

# Index

- activins, 135  
 ADAMTS 8, 51  
 American Society of  
   Reproductive Medicine (ASRM), physical  
   activity guidelines  
   of, 130  
 androgen receptors, in PCOS,  
   190,  
 androstenedione, 3  
 aneuploidy, embryo,  
   177–179  
 angiogenesis, in ectopic  
   pregnancies, 136–137  
 antiphospholipid syndrome  
   (APS), 169, 170–171,  
   175, 176–177  
 anti-tumor necrosis factor  
   (anti-TNF), 148  
 apposition, 14–15  
 APS. *See* antiphospholipid  
   syndrome  
 aromatase inhibitors, 187, 193  
 ART. *See* assisted reproductive  
   technology  
 aspiration, of uterine fluid, 23  
 aspirin, 171–172  
 ASRM. *See* American Society of  
   Reproductive Medicine  
 assisted reproductive  
   technology (ART). *See*  
   *also* embryo transfer;  
   in-vitro fertilization  
   advancements in, freeze-  
   only approach, 119–120  
   endometrial factor  
   evaluation in, 34–35  
   estrogen and progesterone  
   support in, 65–66, 70  
   assessing alterations in  
   WOI, 69–70  
   estrogen in IVF, 68  
   progesterone in IVF,  
   66–68  
   supplementation in  
   frozen-thawed, donor-  
   recipient, and  
   gestational carrier  
   cycles, 68–69  
   glucocorticoids in, 165  
   immune therapies used in  
   (See immune therapies)  
   NK cell measurement in,  
   145–146  
   PCOS and, 187–189, 194  
   optimizing endometrial  
   health in, 192–194  
   uterine microbiome impact  
   in, 60–62  
 attachment, 14–15  
   endometrial epithelial  
   remodelling for, 10–12  
 bacteria. *See* microbiome  
 bed rest, after ET. *See* physical  
   activity  
 biomarkers. *See also* genetic  
   markers  
   of endometrial receptivity,  
   28–29  
   blood, urine and saliva, 25  
   future of, 25–26  
   identification of, 21  
   requirements of, 20–21  
   in superovulation cycles,  
   45–48  
   tissue, 21–23  
   uterine fluid, 23–25  
   IVIg treatment selection by,  
   163, 164  
 biopsy, endometrial. *See*  
   endometrial scratch  
 biosensor, decidua as, 181–183  
 blastocyst  
   apposition of, 14–15  
   implantation of, 6–7, 10  
   regulation of, 16–17  
 blastocyst embryo transfer,  
   91–92  
   advantages of  
   better embryo selection,  
   increased implantation  
   and pregnancy rates, 93  
   endometrial  
   synchronicity, 93  
   PGD and PGS, 94  
   reduction in multiple  
   pregnancy rates, 94  
   timely exposure to uterine  
   environment, 93  
   disadvantages of  
   altered sex ratio, 97, 98  
   cycle cancellation, 94  
   obstetric and perinatal  
   outcomes, 95–98  
   reduced rates of embryo  
   cryopreservation, 95  
   discussion and conclusions,  
   98–100, 101  
 blood, endometrial receptivity  
   biomarkers in, 25  
 catheters  
   implantation success and,  
   109, 116  
   optimization of ET  
   technique, 115–116  
   outcomes with different  
   catheters, 111–113,  
   114–115  
   types of catheters,  
   109–111  
   operator role in success of,  
   114–115  
   trauma caused by, 109,  
   110–111  
 CD cells, in ectopic  
   pregnancies, 136  
 CE. *See* chronic endometritis  
 chorioamnionitis, 59  
 chronic endometritis (CE), 60  
 ciliary beat activity, in ectopic  
   pregnancy, 132  
 cleavage stage embryo transfer,  
   91–92  
   blastocyst advantages  
   compared with, 92–94  
   blastocyst disadvantages  
   compared with, 94–98  
   discussion and conclusions,  
   98–100, 101  
 clomiphene citrate, 187, 193  
 coagulation, implantation  
   failure and, 169  
   aspirin for, 171–172  
   heparin for, 169–171  
 co-expression networks, 33

- congenital anomalies, in  
blastocyst embryo  
transfer, 96
- contraceptives, for PCOS, 192
- controlled ovarian stimulation.  
*See* ovarian stimulation
- Cook catheter, 113, 114, 115–116
- corpus luteum, 4, 5  
during implantation, 6
- corticosteroids. *See*  
glucocorticoids
- cryopreservation, embryo, 95,  
119–120
- cycle cancellation, 94
- dating, endometrial. *See*  
endometrial dating
- decidualization of stromal cells,  
7, 13  
in early pregnancy  
embryo quality control  
and, 181–183  
endometrial plasticity  
and, 183  
pathways of, 179–180  
WOI and, 180–181  
in PCOS, 190  
in RPL, 183–184  
trophoblast invasion and,  
15–16
- delayed embryo transfer. *See*  
freeze-only approach
- DET. *See* dummy embryo  
transfer
- dexamethasone, 147
- DG. *See* dystroglycan
- Dickkopf-related protein 1  
(DKK-1), 47–48
- donor-recipient cycles,  
estrogen and  
progesterone  
supplementation in,  
68–69
- drug response models, 33
- dummy embryo transfer  
(DET), 104, 106  
in clinical practice, 105  
as research tool, 105–106  
technique optimization  
using, 115  
as training tool, 106
- dystroglycan (DG), 12
- early pregnancy loss, 173–174.  
*See also* recurrent  
pregnancy loss
- in blastocyst embryo  
transfer, 98
- E-cadherin, in ectopic  
pregnancies, 135
- ECF. *See* endometrial cavity  
fluid
- ectopic pregnancies, 137  
embryo controlled factors  
in, 137  
hCG levels in, 137  
maternal factors in, 131  
tubal immune cell–embryo  
interaction role in  
CD cells, 136  
intra-epithelial  
lymphocytes, 136  
naturally occurring  
peptides, 136  
tubal microenvironment  
role in  
activins, 135  
E-cadherin, 135  
HOXA 10, 135  
integrins, 133–134  
interleukins, 135  
LIF, 134  
MUC 1, 134  
trophinin, 134  
uteroglobin, 134  
tubal smooth muscle and  
epithelium role in, 132  
ciliary beat activity, 132  
smooth muscle  
contractility, 132–133  
tubal-embryo interactions  
and angiogenesis role  
in, 136  
PIGF, 137  
VEGF, 136
- elafin, 136
- embryo  
aneuploidy of, 177–179  
cryopreservation of, 95,  
119–120  
decidua response to quality  
of, 16, 181–183  
in ectopic pregnancies  
factors controlled by, 137  
tubal immune cell  
interaction with, 136  
tubal-embryo interactions  
and angiogenesis,  
136, 137  
endometrial interaction with  
apposition and  
attachment, 14–15
- blastocyst regulation of,  
16–17  
stroma invasion, 15–16  
genomic instability in,  
177–178  
implantation of (*See*  
implantation)  
selection of, 93, 178–179
- embryo transfer (ET)  
blastocyst stage (*See*  
blastocyst embryo  
transfer)  
catheter role in (*See*  
catheters)  
cleavage stage (*See* cleavage  
stage embryo transfer)  
difficulty of, 104, 114–115  
dummy (*See* dummy embryo  
transfer)  
endometrial scratch before,  
77–79  
freeze-only approach to (*See*  
freeze-only approach)  
operator role in success of,  
114–115  
physical activity after (*See*  
physical activity)  
seminal fluid exposure  
effects on, 153–155  
technique optimization for  
dummy transfer, 115  
fixed distance, 115  
ultrasound guidance,  
115–116  
timing of, 19 (*See also*  
endometrial dating)  
traumatic, 109, 110–111  
uterine microbiome  
screening prior to (*See*  
uterine microbiome)
- endocannabinoids, in ectopic  
pregnancy, 133
- endometrial cavity fluid  
(ECF), 61
- endometrial cycle, 1–2, 7, 43–44
- endometrial receptivity  
changes during, 28–29
- follicular phase regulation,  
1, 3–4
- follicular phase repair, 4
- luteal phase haemostasis, 5–6
- luteal phase regulation,  
1, 4–5
- endometrial dating  
assessing WOI alterations in  
ART, 69–70

- histology, 28  
transcriptome, 39–40
- endometrial plasticity, 183, 184
- endometrial polyps, 88  
hysteroscopy in, 75  
management algorithm for, 88–89
- endometrial preparation  
for frozen embryo transfer, 122–123
- immune therapies (*See* immune therapies)
- endometrial receptivity, 19–20  
biomarkers of (*See* biomarkers)
- blastocyst synchronicity  
with, 93
- endometrial scratch for  
improvement of, 77–79
- genetic markers of (*See* genetic markers)
- hysteroscopy for  
improvement of (*See* hysteroscopy)
- immune response role in  
(*See* immune response)
- implantation failure and, 73, 79
- ovarian stimulation impact  
on (*See* ovarian stimulation)
- superovulation effects on  
(*See* superovulation)
- testing for, 20
- WOI and, 28, 29, 34–35
- Endometrial Receptivity  
Analysis (ERA), 37–40, 69–70
- endometrial scratch, 77–79
- endometriosis, 60
- endometritis, 60
- endometrium  
decidualization of (*See* decidualization)
- embryo interaction with  
apposition and  
attachment, 14–15
- blastocyst regulation of, 16–17
- stroma invasion, 15–16
- epithelial remodelling of, 10–12
- histology of, 2–3  
dating with, 28  
in superovulation cycles, 45–48
- implantation in (*See* implantation)
- microbiota of, 57–59 (*See also* uterine microbiome)
- in PCOS (*see* polycystic ovary syndrome)
- proliferative, 28–29
- secretory, 28–29
- structure of, 2–3
- superovulation effects on  
(*See* superovulation)
- vascular supply to, 2–3
- fibroid impact on, 85
- in superovulation  
cycles, 48
- epigenetic changes, in  
blastocyst embryo  
transfer, 97–98
- epithelial remodelling, for  
embryo attachment
- glycocalyx remodelling, 11–12
- ion channel activation, 12
- plasma membrane  
transformation, 10–11
- ERA. *See* Endometrial  
Receptivity Analysis
- ErbB 4, 15
- Erlangen catheter, 111
- estradiol  
in IVF, 68  
in superovulation cycles, 45, 46, 65–66
- estrogen  
during follicular phase, 1, 3–4  
during luteal phase, 1, 4–5  
in PCOS, 189–190  
in superovulation cycles, 45
- support in ART, 65–66, 70
- assessing alterations in  
WOI, 69–70
- in frozen-thawed,  
donor-recipient, and  
gestational carrier  
cycles, 68–69
- in IVF, 68
- ET. *See* embryo transfer
- ethinyl estradiol, for PCOS, 192
- exercise. *See* physical activity
- exosomes, in uterine fluid, 14
- extracellular vesicles, in uterine  
fluid, 14
- ezrin, 11
- Fallopian tube, pregnancy in.  
*See* ectopic pregnancies
- female reproductive cycle,  
1–2, 7
- follicular phase, 2  
endometrial repair  
during, 4  
hormonal regulation  
during, 1, 3–4
- implantation, 6–7
- luteal phase, 2  
endometrium during, 5–6  
hormonal regulation  
during, 1, 4–5
- female reproductive tract,  
microbiome of, 55–57
- lower tract, 57
- upper tract, 57
- uterine (*See* uterine  
microbiome)
- fertility, seminal fluid as  
determinant of, 156
- fetal membranes, microbiota  
of, 59–60
- fetus, immune response to,  
143–145
- fibroids. *See* uterine fibroids
- fixed distance technique, 115
- follicle-stimulating  
hormone (FSH)  
during follicular phase,  
1, 3–4  
during luteal phase, 1, 5
- follicular phase, 2  
endometrium during, 4  
hormonal regulation of,  
1, 3–4
- freeze-only approach, 118, 123
- indications for, 123
- optimal endometrial  
preparation for,  
122–123
- for PCOS, 193
- potential benefits of,  
120–121
- potential risks of, 121–122
- rationale for  
clinical and laboratory  
ART advancements,  
119–120
- peri-conception milieu of  
stimulated cycles,  
118–119
- frozen-thawed cycles, estrogen  
and progesterone  
supplementation in,  
68–69
- Frydman catheter, 113, 114

- FSH. *See* follicle-stimulating hormone
- functional analysis, 33
- G-CSF. *See* granulocyte colony stimulating factor
- gene co-expression networks, 33
- gene set enrichment analysis (GSEA), 33
- genetic abnormalities, in blastocyst embryo transfer, 97–98
- genetic markers, of endometrial receptivity, 28–29  
clinical application of, 39–40  
evaluation in ARTs, 34–35  
future of, 40  
genomic approaches in medicine, 31–33  
genomic markers, 35–37  
genomics and precision medicine, 29–31  
in superovulation cycles, 45–48  
transcriptomic predictors (*See* transcriptomic predictors)
- genetic testing, pre-implantation, 94, 120
- genomic instability, in human embryos, 177–178
- genomic markers, of endometrial receptivity, 35–37
- genomics and genomic medicine, 29–31  
functional analysis, network modelling and drug response models, 33  
future of, 40  
transcriptomic predictors (*See* transcriptomic predictors)
- gestational carrier cycles, estrogen and progesterone supplementation in, 68–69
- gestational disorders, seminal fluid impact on, 155–156
- glucocorticoids, 147, 148, 165  
in ART, 165  
in RIF, 165–166
- GLUT-4, in PCOS, 190
- glycocalyx, remodelling for embryo attachment, 11–12
- glycodelin, 46–47, 85
- gonadotropin-releasing hormone (GnRH), 3
- granulocyte colony stimulating factor (G-CSF), 148, 149
- GSEA. *See* gene set enrichment analysis
- HB-EGF. *See* heparin-binding EGF-like growth factor
- hCG. *See* human chorionic gonadotropin
- heparin, 169–171
- heparin-binding EGF-like growth factor (HB-EGF), 15
- histology, endometrial, 2–3  
dating with, 28  
in superovulation cycles, 45–48
- homeobox protein A10 (HOXA10), 85, 135
- hormonal regulation, 1–2, 7  
during follicular phase, 1, 3–4  
during implantation, 6–7  
during luteal phase, 1, 4–5  
in PCOS, 189–190
- hormonal treatment, for PCOS, 192
- HOXA 10. *See* homeobox protein A10
- HSC 70, 16
- Hughes Syndrome. *See* antiphospholipid syndrome
- human chorionic gonadotropin (hCG)  
in ectopic pregnancies, 137  
as embryo fitness signal, 178  
endometrial effects of, in superovulation cycles, 48–49, 50  
during implantation, 6  
LH compared with, 48–49  
in OHSS, 120
- human microbiome. *See* microbiome
- hysteroscopy, for improving endometrial receptivity, 73–74, 79
- endometrial polyps, 75
- major uterine cavity abnormalities, 75
- normal ultrasound uterine cavity, 74
- submucosal fibroids, 75–76, 84, 87–88
- uterine septum, 76–77
- ICCs. *See* interstitial cells of Cajal
- IGF, in PCOS, 190
- IGFBP-1, in PCOS, 190
- immune response. *See also* natural killer cells  
in ectopic pregnancies, 136  
to fetus and placenta, 143–145  
in PCOS, 191–192  
sexual activity effects on (*See* sexual activity)
- immune therapies, 146, 159–160, 166–167  
anti-TNF, 148  
G-CSF, 148, 149  
glucocorticoids, 147, 148, 165  
in ART, 165  
in RIF, 165–166
- Intralipid, 147, 148, 166
- IVIg (*See* intravenous immunoglobulin)
- implantation, 6–7  
blastocyst embryo transfer advantages for, 93  
cascades involved in, 10  
catheter role in success of, 109, 116  
optimization of ET technique, 115–116  
outcomes with different catheters, 111–113, 114–115  
types of catheters, 109–111
- coagulation activation in, 169  
aspirin for, 171–172  
heparin for, 169–171
- embryo-endometrial interaction during apposition and attachment, 14–15  
blastocyst regulation of, 16–17  
stroma invasion, 15–16

- endometrial epithelial remodelling for, 10–12
- failure of
- endometrial receptivity and, 73, 79
  - transcriptomic predictors in, 37–39
- NK cell role in, 143–145
- stromal cell decidualization for, 13
- superovulation effects on, 44–45
- uterine fluid
- microenvironment at, 13–14
- imprinting disorders, in
- blastocyst embryo transfer, 97–98
- inflammation
- in PCOS, 191–192
  - in RPL, 183
  - in superovulation cycles, 48
- inhibin, 1, 3–4, 5
- injury, endometrial. *See* endometrial scratch
- insulin signaling, in PCOS, 190
- integrins, 15
- as biomarkers of endometrial receptivity, 22
  - in ectopic pregnancies, 133–134
- intercourse. *See* sexual activity
- interleukins, in ectopic pregnancies, 135
- interstitial cells of Cajal (ICCs), in ectopic pregnancy, 132–133
- intra-epithelial lymphocytes, in ectopic pregnancies, 136
- Intralipid, 147, 148, 166
- intramural fibroids, 86–87
- intrauterine adhesive disease, 70
- intravenous immunoglobulin (IVIg), 146–147, 148, 160, 164
- clinical studies in RIF, 160–162
  - cost effectiveness analysis of, 164
  - selection by immune biomarkers, 163, 164
  - shortcomings in studies of, 162–163
- in-vitro fertilization (IVF)
- assessing alterations in WOI after, 69–70
  - estrogen in, 68
  - immune therapies in (*See* immune therapies)
  - progesterone in, 66–68
  - seminal fluid exposure effects on, 153–155
- ion channels, activation for embryo attachment, 12
- IVF. *See* in-vitro fertilization
- IVIg. *See* intravenous immunoglobulin
- killer-like immunoglobulin receptors (KIRs), 143–144, 145, 149
- large for gestational age babies, in blastocyst embryo transfer, 97–98
- lavage, uterine, 23
- leiomyomata. *See* uterine fibroids
- letrozol, 187, 193
- leukaemia inhibitory factor (LIF)
- in ectopic pregnancies, 134
  - fibroid impact on, 85
  - in superovulation cycles, 46–47
- LH. *See* luteinizing hormone
- LH/CG receptor, hCG-induced
- down-regulation of, 48–49, 50
- LIF. *See* leukaemia inhibitory factor
- life style interventions, for PCOS, 192
- lipid emulsion, 147, 166
- low molecular weight heparin (LMWH), 169–171
- L-selectin, 14–15
- luteal phase, 2
- endometrium during, 5–6
  - hormonal regulation during, 1, 4–5
- luteinizing hormone (LH)
- during follicular phase, 1, 3–4
  - hCG compared with, 48–49
  - during luteal phase, 1, 4–5
- lymphocytes. *See also* natural killer cells; T cells
- in ectopic pregnancies, 136
- magnetic resonance guided focused ultrasound surgery (MRgFUS), 87
- magnetic resonance imaging (MRI), of uterine fibroids, 83–84
- menstrual cycle. *See* endometrial cycle
- menstruation
- decidualization and, 183
  - endometrial repair after, 4
  - as evolutionary adaptation, 178–179
  - progesterone withdrawal leading to, 5–6
- metformin, for PCOS, 193, metropathy, 77
- microbiome
- female reproductive tract, 55–57
  - lower, 57
  - upper, 57
  - uterine (*See* uterine microbiome)
- microRNA, implantation regulation by, 16–17
- microvesicles, in uterine fluid, 14
- mid-secretory phase, histological criteria for, 28
- miscarriage, 173–174. *See also* recurrent pregnancy loss
- in blastocyst embryo transfer, 98
- mock embryo transfer. *See* dummy embryo transfer
- monozygotic twinning, 95–96
- mosaic embryos, 177–178
- MRgFUS. *See* magnetic resonance guided focused ultrasound surgery
- MRI. *See* magnetic resonance imaging
- mucin 1 (MUC1), 11–12
- in ectopic pregnancies, 134
- embryo removal of, 15
- multiple pregnancies, blastocyst embryo transfer for reduced rates of, 94
- myomectomy, for uterine fibroids, 86, 87–88

Naples study, on physical activity after ET, 128  
 National Institute of Clinical Excellence (NICE), physical activity guidelines of, 129  
 natural killer (NK) cells, 142–143  
   future directions for, 149  
   immune therapies targeting (See immune therapies)  
   implantation role of, 143–145  
   measurement of, 145–146  
   in PCOS, 191  
 Netherlands study, on physical activity after ET, 129  
 network medicine, 30  
 network modelling, 33  
 NICE. *See* National Institute of Clinical Excellence  
 nitric oxide (NO), in ectopic pregnancy, 133  
 NK cells. *See* natural killer cells  
 NO. *See* nitric oxide  
 Noyes criteria, 28  
  
 obesity, in PCOS, 187, 189, 192  
 obstetric outcomes, in blastocyst embryo transfer, 95–98  
 OHSS. *See* ovarian hyperstimulation syndrome  
 operator dependence, in embryo transfer success, 114–115  
 ovarian hyperstimulation syndrome (OHSS), 48, 120, 187–189  
 ovarian stimulation  
   assessing alterations in WOI after, 69–70  
   endometrial effects of, 45, 65–66, 118–119  
   clinical implications of, 50–51  
   hCG effects, 48–49, 50  
   histological, transcriptomic and proteomic studies of, 45–48  
   endometrial receptivity and, 19–20  
 ovulation, hormonal regulation of, 1, 3–4

P5 medicine, 31  
 PCOS. *See* polycystic ovary syndrome  
 peptides, in ectopic pregnancies, 136  
 perinatal outcomes, in blastocyst embryo transfer, 95–98  
 personalized medicine, 30  
 PGD. *See* pre-implantation genetic diagnosis  
 PGS. *See* pre-implantation genetic screening  
 PGT. *See* pre-implantation genetic testing  
 physical activity, after ET, 127, 130  
   ASRM 2017 guidelines on, 130  
   benefits of exercise in ART, 129  
   in early years of ART, 128  
   Naples study on, 128  
   Netherlands study, Cochrane Database Systematic Review on, 129  
   NICE 2017 guidelines on, 129  
 placenta  
   immune response to, 143–145  
   microbiota of, 59–60  
 placenta growth factor (PLGF), in ectopic pregnancies, 137  
 plasma membrane transformation, for embryo attachment, 10–11  
 plasticity, endometrial. *See* endometrial plasticity  
 PLGF. *See* placenta growth factor  
 polycystic ovary syndrome (PCOS)  
   abnormalities of, 189, ART and, 187–189, 194  
   IGF, IGFBP-1 and GLUT-4 in, 190  
   inflammation and immune cells in, 191–192  
   optimizing health in, 192–194  
   steroid hormone receptors in, 189–190

polypectomy, 75  
 polyps, endometrial. *See* endometrial polyps  
 precision medicine, 29–31  
 prednisolone, 147, 165  
   in ART, 165  
   in RIF, 165–166  
 pre-eclampsia, 59, 155–156  
 pregnancy  
   blastocyst embryo transfer rates of, 93  
   decidualization role in decidual pathway, 179–180  
   embryo quality control and, 181–183  
   endometrial plasticity and, 183  
   WOI and, 180–181  
   ectopic (See ectopic pregnancies)  
   loss of, 173–174 (See also recurrent pregnancy loss)  
   multiple, blastocyst embryo transfer for reduced rates of, 94  
   uterine microbiome impact in, 59–60  
 pre-implantation genetic diagnosis (PGD), 94  
 pre-implantation genetic screening (PGS), 94  
 pre-implantation genetic testing (PGT), 94, 120  
 premature rupture of membranes, 59  
 preovulatory phase. *See* follicular phase  
 preterm birth (PTB), 59–60, 95  
 primary follicles, 1, 3–4  
 progesterone  
   in decidualization, 13  
   in endometrial haemostasis, 5–6  
   in endometrial repair, 4  
   during follicular phase, 3–4  
   during implantation, 6  
   during luteal phase, 1, 4–5  
   in PCOS, 189–190  
   in superovulation cycles, 45  
   support in ART, 65–66, 70  
   assessing alterations in WOI, 69–70



- in frozen-thawed, donor-recipient, and gestational carrier cycles, 68–69
  - in IVF, 66–68
- progesterin, for PCOS, 192
- prokinectins (PROK), in
  - ectopic pregnancy, 133
- proliferative endometrium, 28–29
- proteomic studies
  - of endometrial receptivity biomarkers, 21
  - blood, urine and saliva, 25
  - future of, 25–26
  - tissue, 21–23
  - uterine fluid, 23–25
- of superovulation cycles, 45–48
- PTB. *See* preterm birth
- receptivity, endometrial. *See* endometrial receptivity
- recurrent implantation failure (RIF), 159–160
  - glucocorticoids in, 165–166
  - hysteroscopy for, 74
  - immune disturbances causing, 159–160
- Intralipid in, 166
- IVIg in, 160, 164
  - clinical studies in RIF, 160–162
- cost effectiveness analysis of, 164
- selection by immune biomarkers, 163, 164
- shortcomings in studies of, 162–163
- transcriptomic predictors in, 37–39
- uterine microbiome role in, 61–62
- recurrent pregnancy loss (RPL), 159–160, 173–174
  - aberrant decidualization in, 183–184
  - clinical criteria for, 173–174
  - clinical perspective on, 184–185
  - embryo genomic instability and, 177–178
  - immune disturbances causing, 159–160
- intrinsic and extrinsic
  - embryo selection and, 178–179
- medical intervention for, 176–177
- risk factors and perceived causation of, 174–177
- uterine microbiome role in, 61–62
- WOI in, 183
- regulatory T cells, 152
- reproductive cycle. *See* female reproductive cycle
- reproductive tract. *See* female reproductive tract
- rest, after ET. *See* physical activity
- RIF. *See* recurrent implantation failure
- Rocket catheter, 115–116
- RPL. *See* recurrent pregnancy loss
- saliva, endometrial receptivity biomarkers in, 25
- scratching, endometrial. *See* endometrial scratch
- secretory endometrium, 28–29
- secretory leukocyte protease inhibitor (SLPI), in
  - ectopic pregnancies, 136
- selective estrogen receptor modulator (SERM), for PCOS, 193
- seminal fluid
  - as fertility determinant, 156
  - gestational disorders impact of, 155–156
  - immune receptivity and, 151–153
  - IVF/ET conception rate effects of, 153–155
- septate uterus, 76–77
- SERM. *See* selective estrogen receptor modulator
- serum, endometrial receptivity biomarkers in, 25
- sex ratio, in blastocyst embryo transfer, 97, 98
- sex steroids, 1–2, 7
  - during follicular phase, 1, 3–4
  - during implantation, 6–7
  - during luteal phase, 1, 4–5
  - in PCOS, 189–190
- in superovulation cycles, 45, 65–66
- sexual activity, immune receptivity and, 151, 156–157
- seminal fluid composition as fertility determinant, 156
- seminal fluid effects on IVF/ET conception rates, 153–155
- seminal fluid impact on gestational disorders, 155–156
- seminal fluid signalling, 151–153
- SLPI. *See* secretory leukocyte protease inhibitor
- smoking, 192
- smooth muscle contractility, in
  - ectopic pregnancy, 132–133
- soluble factors, in uterine fluid, 13–14
- stem cells, endometrial
  - plasticity and, 183, 184
- steroid hormone receptors, in PCOS, 189–190
- stimulated cycles. *See* ovarian stimulation
- stratified medicine, 30
- stroma, embryo invasion of, 15–16
- stromal cells, decidualization of. *See* decidualization of stromal cells
- submucosal fibroids, 75–76, 84, 87–88
- subserosal fibroids, 86
- superfertility, 175–177, 183
- superovulation
  - assessing alterations in WOI after, 69–70
  - endometrial effects of, 43–44, 65–66, 118–119
  - clinical implications of, 50–51
  - in controlled ovarian stimulative cycles, 45
  - hCG effects, 48–49, 50
  - histological, transcriptomic and proteomic studies of, 45–48
  - receptivity and implantation, 44–45

204	Index	
superovulation (cont.) peri-conception milieu of, 118–119 systems biology, 30 systems medicine, 31  T cells, 142–143, 152 tamoxifen, for PCOS, 193 TDT catheter, 113 thrombophilia, 169, 175, 176–177 tissue, endometrial receptivity biomarkers in, 21–23 Tomcat catheter, 113, 115 transcriptomic predictors, 31–33 clinical application of, 39–40 in endometrial receptivity, 37–39 in superovulation cycles, 45–48 traumatic embryo transfer, 109, 110–111 trial embryo transfer. <i>See</i> dummy embryo transfer trophinin, 15, 134 trophoblasts, 6–7, 15–16 tubal ectopic pregnancy. <i>See</i> ectopic pregnancies twinning, 95–96  UGET. <i>See</i> ultrasound guided embryo transfer ulipristal acetate, for intramural fibroids, 87 ultrasonography (US) hysteroscopy after normal, 74 for uterine cavity abnormalities, 75	of uterine fibroids, 82–84 ultrasound guided embryo transfer (UGET), 115–116 unstimulated cycles, ET in. <i>See</i> freeze-only approach urine, endometrial receptivity biomarkers in, 25 US. <i>See</i> ultrasonography uterine artery embolization, for intramural fibroids, 87 uterine cavity hysteroscopy of, 73–74, 79 endometrial polyps, 75 major abnormalities, 75 after normal ultrasound, 74 submucosal fibroids, 75–76, 84, 87–88 uterine septum, 76–77 premature exposure to, 93 uterine fibroids, 82–86 hysteroscopy in, 75–76, 84, 87–88 intramural, 86–87 management algorithm for, 88–89 submucosal, 75–76, 84, 87–88 subserosal, 86 uterine fluid control of volume of, 12 endometrial receptivity biomarkers in, 23–25 at implantation extracellular vesicles, 14 soluble factors, 13–14 uterine microbiome, 54, 57–59 future of assessment of, 62–63	impact in ART, 60–62 impact in pregnancy, 59–60 technical assessment of, 54–55 uterine natural killer cells. <i>See</i> natural killer cells uteroglobin, in ectopic pregnancies, 134  vaginal microbiome, 57 vascular endothelial growth factor (VEGF), in ectopic pregnancies, 136 vascular supply, endometrial, 2–3 fibroid impact on, 85 in superovulation cycles, 48 VEGF. <i>See</i> vascular endothelial growth factor vitrification, 119–120  Wallace catheter, 111, 113, 115–116 window of implantation (WOI), 6, 10 assessing alterations in, 69–70 decidualization and, 180–181 endometrial receptivity during, 28, 29, 34–35 ERA detection of, 39–40 in RPL, 183 timing of embryo transfer with, 19 transcriptomic predictors in, 37–39