

Index

Note: Page numbers followed by *f* and *t* refer to figures and tables, respectively.

A

- Abdominal obesity, 335
- Abnormal tau protein, 330
- Academic abilities, 91
- Acanthoema vitae*, 250
- Acquired drug resistance, 167–168
- ACTH, 262, 264
- Actinomycetes, 244
- Activity, 110
 - glucocorticoid, 83
 - intestinal enzyme, 79
 - physical, 110, 113, 335, 366
- Acyl-CoA:cholesterolacyltransferase (ACAT1), 284*f*
- Adaptation, adaptive, 6–7, 75–84
 - extremes of, 303
 - genetic, of fatty acid metabolism, 125–126
 - immunity, 265
 - mental, evolution of, 300–302
 - myocardial tissue response to cardiac overload as, 139–147
- Adaptationist, 97–98
- Addictive, addiction, 183–185
- Adenosine, 23–24
- Age, ageing, aging
 - brain, 286
 - and chronic heart failure, 146–147
 - defined, 278
 - species variations in neurodegenerative disorders of, 278–279
- Age-related diseases, 259–273
- Agriculture, 37, 48, 90, 110, 124, 156, 268
- Alcohol, 64, 200
- Allele, 22, 81, 158, 195, 231, 277, 280–283, 285, 305, 308, 331–335, 338
 - deleterious, 302–303
- Allergen, 2
- Allergic disorders, 244, 245
- Allergy, 2
- Allocation, 303, 350, 359, 360
- Altricial, 62
- Alzheimer's disease (AD), 277–286
 - and antagonistic pleiotropy, 333–334
- Amino acid, 83, 227, 231, 282, 302
- Amyloid deposits, 278
- Amyloid precursor protein (APP) gene, 336
- Amyloid- β (A β)
 - peptide, 278, 280, 284*f*, 285
 - plaques, 331, 336–339
- Ancestral allele, 280
- Aneuploidy, 182
- Angiogenesis, 172, 180, 196
- Antagonistic pleiotropy, 264–266, 280, 282, 283, 285, 333–334
- Antagonist pleiotropy theory, 261
- Anti-aldosterone, 148
- Anti-apoptotic effects, 197
- Antibiotic resistance, 6, 7, 171, 218, 232
- Antibiotic use, 6
- Aantidepressants, 49–50
- Antigen receptor, 225
- Antigen specificity, 227
- Antigen-specific receptors (ASR), 227
- Anti-inflammatory, 127, 160, 213, 214, 218, 245, 249, 265, 272
- Antimicrobial activities, 280, 285
- Antioxidants, 127–129, 337
- Antiparasitic activity, 282
- Antisocial therapy, 169–172
- Antiviral, 201, 233
- Apes, 35, 273–277, 338
- Apolipoprotein E (ApoE)
 - allele, 280, 282, 338
 - isoform, 281, 285
- Apoptosis, 180, 183, 193, 194, 214
- Appetite, 109, 112
- Aquaculture, 124
- Arterial hypertension, 137, 138, 145, 147, 156

- Arterial lesions, 286
Ascaris lumbricoides, 246
 Asthma, 2, 129, 216
 Astrocyte, 281
 Atherogenesis, 141, 145
 Atheromas, 122
 Atherosclerosis, 157–159
 Atopy, 216, 217, 218*f*
 Atrial natriuretic factor (ANF), 143
 Attachment, bonding, 50
 Autism, 47–55, 299–318
 Autoimmune disorder, 2, 3, 336
 Autoimmunity, 242, 243, 247*f*, 250
 Autophagy, 284*f*
 Axonal transport, 285
- B**
- Babies, 36, 48–50, 53–55, 63, 68, 69
 Baboons, 278
 Bacteria, 7, 171–172, 217–219, 232, 233, 235
 Bacterial endotoxins, 282
 Bacteriotherapy, 220
 Barriers, 193–197, 201
 β -amyloid, 277, 278, 284*f*
 β -amyloid precursor protein (APP), 278
 Bet-Hedging, 283
 Binge eating disorder (BED), 107–108
 Biogenic amines (noradrenaline, adrenaline, dopamine), 262
 Biological adaptation, 36
 Biologically primary, 91, 92, 93*t*
 Biologically secondary, 91, 92, 93*t*
 Biosynthesis, 125, 126
 Bipedalism, 4, 34
 Bipolar disorder, 129, 300, 304, 308, 309, 317
 Birth canal, 34–37, 39
 Birth spacing, 51–52
 Birthweight, 37, 39*f*, 52, 66, 76, 78, 80–83
 Blood
 perfusion, 23
 pressure, 23–25, 27, 156–157, 159.
 See also hypertension
 redistribution, 21
 transfusion, 8
 B lymphocytes, 213
 Body fat, 48, 108, 109
 Body mass index (bmi), 26, 38, 40, 106
 Body size, 84, 108, 126
 Bottle feeding, formula, 47–55
 autism and, 51
 and birth spacing anomalies, 52–53
 and birth spacing problems, 51–52
 breast milk, 50–51
 and post-partum depression, 49
- Bovine spongiform encephalopathy, 337
 Brain
 aging, 286
 development, 130, 282, 305, 307, 318, 333
 size, 35, 36, 303
 sparing, 36, 76
 Brain natriuretic peptide (BNP), 143, 148
 Breast cancer, 48, 55
 Breastfeeding
 antidepressants and, 49–50
 obstacles in medical practice, 53–54
 policy and practice, implications for, 55
 success, obesity and, 55
 Breast milk, 50–51
- C**
- Caenorhabditis elegans*, 283
 Caesarean, 34, 36–38, 40, 53–55
Callithrix jacchus, 279
Campylobacter jejuni, 250
 Cancer
 cell lines, 184, 196
 cells, 168–169, 171*f*, 172, 181, 183–185,
 192, 193, 196, 229
 cervical, 195, 196, 199–202
 diet and, 127–129
 evolution, 169, 178–182, 184, 185
 niche construction, 168–169
 Captive, captivity, 19, 338
 Carbohydrates, 108, 110, 124, 269
 Carcinogens, carcinogenic, 180, 182, 183
 Cardiac hypertrophy, 140, 143, 145, 147, 148
 Cardiac torsion, 146, 147*f*
 Cardiovascular diseases (CVD), 77, 155, 156,
 158, 331, 335, 340, 348, 352
 diet and, 127–129
 Care practices, 61–65, 67, 70
 Case–control study, 65
 Causal thinking, 301, 309
 Cells
 adhesion, 142, 196
 cooperation, 169–170
 cycle arrest, 193, 194, 197
 death (*see* apoptosis)
 membranes, 130, 131, 159
 Cellular proliferation, 194, 225
 Central nervous system, 76
 Cephalopelvic disproportion, 36–37
 Cerebral malaria, 214, 249, 278, 281, 282
 Cervical cancer, 195, 196, 199–202
 Chemotaxis, 262
 Chemotherapy, 177–186
 Childbirth
 assistance, 36

- positions, birth posture, 39–40
 - related death rates, 37
 - Child(ren)/hood), 93–94, 243
 - care, 332
 - child-centered, 89
 - health, 89
 - loss, 49, 50, 55
 - Chimpanzees, 278–281, 332
 - Chlamydia pneumoniae*, 286
 - Cholecystokinin, 109
 - Cholesterol, 158, 160, 271, 281, 282, 337
 - Chromatin structure, 180
 - Chromosome, 20, 179–182
 - anomaly, 21
 - instability (CIN), 182–184
 - translocation, 180
 - Chronic diseases, 234–235
 - Chronic heart failure (hf), 137–148
 - Chronic hepatitis c, 282
 - Chronic inflammatory disorders, 243, 244
 - Chronic life stress, chronic stress, 112
 - Chronic pro-inflammatory status, 122, 123, 245
 - Cigarette, 158, 243. *See also* smoking
 - Climatic transitions, 110
 - Cline, 216, 282
 - Clonal competition, 227–229
 - Clones, 169, 173, 178*f*, 265
 - Clostridium difficile*, 220
 - Coagulation, 260
 - Cognition
 - mechanistic, 307
 - social, 99, 300, 301, 307, 308, 310, 316, 317
 - visual–spatial, 307
 - Cognitive abilities, 97
 - Cognitive deficits, 230, 310
 - Cognitive response, 282
 - Collagen-induced arthritis, 250
 - Commensal bacteria, commensal organisms, 215–217, 244
 - Compensatory response, 337, 339
 - Conflict, foetal–maternal, 19–27
 - early-onset pre-eclampsia, 22–24
 - foetal growth restrictions and abnormal interactions, 20–22
 - gestational diabetes, 26–27
 - late-onset pre-eclampsia, 25
 - maternal thrombophilias, 25
 - policy and practice, implications for, 27
 - preterm parturition and abnormal interactions, 25–26
 - Congenital infection, 230
 - Conjugate vaccine, 234
 - Conserved, 234, 260–263, 285
 - Contraction, 26, 27, 143, 144, 146
 - Converting enzyme inhibitors, 148
 - Cooperation, 169–170
 - Copy number variants, 302, 316
 - Coronary heart disease (chd), 76*f*, 126, 160
 - Cortex
 - anterior cingulate, 308
 - cerebral, 120
 - entorhinal, 282
 - insular, 109
 - orbitofrontal, 109
 - parietal, 286
 - prefrontal, 109, 286, 301
 - temporal, 282
 - Corticosterone, 262
 - Cortisol, 83, 262
 - C-reactive protein (CRP), 248, 271
 - Creativity, 309
 - Creutzfeldt-Jakob disease (CJD), 337
 - Cryptosporidial infections, 282
 - Crystallized intelligence, 334
 - Culture, 24, 92, 184
 - Cultured cell lines, 184, 196
 - Curcumin, 272
 - Cytokine, 213, 214, 216, 245, 246, 248, 251, 260, 262–264, 272
 - Cytokine IL-13, 282
 - Cytomegalovirus (CMV), 14
 - Cytotoxins, cytotoxic drug, 168, 169–170
- D**
- Decision-making, 109, 213, 301
 - Defences, 304–305
 - Degenerative diseases, 146, 268
 - Deleterious alleles, 302–303
 - Delivery
 - caesarean, 34, 36–38, 40, 53–55
 - preterm, 25
 - vaginal, 54
 - Dementia, 277–286, 333–334. *See also* alzheimer’s disease (ad)
 - Demyelinating disease, 242
 - Dendritic cells (DCs), 214, 247*f*
 - Denisovans, 281
 - Depression
 - evolutionary approaches to, 347–353
 - post-partum, 47–55
 - Developing countries
 - cardiovascular diseases, 138
 - chronic heart failure in, 141
 - Development
 - brain, 130, 282, 305, 307, 318, 333
 - drug, 16
 - neurodevelopment, 130, 300–304, 307

zone of proximal, 94
 Developmental plasticity, 76–80
 Diabetes
 gestational, 26–27
 type 1, 216, 220*f*, 299, 307
 type 2, 37, 77, 81, 220, 235
 Diagnostic and Statistical Manual of Mental Disorders (DSM), 300
 Diagnostic and Statistical Manual of Mental Disorders 4 (DSM4), 106
 Diametric model, 317
 Diarrhoea, 219, 249, 250
 Diet
 Diet of Crete, 127–129
 maternal, impact on offspring health, 80
 Dietary habits, 124
 Dietary interventions, 261, 271
 Dietary restriction, 78, 79
Dirofilaria immitis, 250
 Disinhibition, 107–110
 Diuretics, 148, 157
 Division, 193
 Division rate, 193
 DNA sequences, 196, 281
 Dopaminergic reward system, 111
 Drug(s), 169–170
 Dummies, 63
 development, 16
 resistance, 167–173
 Dutch hunger winter, 76
 Dysregulated immune functioning, 212
E
 Early conditions, early life conditions, growth conditions, 75
 Early-onset familial ad, 286
 Eating disorder, 107–110
 Ebola virus, 215
 Education
 policies, 89
 practices, 91, 95, 99
 Educator, teacher, 61
 Ejection fraction, 148
 Electrocardiogram (ecg), 143
 Embryogenesis, 146
 Emotion, 109, 301
 Endocrine, 81
 Energy dense foods, 108
 Energy rich foods, 108, 335
Enterobius vermicularis, 246
 Environment
 post-industrialized, 220, 329, 335
 prenatal, 51
 seasonal, 108–110

 uncertain, 108
 unstable, 108
 Environmental factors, 211, 215, 216, 242, 243
 Environmental interactions, 285
 Enzyme, 79, 108, 120, 121, 125, 143, 148, 229, 231, 339
 Eosinophilia, 250
 Epidemiological studies, 215–216, 249, 268
 Epidemiology
 immune diseases, 215–216
 SIDS, 65–66
 Epigenetic drift, 283
 Epigenetic gambling, 283
 Epigenetics, 4
 Episiotomy, 39
 Epistatic gene interaction, 282
 Evolutionary developmental psychology, 95, 99
 Evolutionary history, 5, 48, 50, 51, 54, 70, 78, 91, 92, 94, 105, 112, 130, 142, 157, 219, 262, 270, 280–281, 303, 305, 331, 332
 Evolutionary mismatch, 52, 64
 Experimental autoimmune encephalomyelitis (eae), 245, 248, 250, 251
 Extended phenotype, in oncogenesis, 196

F

Faecal transplant, 220
 Family size, 280
 Family studies, 156
 Famine, 48, 76, 78
 Fat
 body, 48, 108, 109
 gluteofemoral, 52
 monounsaturated, 129, 130, 150
 saturated, 123, 158, 160
 Fatty acid
 metabolism, genetic adaptation of, 125–126
 omega-3 (ω -3), 119–130, 120*f*, 121*f*, 125*t*
 omega-6 (ω -6), 119–130, 120*f*, 121*f*, 125*t*
 short chain, 272
 Fecundability, 282
 Feeding adaptation, 108
 Fertility, 304
 Fever, 7–8, 215, 304, 305, 350
 Fibrogenic, 141
 Fibrosis, 141, 146–148
 Filarial parasite, 250
 Filariasis, 215
 Fish, 120–125, 123*t*, 127–129, 146, 156, 157, 269, 278, 280, 338
 Fluid intelligence, 334
 Fluoxetine, 49

- Foetal gene reprogramming, 139, 143
- Foetal growth restrictions, and abnormal foetal–maternal interactions, 20–22
- Foetal macrosomia, 37–39
- Foetal–maternal conflict
- early-onset pre-eclampsia, 22–24
 - foetal growth restrictions and abnormal interactions, 20–22
 - gestational diabetes, 26–27
 - late-onset pre-eclampsia, 25
 - maternal thrombophilias, 25
 - policy and practice, implications for, 27
 - preterm parturition and abnormal interactions, 25–26
- Foetal–maternal interactions
- foetal growth restrictions and, 20–22
 - preterm parturition and, 25–26
- Foetus, 20
- Food
- consumption, 109, 111, 112
 - intake, 107, 111–113
 - security, 37, 105, 107, 110
 - uncertainty, 109, 110
- Foraging, 108, 110, 279, 350
- Forceps, 39
- Fossil, 281
- Fruits, 108, 127–129, 157
- Furosemide, 159
- G**
- Gallium, 171
- Gamma secretase activating protein (GSAP), 284f
- γ -secretase inhibitor semegacestat
- Gene
- epistatic interaction, 282
 - expression, 123, 143, 196, 216, 283, 284f
 - foetal reprogramming, 139, 143
- Gene-by-environment interactions, 301
- Genetic adaptation, of fatty acid metabolism, 125–126
- Genetic drift, 5–6, 156, 184, 283, 332–334
- Genetic heterogeneity, 173, 179, 181f
- Genetic risk factor, 280, 310, 311–315r, 316
- Genetic variation, 195, 234
- Genome evolution, 177–186
- Genome theory of cancer, 179–183
- Genome topology, 180
- Genome-wide association studies (gwas), 158, 271, 285
- Genomic data, 126
- Genomic imprinting, 21–22, 304
- Genomic techniques, 285
- Geographic gradients, 282
- Geriatric pathologies, 283
- Germinal centers (gc), 228, 229f
- Gerontologists, 283
- Gestation, 21, 23, 25, 78
- Gestational diabetes, 26–27
- Ghrelin, 109
- Glacial periods, 1100
- Glucocorticoids, 83, 112, 264
- Glucose–insulin metabolism, 77, 79
- Glucose intolerance, 26
- Gluteofemoral fat, 52
- Gradients
- geographic, 282
 - latitudinal, 282
- Grandmother hypothesis, 332
- Growth factor
- diffusible, 172
 - placental, 23
 - transforming, 213, 246
 - vascular endothelial, 23, 129
- Gut flora, 159
- Gut microbiota, 15, 260, 270, 272
- H**
- Hallucinations, 308
- Haplotype, 126
- Happiness, 5, 301
- Hay fever, 215
- HbAA, 282
- HbAS, 282
- HDL, 281
- Head circumference, 36, 39f, 40
- Head size, 34–37, 35f
- Health education, 69
- Heat shock gene, 283
- Height, 36–38
- Helicobacter pylori*, 197
- Helminth immunoregulation, 241–251
- induction of, 245–247
- Helminthic parasites, 211
- Helper t cells, helper t lymphocytes, 228, 229f
- Helping, 96
- Hematopoietic stem cells, 227
- Hepatitis viruses
- hepatitis B virus (HBV), 194, 198r, 201, 202
 - hepatitis C virus (HCV), 194, 198r, 201
- Hepatocellular carcinoma, 202
- Heritability, 157
- Herpes simplex virus, 199r, 282, 285
- Herpes zoster virus, 286
- High calorie diets, 329
- HINT (Helminth-induced immunomodulation therapy) study, 248

- HIV, 228–229, 282, 340
 Homeostasis, 109, 130, 143, 185, 213, 263
 Horizontal gene transfer, 234
 Hormonal changes, 51
 Hormones, 26, 50, 53, 109, 262, 264
 Hospital practices, 50, 53, 55
 Host–pathogen coevolution, 10
 Host(s), 11, 192, 193, 212–214, 217, 218
 defense, 225–235, 277–286
 resistance, 280
 Human immunodeficiency virus-1 (HIV-1), 225, 228
 Human papillomavirus (HPV), 194–196, 198*t*, 200–202
 Human placental lactogen (hpl), 26
 Hunger, hungry, 76, 111
 hedonic, 109
 Hunter-gatherers, 37, 90, 94, 95, 99, 108, 129, 335, 350
 Huntington's disease, 283
 Hygiene, 146, 201, 212, 215
 Hygiene hypothesis, 3, 211, 215, 243–245
Hymenolepis nana, 246
 Hypertension. *See also under* blood
 arterial, 137, 138, 145, 147, 156
 Hypodermic needles, 192
- I**
 IL-6, 260, 262
 IL-10, 213, 246
 IL-12, 246
 Imatinib, 183–184
 Immune disorders, immune dysfunction, 2, 3, 212, 213, 215, 216, 220, 221, 335, 336
 Immune receptors, 226
 Immune response, 212–215, 217, 220, 226–229, 234, 235, 245, 246, 248, 249, 261, 266, 269, 285
 Immune system (is), 213–215, 226–227
 Immunity, 213, 214, 227, 264
 adaptive, 265
 innate, 265
 Immunity-related gtpases (irgs), 231
 Immunogens, 228
 Immunoglobulin E (ige), 3
 Immunological biography, 266–269, 267*f*
 Immunological tolerance, 212, 214, 220
 Immunology, 225, 234, 269
 Immunomodulatory molecule, 250
 Immunopathology, 212, 214, 251
 Immunoregulation, 241–251
 Immunosenescence, 264–266
 Immunosuppressive drug, 220, 249
- Imprinted genes, 20
 Imprinting, 21–22, 304
 Inclusive fitness, 99
 Income, 53, 90, 99, 112, 138, 363
 Indoleamine 2,3-dioxygenase (IDO), 231
 Industrialisation, 2
 Industrialised societies, 6
 Infant
 biology, 62–63
 care, 62–63
 mortality, 76, 81
 sleep, 62–64, 66–70
 survival, 280
 Infant Sleep Safety Tool, 69–70
 Infection, 191–202
 Infectious agents, 193–194
 Infectious causes of cancer, 197, 201, 202
 Infectious diseases, 3, 9, 10, 170, 173, 200, 215, 231, 235, 244, 268, 286
 Infectious proteins, 337
 Inflammaging, 259–272
 Inflammation, 159, 218, 260–261, 264, 269
 Inflammatory bowel disease, 217, 219, 220
 Inflammatory disorders, 122, 215, 243, 244
 Inflammatory responses, 213, 214, 250
 Influenza a virus, 233, 285
 Information processing, 350
 In-group preference, 99
 Injuries, 3, 8, 213
 Innate immune activation, 282
 Innate immunity, 265
 Insulin-glucose metabolism, 77, 79
 Insulin-like growth factor, 22
 Insulin resistance, 26, 335
 Inter-birth interval, 52
 Interferon (ifn)- γ , 231, 246
 Inter-individual variability, 156, 159
 Interleukin (il), 123, 213, 246
 Intracellular parasites, 194
 Intracellular pathogens, 285
 Intra-tumour heterogeneity, 179, 185
 Intrauterine growth, 76, 77, 81
 In utero, 218
 In vitro, 24, 184, 233, 282, 285, 337
 Iron, 171
 Irritable bowel disease, irritable bowel syndrome, 220
- K**
 Karyotypic heterogeneity, 182
 Kin, 99
 Knowledge, 1, 90, 92, 93*t*

L

Lactation, 52–55
 Lactational amenorrhoea, 55
 Lactobacilli, 244
 Language, 91–92
 Late-Onset forms of Alzheimer Disease. *See*
 LOAD
 LDL receptor, 281
 Learning, 90
 biases, 98
 discovery, 92
 Leptin, 81
 Leukotriene, 121, 123
 Life expectancy, 270, 280, 340, 352, 362
 Lifespan, 2, 38, 138, 147, 148, 331, 334, 338,
 340
 Lifestyle changes, 38
 Lipid binding, 281–282
 Lipids, 120, 159, 281, 285, 286
 Liver cancer, 201
 Load, 284*f*, 285–286
 Loci, 158, 196, 231, 234, 283, 285
 Lone sleeping, 61
 Longevity, 5, 212, 265, 280, 333, 340
 Lung cancer, 195–196
 Lymphedema, 217
 Lymphocytes, 213, 214, 227–229, 262
 Lysosomal proteolysis, 284*f*

M

Macaque, 278
Maccaca mulata, 279
 Macrophages, 214, 215, 219*f*, 246, 262, 263
 Maladaptations, 124, 301, 302, 304, 316
 Maladaptive traits, 156
 Malaria, 214, 249, 278, 281, 282
 DNA vaccine, 249
 Marmoset, 279*f*
 Maternal age, 26, 52
 Maternal care, 332
 Maternal death, 36
 Maternal investment, 20
 Meat, 119, 122, 124, 127, 129, 155, 157, 159,
 160, 230, 269
 Mebendazole, 250
 Mechanotransduction, 139
 Medical education, 10
 Menopause, 278, 332
 Menstrual cycle, 51
 Mental disorders, mental illness, 106, 348, 352
 evolutionary causes of, 302–305
 Mental health, 129, 130
 Meta-analysis, 52, 64, 78, 286, 366

Metabolic disease, metabolic disorders,
 metabolic syndrome, 4, 126, 335
 Metabolism
 fatty acid, genetic adaptation of, 125–126
 glucose–insulin, 77, 79
 tau, 285
 Metalloproteases, 196
 Metastasis, 172, 180, 183, 196
 Metazoan parasites, 214
 Methicillin-resistant *staphylococcus aureus*
 (mrsa), 231–232
 Methylation
 DNA, 183
 of gene promoter regions, 196
 Mice, mouse, 22, 82, 183, 214–215, 219, 220*f*,
 227, 230–231, 233, 249, 250, 281, 282
 Microbial-associated molecular patterns
 (mamps), 226
 Microbiology, 234
 Microbiome, 3, 159, 235, 270
 Microbiota, 244
 gut, 217, 260, 270, 272
 skin, 218*f*
Microcebus marinus, 279
 Micronutrient supplementation, 78
 Microorganisms, 212, 216, 270
 pathogenic, 214
 telerogetic, 221
 Microsatellite, 281
 Midwives, 36
 Migration, 5, 242, 244
 Mind, domains of, 92*f*
 Minerals, 127, 363
 Miscarriage, 230
 Mismatch, 3–5, 10, 25, 47, 52, 64, 84, 129
 environment, 303
 hypotheses, 335–336
 explanation, 349–350
 Modern agriculture, 48, 124
 Modern human populations, 109
 Modern lifestyle, 217
 Molecular targeting, 173
 Monkeys, 35*f*, 277, 278, 279, 279*f*, 286
 Monounsaturated fat, 129, 130, 150
 Mood, 50, 129, 300, 305, 309, 317
 Mortality, 2, 34, 52, 129
 cardiovascular, 156
 coronary heart disease, 76*f*
 infant, 81
 infection-related, 232
 neonatal, 138
 sleep-related, 67
 starvation -and cold-related, 110

- Mother
 bottle feeding, 50–51
 depression effect on breastfeeding, 49–50
 foetal–maternal conflict, 20
 gestational diabetes, 26
 SIDS, 63, 65
- MRI, 248, 249, 282
- Multidrug resistance, 183
- Multiple sclerosis (ms), 216, 219, 241–251
- Muscle, 79
 cardiac, 142–143, 145*f*, 148
 physiology, economy and
 mechanotransduction in, 139
- Mutations
 rate, 228
 somatic hypermutation, 227–229
 somatic mutations, 168, 178, 228
- Mycobacteria, 244
Mycobacterium tuberculosis, 249
- Myelin, 241
- Myocardial infarction, 130, 138, 139, 141
- Myopia, 4, 5
- N**
- Natural population, 280
- Natural selection, 6–7
 on cancer infectious agents, 193–194
 fundamentals of, 7
 on multicellular organisms, 193
- Necator americanus*, 247
- Needle-borne transmission, 197
- Nefazodone, 49
- Nematode, 215, 217, 219, 250, 283
- Neocortex, 300
- Neolithic, 124, 267–269
- Neonatal death, 25, 26
- Neurocytoskeletal disorganization, 279*f*
- Neurodegenerative disorders of aging, 278–279
- Neurodevelopment, 130, 300–304, 307
- Neuro-endocrine system (nes), 262, 263
- Neurofibrillary tangles (nft), 278, 331, 336, 337
- Neuronal damage, 286, 337
- Neuron loss, 278
- Neurons, 262, 278, 281, 337
- Neuropathological lesions, 285
- Neuropeptides (crh), 262
- Neuroscience, 99, 301
- Neurotoxic, 285, 336
- Neutralizing antibodies, 228, 229*f*
- Nitric oxide (no), 262
- Nocebo, 366
- Non-steroidal anti-inflammatory drugs, 218
- Nurseries, 50
- Nutrient, 19, 25, 124
- Nutritional status, 51, 147
- Nutrition transition, 110
- Nuts, walnuts, 119, 120, 122, 127, 128, 271
- O**
- Obesity, obese
 abdominal, 335
 and breastfeeding success, 55
- Obsessive-compulsive disorder, 303, 348
- Obstetric complications, 19–27
- Obstetric dilemma, 36–37
- Obstructed labour, 38–39
- Offspring health, 80
- Old friends
 coevolution with, 216–217, 218*f*
 hypothesis, 243–245
- Olive oil, 127, 128, 130
- Omega-3 (ω -3) fatty acids, 119–130, 120*f*,
 121*f*, 125*r*
- Omega-6 (ω -6) fatty acids, 119–130, 120*f*,
 121*f*, 125*r*
- Oncogene addiction, 177, 183–185
- Oncogenesis, 192–194
- Oncogenic selection, 192–193
- Oncogenic viruses, 194, 196, 197
- Oocysts, 230
- Optimum, 349
- Origins, 75–84
- Oseltamivir, 233
- Osteoporosis, 129
- Outbreaks, 231, 235
- Ovary, 278
- Overeating, 106, 107, 111, 112
- Overweight, 37, 39, 48, 54
- Ovulation, 51, 55
- Ovulatory cycle, 282
- Oxidative damage, 335, 337
- Oxidative stress, 182, 330, 334, 335, 337
- Oxytocin, 50, 53
- P**
- Pain, 362–363
 abdominal, 249, 250
 lower back, 2
 physical, 352
- Paired helical filament tau (phftau), 331
- Pan troglodytes*. See chimpanzees
- Pancreatic β -cells, 79, 213
- Paranoia, 308
- Parasites, 211–221
 load, 244
 oncogenic, transmission of, 197–198, 198*r*,
 199*r*
- Parasitic agents, 212

- Parasitoses, 244
- Parental care, 332
- Parenting
 neglectful, 53
 strategies, 68
- Parity, 26
- Pathogens, 170–172
- Pattern recognition receptors (prr), 226
- Pay-offs, 350
- Pedagogy, 92, 94, 95
- Pelvis
 pelvic canal, 35, 37
 pelvic morphology, 34–36, 35f
- Penicillin, 6, 232
- Perineal tearing, 39
- Persistence explanation, 350–351
- Personality traits, 20
- Phagocytosis, 262
- Phenotype
 extended, in oncogenesis, 196
 maternal, 34, 36, 38
 offspring, 34, 38, 78
 thrifty, 109
- Phenotypic expression, 283–284
- Phenotypic integration, 79–80, 82–83
- Phenotypic plasticity, 142
- Phospholipid, 129–131, 142, 159, 281
- Photoperiod, 48
- Phylogenetic comparisons, 279
- Phylogenetic history, 2
- Phylogenetic relationships, 235, 338
- Physical activity, 110, 113, 335, 366
- Pittsburgh (pi) compound b (pib), 286
- Placebos, 365–366
- Placenta, 20
- Plant, 78
- Plasma membrane, 142
- Plasmodium falciparum*, 197, 282
- Plasticity
 adaptive, 142–145
 developmental, 76–80
 phenotypic, 142
- Platelet aggregation, 129
- Playing, 90, 93
- Pleiotropy
 antagonistic, 264–266, 280, 282, 283, 285, 333–334
 antagonist, 261
- Policy and practice
 age-related diseases, 269–272
 Alzheimer's disease, 338–340
 autism spectrum disorder, 316–318
 bottle feeding, 55
 brain aging, 286
 cardiovascular diseases, 159–160
 chemotherapy, 185–186
 chronic heart failure, 147–148
 depression, 353
 DOHaD, 80–82
 drug resistance, 173
 eating disorder, 111–112
 evolutionary novelty of modern education, managing, 99–100
 foetal–maternal conflicts, 27
 immune diseases, 218–221
 infectious diseases, 200–202
 multiple sclerosis, 247–250
 obstructed labour, 38
 placebos, 365–366
 ω -6 and ω -3 fatty acid ratio, 130–131
 SIDS, 68–70
- Polymorphic gene, 214
- Polysaccharide, 233–234
- Population bottleneck, 6, 332
- Population diversity, 180, 185
- Population of cancer cells, 168
- Post-industrialized environment, 220, 329, 335
- Post-partum depression, 47–55
- Post-partum haemorrhage, 36
- Post-reproductive period, 283
- Potent broadly neutralizing antibodies (pbnab), 228–229
- Preagricultural societies, 37
- Predators, 279, 361
- Predictive adaptive response (par), 76–77
- Pre-eclampsia
 early-onset, 22–24
 late-onset, 25
- Pregnancy
 complications, 20–23, 26, 27
 maternal diet during, 80
 weight gain, 37, 38, 40
- Prehistoric foragers, 108
- Prehistoric humans, 109
- Preindustrial societies, 95
- Premature foetus, premature birth, 26
- Prenatal environment, 51
- Presenilin, 336
- Preterm delivery, 25
- Primate, 35f, 49, 62, 108, 126, 278, 279, 279f, 281, 332
- Prion diseases, 337–338, 339
- Problem-solving, 352, 353
- Progesterone, 282
- Pro-inflammatory cytokines (il-1, il-6, tnf α), 213, 260, 262, 263, 272
- Prolactin, 53, 54
- Proliferation, 169, 172, 180, 194, 196, 215, 246

- of cells, 122
- Pro-simians, 278
- Prostaglandin, 123
- Proteases, 172
- Protein tau, hyperphosphorylated tau, 278
- Prothrombotic, 123
- Proximate
 - causes, 2, 317
 - clinical, 2
 - mechanistic, 2, 50, 68
- Psychiatric disorders, reification of, 299–300
- Psychiatry, 299, 329, 347, 357
- Psychosis, 305, 308, 309, 317
- Psychosocial stress, 83, 303
- Psychotic affective disorders, 316, 317
- Puberty, 331
- Public allele system, 280
- Public good molecules, 169
- Public goods, 171
- Public health, 67

- R**
- Rates of progression, 250
- Reading, 91–92
- Reality distortions, 312*r*
- Recombination, 7, 126, 234
- Regulatory network induction, 249
- Regulatory t-cells (reg), 213, 246, 247*f*
- Relapsing–remitting forms of ms (rrms), 242, 243, 248
- Renal failure, 156
- Replication, 194, 197–198, 215, 233, 282, 285
- Reproduction, 2, 5, 108, 192, 261, 279, 280, 301, 302, 332, 334
- Reproductive success, 68, 108, 350, 359
- Resistance
 - antibiotic, 6, 7, 171, 218, 232
 - drug, 167–173
 - host, 280
 - insulin, 26, 335
 - multidrug, 183
- Retinoblastoma, 195
- Rhesus monkey, 279*f*
- Rumination, 351, 352–353

- S**
- Saimiri sciureus*, 279
- Saliency (causal meaning), 305, 307, 308
- Saliva, 192, 197
- Salivary transmission, 197, 198
- Salt, 138, 157, 159
- Sanitary conditions, 211, 244
- Satiety, 1091
- Saturated fats, 123, 158, 160
- SCFA (short chain fatty acids), 272
- Schistosoma mansoni*, 249, 250, 251
- Schizophrenia, 76, 302–304, 308–310, 311–315*r*, 316
- School, 10–11, 91, 95–96
- Scleroderma, 229
- Seasonal environment, 108–110
- Seasonality, 106, 108–110, 112
- Sedentary behavior, 107, 138
- Sedentary lifestyle, 4, 90, 329, 335
- Selection
 - natural, 6–7, 193–194
 - oncogenic, 192–193
 - pressures, 178, 235, 332
- Selective advantage, in host defense, 280–282, 281*r*
- Selective forces, 156
- Selective pressures, 159, 235
- Senescence, 186, 332
- Serotype, 233–234
 - replacement, 234
- Sexual contact, 192, 199
- Sexually-antagonistic alleles, 304
- Sexually transmitted pathogens, 200
- Sexual transmission, 197
- Shortage of pathogens, 329
- Sickle cell hemoglobin, 282
- Siderophores, 171
- Skills, 90
- Skin-to-skin contact, 50, 53, 54
- Sleep location, 67
- Sleeping, 61–62, 64, 66
- Smallpox virus, 233
- Smoking, 158, 243. *See also* cigarette
- Social-based education, 99
- Social behavior, 279
- Social brain, 305, 307
- Social cognition, 99, 300, 301, 307, 308, 310, 316, 317
- Social group, 350
- Social learning, 95
- Social network, 351
- Sociality, 299, 307, 317
- Sodium, 157, 159
- Somatic hypermutation, 227–229
- Somatic mutations, 168, 178, 228
- Special care baby unit (scbu), 231
- Spiral arteries, 22, 25
- Spirochetal bacteria, 286
- Squirrel monkey, 279*f*
- Starch, 287
- Statins, 160
- Stature, 39–40
- Stochastic events, 5, 283

- Streptococcus pneumoniae*, 233
- Stress
- chronic, 112
 - oxidative, 182, 330, 334, 335, 337
 - psychosocial, 83, 303
 - response, 262–264, 263f
- Stroke, 160, 271
- Strongyloides stercoralis*, 246
- Suckling, 50, 54
- Sudbury Valley School, 95–96
- Sudden Infant Death Syndrome (SIDS), 61–70
- cross-cultural perspectives, 64–65
 - epidemiology of, 65–66
 - policy and practice, implications for, 68–70
 - sleep location and, 67
 - triple-risk model for, 66f
- Sugars, 4, 62, 63, 108, 111, 138, 268, 335
- Suicide, 348, 352
- Sunlight, 5, 243, 353
- Suppressor loci, 285
- Survival, 89–100
- Synapse, 278, 337
- loss, 278
- T**
- Targeted drugs, 185, 339
- Targeted gene studies, 156
- Targeted therapies, 168, 185
- Task, 90, 94, 97, 111, 113, 217, 304, 307, 350
- Tau
- hyperphosphorylated, 278
 - metabolism, 285
 - paired helical filament, 331
- Telomerase
- expression, 196, 197
 - length, 129
 - regulation, 193
 - synthesis of, 194
- Tetanus, 249
- Th1, 247f, 248, 249, 251
- Th2, 247f
- Th17, 245, 247f, 251
- Therapy-Induced Genome Instability, 185
- Thiazides, 159
- Three Factor Eating Questionnaire, 106, 107
- Thrombus, 122
- TNF α , 262, 282
- Tobacco, 138, 195, 200
- Tolerance, 212, 214, 217, 218, 220
- Toxoplasma gondii*, 230
- Trade-off, 4, 5, 48, 62, 68–70, 280, 282, 303–304, 307, 317, 358, 359
- Traditional societies, 39, 90, 93, 95, 110
- Transcriptome, 180, 183
- Transforming growth factor (tgf)- β , 213, 214, 216, 246, 247f
- Transgenic models, 184
- Transmissibility, 226, 230, 230f, 231
- of AD pathology, 337–338
- Trichinella spiralis*, 250
- Trichura suis*, 247
- Trichuris trichiura*, 244
- Triglycerides, 159, 281
- Tropisms, 81
- Trypanosoma*, 214
- Trypanosoma brucei brucei*, 281
- Tumorigenesis, 229
- Tumour cells, 179, 184, 185
- Tumour progression, 178, 178f, 179
- Tumour suppressor genes, 178, 180, 186
- Type 1 diabetes, 216, 220f, 299, 307
- Type 2 diabetes, type II diabetes, 37, 77, 81, 220, 235
- U**
- Ulcerative colitis, 219
- Ultimate (evolutionary), 2
- Ultimate causes, 349
- Uncertain environment, 108
- Uncertainty in food availability, 107, 112
- UNICEF, 54, 62, 69
- Unstable environment, 108
- Urbanization, 2
- Urea, 108
- Uteroplacental ischaemia, 20, 22–23, 25
- UV exposure, 243
- V**
- Vaccine, 170–171, 200–202
- conjugate, 234
 - effectiveness, 233–234
 - HIV, 228–230
 - HPV, 202
 - resistance, 171
- Vaginal delivery, 54
- Valve diseases, 137–139, 147, 148
- Variable domain genes, 228
- Variation, 278–279
- Vegetable oil, 119, 123, 126
- Vegetables, 108, 120, 124, 127–129, 157
- Vegetarian, 159
- Vertebrates, 226, 263, 263f, 280, 285
- Viral infections, 6, 195, 243
- Virulence, 230–231
- Viruses, 194
- Vitamins, 123f, 127, 128, 159
- VLDL, 281
- Vulnerability, 2, 5, 66, 195, 331, 333, 334

W

Weaning, 49, 51, 54, 55

Weight, 36

Western cultures, 61, 63, 65

Western diet, 119, 121, 124, 126, 129, 130

Western societies, 61, 119, 158, 350

Westernization, 37, 39f

Whole-genome sequencing (wgs), 231, 234

Womb, 75, 80

Women

bottle feeding, 48–52, 54

cephalopelvic disproportion, 36, 37

gestational diabetes, 26, 27

healthy weight and lifestyle, 38

obesity, 54

post-partum depression, 49

Worms, 2, 3, 127, 214, 249

Writing, 90, 92

Y

Yeast, 140f, 285

Young

age-related diseases, 261

Alzheimer's disease, 333

biology and care, 62

bottle feeding, 53

dementia, 280

hygiene, 243

Z

Zone of proximal development, 94