Index

advection-diffusion equations, 13, 91
adventitia, 53
anastomosis, 73
angiogenesis, 14, 30
anti-inflammatory macrophages, 4
antibodies, 2
antigen, 2
antigen presenting cells, 3
apoptosis, 2
arterial wall, 52
asymptotically stable, 18, 46
atherosclerosis, 51
atherosclerosis model, 63

B cells, 3
basic reproduction number, 20
benign tumor, 25
boundary value problem, 85
branches of non-spherical solutions, 45

cancer, 14, 21, 25
cancer models, 41
carrying capacity, 13
$CD4^+$ T cells, 3
$CD8^+$ T cels, 3
cell cycle, 1, 48
checkpoint, 47
chemokines, 3
chemostat, 15, 16
chemotaxis, 13
cholesterol, 51
chronic wound model, 79
chronic wounds, 71
co-operativity, 10
collagens, 2
conservation of mass, 13
cytokines, 3
cytoplasm, 1
cytotoxic T cells, 4

death/degradation rates, 34
dendritic cells, 3
diffusion coefficients, 33
diffusion coefficients of proteins, 33
diffusion equation, 88
dilution rate, 16
Dirichlet problem, 85
disease free equilibrium (DFE), 18
DNA, 1
DNA synthesis, 1

elliptic equations, 85
elliptic operator, 86
endemic state, 19
endocytosis, 3
endothelial cells, 2
enzyme dynamics, 7
enzymes, 1
epithelial cells, 2
Estimates of K_X, 35
eukaryotic cell, 1
expected secondary infection, 20
extracellular matrix, 2

fibroblasts, 2
foam cells, 53, 64
free boundary, 42
free boundary problems, 91

gap phases, 1
gene, 1
gene transcription, 1
globally asymptotically stable, 19
granular macrophage colony stimulating factor (GM-CSF), 30

Hölder continuous, 87
half-life, 11, 12
half-saturation, 11, 34
haptotaxis, 53
Hele-Shaw problem, 93
high density lipoprotein, 51
Hill dynamics, 11
Hill equation, 11
Hopf bifurcation, 46
hyperoxic, 73
hypoxic, 26, 73

immune cells, 2

immune system, 3, 25
infectious diseases, 18
initial-boundary value problem, 88
intima, 52
Ischemia, 71

Laplace operator, 85
ligand, 2
lipoproteins, 51
Logistic growth, 13
low density lipoprotein, 51
Lyapunov functions, 19
lymphokines, 3

macrophages, 3
major histocompatibility complex (MHC), 3
malignant tumor, 25
mathematical analysis, 41, 63, 79
maximum principle, 86
maximum principle for parabolic equations, 88
media, 53
Michaelis-Menten law, 9
minimal models, 32
mitochondria, 1
mitosis, 1
monocytes, 3
multiscale tumor model, 47
myeloids, 3

naive T helper cells, 4
natural killer cells, 4
necrosis, 2
network of cells and cytokines, 26, 31
Neumann problem, 85
neutrophils, 3
NK cells, 4
nonlinear equations and systems, 89
nude mice, 30

oncogenes, 25
organelles, 1

parabolic equations, 88
parabolic operator, 88
parameters estimation, 33
PDEs, 85
phagocytosis, 3
plaque, 51, 55
plasma cells, 3
plasma membrane, 2
platelet-derived growth factor (PDGF), 71
population dynamics, 15
product, 7
production of cytokines, 12
production rates, 36
progenitor cell, 2
progenitor cells, 3
proinflammatory macrophages, 4
prokaryotic cell, 1
protein, 1

quiescence, 47

radially symmetric stationary cancer, 45
receptor, 2
receptor recycling time, 11
receptor-ligand complex, 11
regulatory T cells, 4
reverse cholesterol transport, 54
risk map, 61, 67
RNA, 1
Robin problem, 85
robosome, 2

SEIR model, 20
senescence, 2
SIR model, 18
smooth muscle cells, 2
solid tumor, 25
steady states, 34
Stefan problem, 91
stem cell, 2
substrate, 7
suppressor genes, 25

T helper cells, 3
T lymphocytes, 3
transcription factors, 1
tumor, 25
tumor associated macrophages, 30

upper convected Maxwell fluid, 73

vascular endothelial growth factor (VEGF), 13, 30, 71
vesicle, 1

yield constant, 16