl	sodium chloride
NAD	nicotinamide adenine dinucleotide
NaHCO <sub>3</sub>	sodium bicarbonate
NaH <sub>2</sub> PO <sub>4</sub>	sodium dihydrogen phosphate
NF-κB	nuclear factor-κB
ng	nanogram(s)
<i>N. gonorrhoeae</i>	<i>Neisseria gonorrhoeae</i>
NIK	NF-κB-induced kinase
NK	natural killer
NSS	normal saline solution
OD	optimal density(-ies)
OMP	outer membrane protein(s)
ORF	open reading frame

<b>Abbreviation or symbol</b>	<b>Term</b>
P	procholeragenoid
PAMP	pathogen associated molecular pattern(s)
PB	phosphate buffer
PBMC	peripheral blood mononuclear cell(s)
PBS	phosphate buffered saline
PBST	phosphate buffered saline containing Tween-20
pg/ml	picograms per milliliter
pH	Negative logarithm of hydrogen ion activity
pIgR	polymeric immunoglobulin receptor
PLG	poly (D, L-lactide-co-glycolide)
PMN	polymorphonuclear cells
pmol	picomole(s)
POE	polyoxyethylene
POP	polyoxypropylene
PRR	pattern recognition receptor(s)
RF	replicate form
rpm	round(s) per minute
RPMI-1640	Rosewell Park Memorial Institute medium number 1640
rRNA	ribosomal ribonucleic acid
RS	repetitive sequence
RSV	respiratory syncytial virus
SAF-1	Syntex adjuvant formulation 1
SC	secretory component
SDS	sodium dodecyl sulfate
SDS-PAGE	sodium dodecyl sulfate-polyacrylamide gel electrophoresis
sIgA	secretory immunoglobulins A
SPDP	N-succinimidyl 3-(2-pyridyldithio) propionate
spp.	species
SUV	small unilamellar vesicle(s)

<b>Abbreviation or symbol</b>	<b>Term</b>
TBS	Tris-buffered saline
TCBS	thiosulfate-citrate-bile salts-sucrose medium
Tcp	toxin co-regulated pili
TcpA	toxin co-regulated pili-A
TCR	T-cell receptor
TDM	trehalose dimycolate
TE	Tris-ethylenediaminetetraacetic acid
TEMED	N,N,N',N',-tetramethylenediamine
TGF- $\beta$	transforming growth factor- $\beta$
TIR	Toll/IL-1 receptor
TLR	Toll-like receptor
TNF- $\alpha$	tumor necrosis factor-alpha
TRAF6	tumor-necrosis-factor-associated factor-6
Tris	Tris (hydroxymethyl aminomethane)
TSA	trypticase soy agar
TSB	trypticase soy broth
TSI	triple sugar iron agar
UDW	ultrapure distilled water
UV	unilamellar vesicle(s)
v/v	volume by volume
VC	<i>Vibrio cholerae</i>
VPI	<i>V. cholerae</i> pathogenicity island
VPS	<i>V. cholerae</i> exopolysaccharide
w/v	weight by volume
Zot	Zonula Occludens toxin