Index

A
AD. See Alzheimer’s disease
Agrawal, A., 275
Altered nuclear transfer (ANT), 316
Alzheimer’s disease (AD)
  stem cell therapy
    cholinergic neurons, 9
    hippocampal neurogenesis, 9
    pathological changes, 8
Anderson, J.A., 403
Andrews, P.W., 35
“Animalization”, 220
Animals and species, chimeras
  integrity aspect, 203–204
  ontological assumption, 203
  suffering and killing, 202–203
ANT. See Altered nuclear transfer
Aristotle, 376
Arrested embryos, 315–316
Aryee, M.J., 424
Ashcroft, R., 437
Autologous epithelial stem cells, SSE disorder
  embryonic stem cells and iPS, 50
  engraftment, comprehending, 48–49
  epidermis and cornea
    autologous dermal fibroblasts, 48
    ex vivo cell and gene therapy, 47–48
    keratinocyte, 46–47
    slow-cycling cells, 46
  ex vivo gene therapy
    recombinant viral vectors, 49
    self-inactivating (SIN) vectors, 49–50
  plasticity, 49
Ayetey, H., 77

B
Badura-Lotter, G., 115, 193
Baker, M., 365

Ballinger, W.F., 25
Banks, repositories and registries, stem cell lines
  biobanks, 252
  hybrids, 263
  interests, regulation formulation
    health, defined, 255
    informed consent, 254
    self-determination, 254–255
    social regulation, 254
  international regulation, 256–261
  research/treatment, 255–256
  stem cell banks, 252
  stem cell collection, regulation
    biological research, 253
    humans, 253
    individual rights and ethical
      acceptability, 253–254
  translational research
    “change of purpose”, 261–262
    clinical trials, 261
    patient treatment, 261–262
    research situation to donation situation,
      262
  self-determination, 261
Barrandon, Y., 45
Baylis, F., 115
Bergman, K., 272, 276
Beyleveld, D., 437
Bone marrow cells (BMCs)
  adult, cardiac disorder
    function, 17–18
    green fluorescent protein (GFP), 16–17
    transplantation, 17
    treatment, 18
  pluripotent and cardiac progenitors
    biological pacemakers, 19
    hESCs, 18
    induce differentiation, 18–19
    therapeutic benefit, 19–20
Bone morphogenetic protein (BMP), 19

Broad consent
- autonomy, 245–246
- biobanks, 239
- deontological constraints
  - medical research, human beings, 246
  - permission, individual, 247
- doctrine, 238
- empirical support, 248
- infants, 248–249
- information, specificity, 240
- informed consent
  - autonomy promotion, 243
  - deontological constraints, 243–244
  - doctrine, 238, 239
  - procedures, 240–241
  - protection against harm, 242
  - requirement, 237, 239
  - trust, science, 243
- potential donors, 238
- protection against harm, 245
- translational stem cell research, 239
- trust, science, 246
- virtuous scientist, 249

Brock, D.W., 141
Broström, L., 237
Brownsword, R., 437
Brüstle, O., 91, 330
Bubela, T., 275

Chimbrds, legal aspects
- activities, 217
- ethics and regulation, 218–219
- European Union, competency and legitimacy, 217–218
- “human” and “animals”, 212–213
- recommendations, 219–221
- regulatory needs and challenges
  - “animal” and “human”, 213–214
- interests and values, 213
- scientific tourism, 214
- terminological ambiguity, 214
- tools and strategies, regulatory competency and level, 214–215
- domestic law, 215–217
- EU Regulation, 215
- public international law, 215

Chimeras
- categories, 175–178
- development, human-nonhuman creation, 178
- human embryonic stem cells, role, 179
- living mammal, defined, 178
- reproductive cloning, 180 generation, 177
- host-dependent tumorigenesis, 177–178
- human-human, 177

Chimeras and hybrids
- definitions, 194
- ethical debate
  - biological categories, 195
  - developmental stage, recipient and transplantation side, 197–198
  - intra- vs. interspecific mosaic and, 195–196
  - recipient species, 197
  - research aims, uses and side effects, 198
  - sources, donors and introduced material, 196
- ethical problems and animals and species, 202–205
- human embryos/fetuses use, 205–207
- human somatic cells, 199
- intra- vs. inter-specific mosaic and hybrid embryo, 199
- potentiality argument, 199
- recipient developmental stage, transplantation side, 199–200
- research aims, 200
- sources, donors and materials, 200
- tentative appraisement, 202

C
California Institute for Regenerative Medicine (CIRM)
- CSCC, 276–277
- intellectual property policy, 279
Cancer Stem Cell Consortium (CSCC), 276–277
Candidate patient-specific disease model, 83–84
Cardiac disorder, stem cells
- blood pressure/obesity/diabetes, 15–16
- BMCs (see Bone marrow cells)
- iPSCs, 16
- swelling, 15
Castor, A., 151
Caulfield, T., 273, 275, 354, 355, 358
Cell therapy
- donor selection, issue, 60
- muscular dystrophy, 56
- patient selection, 59–60
- transplantation, 58–59
Chen, Y., 198–200, 202
transplantation medicine
ES cells, 201

gene therapy trials, 201
pluripotent stem cells, 201–202
uses, 200–201

Choi, I., 396
Cobbe, N., 115, 169

Communication
controversial field, 377–378
duty
freedom of choice, 385
legal dimension, debate, 385–386
scientist, 384

education
science teachers and journalists, 382
scientists, 383
system, 382

lobbies
description, 386
medical units, 386–387
logistics, 387

outreach and academia
cooperative research grants,
379–380
journals, 380
rewards, 380

science vs. neutrality, 381–382

science-society interactions
middle ages, 376
politics, 377

scientist’s support
communication skills/strategies,
378–379
time allocation, 379

self-sustained debates
ESTOOLS, 384
Internet drive ideas, 383

society, 375–376

Cosell, C., 275
Cossu, G., 55

Creutzfeldt-Jacob’s disease, 105
Crohn’s disease, 128

Cytoplasmic hybrids (cybrids)
branch lengths, 174
phylogenetic tree, 174, 175
somatic cell donor, 174
transgenesis, 175

Diabetes mellitus (DM)
cell therapy, blood sugar levels
beta cells, 25
insulin-producing, replacement, 25
islet transplantation, 25
ES and IPS cells, 29–30
immense distress, 24
immunological compatibility and
autoimmunity
adult stem cell-mediated
correction, 28
iPS, autoimmune diabetes, 29
pluripotent stem cell-mediated
tolerization, 28–29
stem cell-based therapies, 27
insulin, beta cell and types,
24–25
therapeutic beta cells, stem cells
characteristics, 25
iPS cells, 26, 27
multipotent, 26
pancreatic, 26
pluripotent ES cells, 26
totipotent and pluripotent, 26
transplantation, encapsulation/
immunomodulation, 30

Ding, W.W., 275
DM. See Diabetes mellitus
Doi, A., 424

Domestic law, chimbrids
activities, 217
legislation, 215–216
regulation, 216
xenotransplantation, legislation, 216

Duchenne muscular dystrophy (DMD)
auto-transplantation cells, 57
outcome measures, patients, 58
patient association, 61
premature death, 56
Duewell, M., 325
Duprat, S., 375
Düwell, M., 115, 193
Dvořák, P., 65

E
EBoA. See Enlarged Board of Appeal
EFFCA. See European Federation of Crohn’s
and Colitis Association
EFNA. See European Federation of
Neurological Associations
Einsiedel, E., 273, 349
Eisenberg, R.S., 273
Embryoid bodies, 18
Embryonic stem (ES) cells
   based therapies, 201
   and iPS, 50
   leukemia, 39
   nullipotent, 38
   teratocarcinomas and germ cell tumors, 37–38
Enlarged Board of Appeal (EBoA)
   g2/06 decision, 330
   level, 336
EPO. See European Patent Office
Ethical, legal and social implications, translational SCR
   public opinion trends
      awareness/knowledge, 349–350
      constituencies, 345
      perceptions, regulatory environment, 350–351
      support/opposition, 346–347
      variation, 345–346
   public trust and research
      commercialization
      biotechnology, 351
      industry involvement, 354–355
      NCE, 352–353
      objective, 355
      patents, 354
      “price”, 353–354
      research ethos, 352
      and SCN models, 353
      trust, 355–357
Ethical matrix (EM), 120–121
Ethics and uncertainty
   assessment
      direct-benefit, 406–407
      favorable risk-benefit value, 408–409
      risk, 405–406
      social value, 407–408
   challenges
      first-in-human (FIH) studies, 404
      human embryo, 405
   informed consent
      intervention, 413
      unsustainable expectations, 412
   justice
      disadvantaged populations, 411
      LMICs, 412
      responsiveness and post-trial access, 411–412
   preclinical and FIH studies
      translational trials, 410
      validity, 410
   privacy and procurement, 413–414
   recommendations, 414–415
   research ethics committee, 404
   scientific expertise, 414
   subject selection
      non-maleficence, 411
      treatment refractory, 410–411
   European Federation of Crohn’s and Colitis
      Association (EFFCA), 368
   European Federation of Neurological
      Associations (EFNA), 367
   European Group on ethics (EGE)
      EPO
         advantages, 337
         levels, 336
         objections, 336–337
         proposal, 335–336
         self-regulation and political autonomy, 335
      social justice aspects, 445
   European Patent Convention (EPC)
      cloning, human beings, 316
      “embryo” definition, 317
      human ES cell cultures, 314
      patentability, 310
   European Patent Office (EPO)
      commercialization, embryos, 318
      community legislative provisions, 320
   EGE
      advantages, 337
      levels, 336
      objections, 336–337
      proposal, 335–336
      self-regulation and political autonomy, 335
      embryo definition, 313, 317
      position, 314
   Evans, M., 114
   Experimental stem cell-based therapy (ESCT),
      pediatrics
      in adults, 154
      children, research question
      alternative therapies, 156
      animals, adults and older, 155–156
      disease/disorder, 156
      drug, 155
      conditions, 155
      free and informed consent
      parental, 162–163
      research project participation, 163
      theoretical knowledge and preclinical
      experiments, 164
      risk of harm and benefit
      acceptable, 157
      assessment, 156–157
      consequentialist arguments, 158–159
deontological arguments, 161–162
dignitarian arguments, 160–161
human rights, arguments, 159–160
lethal burn victim, 158
minimal, 157
scope of, 153

F
Familial dysautonomia (FD), 72
Fanconi anemia (FA), 71–72
Fatal burn injury, 156
Federation of International Mouse Resources, 227
Feeder cells, 105
Finucane, M.L., 391
Fleischhauer, K., 436, 442
Fragile X mental retardation 1 (FMR1) gene, 70
Fuchs, M., 137, 154, 156–157

G
Galileo, 377–378
German Embryo Protection Act of 1990, 313
Gewirth, A., 437, 445
Graff, G.D., 268, 272, 276–277
Graft-versus-host disease (GVHD), 27
Grasset, N., 45
Greene, M., 115
Green, H., 47
GRNOPC1 therapy, 422
Guillain-Barré syndrome, 158

H
Haber, F., 377
Hadenfeld, M., 91
Haematopoietic stem cells (HSC), 26
Hanna, J., 81
Hansson, M., 23
Harris, J., 325
Hartlev, M., 251
Heller, M.A., 273
Herceptin drugs, 368
Herder, M., 267
Hermerén, G., 323, 431
HFEA. See Human fertilisation and embryology authority
Ho, S.S., 394–395
Hovatta, O., 103
Huang, K.G., 273
Hug, K., 151

Human-animal entities
animals vs. humans
brain volumes, 181
characteristics, 182
FOXP2 transcription factor, 181
genome sequence level, 180
development, human-nonhuman chimeras, 178–180
interspecies
chimeras categories, 175–178
cybrids and transgenic animals, 173–175
and human identity, 182–185
hybrids, 173
“Human dignity”, 160, 161
Human embryonic stem cells (hESC)
as biological pacemakers, 19
BMP, 19
description, 18
and iPS, human genetic diseases
advantage of, 70
cystic fibrosis, 71
fragile X syndrome, 70–71
Lesh-Nyhan disease, 71
Parkinson’s disease (PD), 72
X-linked disorder, 71–72
line, two-way traceability, 233
teratomas, 127
Human embryos/fetuses, mosaic and hybrid research
attitude, fear problematic changes, 206–207
“foreign” cell transplantation, 205
moral status, 205–206
NT-hybrids, 206
Human Fertilisation and Embryology Act of 1990, 313
Human Fertilisation and Embryology Authority (HFEA)
opinion poll, 348
SCR
awareness/knowledge, 349
public engagement, regulation, 344
“Humanization”, 220
Human stem cell-based inventions, patenting criticisms, patents and patent law
collaborative licensing models, 330
EBoA, 330
EPO, 329–330
health impact fund, 330–331
definition and interpretation problems
human embryo, 334
“invention,” meaning, 335
“oncomouse”, 334–335
economy and politics, 329
Human stem cell-based inventions, patenting
(cont.)
EPO and EGE
advantages, 337
levels, 336
objections, 336–337
proposal, 335–336
self-regulation and political autonomy, 335
ethics
arguments, 331
“choice” and “value conflicts”, 326
codes and conventions, 325
disagreement over tenability, 334
human dignity, 332–333
induced pluripotent stem cell (iPSC) research, 333
interdisciplinary approach, 326
knowledge gaps, 332
monodisciplinary approach, 325–326
practical, 325
theoretical issues, 324–325
utilitarian and human rights traditions, 332
virtue, 333
ethics and patent law, 331
patents and ethics
before application, 327–328
consequences, 328–329
legalistic view, controversies, 326
morality clause, 328
relations, 327

Hurlbut, W.B., 316
Hwang Woo Suk affair, 355
Hybrids
non-viable, 173
somatic cell, 173

Hyun, I., 131

I
Immunogenicity
allogenic cells, 106
immunosuppressive medication, 106
iPS cells, 106, 107
Induced pluripotent stem cells (iPSCs), 114.
See also Industrial application, stem cells; Pluripotent cells
autoimmune diabetes, 29
and cell therapy
cardiac regeneration, 80
gene, 81–82
ophthalmic diseases, 81
PD, 80
degenerative disorders, 79
and disease modeling
ageing, 82–83
animal, 82
dermal fibroblast, Mendelian and complex inheritance patterns, 83
differentiated tissue types, 82
long QT syndrome (LQTS), 83–84
epigenetic factors, 426
and ES cells
molecular properties, 78–79
self-renewing, 78
therapeutic potential, 79
hemato-oncological disorders, 85
and hES, human genetic diseases
advantage of, 70
cystic fibrosis, 71
fragile X syndrome, 70–71
Lesh-Nyhan disease, 71
Parkinson’s disease (PD), 72
X-linked disorder, 71–72
human cell therapy, 77–78
oncogene (c-Myc), 127
pharmaceutical applications
cardiomyocytes, 84
cardiotoxicity screens, 84
hepatocyte, 84–85
reprogramming process, 79
stem cell surveillance in vivo, 85
Industrial application, stem cells
challenges
stem cells, defined, 100
three-dimensional (3D) culture techniques, 100
hES cells, high throughput screenings (HTS)
drug development, 99
and iPS, 98
iPS
applications and prospects, 94
generation, 93
somatic cells, 94
pluripotent
applications and prospects, 96–97
sources and characterization, 92–93
Informed consent
autonomy promotion, 243
deontological constraints
moral right, 244
potential research subjects, 243
free and parental, 162–163
research project participation, 163–164
theoretical knowledge and preclinical experiments, 164
Index

and human
drug trials, 138–139
problems, 138
self determination, 138
intervention, 413
procedure
moral foundation, 241
steps, 240–241
protection against harm, 242
trust, science, 243
unsustainable expectations, 412
Insertional mutagenesis, 144
International Society for Biological and
Environmental Repositories ((ISBER), 226–227
International Society for Stem Cell Research
(ISSCR), 118, 129
Interspecies entities
chimeras categories, 175–178
cybrids and transgenic animals, 173–175
and human identity
characteristics, 184
DNA/coding sequences, 183
qualitative features, 184–185
relationship to species, 185
species membership, 183
hybrids, 173
subcellular mixtures, 170, 171–172
iPSC. See Induced pluripotent stem cells
Irizarry, R., 424

J
Johansson, M., 237

K
Kahneman, D., 428
Kimmelman, J., 403
Kitchin, J., 293
Klinefelter’s syndrome, 70
Kokaia, Z., 3
Krtolica, A., 120

L
Lacy, P.E., 25
Lee, S.C., 395–396
Legal problems, human stem cell-based
inventions
industrial application
Article 5, Directive, 291–293
definition, 290–291
European Biotech Directive, 291
exploitation, 293
neutrokine-a, 294
substance and function, 293, 294
traditional and potential value, 290
insufficiency
Biogen v Medeva case, 296
Canadian patent law, 295
common general knowledge, 296
No-Fume Ltd v Frank Pitchford & Co Ltd., 295
inventive step, 289–293
novelty
protein, 289
treatment methods, 289
patentability, 288
subject matter and morality
Chinese and US patent law, 297
common standard, 297–298
distributive application approach,
300–301
EPO, 297–298
minimalist and maximalist approach, 300
national patents, 298–299
ordre public, 298, 299
WARF (see Wisconsin Alumni
Research Foundation)
Legal regulation. See Banks, repositories and
registries, stem cell lines
Lesh-Nyhan disease, 71
Leukemia
cell types, 39–40
embryonic stem (ES) cells, 40
hematopoietic cells, 39
hematopoietic system, 39–40
stem cell quiescence, 40
Lindvall, O., 1, 131
London, A.J., 408–409
Long QT syndrome (LQTS)
description, 83
mouse models, 83
nitric oxide synthase adaptor protein
(NOSIAP), 84
Lynch, D., 169

M
Macklin, R., 437
Madsen, O.D., 23
MAPS. See Multipotent adult progenitors
Mayr, E., 183, 184
McCormick, R., 140, 141
McCullough, E.A., 39
MDSC. See Muscle-derived stem cells
Mesenchymal stem cells (MSCs), 11–12
Milgram, S., 239
Millar, K.M., 113
Mosaic, 194
MSCs. See Mesenchymal stem cells
Multipotent adult progenitors (MAPS), 57
Mummary, C., 15
Murakami, P., 424
Murdoch, C., 273
Murray, F.E., 273
Muscle-derived stem cells (MDSC), 57
Muscular dystrophy
  autologous cell transplantation
dystrophin gene, 59
  immune suppression, 58
bone marrow-derived stem cells, 57
costs, health systems
duchenne dystrophic patients, 60–61
  fund, patient association, 61
description, 55
DMD (see Duchenne muscular dystrophy)
donor selection, 60
mesoangioblasts
  dystrophic mice, 57
  pericytes and HLA, 58
patient selection
  oligonucleotides/morpholinos, treated, 60
  problems, 59
satellite cells, 56
strategies, affected cells replacement
  adult tissues, 57
  myoblasts, 56–57
Myelodysplastic syndrome, 80
Myocardial infarction, 15

N
Networks of Centres of Excellence (NCE)
description, 352–353
  SCR-specific, 353
Neural stem cells (NSCs)
  hippocampal neurons formation, 9
  human ES cell-derived, 10
  and MSCs, 11
Nichogiannopoulou, A., 309, 334, 337
Nisbet, M.C., 345, 350, 394
Nisbett, R.E., 396
Nobel, A., 376–377
Norenzayan, A., 396
NSCs. See Neural stem cells
Nuclear transfer (NT) embryos
  ANT, 316
  human dignity, 317
  somatic nucleus, 316
techniques, 194

O
Obesity, 24
O’gbo, U., 273,
Oncologic disease treatment
cancer-initiating cells, 37
cancer stem cell hypothesis, 36–37
developmental cancers
  colon, 40
  leukemia, 39–40
  metastatic, 41–42
  stem cell, 41, 42
  stem cell structure characteristic, 40–41
  teratocarcinomas and germ cell tumors, 37–38
  metastatic cancer, 36
  RB gene allele, 36
Ophthalmic diseases, 81
Orphan issues, 218
Osiris therapeutics, 126

P
Park, I.H., 424
Parkinson’s disease (PD)
  fetal midbrain cells use, 104
  hiPS cells, patient-specific, 72
  patients, 4, 12
  stem cell therapy
    cardinal symptoms, 5
    DA neuroblasts, 6–7
    neuronal replacement, 5–6
    off-medication dyskinesias, 7
    substantia nigra neurons, 6–7
Parthenotes, 317–318
Partridge, T.A., 56
Patenting, human stem cell-based inventions
  EPO position
decision G2/06, 314
  WARF, 314
  “human embryo” definition
    fertilization, 312
    “pluripotent” and “totipotent,” 312
    restrictive interpretation, 313
  somatic cell nuclear transfer, 312
human ES cells procurement, technological
  alternatives
    non-viable entities, 314–318
    protection, embryo, 319
  single-blastomere biopsy (SBB)
    process, 318
legal framework
  EPC, 311
  ES cells, 311
Patient selection
oligonucleotides/morpholinos, treated, 60
problems, 59

Patients’ organizations and opinions
advocacy movement
education, 368
trusted sources, information, 367
European institutions, 366–367
healthcare governance, 366
laws of nature and God, 366
stringent and enforceable rules, 373
translational SCR, role
European conference, 369
interactive keypad voting tool, 369
issues, 370–372
public-lite-rate, 371
religious ethics, 371
sensitivity, 370

PD. See Parkinson’s disease
Peng, K., 396
Persson, J., 421

Pluripotency-related tumors, 107
Pluripotent cells
applications and prospects
freezing batches, iPS, 98
iPS, 94
sources and characterization
ES cells, 93
primary, 92
tetraploid ES cell aggregation, 92

Pluripotent stem cells, genetic diseases
barrier, 72–73
challenges, 73
human embryonic stem (hES), 66–67
human, models
autosomal abnormalities, 68
banking and registering, 69
hES and hiPS cells, 68–72
human somatic cells, 66
modeling, advantages and limitations
cellular crosstalk, 67
embryo-derived, somatic cells, 67–68
self-renew, 67
mouse embryonic stem (mES), 66
treatment, 72

Pogge, T., 330–331

Property layers, proprietary interests and collaboration
“data”, 269
patent rights and MTAs, 269
stem cell data
data sharing, 270
researcher, 270
stem cell materials
registries and banks, 271
WARF, 271
stem cell patents, 272
WARF, 269

Proprietary interests and collaboration
anticommons vs. patent canalyzation
invention disclosure, 275
knowledge flow, 273
material transfer agreements (MTAs), 273
path dependence, 274
perturbation, 274
skepticism, 272
architecture, lack of, 268
property layers
“data”, 269–270
patent rights and MTAs, 269
stem cell data, 270
stem cell materials, 271
stem cell patents, 272
WARF, 269

stem cell commercialization models
CSCC, 276
minimization, costs to research quality,
280–281
“Pattison Report,” 276
SC4SM, 277–278
transaction costs, management, 278–280

Psychosocial and cultural factors
cultural differences, decision process
Confucianism, 395
daily life, models, 395
individualism vs. collectivism, 396
innovation diffusion, social network
adopters, 397
peers and stakeholder groups, 396
recommendations, policymakers, 397–398
risk, intuitive understanding
analytic processes, 392–393
technology, 392
“yuck factor”, 392
value predispositions and knowledge
interaction
positive relationship, 394
public opinion, 395
worldview and value
“exceptionalism”, 393
scientific and religious groups, 394

Public international law, 215

R
Ramsey, P., 140, 141, 146
Ramsey’s blanket prohibition, 146
Rawls, J., 445
Recipient species, 197
Research Ethics Committee, 152
Retinal pigment epithelium (RPE) cells, 81
Robert, J.S., 115
Roßbach, M., 91

S
Saha, K., 268, 272
Sahlin, N-E., 332, 421
“Sauvons la Recherche” group, 377
Schatz, U., 299–300
SC4SM. See Stem cells for safer medicines
Shapiro, M.A., 25
Shelley, M., 366
Sickle cell anemia (SCA), 72
Singer, P., 325
Sipp, D., 125
Smith, 330
Socrates, 429
Stacey, G., 225

Stem cell banks
benefits, 230–231
biological cultures
hESC, 226
hESCreg, 226
cell line procurement
donor consent, 231
UKSCB, 232, 233
description, 226, 253
functions of, 228
international coordination and future, 234
international regulation
considerations, balance, 257–258
donation, rules, 256
individual self-determination, respect,
258–260
privacy protection, 260–261
“mission drift”, 228
models, stem cell lines, 230
process standardization and culture
practice
cell line characterization, 232–233
standard operating procedures (SOPs),
232–233
quality
assurance component, 229–230
control, 229–230
supply challenges, cell lines, 233–234
tiered master-working-cell bank system, 227
UKSCB
goals, stakeholders, 228–229
governance, 229
principles, 228

Stem cell-based clinical translation, ethical aspects
medical innovation
description, 129–130
ethics, 131
hematopoietic progenitor cells, 130
moral theory, 131
therapeutic benefit, 130–131
variation, 130
research
clinical, 126
hESCs/iPSCs, 127
multipotent cells, 127–128
Phase III clinical trial, 128
Phase I, Phase II and Phase III, 126
pluripotent and multipotent transplants,
129
standard, 126
therapeutic misconception, 128
tumorigenesis, 129
unproven interventions
medical practice, 133
medical tourism, 132
online advertisements, 132–133

Stem cell-based therapies
clinical applications
embryonic, 104
fetal midbrain, 104
mesenchymal, 104
retinal pigment epithelium, 104
transplantation, risk
immunogenicity, 106–107
infections and, 105–106
tumorigenicity, 107–109

Stem Cell Network (SCN), 353

Stem cell research (SCR)
awareness/knowledge
levels, 349
upward mobility, 350
US and Canada, 349
perceptions, regulatory environment
Canada, 351
research governance, 350
primer
derivation, 342–343
regimes, regulatory, 344
regulatory activity, 343
somatic and embryonic cells, 342
somatic cell nuclear transfer (SCNT), 343
public opinion, 344–345
public trust and research
commercialization
biotechnology, 351
industry involvement, 354–355
Index

NCE, 352–353
objective, 355
patents, 354
“price”, 353–354
research ethos, 352
and SCN models, 353
trust, 355–357
support/opposition, public
attitudes, biotechnology, 346–347
consultation process, 348
funding, 347
HFEA poll, 348
hybrid embryo, 349
Pew study, 347–348
social controversy, 346

Stem cells and risks (Unruhe und Ungewissheit)
analysis, 425
decision types
epistemic uncertainty, 426–427
fact of irrationality, 427
paradigmatic, 425–426
toxicity testing, 427
fact of irrationality, 422
fibroblasts and ES cells, 424
GRNOPC1, 422–423
hematopoietic stem cell transplantation, 423
mathematics, 425
reprogramming, 424
time, pushing and tugging
decision situation, types, 428–429
hedonic adaptation, 427–428
risk assessment, 429

Stem cells application, neurodegenerative
disorders
approach
iPS technology, 5
PD vs. ALS patients, 4–5
stroke, 9–12
therapy
AD, 8–9
PD, 5–8
treatments and tourism, 4

Stem cells for safer medicines (SC4SM)
and CSCC, 278–280
intellectual property
categories, 277
policy, 278
intellectual property categories, 278
“Stem cell tourism”, 20–21

Stratified squamous epithelia (SSE). See also
Autologous epithelial stem cells,
SSE disorder
description, 45–46
ex vivo cell therapy, 47

Stroke
ischemic, 1
stem cell-based therapies
approaches, 10–11
challenges, 11–12
electrophysiological recordings, 8
MSCs and NSCs, 10
subventricular zone (SVZ), 11

Strotmann, A., 275
Stuart, T.E., 275
Sugarman, J., 125

T
Takahashi, K., 94
Tännsjö, T., 325
Taupitz, J., 115, 211
Teratocarcinomas and germ cell tumors
description, 37–38
embryonal carcinoma (EC) cell, 38
self-renew and differentiation, stem cell,
38–39
Teratomas, 107
The European Convention on Human Rights and
Fundamental Freedoms, 161–162
Thomson, J.A., 114, 269, 271, 311, 314
Thursby, M.C., 275
Till, J.E., 39
Torremans, P., 323
Torremans, P.L.C., 287
Transient amplifying (TA) cells, 46
“Transit amplifying cell”, 36–37

Translational SCR and stem cell-based therapies
departure, normative points
cost, 437–438
“human dignity”, 425
resources distribution, 437
diagram
easy and serious case, 443
health economy, 444
severity, condition, 443
doctor perspective, 434–435
health care and priorities
social needs, 434
treatment, cost-effectiveness, 433
increasing difficulty cases
different treatment, different diseases,
442
financing and allocation, resources,
442–443
horizontal priority setting, 441
same disease, different health care
systems, 441–442
medical tourism, risks and ethics, 439–440
Translational SCR and stem cell-based therapies (cont.)

priority-setting
and health care systems, 436
“vertical” and “horizontal”, 435
research
basic and applied, 433
criteria, reviewers, 432
European research funding, 433
resource allocation, 434
social justice aspects
fair access, 445,
ISSCR guidelines, 445
10/90 problem, 445–446
standards, 435
uncertainties and knowledge gaps
evidence, 440
interventions, 441
Parkinson’s disease, 440–441
values and norms, 444–445
variables/dimensions
medicine, 438
positive and negative effects, 438–439
public perceptions, 439

Translational stem cell research
animal use
biomedical research, 115
ethical issues, 117
experimentation, 116–117
UK, 116
cell biology and treatment outcomes, 114
cowpox, 138
ethical framework, decision-making
adapted and modified matrix, 122
cost-benefit analysis, 120
ethical matrix (EM), 120–121
hESC, toxicity screening, 115
human-animal interspecies embryos and chimeras, 115
informed consent, human
drug trials, 138–139
problems, 138
self determination, 138
on minors
consent validity, 146
therapeutic benefit, 145–146
therapeutic misconception (TM), 146
3Rs and animal use
cost-benefit assessment, 117
refinement and reduction, 118–119
replacement, 119–120
scrutinized procedures and products, 139
therapy features
clinical research and applications, 142

experimentation/attempt, 143
gene, 143–144
trials /attempt, 143
Web-contents, 142
Wiskott Aldrich Syndrome, 145
X-SCID, 144–145
without informed consent
children, 140–142
minimal risk, 142
minimal risk and burden, 140
minors benefit, 139
placebo-controlled trials, 141–142
risk-benefit assessment, 140

Triploid embryos, 314–315
Tumorigenicity
culture adaptation, 107–108
pluripotency-related tumors, 107
tumor-forming cell detection
fluorescence-assisted cell sorting (FACS), 108
immunocytochemistry, 108
polymerase chain reaction (PCR), 108–109
Turner’s syndrome, 70
Tyc, V., 427–428
Type 1 DM (T1D), 24
Type 2 DM (T2D), 24

U
UK Stem Cell Bank (UKSCB)
aims, 235
goals, stakeholders, 228–229
governance, 229
principles, 228

V
Vareman, N., 421
Varma, S., 140

W
Waddington, C.H., 273, 274
Walsh, J., 354
Walsh, J.P., 273
WARF. See Wisconsin Alumni Research Foundation
Watson, P., 365
Wedler, D., 140
Wen, B., 424
Williams, A.E., 391
Wilson, V., 115, 169
Winickoff, D.E., 268, 272
Wisconsin Alumni Research Foundation (WARF) decision, 305–306, 314
embryonic stem cell-related inventions, 299
“embryo,” term meaning, 302–303
industrial/commercial purposes
   definition, 304
   exploitation, invention, 305
   Rule 23 d(c), 305
stem cell materials, 271
stem cell patents, 272
use and research, meaning
   Enlarged Board, 301
   moral consensus, 302
“use of the embryo” definition
   exclusion, 303
   invention, 303–304
   non-procreative purposes, 304
Wiskott Aldrich syndrome, 145
World Federation of Culture Collections, 226–227
X
   X-linked disorder, 71–72
Y
   Yamanaka, S., 94, 114
   “Yuck factor”, 392, 394
Z
   Zarzeczny, A., 341
   Zinc Finger nucleases, 78