

## APPENDIX A

Names of the 41 developmental events examined in Jeffery *et al.* (2002), subdivided according to organ system.

#	System	Event
1	Axial	1st Somite
2	Cardiovascular	Endocardial anlage (single or paired rudiments)
3		Endocardial tubes start to fuse
4		Heart looping
5		Atrioventricular canal indicated by constriction (or atrium distinct from ventricle)
6		1st aortic arch formed
7		Septum primum of atrium
8		Endocardial cushions of atrioventricular canal
9		Outflow tract cushions
10		Trabeculae carneae in ventricles
11		Outflow tract valves
12	Intestinal	Anterior intestinal portal begins as diverticulum (or archenteron reaches head fold)
13		Liver diverticulum
14		Dorsal pancreas as diverticulum
15		Gall bladder as diverticulum
16		Liver cords
17		Ventral pancreas anlage(n)
18		Spleen anlage
19	Kidney	Mesonephric duct anlagen
20		Paramesonephric duct anlagen
21		Mesonephric ducts open into cloaca
22	Limb	Forelimb (or pectoral fin) bud
23	Neural	Neural folds begin to fuse
24	Olfactory	Nasal placodes appear as ectodermal thickenings
25		Nasal placodes depressed (formation of olfactory pit)

26	Optic	Optic vesicle as lateral evagination from neural tube
27		Lens placode
28		Optic vesicle starts to invaginate to form optic cup (2° optic vesicle)
29		Lens placode depressed (formation of optic pit)
30		Lens vesicle pinches off from surface ectoderm
31		2° retinal pigmentation
32	Otic	Otic placode
33		Otic placode depressed (formation of otic pit)
34		Otocyst closed but still connected with surface ectoderm
35		Otocyst detached from ectoderm
36		Endolymphatic appendage
37	Pharyngeal	2nd visceral pouch contacts ectoderm (formation of hyoid arch)
38		Thyroid anlage
39		3rd visceral pouch contacts ectoderm (formation of first branchial arch)
40		Hypophysis anlage
41		Lung buds as distinct paired evaginations

## APPENDIX B

Names of the 116 developmental events examined in Bininda-Emonds *et al.* (in prep), subdivided according to organ system and subsystem.

#	System	Subsystem	Event		
1	External	Somites	1 post-otic somite pair		
2			4 post-otic somite pairs		
3			13 post-otic somite pairs		
4			23 post-otic somite pairs		
5	Miscellaneous		mesencephalic (cephalic) flexure first indicated		
6			externally visible tailbud beginning (all three germ layers need not be present)		
7			Cardiovascular	Heart	endocardial anlage
8					endocardial tubes start to fuse
9					heart becoming bent or S-shaped (endocardial tubes no longer straight)
10					interventricular septum just beginning
11					trabeculae carneae in ventricles of heart
12					atrioventricular canal indicated by constriction
13					endocardial cushions of atrioventricular canal just beginning
14					septum primum of atrium just beginning
15					septum primum broken through (foramen ovale / secundum)
16			proximal outflow tract cushions appearing		
17			truncus arteriosus initially divided (= initial fusion of distal bulbar cushions)		
18			semilunar (aortic and pulmonary) valves first appearing		
19		Associated vessels	1st aortic arch formed		
20			2nd aortic arch (hyoidean) formed		
21	Eye	Optic vesicle	(primary) optic vesicle beginning as distinct lateral evagination from neural tube (not sulcus opticus)		
22			(primary) optic vesicle starts to invaginate to form optic cup (secondary optic vesicle)		

23		optic stalk beginning to be invaded by retinal nerve fibres
24		retinal pigmentation beginning
25	Lens	lens placode appears
26		lens placode depressed (formation of optic pit)
27		lens vesicle pinches off from surface ectoderm
28	External	eyelid anlage appears
29	Ear	otic placode appears
30	Otic placode	otic placode depressed (formation of otic pit)
31		otocyst closed but still connected with surface ectoderm
32		otocyst detached from ectoderm
33		endolymphatic appendage appears
34		auricular tubercles (hillocks) become distinct
35		anlage of utricle
36		anlage of cochlea
37	Semicircular canals	superior (= vertical or anterior) semicircular canal pinched-off as a tube
38	Ossicles	malleus appears as mesenchymal condensation
39	Facial region	oropharyngeal (buccopharyngeal / oral) membrane formed
40		oropharyngeal membrane becomes perforated
41	Nasal pits	nasal placodes appear as ectodermal thickenings
42		nasal placodes depressed (formation of olfactory pit)
43		primitive choanae (posterior nares) open
44		closure of nostrils by epitrichial plugs
45		Jacobson's organ beginning as a diverticulum
46		conchae (turbينات) developing
47		anlage of nasolacrimal duct (as maxillary and lateral nasal processes start to fuse)
48	Miscellaneous	anlage of hypophysis (Rathke's pouch)
49		lateral palatine processes appearing on either side of tongue
50		dental lamina forming
51		anlagen of tooth germs appearing in dental lamina
52		parotid gland first indicated
53	Pharynx	thyroid (or endostyle) depression appears in floor of pharynx

54			anlage of ultimobranchial bodies (of pharyngeal pouch V) (= lateral thyroid; parafollicular cells of thyroid)
55	Pharyngeal pouches		1st visceral pouch contacts ectoderm
56			2nd visceral pouch contacts ectoderm (formation of hyoid arch)
57			3rd visceral pouch contacts ectoderm (formation of first branchial arch)
58			cervical sinus formed
59			anlage of thymus (of pharyngeal pouch III)
60	Visceral skeleton		Meckel's cartilage cartilaginous
61			mandible beginning to ossify
62	Urogenital	Wolffian (mesonephric) duct	Wolffian duct appears as a thickening with no lumen
63			Wolffian ducts open into cloaca
64		Kidneys	mesonephric (= Wolffian) tubules appearing, but still solid
65			ureteric bud just forming from Wolffian duct
66			anlagen of metanephric tubules
67		Gonad	anlage of gonad (gonadal ridge) appears as a thickening of the coelomic epithelium
68		Mullerian (paramesonephric) duct	anlagen of Mullerian ducts appear
69			Mullerian ducts fusing caudally
70		Cloaca	cloacal partition just completed
71		External genitalia	genital tubercle appears
72	Intestinal tract	Intestine	anterior intestinal portal beginning as a diverticulum
73			postanal (tail-) gut no longer present
74			(future) cloacal membrane becomes distinct at the caudal end of primitive streak
75			cloacal membrane breaks through (perforated)
76		Associated glands	liver diverticulum appears
77			liver cords forming
78			gall bladder beginning as a diverticulum
79			dorsal pancreas beginning as a diverticulum
80			ventral pancreas beginning as a diverticulum
81			spleen anlage beginning as thickening of peritoneal epithelium and/or mesenchymal proliferation

82	Nervous	Neural tube	neural folds first beginning to fuse
83			anterior neuropore closed
84			posterior neuropore closed
85		Brain	rhombomeres start to appear
86			cerebral hemisphere anlagen of telencephalon just beginning (as lateral expansions)
87			anlage of optic chiasma
88		Miscellaneous	trigeminal ganglion (of cranial nerve V) becomes distinct as cellular aggregate
89			infundibular groove (not recess) forms
90			anlage of epiphysis
91			anlage of adrenal cortex (interrenal gland) as mesodermal proliferation from peritoneum
92	Coelom	Coelom	pericardial coelom beginning
93	Respiratory	Respiratory	laryngotracheal (part of the median pharyngeal) groove indicated
94			lung buds as distinct evaginations
95	Limbs	Forelimbs	Wanek <i>et al.</i> (1989) stage 1 (limb bud first visible)
96			Wanek <i>et al.</i> (1989) stage 6 (constricted wrist / dorsoventrally flattened hand plate)
97			Wanek <i>et al.</i> (1989) stage 8 (initial indentations between digits)
98			scapula cartilaginous
99			humerus chondrification beginning
100		Hind limbs	Wanek <i>et al.</i> (1989) stage 1 (limb bud first visible)
101			Wanek <i>et al.</i> (1989) stage 6 (constricted wrist / dorsoventrally flattened hand plate)
102			Wanek <i>et al.</i> (1989) stage 8 (initial indentations between digits)
103	Extraembryonic membranes	Allantois	allantoic diverticulum beginning (mesodermal and endodermal components)
104			expansion of allantois (anlage of bladder)
105		Amnion	amniopore closed (= amnion complete)
106		Umbilical cord	umbilical hernia beginning
107			umbilical hernia totally reduced

108	Integument	Mammary glands	milk line appears
109			anlagen of mammary glands (papillae) appear
110		Hair	hair papilla appears over eye
111		Claws	anlagen of claws
112	Axial skeleton	Skull	petrosal bone (periotic capsule) as mesenchymal condensation
113		Vertebrae	vertebral bodies are mesenchymal condensations around notochord
114		Notochord	primitive streak no longer present
115			notochord starts separating from alimentary endoderm
116		Ribs	some ribs are appearing as mesenchymal condensations