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able A1: A	Age-depender	nt Development of	Human Organ Syster	ns					
Milestones:	Birth	•	1ª Solid Foo	J Weaning	<b>→</b>	-	Puberty	•	
Age Categories: System:	Premature through full term birth	Neonate (Term Birth-27 days)	Infant/Toddler (28 days-23 month	.s)	Child (2-11 years)		Adolesc (12-18 ye	ent ears)	Adult (> 18 years)
Cardiovascular	Critical neonatal physi and vascular resistan	iologic transitions (pulmonary ce , closure of fetal shunts)	Progressive increase in ion channels/conductance	Adaptive myocardi	ial and vascular changes				
Endocrine	Fetal hormone product Endocrine functions of	tion begins second trimester & st artical for growth/development	ructurally well developed at term		Adrenarche in late childhood				
Eye	O <sub>2</sub> -sensitive retinal angiogenesis	Morphologicallywell developed at term kirth	Development of retina (fovea), lens, iris pigmentation complete by 1 year	Training of vision in 1-4 months; color v	Training of vision important between 1-4 years (focus and track at 1-4 months; color vision starts at 3 months) Star sutures of lens form continuously during adolescence and adulthood				
Gastrointestinal	Variable preterm suck/swallow reflex Oritical functionalitypresent in term neonates Acidification, transit, microbiome		h creased digestive functionality, and absorptive capacity with growth	Progressive adaptations in digestive function to accommodate shift in disticomplexity					
Hepatobiliary	Structurally well developed at term Important neonatal transitions in bile production and elimination		Important increases in metabolic and elimination capacity	Continued refinement of metabolic and elimination function and capacity					
mmune	Neonatal structural expansion of primary and secondary immune tissues		Progressive population of immune tissues and development of memory as a function of time and environment			nvironment			
htegument	Cornification & vernix	Critical neonatal function (barri High surface area relative to w	er, water, thermoregulation, sensation) eight as compared to adults	Progressive surface acidification, local microbiome and immune function Pubertal hair growth, oil production					
Nervous	Neuronal subsets defined and active excitatory signaling initial myelination	Maximum neuron count and bra Myelin and glia present at term Postnatal neuronal apoptosis, e Metabolic functions, neurotran	ain bodyweight at term birth birth with continued refinement synapse pruning, migration and circuit i smitter and conduction systems mature	Refinement of sensorimotor control and expanded capability for complex learning and memory function a satisfie rates					
Pulmonary	Critical liquid → air transtion at birth Aveolization progresses CransTicular → saccular → alveolar structure Surfactant made preterm, secrete d at term			Increased alweolar surface area with growth to maximum aerobic function in adolescence					
Renal	Nephrogenesis not co	mplete until term	hcreases in renal function Tubular growth and GFR precedes concentration erythropoietin and		d refinement of function including angiotensin axis				
Reproductive	Oocyte meinsis & Testes descended Postnatal HPG surge of sex hormones ('mini-puberty)			Quiescent period Sertoli cell exp Breast d Spe			l expansion st development Spermarche/Menarche		
Skeletal	Growth plate development	Growth plates present at term b Critical period of rapid growth e	oith driven by growth hormone and thyroid h	omone	Slower growth	Pubertal g	rowth	Growth plate	losure 16

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Table A2:	Appendix A Age-dependent Development of Rat Organ Systems					
System	General Considerations	Neonate (~PND 1-10)	1= Solid Food (~PND 15)	Weaning (~ PND 21-25)	Puberty (M ~ PND 42, F ~ PND 33)	Adulthood (~ PND 70)
Cardiovascular	Critical neonatal physiologic transitions (pulm onary and systemic vascular resistance)     Adaptive m yooardial and vascular changes     Progressive increase in cardiomy oxycles and ion channels to PND 21					
Endocrine	<ul> <li>Most glands are well developed at birth and critical for growth</li> </ul>					
Eye	<ul> <li>Morphological development of retina, lens, iris, comes and adness ongoing until PND14</li> <li>Eystelids open on PND14</li> <li>Eystelin ophologically fully developed by weaning, continued growth and retinem ent of vision through puberty</li> </ul>					
Gastrointestinal	Immature at birthy lack gastric acid and poor pancreatic enzyme production until PND 14 Highly permeatie proximal an all intestine infalally allove absorption of intact proteins Adaptations in 5 of week of age to accommode at with in det					
Hepatobiliary	Structurally/immature at birth     Progressive development of organized hepatic cords and plates, with increase in metabolic functionality, over first 4 weeks     of age					
Immune	Progressive population of secondary immune tissues and development of memory as a function of time and environment     TDAR typically assessed after PND 45					
Integument	Critical recordsof function (barrier, water and thermoregulation, conductance, sensation); thicker epidemiis first 2 weeks of age Adnosa and hair develop postnatally, diruct/araly resembles adult by PND 21 Sexual dimorphism by PND 35 to 2					
Nervous	Structural in induzifion of offsdroy hullis, cerefacilium, hippocampus, and cereferial codes occurs over fird 3 veeks of age Maximum neuron count and benotio body vegidit at Physician Physician Barbard and postantial any set Postnatal in yetination of aginal code caudal to cranial; brain for reflores, sensorim dor; then learning and memory Conduction systems, opater ecceptor/methololism, of AdA, sentorini in Sorademain pathwayee malure at different rates					
Pulmonary	Saccular at bith     Alveolization occurs over first 2 to 3 weeks of age					
Renal	Nephrogenesis incomplete at birth     Progressive increase in GFR and renal function over first 3 to 5 weeks of age					
Reproductive	<ul> <li>Period of decreased androgen production by Leydig cells during 3rd week of age necessary for expansion of Sertoli and germ cells</li> <li>Remaining reproductive changes and appearance of sexual dim orphism occur at onset of pubert y (5 to 7 weeks of age)</li> </ul>					
Skeletal	Repid postnatal growth through adulthood     Long bone growth plate structure not evident until PND 14 to 21, and rem ain open into adulthood				17	



























