Subject Index

Allotransplantation, see Vascularized composite allotransplantation
Animal models, vascularized composite allotransplantation
anesthesia 117, 118
Chang Gung Memorial Hospital VCA Center 105
heterotopic osteomyocutaneous hind-limb flap
donor 118, 119
pearls 119
rat strains 115
rationale 115, 116
recipient 119
model design
evolution 121
general considerations 113, 114
immunosuppression 114
mystacial flap
rat strains 116
rationale 116, 117
operating room setup 117, 118
outcome measurements
clinical evaluation 119, 120
electron microscopy 121
functional magnetic resonance imaging 120
ultrasound biomicroscopy 120, 121
overview 112, 113
surgical personnel 114, 115
Appendix flap
esophageal reconstruction 29
urethra reconstruction 30
vaginal reconstruction 31
Biliary tract, food reflux 33, 34
Bladder, reconstruction 30
Bone marrow transplantation, see Tolerance induction
BPI, see Brachial plexus injury
Brachial plexus injury (BPI)
anatomy 2
classification
level I 3, 4
level II 4
level III 4
level IV 4
overview 2, 3
microsurgical reconstruction outcomes 4, 5
Breast cancer, reconstruction surgery
overview 18, 19
transverse rectus abdominis mycutaneous flap 19–21
Buccal mucosa, reconstructive surgery in cancer 14, 32, 41
Chang Gung Memorial Hospital VCA Center
animal models 105
challenges 109, 110
foundation 104
goals 108, 109
mock surgery 107
successes 108
team development 104–107
Chimerism
imaging 151
mixed chimerism
hematopoietic stem cell derivation from induced pluripotent stem cells for generation 167, 168
tolerance induction 125, 126
Chylous ascites, vascularized lymphatic cable management 33
Computed tomography (CT)
muscle imaging 153
rejection and tolerance imaging 148
vessel imaging 153
CT, see Computed tomography
DC, see Dendritic cell
Dendritic cell (DC), tolerogenic dendritic cell
derivation from induced pluripotent stem cells 168, 169
therapy for tolerance induction 136, 137
Digital subtraction angiography (DSA)
rejection and tolerance imaging 148
vessel imaging 153
DSA, see Digital subtraction angiography
Epiglottis, reconstructive surgery 32
Esophageal reconstruction
appendix flap 29
epiglottis 32
ileocolon flap 25–27
jujena flap 24, 25
surgical anatomy and technique 27–29
voice 24, 29
Facial palsy, functioning free muscle transplantation
one-staged reconstruction 8–10
outcome assessment 10
overview 5, 6
postoperative care 8
two-staged reconstruction 6–8
Facial transplantation (FT)
complications 99
functional outcomes 96, 97
historical perspective 93, 94
immunosuppression 98, 99
indications 94
patient selection 94
prospects
donor pool expansion 100
graft monitoring 100, 101
graft preservation 100
immunosuppression 100
outcome reporting 101
technique 94–96
vascularized composite allotransplantation 42
FFMT, see Functioning free muscle transplantation
Fluorescence imaging
muscle imaging 153
neuronal regeneration imaging 152
rejection and tolerance imaging 148–151
vessel imaging 153
FT, see Facial transplantation
Functioning free muscle transplantation (FFMT)
brachial plexus injury 2–4
facial palsy
one-staged reconstruction 8–10
outcome assessment 10
overview 5, 6
postoperative care 8
two-staged reconstruction 6–8
Groin flap, toe-to-hand surgery 47
Hand transplantation, see also Toe-to-hand surgery
reconstruction of hand 47, 48
upper extremity allotransplantation
restoration
bone 52
nerves 52
tendons 52
vessels 52
vascularized composite allotransplantation
challenges 53
historical perspective 48–50
immune modulation and tolerance
induction 90
immunosuppression 50, 51, 81–83
indications 83, 84
IRB approval 51
outcomes 52, 53, 80–83
patient selection 83, 84
prospects 53, 90
technique
donor operation 84, 85
overview 51, 52
recipient operation 85–89
Head and neck cancer, reconstructive surgery
allotransplantation
larynx 41, 42
mandibular reconstruction 38–40
mid-face reconstruction 40
oral cavity and mucosa 40, 41
vascularized composite
allotransplantation 42
autologous transplantation limitations 38, 43
buccal mucosa 14
mandible 16, 17
maxilla and oral cavity 13, 14
sculpt 13
tongue 15
Hematopoietic stem cell (HSC), derivation from induced pluripotent stem cells and mixed chimerism generation 167, 168
HSC, see Hematopoietic stem cell
Ileocolon flap, esophageal reconstruction 25–27
Induced pluripotent stem cell (iPSC) culture 166
hematopoietic stem cell derivation and mixed chimerism generation 167, 168
nerve regeneration studies 167
prospects for study in vascularized composite allotransplantation 169, 170
tolerogenic dendritic cell derivation 168, 169
wound healing studies 166
iPSC, see Induced pluripotent stem cell
Jujenal flap
esophageal reconstruction 24, 25
palate and oral mucosa reconstruction 32
vaginal reconstruction 30, 31
Larynx, reconstruction 41
Macrophage, activated macrophage imaging 150, 151
Magnetic resonance imaging (MRI)
avantages and limitations in vascularized composite allotransplantation imaging 146, 147
functional magnetic resonance imaging of vascularized composite allotransplantation
animal models 120
clinical studies 152, 153
muscle imaging 153
rejection and tolerance imaging 148, 150, 151
vessel imaging 153
Magnetoencephalography (MEG), vascularized composite allotransplantation studies 153
Maxilla, reconstructive surgery in cancer 13, 14
MEG, see Magnetoencephalography
Mesenchymal stem cell (MSC), tolerance induction 137–139, 141
MicroRNA
diagnostic applications in vascularized composite allotransplantation
advantages as noninvasive biomarkers 159, 160
expression and allograft status 159
skin biopsy monitoring 158, 159
expression in vascularized composite allotransplantation 160, 161
immune modulation mechanisms 157, 158
prospects for study in vascularized composite allotransplantation 162, 163
therapeutic targeting in vascularized composite allotransplantation 162
MRI, see Magnetic resonance imaging
MSC, see Mesenchymal stem cell
Near infrared spectroscopy (NIRS), muscle imaging 153
NIRS, see Near infrared spectroscopy
OCT, see Optical coherence tomography
Optical coherence tomography (OCT) neuronal regeneration imaging 152
rejection and tolerance imaging 148
vessel imaging 153
Organ transplantation, vascularized composite allotransplantation comparison
allocation criteria 57, 58
immunology 58, 59
immunosuppression 60–63
indications 56, 57
long-term immunological results 63, 64
Palate, reconstructive surgery 32
PET, see Positron emission tomography
Positron emission tomography (PET) muscle imaging 153
rejection and tolerance imaging 148
Regulatory T cell (Treg), tolerance induction studies 139–141
Sarcoma, reconstructive surgery in extremities 17, 18
Scalp, reconstructive surgery in cancer 13
Single-photon emission computed tomography (SPECT)
rejection and tolerance imaging 148, 150
vessel imaging 153

Solid organ transplantation, see Organ transplantation
SPECT, see Single-photon emission computed tomography

Tissomics, vascularized composite allotransplantation studies 154, 155

Toe-to-hand surgery
allotransplantation 36, 37
groin flaps 47
hand function overview 45, 46
options 47
prostheses 46
reconstruction of hand 47, 48

Tolerance induction
cell migration in graft acceptance 125
cell therapy
 combination of cells 141
 mesenchymal stem cells 137–139
 prospects 141, 142
 regulatory T cells 139–141
tolerogenic dendritic cells 136, 137
hand allotransplantation 90
lymphocyte response 126
mixed chimerism 125, 126
vascularized bone marrow transplantation
clinical studies 131
experimental evidence 127
hematopoietic stem cell niche 128, 129
historical perspective 126, 127
mouse model 129–131
prospects 131

Tolerogenic dendritic cell, see Dendritic cell

Tongue, reconstructive surgery in cancer 15
Trachea, reconstructive surgery 34
TRAM flap, see Breast cancer
Treg, see Regulatory T cell

Upper extremity transplantation, see Hand transplantation
Ureter, reconstruction 30
Urethra, reconstruction 30

Vaginal reconstruction
appendix flap 31
jejunal flap 30, 31

Vascularized bone marrow transplantation, see Tolerance induction
Vascularized composite allotransplantation (VCA)
animal models, see Animal models,
vascularized composite allotransplantation
clinical program development, see also
Chang Gung Memorial Hospital VCA Center
donor evaluation 73
IRB protocol 72
ongoing care
 funding 75–77
 patient education and support 75
organ procurement organizations 72, 73
overview 67, 68
publication 77
recipient evaluation
 informed consent 75
 medical evaluation 73–75
 patient selection criteria 75, 76
 psychological evaluation 75
team composition
 administrative staff 71
 coordinator 70
 ethics committee member 70
 internist 70
 leader 68
 media representative 70, 71
 physical therapist 71
 psychiatrist 69
 social worker 71
 speech therapist 71
 surgical team 69
 training staff 71
 transplant surgeon 69

face 42
hand transplantation
 challenges 53
 historical perspective 48–50
 immune modulation and tolerance induction 90
 immunosuppression 50, 51, 81–83
 indications 83, 84
 IRB approval 51
 outcomes 52, 53, 80–83
 patient selection 83, 84
 prospects 53, 90
 technique
donor operation 84, 85
overview 51, 52
recipient operation 85–89
imaging, see specific techniques
induced pluripotent stem cell studies, see
   Induced pluripotent stem cell
microRNA studies, see MicroRNA
organ transplantation comparison
   allocation criteria 57, 58
   immunology 58, 59
immunosuppression 60–63
indications 56, 57
long-term immunological results 63, 64
tolerance induction, see Tolerance induction
VCA, see Vascularized composite allotransplantation
Voice, see Esophageal reconstruction