A Acridine orange, 40, 60 Actin, 69, 199, 206, 208, 209, 269, 287, 288, 289, 328 Aggregate, 1, 11, 44, 48, 51, 99, 123, 195–209, 238, 332 AICAriboside (AICAR), 89, 95 Alzheimer's disease, 195 Amino acid, 2, 3, 4, 9, 14, 20, 24, 26, 48, 89–101, 111–112, 138, 148, 175, 177, 181, 187, 227, 228, 231, 234, 237, 251, 355	Autophagosome, 1–7, 11–25, 29–32, 42–46, 49, 55–56, 66, 77–85, 89–101, 111, 119–123, 125, 129, 131, 135–143, 147–155, 159, 175–190, 195, 213–216, 245, 247, 250, 261, 262, 271, 390 Autophagy, 1–7, 11–15, 24–25, 29–57, 77–85, 89–101, 111–113, 119–123, 125–131, 135–136, 147–149, 159–164, 175–190, 195–209, 214, 227–239, 245, 262, 407
AMP-activated protein kinase (AMPK),	B
3, 89, 91, 95–97 Amphisome, 2, 5, 12, 13, 25, 186	Bafilomycin A, 31, 35, 44–46, 177, 196, 202, 410, 412
Antigen processing, 353–376	Bax, 31, 59, 175, 178, 183–185
Apoptosis, 2, 29–32, 57, 59–61, 64, 160,	BCG, 441, 444
175, 186–189	Beclin, 1, 30–31, 36, 43–44, 46, 64, 89,
Atg, 4, 13, 30, 43, 45, 64, 90, 136	94, 100
Atg1, 3, 94, 95, 136–137, 141–143	Biotin, 301–309, 330, 334, 347, 357, 366, 418, 421–428, 434
Atg3, 78 Atg5, 30–32, 36, 44, 46, 64, 90, 119,	Brefeldin A, 34, 43, 44, 356
120, 123	Brucella, 268, 278
Atg6, 30, 31, 36, 44, 64, 94	,,
Atg7, 30, 31, 78, 90, 123	C
Atg8, 5, 13, 30, 78, 119, 125, 126, 129–131, 139, 141, 142, 213, 214,	Calcium, 58, 228, 247, 267, 277, 304, 306, 341
216, 217 Atao 136 143 147 151 153 156	Calmodulin, 245, 247, 322
Atg9, 136–143, 147, 151, 153–156 Atg10, 30, 44, 46, 64, 65	Calnexin, 379, 380, 382, 385, 386 Cancer, 1, 11, 71, 77, 94, 97, 99, 101,
Atg12, 5, 30, 36, 44, 46, 64, 65, 119	135, 136, 160, 163, 175
Atg16, 5	Caspase, 30–31, 57, 59, 60, 63,
ATPase, 35, 46, 176–178, 262, 312, 319,	175–190, 203
320, 322, 325, 412	Cathepsin, 26, 312, 345, 346, 390
Autolysosome/Autophagolysosome, 1, 2, 4–6, 12, 13, 25, 30, 31, 55, 77–78,	CD4 ⁺ T-cell clones, 213, 214, 216, 218, 219, 221, 223
82, 85, 90, 111, 112, 117, 119,	Cell-free system, 247, 255, 301
129, 131, 178, 186, 187, 271, 408	Ceramide, 34, 44, 100, 159–168

Chaperone-mediated autophagy (CMA), 227-239, 241 Fat body, 99, 125, 127–131 Chloroquine, 31, 220, 223, 356, 361, 362 Fluorescence microscopy, 29, 33, 41, 42, Class II MHC/MHC II, 4, 213, 216, 52, 56, 59–62, 122, 135–143, 179, 203, 214, 220, 246, 250, 251, 253, 353–373 Confocal microscopy, 58–59, 131, 258, 316, 379, 382, 384, 385 184, 213, 215, 217, 220, 287, FRET, 311, 313, 322–323, 410 293, 440, 446 Fusion, 213–239, 301–309 Coxiella, 389-403 Cryosectioning, 11, 13, 18, 20, 25 Cytochalasin D, 356, 361, 362 G Cytochrome c, 40, 42, 57, 62, 178, GFP (green fluorescent protein), 31, 40, 185, 193 49, 119–123, 128, 196, 289 Cytoplasm to vacuole targeting Glucagon, 90, 92, 93 (Cvt), 136 Glutamate dehydrogenase, 89, 96, Cytosol, 2, 6, 12, 13, 29, 30, 46, 57, 97, 101 59, 63, 97, 183, 196, 245, 247, Golgi, 30, 136–138, 147–156, 245, 346, 249–252, 255, 258, 302–308, 362, 380, 389, 393, 400, 407 390, 418, 426–429 GTPases, 3, 6, 407–411, 418, 421, 439, 440 D H Dictyostelium, 327, 329, 336 Hexoseaminidase, 365, 366, 368 DQ-BSA, 314 HRS, 6, 289, 291 Drosophila, 99, 125-131 Huntington's disease, 11, 99, 195 \mathbf{E} IFN(interferon), 32, 217, 344, 354, E64d, 78, 80, 82, 85, 187 407-413 EEA1, 6, 148, 154, 155, 289, 291 Immunoelectron microscopy, 11, 48, Electron microscopy, 11–13, 19, 24–26, 233, 429 29, 31, 32, 35, 38, 42, 47, 48, 126, 187, 233, 248, 253, 261–262, 264, Immunofluorescence microscopy, 41, 42, 275, 277, 362, 380, 389, 421, 59, 60, 62, 214, 220, 379 Influenza, 213, 214, 217, 390 429, 431 Insulin, 43, 89–101, 304, 308, 309 Endoplasmic reticulum, 2, 20, 22, 29, 43, 58, 90, 136, 176, 245, 262, 270, Isolation membrane (phagophore), 2, 5, 277, 278, 362, 379, 380, 393 12, 20, 22, 44, 119, 136 Endosome, 5, 12, 25, 147, 150, 153–154, Isotope coded affinity tag, 339, 342, 347 214, 245, 247, 261, 271, 272, 274, 290, 301 Enzyme cytochemistry, 261, 263, 266, K 267, 275, 277 KDEL, 379–384

L	Membrane, 12, 30–32, 37, 38, 44, 45, 46,
Lamp(Lysosome-associated membrane	55, 59–64, 78, 84, 90, 95–97, 101,
protein)	135–143, 147, 148, 153, 178–190,
Lamp-1, 37, 55, 345, 346, 354, 358,	198, 207, 214, 216, 227–228,
369–371, 389, 393, 398, 400	231–234, 245–250, 255, 256,
Lamp-2, 26, 31, 37, 44–46, 55, 58,	261–263, 268–271, 274, 287–289,
369, 389, 393, 398, 400	301–302, 321, 325, 328, 329, 332,
Latex beads, 278, 294, 327-333,	334, 339, 342, 346, 351, 362–366,
340–348, 353–354, 356–369, 389,	369, 374–376, 380, 389, 390–393,
391–400, 444–445	396, 400, 402–403, 408, 410, 413,
LC3, 5, 30, 49, 52, 55, 77–80, 82–84,	418, 420, 429–432, 439–440
149, 187–188	Membrane cycling, 135–144
Legionella, 268, 327, 379, 390	Membrane transport, 135
Lipidation, 77	Metabolic labelling, 227
Lipopolysaccharide (LPS), 350	MHC class II, 213–216, 366
Liquid chromatography tandem mass spectrometry, 339	Microautophagy, 2, 231, 232, 245, 247–257
Listeria, 268, 276, 359, 418	Microtubule, 13, 25, 30, 40, 49, 77–78,
Lithium, 34, 43, 44, 138–139, 144	100, 148, 186
Loading compartment (MIIC), 213–215,	Mitochondria, 22, 25, 29-31, 56-64, 78,
223, 353, 362, 364, 365, 368, 369	95, 97, 101, 136–137, 139, 176,
Long-lived proteins, 29, 48, 50, 51, 64,	178, 183–186, 189, 233, 235, 240
111–113, 159, 164, 196, 231	Mitochondrial membrane
LY294002, 93, 188	permeablization (MMP), 30, 31,
Lysosome, 12, 22, 31, 37, 44, 45, 55, 78,	46, 57, 59, 60
136, 160, 228, 233, 262, 311–313,	Mitogen-activated protein kinase
389–390, 393, 400, 439	(MAPK), 46, 90, 91, 100, 188
LysoTracker Red, 125, 126,	Mitophagy, 2, 57
129–131, 408	Mitotracker, 39, 57, 58, 63, 139, 189
	Monodansylcadaverine (MDC), 39, 40,
	48, 49, 52, 408
M	Mycobacterium, 270, 284, 327, 353, 354,
Macroautophagy, 2, 43, 89, 111, 136,	408, 418, 439, 443
159–172, 175, 186, 187, 213, 214,	
215, 231, 232, 246, 247, 249, 250	N
Macrophage, 3, 6, 111–116, 268, 276,	Necrosis, 32, 60, 61, 175, 178, 179, 409
278, 287–295, 301–308, 311–323,	Neurodegenerative disease, 77, 99, 136
328, 339–340, 346, 353–369, 374,	Nocodazole, 113–115
379, 380–383, 389–396, 407–413,	Nucleus, 17, 31, 51, 63, 179, 188, 215,
417–426, 439–440, 443, 445, 447	239, 241, 245, 247, 306, 389
Magnetic bead, 301–308	, , , , , , , , = ==
Mammalian target of rapamycin	
(mTOR), 43, 89, 91, 196	0
Maturation, 34, 43–44, 89–100, 196	Organelle purification, 327

P	Phosphatidylinositol 3-kinase (PI3K), 3,
P47 immunity-related GTPase, 407–411	7, 30, 34, 43, 89, 91, 93–99,
P58, 379–384	232, 288
P62, 342, 389, 393, 398, 400	Phosphatidylinositol 3-phosphate (PI3P)
PARP cleavage, 175–181	6, 7, 289, 304 Phosphatidylserine (PS), 41, 60, 61, 178
Pathogen, 1, 4, 6, 112, 261–263, 287, 301–302, 327, 340, 389–394, 400, 402, 407, 408, 413, 417–418, 421, 439	190, 250–252, 255, 258 Phosphoinositide (PtdIns), 6, 7, 91, 93, 94, 99, 287–293 PKB/Akt, 3, 91, 93, 290
Pepstatin, 78, 80, 82, 85, 150, 187, 237, 250, 255, 304, 357, 358	Point counting, 11, 16, 17, 18 PolyQ, 205
Peroxidase, 38, 54, 81, 84, 199, 208, 219, 222, 266, 301–308, 342, 393, 418	Programmed cell death (PCD), 195, 196 Protease protection assay, 227, 231, 234
Pexophagy, 2, 245, 247, 249	Protein trafficking, 147–155
pH, 13, 14, 15, 18, 33, 38, 41, 46, 47, 53, 80–83, 90, 114, 120, 122, 126, 139, 144, 149–150, 154, 160, 161, 162, 165, 177, 198, 199, 217, 218, 229–231, 235, 250–255, 265–267,	Proteolysis, 48, 51, 92, 111–115, 159, 213, 230, 234, 237, 242, 311, 312, 319, 320 Proteomics, 327, 328, 339, 389
274–280, 287–291, 304–305, 311–321, 329–330, 332, 335, 341–343, 345–349, 356–360, 369,	Q Q fever, 389, 390
381, 391–393, 401, 407–410, 413,	R
419, 420, 422	Rab, 6, 148, 151, 290, 345, 417, 418,
PH domain, 287, 290	421, 429, 439–443
Phagocytosis, 1, 4, 6, 8, 32, 55, 261, 275, 282, 287–295, 301, 305, 311, 312, 317, 318, 321, 327–331, 339, 380, 390, 410, 417, 422, 443	Rapamycin, 3, 34, 43–45, 89, 91–95, 98 99, 127, 195–197, 203, 205–206, 247, 250, 253, 256 Reactive oxygen species (ROS), 40, 57,
Phagophore, 2, 5, 12, 20, 22, 44, 119, 136	60, 62, 71, 89, 97, 101, 288 Rheb, 3, 4, 91, 93, 96–97, 129, 130
Phagophore assembly site (PAS), 2, 136–143	Ribosomal protein S6, 43, 89, 91 RNA, 98, 112, 130, 186, 223, 225,
Phagosome	444, 447
acidification, 276, 279, 407, 408, 409 purification, 334, 339–349	S Salmonella, 356, 393, 417–433
Phosphatase, 43, 92, 168, 238, 251, 255, 256, 266, 267, 275, 276, 282, 304, 390	Saponin, 218, 358, 369–371, 381, 385, 446 Sec22b, 380, 382, 384, 385
Phosphatidic acid, 6, 98, 167	Sequestration, 45, 136, 283, 389
Phosphatidylethanolamine (PE), 5, 60,	Shigella, 112, 117, 419

SopE, 417, 418, 420, 421, 431, 433 Transmission electron microscopy Sphingolipids, 159–172 (TEM), 24, 29, 32, 38, 42, 80, 126, Sphingosine 1-phosphate (S1P), 198, 264, 389, 392 159–162, 168, 170 Trypan blue, 115, 149, 150, 294, 314, Sphingosine kinase, 159–172 316, 317, 320, 323, 345, 411, 445 Starvation, 1, 11, 12, 25, 29–31, 34, 43, Tuberculosis, 113, 304, 353, 354, 408, 439-448 44, 77–79, 82, 85, 90, 94, 97–99, 113, 115, 123, 125–131, 135, 140, 175, 227, 228, 233, 245, 247, 251 Streptavidin, 222, 301-304, 334, Ubiquitin, 30, 119, 129, 196 366, 444 Streptococcus, 112, 356 V Stress, 29, 30, 34, 42–45, 57, 59, 64, Vacuole, 11, 12, 16, 17–19, 22, 24, 26, 101, 159, 175, 176, 188, 227, 228, 119, 135–136, 245–258, 278, 288, 233, 382 379, 389–403, 408 Subcellular fractionation, 60, 147, 150, Vinblastin, 113–115, 149, 187 152, 354, 364, 365, 390, 400 Virus, 1, 2, 4, 112, 214, 382–383 Sucrose gradient, 152, 328, 339, 344, Volume fraction, 11, 17–19 364, 391, 393, 395 Vps34/hVPS7, 30, 31, 34, 35, 37, 43-46, 64, 93, 196 VTC(vacuolar transporter chaperone), Thapsigargin, 34, 43, 44, 176 245, 247, 248, 253, 267 3-methyladenine (3MA), 31, 35, 44, 45, 94, 113–114, 160, 205 TNF (tumour necrosis factor), 175–179, W 183, 189, 407 Wortmannin, 93, 94, 113-114, 188 Tor, 2, 3, 4, 8, 95, 98, 99, 127, 129, 130, 247 X Transfection, 33, 38, 45, 47, 57, 123, Xenophagy, 2 149, 163, 165, 197, 200-203, 214, 217, 219, 220, 287, 289, 291–295, 304–306, 382–384, 439, 443, 445-447 Yeast(Saccharomyces), 119, 245