

Index

- academician 69, 141, 175
Adalimumab 108, 110
adenovirus vector 141
African Center for Disease Control 295
African swine fever 199
Agricultural Bank of China 36
agriculture 30, 34, 38, 60, 64, 65, 183, 190, 193, 195, 196, 285, 286, 293, 297, 299
agrobusiness 206, 207
air pollution 251–253, 255, 257
air quality index (AQI) 252, 253
Ajinomoto 224–226
Alibaba 52, 53, 160, 162, 209, 272
AliHealth 160
Alphamab 171, 175
Alstom 45, 51
Alzheimer's patients 76, 135
Analects 208, 211
anemia 76, 103, 222
angiotensin converting enzyme inhibitor 195
animal feed 189, 191, 224, 227, 228, 232, 234, 235
animal husbandry 198–201, 203, 227
animal model 56, 144, 200
Anqing Hexing Chemical Co. 240
APEC *see* Asia-Pacific Economic Cooperation
AQI *see* air quality index
aquaculture 30, 199, 201
AR *see* augmented reality
artemisinin 121, 122, 245
artificial intelligence 24, 133, 161, 170, 223
ASEAN 292
Asian cuisine 226
Asia-Pacific Economic Cooperation (APEC) 255, 256
Asia-Pacific Telecommunity 289
Augmented reality (AR) 158, 159, 161, 272
Bacillus thuringiensis 192
bacteria 70, 186, 211, 212, 221, 233
Baidu 72
baijiu 214, 215
bank 3, 36, 37, 72, 147, 148, 272
Bank of China (BOC) 15, 16, 36
barley 186, 187, 189, 215
Basiliximab 111
Bayer 107, 168
Baymax 163
BDS *see* BeiDou Satellite System
beer 68, 215, 216, 235
BeiDou 53, 54, 195, 292, 293
BeiDou Satellite System (BDS) 292, 293
Beijing 19, 20, 35, 48, 51, 56, 62, 65–69, 92, 113, 122, 133, 134, 145–150, 164, 165, 173–175, 205–208, 236, 237, 251, 252, 254, 255, 276–279
Beijing Institute of Genomics 56
Beijing Minhai Biotechnology 171
Beijing–Tianjin–Hebei conurbation 254, 255
Beike Biotechnology Co. 147
Beishen Medical Technology 158
belt and road 54, 291–293
belt and road initiative (BRI) 280, 290–292, 295, 299
Bevacizumab 110

- BGI 55, 127, 131, 132, 139, 152, 175, 214, 247
 big data 56, 75, 164, 214, 221, 223, 245, 286, 287, 299
 biobank 54, 55, 140
 biodiversity 25, 275, 277, 286, 287, 289, 299
 bioeconomy 245–247, 297
 bioethanol 47, 232, 233, 238
 biogas 46, 256–258, 262, 286
 biologics 80–83, 87, 93, 94, 100
 biomass 43, 44, 46, 223, 232, 244, 245, 256, 257, 271, 286
 biopharmaceuticals 87, 93, 114
 biotechnology 24, 25, 184–187, 189, 191, 218, 221, 222, 227, 242, 245, 252, 256, 262, 269
 blood 94, 100, 101, 129, 130, 144, 158, 176
 blue city water quality index 261
 BOC *see* Bank of China
 Bombardier 51
 brain 134, 143, 153, 155, 156
 breeding 25, 153, 154, 186, 187
 cow 204
 fish 202
 genomic 200
 hybrid 186
 livestock 30
 molecular 194
 pig 151
 brewing 214, 218, 224
 BRI *see* belt and road initiative
 budget 14, 20, 37, 71, 72, 139, 209, 247
 CAAAS *see* Chinese Academy of Agricultural Sciences
 CAE *see* Chinese Academy of Engineering
 campaign 167, 228, 289
 cancer 79, 103, 107, 114, 115, 136, 141
 cervical 97
 genital 97
 liver 76, 77, 108, 111
 lung 76, 111, 191
 stomach 76
 Cancer Targeting Gene-Viro-Therapy 141
 Cathay Biotech Co. 238
 CDC *see* Center for Disease Control
 Cell Engineering Research Center 113
 cell 24, 49, 55, 132, 141–144, 147, 148, 153, 222, 238, 241, 246
 adult 143
 animal host 222
 endothelial 103
 human diploid 96
 microbial 55, 221, 222, 230
 pig 200
 pig fibroblast 153
 pluripotent 143
 Center for Disease Control (CDC) 99, 105, 164, 165, 193, 295
 Center for Excellence in Brain Science and Intelligence Technology 133
 Cetuximab 111
 CFDA *see* Chinese Food and Drug Administration
 Changchun Changsheng Biopharmaceuticals 99
 Chengdu Agricultural University 194
 Chengdu Huasun Group 111
 Chengdu Institute of Biological Products Co 98
 Chengdu Jinweike Biological 141
 Chengdu University 92
 Chengdu University of Traditional Chinese Medicine 122
 CHEN Jiansu Key Laboratory 150
 China Aerospace Information Research Institute 294

- China Agricultural University 152, 194
 China Brain Project 133
 China Dairy Association 204
 China Environmental Network 271
 China Gene Group 142
 China Global Television News 273
 China Heavy Machinery Co. 263
 China Mobile 159, 160
 China National Intellectual Property Administration 72
 China Pharmaceutical Culture Collection 92
 China's Aerospace Information Research Institute 293
 China Statistical Office 184, 190
 Chinese Academy of Agricultural Sciences (CAAS) 198, 204, 205, 217, 218, 278
 Chinese Academy of Engineering (CAE) 16, 69, 200, 205
 Chinese approach 245, 295, 297
 Chinese company 43, 51, 83, 88, 104–106, 124, 128, 129, 203, 204, 234, 238, 241
 Chinese cuisine 191, 199, 211
 Chinese Food and Drug Administration (CFDA) 99, 176, 203
 Chinese government 99, 170, 214, 232, 252, 272, 295
 Chinese hamster ovary (CHO) 95, 222
 Chinese Medical Association 136
 Chinese Medical Sciences 122
 Chinese Medicinal Plants 116
 Chinese Organization for Rare Diseases 136
 CHO *see* Chinese hamster ovary
 Chongqing 3, 19, 20, 23, 45, 151, 173, 206, 218, 272
Clostridium acetobutylicum 234
 coal 3, 41–44, 47, 51, 228, 229, 252, 257, 264, 271, 273
 coast 5, 35, 47, 52, 92, 139, 267, 268, 286
 Communist Party of China (CPC) 13, 14, 16–18, 24
 Conbercept 110
 Confucianism 9
 Confucius 4, 9, 208, 211, 300
 Construction Bank of China 36
 consumer 39, 90, 189, 191, 217, 226, 228, 271
 consumption 44, 189–191, 202, 212, 215, 226, 229, 231, 238, 240, 259
 corn 25, 29, 184, 185, 189–191, 227, 230, 232, 237
 coronavirus 164, 165
 cosmetics 79, 80, 229
 country 1–6, 8, 10, 48, 66, 69, 75, 151, 204, 207, 276, 289–292, 295
 atheist 7
 developed 100
 developing 75, 288, 296
 high-income 288
 industrialized 78, 93, 288, 300
 less-developed 291
 COVID-19 virus 168
 CPC *see* Communist Party of China
 crop 30, 184, 185, 187, 190, 192, 194, 195, 209, 237, 292
 cultivation 30, 119, 120, 143, 144, 221, 246, 291, 299
 culture 4, 10, 16, 37, 56, 79, 208, 221, 298–300
 business 61
 callus 186, 187
 haploid 186
 hydroponic 196
 non-individualistic 298
Cupressus funebris 197
 Daclizumab 111

- Dai-Nippon Brewery 216
 Dalian Yawei Pharmaceutical 109,
 111
 Darwin's theory 65
 desert 3, 46, 48, 252, 270
 development 29, 35, 36, 46, 47, 67,
 69, 92, 94, 143, 144, 161, 168,
 170, 171, 200, 221, 222, 224,
 296–300
 biomedical 170
 bioprocess 241
 demographic 76
 drug 169
 enzyme 242
 green 38, 280
 high-tech 288
 industry-oriented 80
 municipal 267
 social 13
 technical 69
 tourism 293
 diabetes 79, 101, 129, 147, 153,
 193
 diagnosis 75, 77, 133, 140, 159,
 161, 162, 167, 176, 286
 diagnostics 79, 94, 97, 131, 138
 biochemical 125
 clinical 129
 molecular 126, 131
 omics-based 286
 remote 159
 tumor 127, 131
in vitro 123, 234, 285
 DianDiagnostics Group 126
 disease 75, 77, 87, 129, 134–140,
 144, 147, 158, 165, 169, 170,
 176
 age-related 79
 Alzheimer 135
 autoimmune 114
 cardiovascular 79, 105
 chronic kidney 103
 chronic obstructive pulmonary
 76
 eye 115, 159
 genetic 138
 Hodgkin's 115
 Huntington's 138, 153
 hypertensive heart 76
 ischemic heart 76, 77
 life-threatening 76, 105
 Moyamoya 137
 neonatal 77
 neurodegenerative 155
 Parkinson's 76, 152
 rare 135–138, 142
 viral 87
 DNA 132, 138, 222, 223, 245–247
 doctor 60, 78, 90, 115, 151,
 157–160, 166, 295
 Down's syndrome 132
 drone 166, 196, 292
 drought 184, 189
 drug 80, 81, 83, 115, 117, 121,
 122, 128, 135, 160, 167, 169,
 174
 animal 94, 172
 anti-infective 90
 anti-malaria 245
 antiviral 167
 biomedical 84
 diabetes-related 102
 gene therapy 141
 East China University of Science
 and Technology (ECUST) 142,
 241
 ecology 25, 194, 287, 288, 297
 ECUST *see* East China University of
 Science and Technology
 education 24, 27, 34, 35, 37,
 59–61, 63, 64, 70, 78, 79, 121,
 122, 296, 298
 Edward's syndrome 132
 electricity 41–47, 228, 256, 275,
 280
 embryo 142, 144, 153, 200
 emissions 39, 233, 254, 266, 273

- encephalitis 98, 137, 147
 energy 36, 37, 41, 43, 45–47, 208,
 223, 254, 280, 286
 bio 235
 geothermal 43
 non-fossil 273
 nuclear 42, 43, 46
 solar 43, 47, 228
 Energy Foundation China 274
 enzyme 129, 130, 224, 234, 235,
 238, 242
 intracellular 238
 isolated 221
 optimized 238
 purified 234
 epidemic 164–167
 EPO *see* erythropoietin
 equipment 99, 123, 125, 196, 216,
 270, 295, 296
 color-coded ultrasound 125
 diagnostic 125, 159
 Internet of Things monitoring
 196
 multispectral 196
 nursing 79
 therapeutic 285
 wearable 170
 X-ray 125
 erythropoietin (EPO) 73, 93, 103,
 104, 222
 Escherichia coli 222, 244
 Etarnercept 110
 ethanol 210, 211, 223, 231–233
 European Union 29, 133
 expenditure 37, 38, 78–80

 factory 90, 210, 234, 244, 255
 farmer 25, 34, 119, 120, 183, 192,
 196, 270, 291, 292
 FDA *see* Food and Drug
 Administration
 fermentation 93, 102, 105, 168,
 209–211, 221, 223, 225, 229,
 239–241

 secondary 210
 solid-state 215
 submerged 230
 surface 210
 two-step 230
 yeast 223, 228
 Five-Year Plan 168, 169, 172, 251,
 254, 255, 272, 273, 276, 285,
 287
 Food and Drug Administration
 (FDA) 99, 123, 203, 226, 299
 food product 206, 218, 230, 240
 balance flat-tasting 210
 fermented 209, 211, 217
 transgenic 192
 forest 3, 25, 30, 197, 198, 270,
 271, 273, 280, 286, 287
 natural 197, 270, 280
 naturally regenerated 197
 planted 197
 primary 197
 rain 277
 subtropical 277
 Fudan University 62, 65, 66, 145,
 162, 279
 fungi 186, 221, 224, 229

 Galileo system 53
 Gansu 46, 202, 236
 GDP *see* gross domestic product
 gene 55, 65, 79, 139, 140, 152,
 153, 155, 245
 anti-cancer 141
 antimicrobial resistance 92
 human 153
 human MCPH1 155
 insect resistance 192
 transcribed 138
 gene bank 54, 55, 139, 276
 genetically modified organism
 (GMO) 25, 299
 genetic engineering techniques
 93, 186, 194

- genetics 64–66, 113, 138, 149, 150, 194, 195, 222, 246
- genome 56, 117, 138–140, 187, 195, 221, 223, 241, 245, 246, 285
- animal 223
- homozygous 200
- host microorganism's 222
- human 140, 223
- macaque 155, 156
- microbial 134
- pig's 200
- tree shrew reference 155
- genome editing 142, 151, 156, 186, 246
- genome sequencing 56, 64, 139, 223
- genome-wide association studies (GWAS) 139, 140
- genomics 56, 65, 151, 200, 245
- GGF *see* government-guided fund
- Gilead Science 82
- Gini coefficient 6
- GlaxoSmithKline 97, 98, 171
- Global Cord Blood Cooperation 147
- glucose 130, 202, 224, 230, 231, 247
- GMO *see* genetically modified organism
- Gobi Desert 270
- golden rice 192–194
- government-guided fund (GGF) 71, 72
- grains 36, 184, 190, 191, 207, 208, 210, 211, 215, 227, 232, 291
- grants 133, 144, 290
- grasslands 25, 270, 277, 280, 287, 292
- Great Wall Park 277
- Green Valley Pharmaceutical Co. 135
- gross domestic product (GDP) 20, 27, 29, 33–37, 47, 71, 80, 169, 273, 287
- Guangdong 20, 21, 47, 55, 113, 122, 139, 146, 147, 149, 150, 152, 171, 174, 210
- Guangxi 20, 22, 47
- Guangxi Cofco Biomass Energy 232
- Guangzhou 20, 35, 64, 69, 122, 149, 150, 164, 171, 173, 202, 278
- Guizhou 22, 146, 196, 213, 214
- GWAS *see* genome-wide association studies
- Haemorrhagic fever 95
- Hainan island 54
- Hangzhou 3, 62, 156, 173, 175, 206, 218, 263
- HAQ index 78
- Harbin 22, 63, 175, 202, 213, 215, 278, 279
- Harbin Beer 215
- Harbin Institute 140, 278, 279
- Harbin Motor 45
- Hebei 21, 62, 145, 174, 225, 231
- Hefei 21, 31, 46, 67, 148, 149, 274
- Heilongjiang 22, 213, 277
- Henan 21, 36, 146, 199, 213, 257
- Henan Tianguan Group Co. 258
- hepatitis 76, 87, 95, 97–99, 104, 155
- herpes simplex virus 141
- high-speed rail 30, 49, 51
- HIV 100, 142
- Hodgkin's lymphoma 176
- Hoffmann-La Roche Ltd. 230
- Hong Kong 1, 19, 20, 28, 49, 116, 120, 124, 142, 168
- HPV *see* human papilloma virus
- Huawei 52, 71, 157, 158
- Hubei 21, 36, 45, 63, 146, 159, 165, 171, 236, 277

- Hubei University of Technology 217
 Human Genome Center 66
 human papilloma virus (HPV) 95, 97
 Hunan 21, 36, 146, 193, 199, 209, 277
 hybrid wheat 291, 292
- IMS *see* Institute of Microbiology
 induced pluripotent stem cell (iPS) 143, 149
 Industrial and Commercial Bank of China 36
 Infliximab 110
 Institute of Microbiology (IMS) 56, 92, 134
 Institute of Neuroscience 156
 Institute of Zoology 149, 150, 155, 156
 Institute Pasteur of Shanghai 113
 insulin 84, 93, 94, 101, 102, 130, 153, 222
 intellectual property (IP) 17, 51, 72, 114, 119, 243
 Internet of Things (IoT) 196, 285
 investment 39, 48, 55, 72, 133, 134, 147, 229, 268, 290
 IoT *see* Internet of Things
 IP *see* intellectual property
 iPS *see* induced pluripotent stem cell
- Japan 6, 7, 71, 73, 141, 143, 224, 225, 227, 230, 234, 241, 245, 251, 297
 Japanese encephalitis 96
 Japanese invasion 222
 Japanese model 64
 Japan Microbiome Consortium 134
 jaundice 158
 Jiangnan University 213, 214, 217, 218, 242
- Jiangsu 21, 35, 90, 145, 146, 171, 173, 209, 211, 213, 215
 Jiangsu Province 114, 117, 122, 139, 140, 146, 173, 194, 213, 267
 Jiangxi 22, 35, 36, 146
 Jiao Tong University 150
 Jilin 22, 145, 148, 203, 277
 Jilin Agricultural University 194
 Jinan University 150, 153
 Jingdong 52, 53, 160
 Johnson & Johnson 86, 124, 128
 joint venture 45, 51, 83, 102, 118, 151, 168, 233
- kidneys 103, 143, 144, 151, 169
 kidney transplant 109–111
 Kunming 22, 68, 69, 152, 156
 Kunming Institute of Zoology 155
 Kyoto Protocol 290
 Kyoto University 238
- Lactobacillus* 210–212, 224
 lactose 202, 211
 lake 264, 265, 267
 Laozi's Taoism 8, 9
 laws 8, 13, 14, 60
 blood donation 100
 environmental 259
 eternal 8
 patent 72
 residence 35
 vaccine administration 99
 leader 17, 161, 173, 278
 global 247
 world market 83, 240
 Liaocheng City People's Hospital 146
 life science 10, 24, 25, 54, 55, 64, 68, 149, 150, 172, 287, 298, 299
 locust 293
 Louisiana 193
 Luohu Hospital Group 142

- Macaca fascicularis* 154
Macaca mulatta 154, 155
 macaques 155, 156
 cynomolgus 154
 rhesus 154
 maize 186, 187, 230
 transgenic phytase 194
 malaria 121, 139
 market 93, 94, 102, 104, 107, 114,
 120, 124, 128, 131, 160, 161,
 199, 202
 animal vaccine 94
 biomedical 169
 black 99
 Chinese diagnostic 131
 domestic 288
 drug 117
 global 234, 235
 labor 6
 pharmaceutical 80
 soy sauce consumer 210
 stent 128
 stock 174
 market share 83, 93, 102, 104,
 105, 114, 128, 169, 216, 230,
 235
 meat 198, 199, 227
 chopped 208
 pork 199
 medicine 60, 64, 83, 119, 121, 122,
 136, 138, 140, 150, 208, 226,
 229, 285, 286
 MEE *see* Ministry of Ecology and
 Environment
 melamine scandal 202, 204
 Merck Sharp & Dohme 98
 Mesopotamia 211
 metabolic pathways 186, 223
 metabolite 129, 130, 221, 225,
 246
 antibiotic 90
 intestinal bacterial 135
 microbial 224
 methanol 43, 228, 229, 247
 microbiology 56, 92, 134, 221
 industrial 214, 223
 systems 243
 microorganism 55, 129, 134, 213,
 221, 223, 245–247, 269, 285
 migrant workers 34, 35, 77, 183
 MIIT *see* Ministry of Industry and
 Information Technology
 milk product 202–204, 212, 213
 millet 187, 189, 209, 215
 Ming dynasty 4, 20
 Ministry of Agriculture (MOA) 25,
 38, 191, 192, 198, 206, 237,
 298
 Ministry of Ecology and
 Environment (MEE) 15, 25,
 255, 261, 264, 266, 278, 298
 Ministry of Education (MOE) 15,
 24, 59, 61, 64, 70, 150, 298
 Ministry of Environmental
 Protection 253
 Ministry of Finance 15, 61
 Ministry of Foreign Affairs 15
 Ministry of Health 79, 151
 Ministry of Housing and Urban-
 Rural Development 15
 Ministry of Human Resources and
 Social Security 15
 Ministry of Industry 92
 Ministry of Industry and
 Information Technology
 (MIIT) 15, 24, 38, 73, 79–81,
 83, 196, 215, 298
 Ministry of Justice 15
 Ministry of Natural Resources 15
 Ministry of Public Security 15
 Ministry of Science 144
 Ministry of Science and Research
 170
 Ministry of Science and Technology
 15, 25, 61, 79, 80, 245, 298
 Ministry of State Security 15

- Ministry of Transport 15, 50, 52
 Ministry of Veteran Affairs 16
 Ministry of Water Resources 15
 MOA *see* Ministry of Agriculture
 mobile phone 52, 53, 158, 163,
 166
 MOE *see* Ministry of Education
 Montreal Protocol 290
 MSW *see* municipal solid waste
 municipal solid waste (MSW) 257,
 271, 272
 myocardial infarction 105
- Namibia 295
 Nanjing 3, 62, 64, 139, 140, 173,
 175, 194, 238, 247, 272, 278
 Nanjing Agricultural University
 194
 Nanjing Drum Tower Hospital 145
 Nanjing Forestry University 194
 Nanjing Tech University 247
 Nankai University 149, 150
 Nantong University 145
 National Audit Office 15, 16
 National Bureau of Statistics 16,
 199
 National Development and Reform
 Commission (NDRC) 15, 232,
 257, 298
 National Energy Commission 41
 National Engineering Laboratory
 for Industrial Enzymes 243
 National Environmental
 Monitoring Network 264
 National Forests and Grassland
 Agency (NFGA) 25, 270
 National Health Administration
 167
 National Healthcare Security
 Administration (NHSA) 79, 83
 National Health Commission
 (NHC) 16, 24, 79, 80, 87, 100,
 136, 142, 157, 161, 164, 165
- National Medical Products
 Administration (NMPA) 79,
 80, 83, 90, 95, 97, 107–112,
 114, 115, 123, 124, 135, 136,
 158, 160, 164, 167
 national people's congress (NPC)
 13, 15, 17, 256
 national rare diseases registry
 system (NRDRS) 136, 137
 National Research Institute of Food
 and Fermentation Industries
 56, 217, 218
 National Science Foundation
 (NSFC) 25, 241
 NCPC *see* North China
 Pharmaceutical
 NDRC *see* National Development
 and Reform Commission
 Neolithic findings 4
 Neolithic villagers 215
 Neophocaena phocaenoides 265
 NFGA *see* National Forests and
 Grassland Agency
 NHC *see* National Health
 Commission
 NHSA *see* National Healthcare
 Security Administration
 Nimotuzumab 109, 110
 NMPA *see* National Medical
 Products Administration
 North China Pharmaceutical
 (NCPC) 88, 90, 231
 NPC *see* national people's congress
 NRDRS *see* national rare diseases
 registry system
 NSFC *see* National Science
 Foundation
 nucleotides 224, 226, 227
 nutrients 241, 269
- oil 3, 42–44, 186, 191
 cooking 47
 docosahexaenoic acid 70
 edible 198

- fuel 41
- gutter 47
- olive 190
- palm 191
- peanut 190, 191
- vegetable 191
- soybean 191
- one-child-policy 143
- organ 17, 55, 134, 163, 200
 - ailing 143
 - donated 151
 - transplanted 151
- ozone 252, 254
- pandemic 164, 165, 168, 288
- park 286
 - bio-industrial 169
 - high-tech 36
 - high-tech industry 83
 - industrial 173, 174
 - life science 172
 - science 170
- particulate matter 252, 254
- Patau Syndrome 132
- patent 102, 119, 141, 172, 174
- patient 77, 78, 87, 128, 130, 134–136, 139, 142, 143, 147, 151, 153, 157–161, 167, 168, 295
 - diabetic 153
 - hemophilic 106
 - undiagnosed 124
- PBC *see* People's Bank of China
- Pearl-Harbour Bridge 49
- Peking University 62, 64, 70, 133, 147, 278, 279
- Peking University Third Hospital 145, 151
- penicillin 88, 89, 224
- People's Bank of China (PBC) 15, 16, 36
- People's Liberation Army (PLA) 13, 16, 18, 214, 239
- People's Republic of China (PRC) 5–7, 13, 16–18, 20, 22, 66, 80, 120, 216, 222, 227
- pesticide 118, 120
- philosopher 8–10
- philosophy 7, 9, 296
- pig 30, 151–153, 189, 192, 199
 - cloned 152
 - miniature 151
 - small-sized 151
- pig model 152, 153
- PLA *see* People's Liberation Army
- plant 55, 115, 116, 122, 186, 223, 233, 236, 244, 245, 264, 272, 273, 285
 - dicot 186
 - endangered 276
 - flowering 186
 - forest 119
 - industrial 255
 - medicinal 116, 119, 209
 - monocot 186
 - pilot 233, 238
 - self-fertilizing 186
 - sewage 263, 264
 - transgenic 186, 187, 191–193, 246
 - waste incineration 272
 - wormwood 121
- plastics 236–238, 243, 266, 267, 273
- policy 8, 24, 28, 79, 80, 168, 169, 171, 173, 175, 190, 273
 - one-child 5, 132
 - reform 41, 288, 289
 - top-down 168
- Politburo 14, 17, 18
- pollutants 253, 254, 259
- pollution 251–254, 265, 269
 - environmental 226, 287
 - heavy metal 269, 270
 - microbiological 260
 - white 236, 237

- polycyclic aromatic hydrocarbon
 - pollution 269
- population 5, 7, 18–23, 34, 35, 47, 75, 77, 124, 136, 137, 140, 143, 276, 279, 280, 288, 297
- power plant 252, 254
 - coal-based 252
 - nuclear 46
 - petroleum-based 252
- PRC *see* People's Republic of China
- precision medicine 131, 138, 139, 170
- private company 83, 85, 86, 89, 103–107, 127, 131, 147, 225, 228, 229, 236, 239
- probiotics 211–213
- production 96, 99, 114, 117, 184, 186, 198, 209, 210, 225, 230, 232, 239, 240, 245, 246
- agricultural 3, 236, 285
- bioethanol 232
- fish 198
- global fuel ethanol 231
- global methanol 43, 228
- global pork 199
- grain 190
- industrial 41, 51, 79, 230, 238, 257, 264
- juice 234
- microbial 224
- pharmaceutical 171
- poultry 90
- timber 197
- Protection and Development of Chinese Phytotherapy 119
- protein 56, 93, 108, 109, 129, 138, 203, 222
 - amyloid 135
 - fusion 113
 - glycosylated 103, 222
 - human TNF receptor-Ig fusion 110
 - single-cell 228
 - soy 210
- yeast 228
- province 14, 18, 20–23, 36–38, 68, 71, 174, 231, 261, 270, 273, 275, 277
- Psephurus gladius* 265
- Qingdao 52, 215, 216, 236, 267, 268, 274, 275, 279
- Qing dynasty 4, 63, 184, 222
- Qinghai 1, 22, 139, 198, 229, 261, 274, 275, 277
- Qinghai Biological Technology Co. 228
- Qinling Mountain 276
- quality control 99, 120, 123, 214
- quinolones 88, 92
- Rafetus swinhoei* 265
- rail network 47–49, 51
- railways 27, 49, 50
- Ranibizumab 110
- R&D 37, 71, 83, 97, 113, 114, 118, 124, 136, 139, 236, 241–243
 - finance 71
 - frontier science 298
 - genome-related 64
 - industrial 226
- reactor 46, 228, 240
- Regenerative Medicine Technology Co. 163
- Reichstein procedure 230
- renal syndrome 95
- repository 54–56, 144, 147
- Republic of China (ROC) 4, 5, 7, 19, 22, 63, 66, 224, 225, 289
- Republic of Korea 73, 227
- research 60, 62–64, 66, 68, 70, 72, 121, 123, 133, 134, 139, 152, 155, 170
 - academic 194, 214
 - applied 205
 - biomedical 170, 173
 - biopharmaceutical 154
 - clinical 145

- collaborative 68
- fundamental 241
- gene therapy 144
- macaque-related brain 156
- pharmaceutical 286
- scientific 122, 170
- stem cell 144, 148
- transformational 146
- rheumatoid arthritis 108–111
- Rhodococcus rhodochrous* 238
- river 1, 48, 92, 259, 264, 265, 267, 277
 - Lancang 275, 277
 - Liaohe 259
 - Yangtze 1, 3, 19, 20, 44, 52, 70, 259, 262, 264, 265, 275, 277
 - Yellow 3, 20, 259, 275
- Robinia pseudoacacia* 197
- robot 129, 162, 163, 176, 268
- robotics 30, 288
- ROC *see* Republic of China
- rulers 8, 9
- Russia 1, 29, 43
- Saccharomyces cerevisiae* 232, 240
- Salubris pharmaceuticals 85
- SAMR *see* State Administration for Market Regulation
- Sanjiangyuan 277
- Sanofi 102, 168
- Sanofi Pasteur 98
- Scarlet fever 87
- Schering-Plough's product 104
- school 34, 35, 59, 60, 243, 255
 - elementary 59
 - high 34, 59, 63, 115
 - secondary 59, 63, 64
 - township 257
- scientist 8, 67, 69, 70, 92, 102, 140, 148, 187, 296, 298
- SDGs *see* Sustainable Development Goals
- sensors 49, 129, 158, 170, 196, 197
- sewage 264–266
- Shaanxi 21, 47, 150, 194, 200, 277
- Shandong 1, 21, 35, 146, 194, 198, 199, 209, 213, 225, 231, 236
- Shang dynasty 215
- Shanghai 1, 3, 19, 20, 35, 51–53, 62, 65, 66, 68, 69, 101, 145, 146, 149, 150, 156, 173, 175, 272, 273
- Shanghai Institutes of Biological Sciences 142
- Shanxi 22, 36, 47, 113, 211, 255, 271
- sheep 30, 198, 200, 202, 292
- Shenyang 231, 236
- Shenzhen 52, 53, 55, 63, 104, 139, 140, 142, 147, 152, 158, 173, 175
- Shenzhen Capital Group Co. 72
- Shenzhen Cowin Capital 72
- Shijiazhuang 21, 23, 90, 173, 202, 230, 231
- Shikoku Island 216
- Sichuan 44, 48, 54, 116, 122, 146, 194, 199, 209, 211, 213, 215
- Sichuan Industrial Institute of Antibiotics 92
- Sichuan University 141, 146
- Silk Road 139, 271, 292
- Singapore 7
- single nucleotide polymorphism (SNP) 135, 139
- Sino Biopharm 86, 96
- Sino-Japanese war 66
- Sinovac Biotech 168
- Sintilimab 109
- smartphone 30, 53, 273, 293
- SNP *see* single nucleotide polymorphism
- social security 15, 35, 37, 38
- society 5, 8, 14, 64, 288, 298
 - ageing 6
 - agricultural 183

- medical 136
- service 23
- soil 198, 251, 269, 270, 286
 - agricultural 269
 - contaminated 270
 - permafrost 50
 - sterile 189
 - urban 269
- soil remediation 269, 270
- sorghum 184, 187, 189, 214, 215
- soybean 25, 186, 187, 189–191, 209, 210
- soy sauce 210, 221, 224
- species 116, 120, 199, 201, 265
 - bird 275
 - tree 197
 - wild rice 188
- sputum 129
- standing committee 13, 14, 17, 18
- starch 222, 225, 245
- State Administration for Market Regulation (SAMR) 72, 79, 80
- State Administration of Traditional Chinese Medicine 122
- State Key Laboratory 68, 92, 141, 213
- state-owned company 85, 86, 89, 98, 100, 103, 104, 106, 107, 114, 119, 207, 214, 236, 239
- stem cell 69, 143–147, 153
 - adult 143, 144, 146–148, 150, 151
 - cord-derived mesenchymal 148
 - embryonal 143, 149, 150
 - endothelial progenitor 143
 - hematopoietic 141, 143
 - mesenchymal 143
 - pluripotent 143, 148–150
- stents 124, 126, 128, 129
 - bioresorbable 129
 - cardio 123, 125, 128
 - drug-eluting 128
- Sunson Industry Group 236
- Sustainable Development Goals (SDGs) 252, 254, 256, 258, 260, 262, 264, 266, 268, 270, 272, 274, 276, 278–280
- Taiwan 5, 7, 18, 20, 22, 28, 64, 116, 137, 168, 193
- Tang dynasty 4, 217
- TCM *see* traditional Chinese medicine
- Tocilizumab 109
- Toripalimab 108
- traditional Chinese medicine (TCM) 69, 75, 80, 81, 105, 115–117, 119–123, 162–164, 167–169, 208, 286, 295, 296
- traffic 47, 49, 51, 79, 269
- transgenic rice 192, 194
- transport 3, 15, 41, 50, 52, 269, 293
 - cargo 51
 - civil 52
 - maritime 268
 - railway 51
- Trastuzumab 111
- Tsinghua University 62, 63, 65, 133, 278, 279
- Tsingtao Brewery 68, 216
- tuberculosis 76, 87
- typhoid 96, 98
- university 35, 55, 59–68, 123, 142, 146, 152, 169, 172, 198, 200, 205, 206
- University of Science and Technology of China 67
- University of Xiamen 97
- urbanization 23, 47
- vaccination 93, 95, 97, 99, 160, 168
- vaccine 83–85, 87, 93–99, 168, 169, 234, 285
 - animal 83, 94

- Anthrax 95
- Brucellosis 95
- cervical cancer 176
- Ebola virus 175
- HPV 85, 97
- human 94, 95, 99
- live 96
- Measles 96
- nonavalent 97
- Pertussis 96
- polysaccharide 84, 96
- Rabies 96, 99
- rubella 96
- tetravalent 97
- vehicle 48, 159, 292
 - electric 30, 49
 - green energy 288
- Venezuela 7
- vinegar 209–211, 221, 223
- vitamin 89, 192–194, 224, 230, 231
- waste 223, 257, 272, 273, 280
 - floating 267
 - household 257
 - pesticide packaging 287
 - plastic 237
 - radioactive fuel 46
- water pollution 258, 259, 261, 263, 264
- water quality 259–262, 264, 279
- Western country 183, 234, 299
- Western cuisine 190
- Western ethics 298
- Western medicine 75, 105, 117, 167
- wheat 25, 184–187, 189, 209, 210, 215, 227, 232, 291, 292
- Wuhan 3, 21, 45, 96, 165–167, 173, 206, 217, 276
- Wuxi 21, 32, 63, 146, 213, 217, 218, 263
- xenotransplantation 151–153
- Xiamen 52, 64, 97
- Xi'an 21, 31, 63, 151, 156, 173, 276
- Xinjiang 20, 22, 192, 198, 237
- Yangling 150, 194, 200
- Yangyang 200, 201
- Yangzhou University 194
- yeast 210, 211, 216, 221, 222, 228
- Yellow fever 96
- yoghurt 211–213, 221
- Yuan dynasty 4, 213
- Yunnan 22, 47, 152, 277
- Zhejiang 20, 21, 35, 90, 146, 147, 167, 173, 209, 211, 215, 277
- Zhejiang University 65, 90, 141, 156, 163, 218
- Zhengzhou 21, 148
- Zhou Dynasty 8, 210
- Zhuhai 49, 175, 238

Picture Credits

In spite of thorough researches, it may be possible that copyright owners could not in all cases be duly identified. If pertinent copyright ownership can be proven to the publisher, a remuneration according to the customary rates of scientific publishing will be paid.

Chapter 1

Fig. 1.1, p. 2: Wikimedia Commons The geography of China, based on Image:WorldMap-B non-Frame.png, Author Alan Mak, <https://commons.wikimedia.org/wiki/File:ChinaGeography.png> GNU Free Documentation License

Fig. 1.2, p. 6: <https://www.populationpyramid.net/china/2019/>

Chapter 2

Fig. 2.1, p. 14: Bundeszentrale für politische Bildung, <https://www.bpb.de/internationales/asien/china/44270/das-politische-system-chinas>, redrawn and modified

Fig. 2.2, p. 19: China administrative, from Wikimedia Commons, Author ASDFGH, https://commons.wikimedia.org/wiki/File:China_administrative_alt.svg

Chapter 4

Box 4.1, p. 45: NASA <https://earthobservatory.nasa.gov/images/7769/three-gorges-dam-china>

Box 4.2, p. 49: High-speed rails in China, https://en.wikipedia.org/wiki/High-speed_rail_in_China Wikipedia CC BY-SA 4.0 author: Ythlev. Picture p. 50 author: Jucember

Box 4.3, p. 54: China Daily, Author: Zhao Lei. Sources: China Satellite Navigation Office, and China Daily
<http://global.chinadaily.com.cn/a/201905/15/WS5cdc0077a3104842260bbd39.html>

Box 4.4, p. 55: Public website of China National Genebank Database CNGBdb <https://db.cngb.org/about/>

Chapter 5

Fig. 5.1, p. 59: UNICEF – Children in China – an atlas of social indicators, 2014, Fig. 8.1
https://www.unicef.cn/sites/unicef.org.china/files/2019-03/EN%20Atlas%202014_0.pdf

Fig. 5.2, p. 67: Chinese Academy of Sciences CAS English website, http://english.cas.cn/institutes/research_bodies/

Fig. 5.3, p. 73: WIPO Statistics Database, August 2019, https://www.wipo.int/edocs/pubdocs/en/wipo_pub_943_2019.pdf

Chapter 6

Box 6.5, p. 91: Qian Qian Zhang et al. A comprehensive evaluation of antibiotics emission..., *Environ. Sci. Technol.* 2015
<https://pubs.acs.org/doi/pdf/10.1021/acs.est.5b00729>

Box 6.6, p. 97: Innovax company brochure
<http://www.innovax.cn/About.aspx?BaseInfoCateID=8&CateID=8>

Box 6.9, p. 115: Innovent website
<http://innoventbio.com/en/#/intro>

Box 6.10, p. 116: Medicinal plants book, Amazon website <https://www.amazon.com/中国法定药用植物-中国中药资源大典-精-匿名/dp/7030529200>

Fig. 6.5, p. 117: Blog of a team von Jiangsu TV, Dashenyang talks about Rudong (大沈阳说如东), Sohu Portal November 27, 2018

https://www.sohu.com/a/278079191_99895802

Box 6.11, p. 121: top: TU Youyou

<https://www.famousscientists.org/youyou-tu/>

bottom: Zhang Hui, May 9, 2019, Global Times

<http://www.globaltimes.cn/content/1149264.shtml>

Fig. 6.6, p. 125: Imported and domestic made medical equipment, translated and redrawn from

<https://mp.weixin.qq.com/s/FS1fQlojnm1fBB18tP2ebg>

Box 6.13, p. 128: Stent from LePu website, https://www.lepumedical.com/productList_appliance_angiocarpy.html

Fig. 6.7, p. 130: Glucose monitor from Yuyue website

<https://www.yuyue.com.cn/index.php/product/info/66.html>

Box 6.14, p. 132: NIFTY product brochure, <https://www.bgi.com/global/wp-content/uploads/sites/3/2017/04/NIFTY-Brochure-ENG-0720.pdf>

Box 6.18, p. 152: top and bottom: press release China Agricultural University, Nov. 23, 2017

http://news.cau.edu.cn/art/2017/11/23/art_8779_544951.html

Fig. 6.8, p. 157: top Contec Co. product list,

http://www.contecmmed.com.cn/index.php?option=com_virtuemart&page=shop.browse&category_id=70&Itemid=655

bottom: Huawei Co. product list

<https://consumer.huawei.com/en/wearables/watch-gt2/>

Box 6.20, p. 158 top: Shenzhen Beshen Medical Technology Co. app, <http://www.bbbscan.com>

Bottom: VCBeat article by Gao Dao Long, June 27, 2017

<https://vcbeat.top/>

<NDhmMGRmOGNkNmQyMDM4NjEzMzY0OGFjZDk4NDNjZmI=>

Box 6.21, p. 160: China Mobile press China Mobile press release of Oct. 23, 2019 <https://m.c114.com.cn/w103-1105510.html>

Box 6.22, p. 162/163 top: QQ portal news of May 31, 2015

<https://xw.qq.com/cmsid/SHC2015031801090901>

bottom: Free Wechat portal news of May 11, 2017

<https://freewechat.com/a/MzIwMzQzNzU3MQ==/2247485099/5>

Fig. 6.9, p. 165: COVID-19 virus model, website of Los Alamos National Laboratory, USA

Fig. 6.10, p. 172: GTAI brochure Medical Biotechnology - Profiling China: markets and stakeholders, 2017 <https://www.exportinitiative-gesundheitswirtschaft.de/EIG/Redaktion/DE/Publikationen/PDF/medical-biotechnology-profiling-china.html>

Fig. 6.11, p. 173: Chinese Society for Bioengineering 2019-CBIB 140 <http://cbib.org.cn/#/kpi/trendLine>

Chapter 7

Fig. 7.2, p. 186: Plant breeding using biotechnology

Rolf D Schmid and Claudia Schmidt-Dannert, *Biotechnology - An Illustrated Primer* Wiley – VCH Publishers, ISBN: 978-3-527-33515-2 (2016), with permission

Fig. 7.3, p. 188: The man who puts an end to hunger. Foreign Languages Press, ISBN 10:7119051091 (2007)

Fig. 7.4, p. 190: U.S. Department of Agriculture (USDA)

<https://www.ers.usda.gov/amber-waves/2016/may/major-factors-affecting-global-soybean-and-products-trade-projections/>

Fig. 7.5, p. 191: redrawn after Jean-Paul Jamet and Jean-Marc Chaumet, DOI : 10.1051/ocl/2016044, Vegetable oil production and consumption in China, Open Access Article

<https://www.ocl-journal.org/articles/ocl/pdf/2016/06/ocl160044s.pdf>

Box 7.2, p. 193: Wikipedia, The Golden Rice Controversy, origin of photograph: Golden Rice grain compared to white rice grain in screenhouse of Golden Rice plants, International Rice Research Institute (IRRI) - <https://www.flickr.com/photos/ricephotos/5516789000/in/set-72157626241604366> cc-by-2.0 license

Fig. 7.6, p. 195: Courtesy Prof. Caixia Gao, photo Steffen Chow, based on article *Fields of dreams, Jon Cohen, Science* **365** (6452), 422-425.

Fig. 7.7, p. 196: from Ministry of Industry and Information Technology, China, <http://www.miit.gov.cn/n973401/n1234207/n1234210/c3841032/content.html>

p. 197: from Sanan Bio Co. website
<http://en.sananbio.com/zhineng/fangan/>

Box 7.3, p. 201: Northwest A&F University press release, author Yongping ZHI: Cloned Goat Yangyang Died at Age of 16, Dec. 5, 2016, <https://en.nwsuaf.edu.cn/news/64323.htm>

Fig. 7.8, p. 207: COFCO press release, undated, <http://www.cofco.com/cn/BrandProduct/NutritionHealthResearchInstitute/>

Fig. 7.9, p. 212: Website of Bright Dairy and Food Co., Shanghai, <http://www.brightdairy.com/product/newitem/10>

Box 7.7, p. 214: Kweichow Moutai Co. website, <https://www.moutaichina.com/maotaigf/cpzx/ptmtj/437200/index.html>

Chapter 8

Box 8.1, p. 226: Ajinomoto Co. website, <https://www.whyusemsg.com/chinese-restaurant-syndrome/>

Fig. 8.2, p. 227: Rolf D Schmid and Claudia Schmidt-Dannert, *Biotechnology - An Illustrated Primer* ISBN: 978-3-527-33515-2 (Wiley VCH Publishers, 2016), with permission

Fig. 8.3, p. 231: redrawn from Yang W, Xu H (2016). Industrial fermentation of vitamin C. In *Industrial Biotechnology of Vitamins, Biopigments, and Antioxidants* (eds E. J. Vandamme and J. L. Revuelta).

Box 8.3, p. 233: Bioenergy International June 23, 2018, graphic courtesy ArcelorMittal.

<https://bioenergyinternational.com/biofuels-oils/arcelormittal-and-lanzatech-break-ground-on-eur-150-million-waste-gas-to-ethanol-project>

Fig. 8.4, p. 235: Shuang LI et al., *Computational and Structural Biotechnology Journal* Volume 2, Issue 3, (2012), open access, CC by 3.0 license.

<https://doi.org/10.5936/csbj.201209017>

Box 8.4, p. 237: Dept. of Agriculture and Rural Affairs of Xinjiang, press release of June 22, 2016,
<http://www.xj-agri.gov.cn/mianywrzl/26932.jhtml>

Box 8.5, p. 244: KKNews: Tianjin Institute of Industrial Biology makes new breakthroughs in the synthesis of vitamins from scratch, press release November 25, 2018, <https://kknews.cc/science/qvg6qby.html>

Fig. 8.5, p. 246: METI Japan presentation “Creating Smart Cell Industry”, https://www.meti.go.jp/english/press/2016/pdf/0714_01a.pdf

Chapter 9

Fig. 9.1, p. 251: Wikimedia Commons, photos taken by Bobak
https://commons.wikimedia.org/wiki/File:Beijing_smog_comparison_August_2005.png

Box 9.1, p. 253: China Air Quality Index website, screenshot taken on an arbitrary day, <https://aqicn.org/map/china/cn>

Box 9.2, p. 256: Picture from article by Ying ZHAO, China Net News Center, May 11, 2014
<https://news.china.com/jiedu/1104-1/>

Fig. 9.2, p. 258, top: Zhifure Co. article by Fang WANG, Aug. 13, 2018
<https://www.zhifure.com/snzfj/68954.html>
 bottom: Henan Tianguan Group Co., Brochure for 80th Anniversary, 2008-2009 Yu ICP:05014892
<http://www.tianguan.com.cn/jituan/swnytrq.asp>

Fig. 9.3, p. 261: cited after Sunan SHEN, Blue City Water Quality Index, Sept. 20, 2019
<http://www.chinawaterrisk.org/opinions/blue-city-water-quality-index/>

Fig. 9.4, p. 262: Rolf D Schmid and Claudia Schmidt-Dannert, *Biotechnology - An Illustrated Primer* Wiley – VCH Publishers, ISBN: 978-3-527-33515-2 (2016), with permission

Fig. 9.5, p. 263: China Heavy Machinery Co. website
<http://www.chmc.cc/channels/2362.html>

Box 9.4, p. 267: Ocean Circle of Knowledge, March 30, 2020
<https://mp.weixin.qq.com/s/8RmJH9IonvDKLDoG9C4ZkA>

Fig. 9.6, p. 268: Mysterious Earth, Oct. 24, 2017 <http://www.uux.cn/viewnews-87254.html> (only in Baidu Search Engine)

Fig. 9.7, p. 269: Rolf D Schmid and Claudia Schmidt-Dannert, *Biotechnology - An Illustrated Primer* Wiley – VCH Publishers, ISBN: 978-3-527-33515-2 (2016), with permission

Fig. 9.8, p. 271: China Environment Network, YU Tianhao, April 25, 2020 <https://zhuanlan.zhihu.com/p/136254870>

Box 9.5, p. 272: China Global Television News CGTN, June 30, 2019
<https://news.cgtn.com/news/2019-06-30/China-braces-for-compulsory-garbage-sorting-HWKRO73Rte/index.html>

Fig. 9.9, p. 274: Xiaoqi Zheng et al., *PNAS* 117(1), 29 – 36 (2020)
<https://doi.org/10.1073/pnas.1908513117>

Box 9.6, p. 275: Xinhuanet, June 20, 2018, photo: Hongxiang Zhang

Fig. 9.10, p. 276: Xishuangbanna Botanical Garden Annual Report 2018, <http://www.xtbg.ac.cn/xscbw/jb/201905/P020190509653963721817.pdf>

Chapter 10

Fig. 10.1, p. 291: Taidong Zhou, Head, Global Development Division, *lecture* on “Implementing SDGs: China’s Progress and Approaches” https://sustainabledevelopment.un.org/content/documents/26674Zhou_EGM_presentation_0123.pdf

Fig. 10.2, p. 294: CAS newsroom, article by Yuan Li, Feb. 27, 2020. Photo from China Aerospace Information Research Institute http://english.cas.cn/newsroom/research_news/earth/202002/t20200225_230194.shtml

Fig. 10.3, p. 295: Xinhua news December 16, 2019, photo Xie Han <http://en.people.cn/n3/2019/1216/c90000-9640663-2.html>

Fig. 10.4, p. 296: Xinhua news April 4, 2020, photo Musa C Kaseke, http://www.xinhuanet.com/english/2020-04/04/c_138946192.htm

“Using a unique combination of Western and Chinese sources of information, the authors succeed in painting an impressive picture of China’s rise to become a major scientific and technological power in the field of life sciences. A clear reading recommendation for scientists and research managers with projects in China, to get acquainted with this fast-moving country. As Napoleon said more than 200 years ago, ‘when China awakes, the whole world will tremble!’”

Prof. Emer. Pierre F. Monsan, INSA Toulouse, France

“Although Chinese authors are increasingly prominent in scientific publications and patent applications, an overview of China’s ambitious plans with the life sciences has been lacking. This book fills that gap and provides insight into how biotechnology is transforming China’s healthcare and agriculture markets, industry, and the environment.”

Prof. Huimin Zhao, University of Illinois at Urbana-Champaign, USA

“As China is expanding its role as ‘the global workbench’ to assume an increasingly dominant role in frontier sciences, this book provides much evidence how this will influence the fields of biomedicine and life sciences not only in China but globally.”

Prof. Horst Domdey, BioM, Munich, Germany

In her quest for global leadership in science and technology, the People’s Republic of China has attained top ranks in the number of scientific publications, “hot papers,” or national and international patent applications. However, analysis of the underlying structures and mechanisms is hindered by the sheer flood of data, stringent government control of all media, and ambiguities inherent in translation from Chinese. This book overcomes these difficulties and provides a concise picture of biotechnology-related research and development in China. It begins with brief accounts of China’s geography, people, political and administrative structure, economy, finance, infrastructure related to science and technology, and educational system. It presents succinct accounts on structures and developments in biomedicine, diagnostics, agriculture, fermented food, bioindustry, and environmental biotechnology, with reference to government, industry, and academia. Finally, it predicts the next steps in Chinese biotechnology for the national agenda and, in view of China’s ambitious global development strategy, the Belt and Road Initiative.



Rolf Schmid is professor emeritus at the University of Stuttgart, Germany, honorary professor at Nanjing Tech University, China, and founder of Bio4Business, Germany. He studied biochemistry at the Ludwig Maximilian University of Munich and the Albert Ludwig University of Freiburg, Germany, and obtained his MBA from the University of Reutlingen, Germany. For 35 years, Prof. Dr. Schmid has led teams on biotechnology research and development in various German industries and at the University of Stuttgart and the Technical University of Braunschweig, Germany. He has 380 publications, 5 books, and about 80 patents or patent applications to his credit.



Xin Xiong is a group leader for biofunctionalized surfaces at the Natural and Medical Sciences Institute (NMI) of the University of Tübingen, Reutlingen, Germany. He earned his PhD from the University of Stuttgart, after which he worked as a scientist at the Institute of Technical Biochemistry (Group Biocatalysis), University of Stuttgart; Institute for Experimental Internal Medicine, University Hospital Magdeburg, Germany; and the Biomaterials Group at the NMI. His research focuses on biomaterials for medical and biotechnological approaches, in particular, collagen-based biomaterials for regenerative medicine and enzyme immobilization.

V811

ISBN 978-981-4877-53-4



9 789814 877534



JENNY STANFORD
PUBLISHING