Parterring of Muscles 150

Striated Skeletal Musculature, 177

Innervation of Axial Skeletal Muscle, 147

PARTONE General Embryology

Clinical Correlates, 2400+£, satabarroD labitation

Clinical Correlates, 242046, antalarron land

CHAPTER 1 Embryology: Old and New Frontiers and an Introduction to Molecular Regulation and Signaling, 3

Clinical Relevance, 3 Pharyngeal Arches 200 A Brief History of Embryology, 4 Introduction to Molecular Regulation and Signaling, 5

CHAPTER 2 Gametogenesis: Conversion of Germ Cells Into Male and Female Gametes, 13

Primordial Germ Cells, 13 Face, 280 Clinical Correlates, 13 The Chromosome Theory of Inheritance, 14 Secondary Palate, 283 Clinical Correlates, 16 Morphological Changes During Maturation of the Gametes, 24 Clinical Correlates, 30

CHAPTER 3 First Week of Development: Ovulation to Implantation, 33

Ovarian Cycle, 33 Clinical Correlates, 33 Spinal Cord. 294 Fertilization, 36 Clinical Correlates, 40 Brain, 303 Cleavage, 41 Clinical Correlates, Blastocyst Formation, 41 Uterus at Time of Implantation, 43 Clinical Correlates, 43

CHAPTER 4 Second Week of Development: Bilaminar Germ Disc, 47

CHAPTER 18 Ear, 327

Internal Ear, 327

Middle Ear, 330

External Ear, 332

Day 8, 47 Day 9, 47 Days 11 and 12, 48 Day 13, 50 Chinical Correlates, 51

CHAPTER 5 Third Week of Development: Trilaminar Germ Disc, 55

Gastrulation: Formation of Embryonic Mesoderm and Endoderm, 55 Formation of the Notochord, 55 Establishment of the Body Axes, 56 Fate Map Established During Gastrulation, 61 Growth of the Embryonic Disc, 61 Clinical Correlates, 61 Further Development of the Trophoblast, 63

CHAPTER 6 Third to Eighth Weeks: The Embryonic Period, 67

Derivatives of the Ectodermal Germ Layer, 67

Molecular Regulation of Muscle Development, 149

Clinical Correlates, 73 Derivatives of the Mesodermal Germ Layer, 74 Clinical Correlates, 81 Derivatives of the Endodermal Germ Layer, 82 Patterning of the Anteroposterior Axis: Regulation by Homeobox Genes, 84 External Appearance During the Second Month, 85 Clinical Correlates, 87

CHAPTER 7 Third Month to Birth: The Fetus and Placenta, 91

Development of the Fetus, 91 Fetal Membranes and Placenta, 95 Clinical Correlates, 95 Clinical Correlates, 97 Structure of the Placenta, 100 Clinical Correlates, 102 Development of the Clinical Correlates, 103 Formation of the Amnion and Umbilical Cord, 104 Clinical Correlates, 105 Placental Changes at the End of Pregnancy, 105 Clinical Correlates, 106 Amniotic Fluid, 106 Fetal Membranes in Twins, 106 Clinical Correlates, 109 Parturition (Birth), 111 Clinical Correlates, 111

CHAPTER 8 Birth Defects and Prenatal Diagnosis, 113

Birth Defects, 113 Clinical Correlates, 120 Prenatal Diagnosis, 121 Fetal Therapy, 123

PART TWO

Climical Correlates.

Maturation of the Lur

Clinical Correlates, 206

Larynx, 203

Systems-Based Embryology

CHAPTER 9 Skeletal System, 127

Mesentenes, Skull, 127 Foregut, 212 Clinical Correlates, 131 Clinical Correlates Limbs, 134 Clinical Correlates, 140 Vertebrae and the Vertebral Column, 142 Ribs and Sternum, 144 Pancreas, 222 Clinical Correlates, 144 Clinical Correlates Clinical Correlates, 145 Midgut, 223 Clinical Correlates, 227

Hindgot, 230

Clinical Correlates, 231

CHAPTER 10 Muscular System, 147

Striated Skeletal Musculature, 147

Innervation of Axial Skeletal Muscle, 147

Molecular Regulation of Muscle Development, 149

Derivatives of the Ector

Clinical Correlates, 73

Parturinon (Birth), 1

Limbs, 134

Ribs and Stermum.

Clinical Correlates.

Clinical Correlates, 14

Patterning of Muscles, 150

Head Musculature, 150

Limb Musculature, 150

Cardiac Muscle, 151

Smooth Muscle, 151

Clinical Correlates, 152

CHAPTER 11 Body Cavities, 155

Formation of the Intraembryonic Cavity, 155

Serous Membranes, 155

Clinical Correlates, 156

Diaphragm and Thoracic Cavity, 159

Formation of the Diaphragm, 159

Clinical Correlates, 162

CHAPTER 12 Cardiovascular System, 165

Establishment of the Cardiogenic Field, 165

Formation and Position of the Heart Tube, 165

Formation of the Cardiac Loop, 168

Clinical Correlates, 170

Molecular Regulation of Cardiac Development, 170

Development of the Sinus Venosus, 171

Formation of the Cardiac Septa, 173

Clinical Correlates, 173

Clinical Correlates, 177 176-189 1601110

Clinical Correlates, 183

Formation of the Conducting System of the

Heart, 185

Vascular Development, 185 Clinical Correlates.

Clinical Correlates, 190

Clinical Correlates, 195

Circulation Before and After Birth, 196

CHAPTER 13 Respiratory System, 201

Formation of the Lung Buds, 201

Clinical Correlates, 202

Larynx, 203

Trachea, Bronchi, and Lungs, 203 Feral Therapy

Maturation of the Lungs, 205

Clinical Correlates, 206

CHAPTER 14 Digestive System, 209

Divisions of the Gut Tube, 209

Molecular Regulation of Gut Tube

Development, 210

Mesenteries, 211

Foregut, 212

Clinical Correlates, 213

Clinical Correlates, 218

Molecular Regulation of Liver Induction, 221

Clinical Correlates, 221

Pancreas, 222

Clinical Correlates, 223

Midgut, 223

Clinical Correlates, 227

Hindgut, 230

Clinical Correlates, 231

CHAPTER 15 Urogenital System, 235

Urinary System, 235

Clinical Correlates, 240

Clinical Correlates, 242

Clinical Correlates, 245

Genital System, 246

Clinical Correlates, 254

Clinical Correlates, 257

Clinical Correlates, 258

Clinical Correlates, 262

CHAPTER 16 Head and Neck, 265

Pharyngeal Arches, 267 Common Maryngeal Arches, 267

Pharyngeal Pouches, 271

Pharyngeal Clefts, 273 Dolo Mon non-bound

Molecular Regulation of Facial Development, 273

Cametes, 13

the Gametes, 24

Fertilization, 36

Day 9, 47

Huical Correlates, 54

Fate Map Established Du

Clinical Correlates.

Clinical Correlates, 275 VCHAPTER 2 Gametogenesis:

Tongue, 277

Clinical Correlates, 278

Thyroid Gland, 278

Clinical Correlates, 279

Face, 280

Clinical Correlates, 13 Intermaxillary Segment, 282

Secondary Palate, 283

Clinical Correlates, 284

Nasal Cavities, 287

Teeth, 287

Clinical Correlates, 30 Molecular Regulation of Tooth Development,

Clinical Correlates, 290

CHAPTER 17 Central Nervous System, 293

Spinal Cord, 294

Clinical Correlates, 302

Brain, 303

Clinical Correlates, 310

Molecular Regulation of Brain Development, 313

Clinical Correlates, 315 (A. 2016) (Correlates, 315 (A. 2016)

Cranial Nerves, 319

Autonomic Nervous System, 319

Clinical Correlates, 323

CHAPTER 18 Ear, 327

Internal Ear, 327

Middle Ear, 330

External Ear, 332

Clinical Correlates, 333

CHAPTER 19 Eye, 335

Optic Cup and Lens Vesicle, 335

Retina, Iris, and Ciliary Body, 337

Lens, 339

Lens, 339 Choroid, Sclera, and Cornea, 339

Vitreous Body, 339

Optic Nerve, 340

Molecular Regulation of Eye Development, 340

Clinical Correlates, 342

CHAPTER 20 Integumentary System, 345

Skin, 345
Clinical Correlates, 346
Clinical Correlates, 346
Hair, 347
Clinical Correlates, 348
Sweat Glands, 348
Mammary Glands, 348
Clinical Correlates, 349

PART THREE

Appendix

Answers to Problems, 353 Glossary of Key Terms, 362 Figure Credits, 369

Index 373