

# INDEX

## A

- Accession number.....134, 143, 144, 146, 148,  
150, 152, 154, 156, 158, 160, 162, 164, 166, 168, 170,  
172, 174, 176, 178, 180, 182, 184, 186, 188, 190, 192,  
193, 197, 203, 204, 228–229
- Acrylamide ..... 52, 55, 57, 62, 245, 248,250
- Activation T cells..... 50, 80, 83, 87, 88, 254, 283
- Acute infection ..... 33, 34
- Affymetrix ..... 132
- Agilent..... 132–134, 142, 194,  
196,231, 256
- AIM V.....15–17
- Alexa Fluor 647-conjugated anti-perforin  
antibodies.....127
- Alexa Fluor 488-fluorochrome .....45
- Alexa Fluor 647-fluorochrome ..... 1, 2, 13, 14,  
16, 21, 22, 25, 29, 71, 87, 88, 91, 94, 95, 137, 142, 270,  
272, 275
- Alexa Fluor 660-fluorochrome .....1, 2, 13, 14, 16,  
21, 22, 25, 29, 71, 87, 88, 91, 94, 95, 137, 142, 270,  
272, 275
- Alexa Fluor 700-fluorochrome ..... 32
- Alkaline-phosphatase (ALP).....76
- Allergy..... 23, 91, 117
- Allogeneic islet transplant .....122
- AmCyan fluorochrome.....32
- Aminoethyl carbazole (AEC).....76, 79, 81, 83, 85
- Amplicon..... 70, 255, 256–257
- Amplification .....24, 68–70, 72, 73, 196,  
205, 230–232, 261–263, 289
- Analysis.....7, 8, 15, 17, 18, 23, 24–29,  
31–33, 38, 39, 41–43, 45, 46, 66, 68–72, 76, 77, 81, 82,  
96, 98, 99, 108, 118, 126, 131–198, 201–232, 233–250,  
254, 256, 257, 267, 275–276, 284–290
- Anesthesia ..... 122, 124–126
- Annexin V ..... 43–45, 123
- Anterior chamber of the eye (ACE).....122–128
- Anti-Akt..... 52, 54, 60
- Anti-Akt1/PKBa.....60
- Anti  $\beta$  actin.....60
- Antibody (Ab) .....2–4, 9, 13, 17, 25–27,  
29–31, 34, 38, 41–45, 52, 53, 56, 58–61, 70, 76–83,  
85, 103–106, 109–118, 123, 126, 127, 272, 274–276,  
286, 288, 289, 291–294
- Anti-CD3.....13, 20, 32, 78, 83
- Anti-c-jun .....60
- Anti-ERK1/2 ..... 52, 54, 60
- Anti-Fyn .....60
- Anti-GADS/grap2.....60
- Antigen (Ag) .....1–11, 13, 14, 17–22,  
27–32, 34, 37–39, 41, 43, 46, 49, 65–73, 75–78, 80,  
82, 83, 87, 88, 90, 91, 103–105, 108–113, 115, 116,  
118, 121, 132, 140, 158, 163, 202, 206, 270, 283, 284,  
286, 287, 289
- Antigenic epitope demasking/antigen  
retrieval .....104, 105, 109, 111,  
118, 286, 287, 290
- Antigen presenting cells (APC)..... 1, 2, 13, 14,  
16, 21, 22, 25, 29, 71, 87, 88, 91, 94, 95, 137, 142, 270,  
272,276
- Anti-Goat IgG .....61
- Anti-GRB2 .....60
- Anti-LAT .....60
- Anti-lck.....60
- Anti-Mouse IgG .....61
- Anti-p-Akt (Ser473) .....60
- Anti-p-Akt (Thr308).....60
- Anti-pERK1/2 (Thr202/Tyr204).....60
- Anti-PKCq.....60
- Anti-p-LAT(y191).....60
- Anti-PLCg1 ..... 52, 54, 60
- Anti-rabbit IgG.....61
- Anti-sheep IgG .....61
- Anti-SLP76/LCP2 .....60
- Anti-SOS.....60
- Anti-vav1.....60
- Anti-Zap70 (y315+y319) .....60
- APC-Cy7-fluorochrome .....25
- APC-fluorochrome ..... 25, 32

- AP-complex ..... 79, 81, 83  
Apoptosis ..... 22, 27, 34, 41, 44, 45, 50,  
90–92, 135, 137, 138, 143, 149, 153, 165, 168, 173, 181,  
183, 189, 191, 206, 243  
Aprotinin ..... 54, 56, 94  
Autoimmunity ..... 22, 23, 66, 122
- B**
- Background levels ..... 30, 231  
Bacterial ..... 21, 22, 27, 132, 202  
B cells ..... 90, 91, 145, 149, 156, 162, 167,  
168, 171, 174, 181, 184, 254  
Biogenesis ..... 90, 93, 132, 134, 135, 202,  
203, 206–227  
Biotin ..... 4, 10, 79, 83, 271, 274, 275  
Blocking buffer ..... 55, 105, 106, 110,  
113, 114, 288, 290, 292, 294  
Blood flow ..... 127  
Blot holder ..... 54, 55, 58, 59, 61, 62  
Blunt 27-G cannula ..... 123, 124  
Bovine serum albumin (BSA) ..... 4, 5–7, 9, 19,  
26, 29–31, 51, 52, 54–56, 79, 82, 105, 106, 111, 112,  
115–117, 271, 272, 278, 288  
B6.129P2-Cxcr6tm1Litt/J mice ..... 122  
Bradford protein assay ..... 51  
Breathing levels ..... 126  
Brefeldin A ..... 29, 34–37, 41–44  
Buprenorphine ..... 123, 124  
BV421. *See* PacBlue-fluorochrome
- C**
- C2 (curated gene sets) ..... 197  
Ca<sup>2+</sup>-dependent perforin/granzyme mediated  
apoptosis ..... 50  
Ca<sup>++</sup> mobilization ..... 50  
Cancer ..... 2, 5, 13, 14, 23, 28, 43, 65, 66, 132,  
147, 148, 153, 171, 180, 202, 206, 244, 253, 254, 269  
Canonical ..... 10, 133, 197, 203, 206  
Canonical pathways (CP) ..... 133, 197, 203, 206  
Carboxyfluorescein diacetate succinyl ester (CFSE).  
*See* Proliferation assay  
Caspases ..... 22, 23, 27, 44, 135–141, 143,  
149, 154, 155, 165, 168, 177, 179, 181, 191  
CCR7. *See* Naïve/memory  
CD 4. *See* Helper T cell  
CD 8. *See* Cytotoxic T lymphocytes (CTLs)  
CD19. *See* B cells  
CD20. *See* B cells  
CD 56. *See* Natural killer (NK) cells  
CD95 (Fas) ..... 22, 27, 34, 41, 44, 45, 50,  
90–92, 135, 137, 138, 143, 149, 153, 165, 168, 173,  
181, 183, 189, 191, 206, 243  
CD107. *See* Cytotoxicity assay  
CD3/CD28. *See* Activation T cells  
CD40 (CD154)/CD40. *See* Activation T cells  
CD 3-cluster differentiation. *See* T cells  
CD4+ CTLs ..... 21, 284  
cDNA ..... 67–70, 72, 196, 203, 205, 231, 258  
CD45 RA. *See* naïve/memory  
CD45 RO. *See* Naïve/memory  
CD8 T cells ..... 1–11, 13, 14, 18, 23, 28, 31–34,  
38–44, 65, 66, 69, 71, 73, 77, 78, 84, 85, 87, 88, 92, 94,  
95–98, 127, 132, 202, 231, 240, 247, 269–271, 278, 284  
Cell enrichment ..... 2, 5, 8, 93–95,  
271, 274–275  
Cellular based assays ..... 23  
Cellular proliferation ..... 43, 206  
CFSE proliferation-fluorochrome ..... 41  
Chemokine (C-X-C motif) receptor 3  
(CXCR3) ..... 284, 286, 288–290  
Chip priming ..... 198  
Chronic infection ..... 22, 32–34, 38–40, 44  
Citrate buffer ..... 285–287, 292  
Clavamox ..... 123  
Collagenase type I-IV ..... 3  
Collection ..... 5, 36, 59, 61, 67, 124,  
197, 204, 231, 256  
Comparative Ct method ..... 205  
Compensation-CompBead ..... 24–28  
Concanavalin A (Con A) ..... 78  
Confocal microscope ..... 117, 286, 291  
Conserved miRNA ..... 204, 230  
Controls ..... 9, 24–26, 28, 30,  
32–35, 38, 42, 59, 68, 69, 73, 78, 80, 82, 83, 85, 92,  
105, 106, 110, 112, 114, 118, 126, 135, 142–194, 198,  
202, 204–231, 238, 243, 250, 255, 257, 260, 263, 267,  
289, 293  
Cornea ..... 122, 124, 125, 127  
Corneoscleral junction ..... 124, 127  
Counterstaining solution (Harris' Hematoxylin, Mayer  
hematoxylin) ..... 105  
CTLs biogenesis and functions ..... 132, 202, 203, 207  
CTLs functional behavior ..... 202  
CTLs-specific pathways ..... 202  
Culture media ..... 94, 273, 277  
Custom Real time PCR plates ..... 202  
Cuvettes ..... 54, 56, 57, 114  
Cyanine ..... 198  
Cytokine ..... 2, 8, 13, 14, 16, 19, 22, 27, 32,  
34–41, 44–46, 65, 66, 76–80, 83, 85, 135, 162, 166,  
192, 206, 234, 253, 254, 269, 270, 284  
Cytolytic function ..... 21  
Cytomegalovirus ..... 78  
Cytotoxicity ..... 8, 22, 32, 37, 91,  
93, 150, 159, 176  
Cytotoxicity assay ..... 8  
Cytotoxic T lymphocytes (CTLs) ..... 2–8, 13–46,  
49–62, 87–99, 103, 121–128, 132, 134, 135, 146, 151,  
174, 202, 206, 231, 233, 243–251, 253–267, 283–294

**D**

DAPI..... 108, 123  
 Data analysis.....25, 28, 29, 32, 33, 38,  
 41–43, 141, 205  
 Data normalization.....231  
 DBA/2 mouse ..... 122, 124  
 Degradation..... 23, 27, 91, 92, 95, 194, 198, 234  
 Denaturation .....50, 198  
 Dendritic cells (DCs) .....13, 14, 16–19, 22,  
 77, 84, 90–92, 141, 206  
 Deparaffinization and re-hydration of tissue slide.....109  
 Design ..... 26, 122, 125, 132–143, 194,  
 197, 203–204, 228, 231, 255, 257  
 Diaminobenzidine (DAB) chromogen solution .....105  
 Differentiation..... 1, 27, 40, 41, 50, 90, 91, 132,  
 150, 159, 202, 206, 233, 243, 269, 270,272  
 Dimethylsulfoxide (DMSO) .....9, 16, 19, 35, 36,  
 67, 71, 83, 94  
 Diseases .....27, 34, 66, 117, 128, 244,  
 250, 253, 258, 269, 284, 289  
 DNA isolation .....256–257  
 DNase ..... 3, 9, 154  
 DNA sequencing .....260  
 DNA transcription .....201  
 Double staining .....108, 115, 285–286, 289–291  
 Doublets .....28–30  
 Drug discovery .....131

**E**

EDTA .....4, 6, 7, 9, 15, 16, 18, 54, 79, 204,  
 205, 231, 234, 245, 246, 270, 271, 273, 285–286, 292  
 ELISpot reader.....76, 77  
 Endogen miRNA normalizers.....231  
 Endonucleases .....179, 235, 239, 245, 247, 250  
 Engraftment ..... 125, 127  
 Enrichment ..... 2, 5, 7, 8, 93–95, 244, 267,  
 271, 274–275  
 Entrez.....134, 143, 144, 146, 148,  
 150, 152, 154, 156, 158, 160, 162, 164, 166, 168, 170,  
 172, 174, 176, 178, 180, 182, 184, 186, 188, 190, 192,  
 193, 197, 203, 207–227  
 Entrez Gene ID .....134, 143, 144, 146,  
 148, 150, 152, 154, 156, 158, 160, 162, 164, 166, 168,  
 170, 172, 174, 176, 178, 180, 182, 184, 186, 188, 190,  
 192, 193, 197, 203, 206–227  
 Enzyme ..... 44, 51, 68, 76, 77, 88, 104,  
 105, 117, 153, 186, 189, 205, 239, 288, 293  
 Enzyme-linked immunosorbent assay  
 (ELISA) ..... 65, 75, 76, 82  
 Enzyme-linked immunosorbent spot  
 (ELISPOT).....2, 34, 46, 66, 75–85  
 Eomesodermin .....47  
 Eomes-transcription factor.....40  
 Epstein Barr virus (EBV) ..... 78, 155

Eukaryotic organisms .....201  
 Extension-ligation ..... 261–262  
 Eyeball..... 124, 125, 127

**F**

FACS buffer ..... 9, 19, 26, 29–31, 37, 45,  
 272, 275, 276  
 FACS Diva. *See* Software  
 Fas ligand/Fas-mediated apoptosis.....50  
 Fc receptors ..... 30, 118  
 Ficoll-hypaque.....3–7, 15, 66, 67, 203, 204,  
 234, 235, 245, 246  
 FITC fluorochrome.....45  
 Fixation buffer ..... 272, 275, 276  
 Fixatives (4% paraformaldehyde, Acetone, Methanol,  
 Ethanol).....105, 106  
 Flow cytometry..... 2, 6, 15, 17, 19, 23–31, 34,  
 36, 40, 45, 46, 104, 114, 127, 128, 275–276  
 Flowjo. *See* Software  
 Fluorescence ..... 2, 23–25, 27, 28–32, 45, 104,  
 115, 118, 121, 122, 126, 181, 285–286, 289–291  
 Fluorescent dye.....24, 29, 41, 104, 244, 289  
 Fluorochrome-labeled Abs .....26, 32  
 Forceps .....55, 59, 61, 123, 125,  
 127, 247, 270, 274  
 Formalin-fixed paraffin-embedded sections .....285  
 Forward scatter (FSC).....24, 25, 28, 38, 279  
 FoxP3. *See* Regulatory T cells (TREG)  
 Fragmentation ..... 44, 45, 154, 169, 196, 198  
 Freezing.....19, 36, 99, 104, 113  
 Frozen sections ..... 104, 111–113, 290

**G**

GATA3. *See* T helper cell type 2 (Th2)  
 Gating strategy .....28–30  
 Gene ..... 1, 15, 50, 69, 131, 201, 233, 253  
 Gene symbol.....142–144, 146, 148, 150,  
 152, 154, 156, 158, 160, 162, 164, 166, 168, 170, 172,  
 174, 176, 178, 180, 182, 184, 186, 188, 190, 192, 193,  
 197, 207–227, 258  
 Glycerol..... 55, 245, 250, 285  
 Graded alcohol series.....285, 286  
 Granulocyte-macrophage colony-stimulating factor  
 (GM-CSF) .....14–16, 19, 135, 141, 175  
 Granzyme A/B .....286  
 Green fluorescent protein (GFP) ..... 27, 42, 122, 126

**H**

Head-holding adapter .....122  
 Heart rate .....126  
 Heating pad..... 123, 126  
 Helper T cell.....22  
 High-throughput technologies.....201  
 HIV..... 35, 69, 70

HLA.....14, 15, 17, 19, 31, 33, 66, 70, 71, 73  
 HLA-I.....70, 78  
 HLA-II .....78, 163  
 Homo sapiens.....197  
 Horseradish peroxidase (HRP).....61, 76, 285, 288  
 Host defense.....23  
 Human.....1, 4–6, 8, 9, 15, 16, 19, 22,  
 30–31, 36, 38, 66, 67, 70, 72, 73, 77, 78, 80, 93–95, 133,  
 143, 144, 146, 148, 150, 152, 154, 156, 158, 160, 162,  
 164, 166, 168, 170, 172, 174, 176, 178, 180, 182, 184,  
 186, 188, 190, 192, 204–227, 235, 244, 246, 254–257  
 Hyaluronidase.....3, 9  
 Hybridization .....68, 132, 133, 194–197,  
 255, 257, 260, 265, 266  
 Hydrogen peroxidase (H<sub>2</sub>O<sub>2</sub>) solution.....83, 85,  
 105, 109, 110, 113, 285, 288, 293

**I**

Identifier.....134, 203  
 Illumina .....132, 253, 255–257, 259,  
 260, 265–267  
 ImageScope v10.2.1.2315 (Aperio) .....285, 289, 290  
 Immune cell functions.....135  
 Immune cell response .....206  
 Immune rejection .....283  
 Immunofluorescence .....104–106, 114–117,  
 285–286, 289–291  
 Immunohistochemistry (IHC).....103–106, 108,  
 109, 111–114, 284–290, 292, 293  
 Immunology.....27, 31, 46, 121  
 Immunomagnetic selection.....2  
 Infection .....21, 22, 28, 32–34, 38–41,  
 43, 44, 90, 132, 202  
 Infiltration .....283, 284  
 Ingenuity Pathway Analysis (IPA) .....132, 133,  
 197, 203, 230  
 In silico design.....133–142, 203–204  
 Interferon gamma (IFN-γ).....2, 22, 38, 39,  
 66–73, 79, 84, 135, 136, 156, 169, 180, 206, 284  
 Interleukin (IL).....22, 65, 143–146, 150,  
 154, 157–160, 162, 164, 167, 170–172, 174, 178–183,  
 186, 187, 189, 191  
 IL-2.....150, 159, 171  
 IL-4.....145, 160, 181  
 IL-5.....174  
 IL-6.....160, 178, 183  
 IL-10.....40, 135, 138, 141,  
 145, 179, 182  
 IL-12.....22, 40, 79, 135, 141  
 IL-13.....143, 160  
 Interleukin1 β (IL-1β).....14–16, 141, 167  
 Inter-plate calibrators .....230, 232  
 Interstitial cells .....293  
 Intracellular signaling .....49–62

Intracellular staining (ICS).....34–41, 44, 275–276  
 Intragraft .....283, 284  
 Intra-ocular.....121  
 Intravital imaging.....121–128  
 In vitro stimulation (IVS).....2, 16, 17, 44, 65, 66  
 In vivo cytolabeling.....121  
 In vivo imaging.....121, 123–126, 128  
 Ionomycin.....35, 78  
 IPA software.....230  
 IPG strip .....245–250  
 Islet isolation .....126, 127  
 Islet transplantation.....122–124  
 Isoelectrofocusing .....245–246  
 Isoflurane.....123–126

**J**

JAK/STAT pathway .....253–267

**K**

Kidney biopsies.....284, 286  
 Kidney transplantation .....283, 284  
 Ki67-(MKI67). *See* Proliferation assay

**L**

Labeling .....7–8, 10, 27, 41–43, 104, 132,  
 133, 194–197, 274–275, 279, 289, 293  
 Ladder .....194  
 Lanthanum.....244, 245  
 Laser.....23–25, 27–29, 32, 33, 38, 41–43,  
 45, 117, 126, 238, 239, 241, 285–286, 289–291  
 Leica confocal software .....123, 126  
 Leukocyte.....2, 7, 15, 67, 90, 171, 175,  
 183, 231, 235, 246, 256  
 Leupeptin .....54, 56, 94  
 Library.....27, 255–260, 263–267  
 Lipopolysaccharide (LPS).....78, 138, 139,  
 141, 181, 206  
 Live and dead staining.....28, 29, 37  
 Live microscopy.....274  
 LNA enhanced oligonucleotide primers.....230  
 Locked nucleic acids (LNAs) .....230  
 Longitudinal studies.....122  
 Low-magnification (5x) objective.....125  
 Lung mononuclear cells (LMNC) .....39  
 Lysate .....14, 20, 78, 84, 85, 96, 236, 239, 247, 250

**M**

MACS columns.....4  
 MACS Separators .....7  
 Magnets.....2, 3, 256  
 Major histocompatibility complex (MHC).....1, 13,  
 14, 21–23, 31, 32, 46, 49, 66, 77, 87, 90, 135–141, 159,  
 174, 175, 270, 271

Matlab .....123  
 Melting curve .....68, 70, 72, 205, 232  
 MHC I-class I molecules1 .....21, 31  
 MHC II-class II molecules .....21, 31  
 Microarray .....3, 131–198, 201, 202  
 Microbeads .....2, 4–8, 10, 11, 271, 274  
 microRNA qPCR panel .....202  
 microRNAs (miRNA)..... 89, 91, 201–232  
     expression profiling.....201  
     extraction .....203–205  
     isolation .....202  
     microarrays .....202  
     relative expression .....205  
     target prediction .....230  
 mirBASE accession number  
     (MIMAT).....204, 226–229  
 miRNA. *See* microRNAs (miRNA)  
 miRNome.....201–232  
 mirSVR Score.....204, 230  
 MiSeq.....253, 256, 265–267  
 Molecular Signatures Database (MSigDB).....197  
 Monensin .....34, 37, 43, 44  
 Monocyte .....13–19, 269  
 Mouse strains .....122  
 Multiphoton fluorescence microscopy.....121

**N**

Naïve/memory.....22  
 Naive T cells .....13, 94  
 Natural killer (NK) cells .....1, 22, 23, 91, 92,  
     139, 154, 167, 205, 253, 283, 284  
 NCBI .....134, 193, 197, 203, 204, 255, 267  
 NCBI Entrez Gene ID .....134, 197, 203  
 NCBI Transcript Accession Number .....134, 203, 204  
 Negative separation .....1–11  
 Neurological disorders.....244  
 Next generation sequencing (NGS) .....131, 253–267  
 Nitrogen .....9, 37, 71, 83, 104, 111, 123  
 NK-natural killer cells .....139, 154, 167, 206, 253  
 Non-invasive imaging.....122  
 Normalization .....126, 202, 231, 255, 264, 265  
 Number. *See* RNA integrity number (R.I.N.)

**O**

Oligo probes.....257  
 Omics .....131  
 Oxygen .....62, 123  
 Ozone.....23, 27, 91, 92, 95, 194, 198, 245

**P**

PacBlue-fluorochrome.....45  
 Paraffin embedding .....104, 106–109  
 Passive reference dye.....231

Pathological conditions .....91, 93, 134, 204  
 Pathway analysis .....132, 133, 203  
 PCR Instruments .....231  
 PD1-programmed death cell receptor 1 .....32  
 PE CF594 .....25, 32, 44  
 PECy7-fluorochrome .....25  
 PE fluorochrome .....44  
 Pepstatin .....54, 56, 94  
 Peptides .....14, 15, 17, 19, 21, 31, 32, 35,  
     36, 39, 41, 42–44, 49, 66–71, 73, 77, 78, 80, 87, 140,  
     234, 244  
 PerCP-fluorochrome .....32  
 Perforin/PRF1 .....103, 283  
 Peripheral blood mononuclear cells (PBMC).....6–7,  
     15–16, 67, 95, 132, 202, 204–205, 235, 246  
 Permeabilization .....34, 44, 105, 106, 112, 114,  
     118, 272, 275, 276, 279, 285, 293  
 Permeabilization buffer .....272, 275, 276  
 Personalized medicine .....131  
 Personal protective equipment (PPE).....124  
 PE TexasRed-fluorochrome .....25, 32, 44  
 PGE2 .....14, 16  
 Phenotype .....14, 19, 23, 30–34, 43, 127, 254  
 Phorbol myristate acetate (PMA) .....35, 78, 136, 142  
 Phosphatase inhibitors .....51, 54, 56  
 Phosphate buffered saline (PBS).....4–9, 15–19,  
     26, 29, 30, 35, 36, 42, 44, 55, 56, 59, 66, 67, 78–83,  
     93, 95, 96, 98, 99, 105, 106, 109–117, 123–125, 127,  
     203, 204, 205, 231, 234, 235, 245, 246, 271–274, 276,  
     285, 286, 288, 290–293  
 Phosphoprotease inhibitor.....239, 245, 250  
 Phosphoproteases .....239, 245, 250  
 Phosphoproteins .....27, 145, 160, 167, 243–249  
 Phosphoproteome.....243–251  
 Physiological mechanisms .....201  
 Phytohemagglutinin (PHA).....78, 83, 85, 94, 95  
 Plate design .....204, 231  
 Platform .....132, 133, 194, 202, 266  
 PLC-g1 .....50  
 Polylisine-coated slides .....105, 109, 285, 286, 292  
 Polyacrilamide gel.....50, 51–52, 55, 57–58,  
     62, 244, 246–250  
 Polyethylene tubing .....123–125  
 Polymerase chain reaction (PCR).....65–73,  
     201–232, 255–257, 262–266  
 Polyvinylidene difluoride (PVDF) plate .....50, 52,  
     54, 55, 58, 62, 76, 77, 81, 84  
 Pooling .....265  
 Positive separation .....1–11  
 Posterior chamber of the eye .....127  
 Post translational modifications (PTM).....51, 243  
 Primary antibodies.....285, 286, 289–291, 293  
 Primer sets .....204, 230  
 Proliferation assay.....41–42

Protease inhibitors .....51, 54, 56, 94–96, 98,  
 235, 239, 245, 247, 250  
 Proteases ..... 22, 51, 54, 56, 92, 94–96, 98,  
 99, 235, 239, 245, 247  
 Protein blocking solution .....285  
 Protein concentration ..... 51, 54, 56–57, 62, 236, 247  
 Protein extracts .....50–51, 54, 56, 57,  
 234–236, 240, 245, 247  
 Protein isolation ..... 245, 247  
 Protein marker ..... 52, 55  
 Protein phosphorylation ..... 51, 243  
 Protein precipitation .....244  
 Protein spot ..... 237, 238, 240, 244  
 Purification ..... 31, 37, 87–99, 196, 255, 256, 271  
 PVDF membrane .....52, 54, 55, 58, 62

**Q**

Quantitation .....66, 69, 72, 73, 197, 202  
 Quantitative real-time PCR (qRT-PCR) ..... 66–73,  
 201–203, 205, 231

**R**

Ras-Erk activation .....50  
 Real time PCR ..... 65–73, 201–232  
 Reference assays .....204, 231  
 Reference miRNAs ..... 202, 205, 231  
 RefSeq ..... 134, 203  
 Regulation of gene expression .....201  
 Regulatory T cells (TREG) ..... 91, 269, 270  
 Relative fold change ..... 69, 70, 73, 205  
 Renal cell carcinoma (RCC) ..... 2, 66, 84, 85,  
 132, 254, 258  
 Resonant scanner .....128  
 Reverse transcription-quantitative polymerase chain reaction  
 (qRT-PCR) .....66–73, 201–203, 205, 231  
 Ribosomal (18S rRNA) ..... 142, 195  
 Ribosomal (28S rRNA) .....195  
 RIPA buffer ..... 50–51, 54, 56  
 RNA ..... 27, 67, 68, 70, 72, 78, 96, 98,  
 99, 104, 132, 133, 142, 194–197, 201, 205, 231, 232  
 RNA integrity number (R.I.N.) ..... 142, 194, 195  
 RNA molecules .....201  
 RNA-spike in assays .....231  
 RNA translation .....201  
 RORgt-orphan receptor gamma 1. *See* T helper cell  
 type 17 (Th17)  
 RosetteSepT .....5  
 RPMI-1640 media ..... 124  
 Running buffer .....55, 57, 62, 246, 250

**S**

Sample buffer ..... 55, 57, 245, 247  
 ScanScope Digital Slide Scanner .....285, 289

SDS-polyacrylamide gel electrophoresis  
 (SDS-PAGE) ..... 51–52, 54, 55,  
 57–58, 245–246, 249, 250  
 Secondary antibodies: FITC-conjugated (555nm),  
 TRITC-conjugated (488nm) .....286  
 Secondary biotinylated antibodies HRP  
 conjugates .....285  
 Side scatter/SSC .....24, 25, 28, 38, 285  
 Signal transduction ..... 49, 50, 90, 243  
 Single-cell resolution .....122  
 Singlets .....28–30  
 Slide ..... 104, 105, 109–115, 117, 118,  
 198, 277, 285–293  
 Slide digitation ..... 285, 289  
 Slide Quantification : Adobe Photoshop .....286  
 SNAP i.d immunoblotting .....50  
 Sodium-dodecyl sulfate (SDS) ..... 50–52, 55,  
 57, 58, 62, 245–250  
 Software ..... 25, 26, 28, 38, 69, 85, 94,  
 123, 126, 132, 133, 203, 205, 230, 237–241, 250, 255,  
 257, 266, 267, 276, 278  
 Specific primary antibodies .....285, 286  
 Spectrophotometer .....51, 54, 94, 96, 98,  
 133, 196, 203, 205  
 Spike-in ..... 196, 231, 232  
 Staphylococcus enterotoxin B (SEB) ..... 35, 38, 42,  
 78, 141  
 STAT6 ..... 40, 139, 160, 160, 254, 257, 258  
 Stereomicroscope .....76, 110, 113, 122, 124  
 Surface staining .....26, 30–32, 34, 37, 45  
 SYBR<sup>®</sup> green technology .....68  
 Symbol ..... 142–144, 146, 148, 150, 152,  
 154, 156, 158, 160, 162, 164, 166, 168, 170, 172, 174,  
 176, 178, 180, 182, 184, 186, 188, 190, 192–194, 197,  
 207–227, 258  
 Synonyms .....197

**T**

Target genes .....72  
 Tbet-transcription factors: type 1 (Tbox1) .....40  
 T cells  
     activation .....50, 80, 87, 88, 283  
     receptor (TCR) ..... 1, 10, 13, 21, 22, 32, 49,  
         50, 87, 88, 91, 92, 135–141, 178, 180, 183, 193, 206  
     receptors ..... 1, 13, 21, 32, 49, 87, 137,  
         178, 183, 193, 206  
     regulatory (Tr) ..... 91, 269, 270  
     response .....32, 43, 65–73, 78, 83, 92, 132, 202, 284  
 T-cell-specific T-box transcription factor, T-bet,  
 TCR ligands .....49  
 T cytotoxic cell (Tc) ..... 40, 276–278  
 Tetramers/pentamers staining .....31–34  
 T helper cell type1 (Th1) .....40  
 T helper cell type 2 (Th2) .....40

T helper cell type 9 (Th9) .....	40	Tumor immunity .....	23
T helper cell type 17 (Th17) .....	40	Tumor-infiltrating lymphocytes (TIL).....	3–6
Time-lapse acquisition .....	128	Tumor necrosis factor alpha (TNF- $\alpha$ ).....	159, 171
Tissue		Tween20 .....	55, 56, 82, 83, 105, 106, 112
bleaching .....	126	Two dimensional gel electrophoresis .....	243–251
damage .....	104, 126, 293	Type 1 interferon's (IFN- $\alpha$ , IFN- $\beta$ ).....	22
TNFR-tumor necrosis factor family Fas receptor		<b>V</b>	
mechanisms (TNFRSF6, Apo-1, CD95) .....	22	Vacuum.....	52, 55, 59, 61
Toll-like receptor (TLR) .....	22, 139, 149, 150,	V500 fluorochrome.....	40'
161, 164, 166, 171, 173, 182, 184, 185, 191		Viral.....	21, 22, 31–34, 38, 92, 132, 145,
Top down approach .....	244	149, 151, 155, 167, 180, 181, 202	
TO-PRO3.....	286, 291	Viscotears .....	123, 124
Transcript .....	71, 73, 134, 143, 156, 165, 203,	Vortex .....	26, 45, 56, 79, 83, 85, 247, 263
204, 207–227, 283		VPD450. <i>See</i> CFSE proliferation-fluorochrome	
Transcription factors.....	32, 34, 37, 40–41, 44,	<b>W</b>	
46, 143, 145, 146, 152, 155, 169, 173, 187, 191, 192,		Washing buffer .....	55, 79, 82, 239, 292
270, 284, 293		Water immersion dipping objectives 20x.....	125
Transcriptome .....	131–198	Western blot .....	51, 54, 96
Transfer buffer.....	55, 58	<b>X</b>	
Transgenic mice.....	127	Xylazine.....	124
Transplantation.....	27, 66, 122–127, 283–294	Xylenes .....	104, 108–110, 113, 285, 286, 292
Transplant patients .....	284, 287, 288	<b>Z</b>	
Transplant rejection .....	23, 91	Z-stacks.....	126
Triton x100 solution .....	285, 290		
Trypan blue .....	6, 9, 16–18		
Tumor 1–11, 14, 20–23, 27, 43, 44, 65, 66, 84, 85, 87, 90–92,			
143, 144, 148, 151, 154, 159, 163, 165, 167, 170, 171,			
174, 176, 179, 182, 184, 187, 189, 191, 254, 258			