

Contents

Preface	ix	Enamel	27
Acknowledgments	xi	Structural Organization	27
		Enamel Structure and Biomechanics	33
1. General Introduction		Cementum	35
Introduction	1	Periodontal Ligament (PDL)	39
Definition of a Mammal	1	Extracellular Matrix	40
Classification	1	Blood Vessels and Nerves	42
Phylogeny	1	Cells	42
Evolution of the Mammalian Jaws and Dentition	3	References	44
Secondary Palate	3		
A New Lower Jaw	3	3. Herbivory	
Jaw Joint	3	Introduction	47
Jaw Movement	4	Arboreal Herbivores	48
Jaw-Closing Musculature	4	Terrestrial Herbivores	49
Tooth Structure	5	Tooth Wear	49
Heterodonty	5	Adaptations to Wear	51
Food Processing by Mammals	6	References	54
Physical Aspects of Food Breakdown	6		
The Tribosphenic Molar and Its Derivatives	9	4. Monotremata and Marsupialia	
Crown Height	13	Monotremes	57
Roots	14	Marsupials	57
Mastication	14	Introduction	57
Correlates of Molar Occlusion	16	Dental Formula	57
Tooth Replacement	16	Tooth Replacement	57
Wear	18	Hard Palate	58
Applications of Wear Patterns	19	Mastication	58
Attrition Facets	19	The Angular Process	58
Microwear Analysis	19	Enamel Structure	58
Mesowear	20	Didelphimorphia	59
References	21	Didelphidae	59
		Paucituberculata	61
2. Mammalian Tooth Structure and Function		Caenolestidae	61
Introduction	25	Microbiotheria	61
Dentine and Pulp	25	Microbiotheriidae	61
Structure and Mechanical Properties of		Dasyuromorphia	62
Dentine	25	Dasyuridae	62
The Dentine-Pulp Complex	26	Thylacinidae	63
		Myrmecobiidae	64

Notoryctemorphia	65	Temporomandibular Joint	117
<i>Notoryctidae</i>	65	Jaw-Closing Muscles	117
Peramelemorphia	65	Morphology of Molars	120
<i>Peramelidae</i>	66	Sciuromorpha	121
<i>Thylacomyidae</i>	66	<i>Aplodontiidae</i>	121
Diprotodontia	66	<i>Sciuridae</i>	121
<i>Phalangeridae</i>	66	Castorimorpha	122
<i>Acrobatidae</i>	67	<i>Castoridae</i>	122
<i>Petauridae</i>	67	<i>Geomyidae</i>	124
<i>Macropodidae</i>	68	<i>Heteromyidae</i>	124
<i>Potoroidae</i>	71	Myomorpha	124
<i>Phascolarctidae</i>	72	<i>Cricetidae</i>	125
<i>Vombatidae</i>	72	<i>Muridae</i>	126
<i>Tarsipedidae</i>	72	<i>Nesomyidae</i>	131
References	74	Anomaluromorpha	132
5. Afrotheria		<i>Pedetidae</i>	132
Introduction	75	Hystricomorpha	133
Afroinsectiphilia	75	<i>Hystriidae</i>	133
Tubulidentata	75	<i>Thryonomyidae</i>	134
Afrosoricida	76	<i>Bathyergidae</i>	134
Macroscelidea	81	<i>Myocastoridae</i>	136
Paenungulata	83	<i>Echimyidae</i>	137
Sirenia	83	<i>Chinchillidae</i>	137
Hyracoidea	89	<i>Erethizontidae</i>	137
Proboscidea	92	<i>Caviidae</i>	139
Online Resources	97	<i>Cuniculidae</i>	140
References	97	References	141
6. Xenarthra		8. Dermoptera and Scandentia	
Introduction	99	Introduction	145
Pilosa	99	Dermoptera	145
<i>Megalonychidae</i>	100	Scandentia	147
<i>Bradypodidae</i>	100	Online Resources	147
Cingulata	101	References	148
<i>Dasypodidae</i>	101	9. Primates	
<i>Chlamyphoridae</i>	102	Introduction	149
References	104	Diet	149
7. Lagomorpha and Rodentia		Dentition	149
Introduction	105	Primate Enamel	151
Dentition	105	Strepsirrhini	153
Wear and Eruption	105	<i>Lemuridae</i>	153
Digestion	107	<i>Cheirogaleidae</i>	154
Lagomorpha	107	<i>Indriidae</i>	155
<i>Leporidae</i>	107	<i>Daubentoniidae</i>	156
<i>Ochotonidae</i>	111	<i>Lorisidae</i>	158
Rodentia	112	<i>Galagidae</i>	159
Incisors	112	Haplorrhini: 1. Platyrrhini	159
Cheek Teeth	115	<i>Tarsiidae</i>	160
		Ceboidea	160

<i>Callitrichidae</i>	160	<i>Thyropteridae</i>	206
<i>Cebidae</i>	161	<i>Vespertilionoidea</i>	207
<i>Aotidae</i>	163	<i>Vespertilionidae</i>	207
<i>Pitheciidae</i>	163	<i>Miniopteridae</i>	208
<i>Atelidae</i>	164	<i>Molossidae</i>	209
Haplorrhini: 2. Catarrhini	165	References	210
<i>Cercopithecoidea</i>	165		
<i>Cercopithecidae</i>	165		
<i>Hominoidea</i>	169	12. Perissodactyla	
<i>Hylobatidae</i>	170	Introduction	213
<i>Hominidae</i>	171	<i>Ungulates</i>	213
Online Resources	176	<i>Perissodactyla</i>	214
References	176	Hippomorpha	214
		<i>Equidae</i>	214
10. Eulipotyphla		Ceratomorpha	216
Introduction	179	<i>Tapiridae</i>	216
<i>Solenodontidae</i>	179	<i>Rhinocerotidae</i>	218
<i>Talpidae</i>	180	References	220
<i>Soricidae</i>	181		
<i>Erinaceidae</i>	184		
References	186	13. Cetartiodactyla: 1. Artiodactyla	
		Introduction	223
11. Chiroptera		Suina	223
Introduction	187	<i>Suidae</i>	223
Diet	187	<i>Tayassuidae</i>	227
Skull Form	187	Tylopoda	228
Tooth Form	189	<i>Camelidae</i>	228
<i>Insectivorous Microbats</i>	189	Ruminantia	229
<i>Carnivorous Microbats</i>	191	<i>Bovidae</i>	233
<i>Frugivorous Microbats (Phyllostomidae:</i>		<i>Tragulidae</i>	237
<i>Stenodermatinae)</i>	191	<i>Moschidae</i>	238
<i>Nectarivorous Microbats (Phyllostomidae:</i>		<i>Cervidae</i>	239
<i>Glossophaginae)</i>	192	<i>Giraffidae</i>	244
<i>Sanguivorous Microbats</i>	192	<i>Antilocapridae</i>	244
<i>Frugivorous and Nectarivorous Megabats</i>	192	Whippomorpha	244
Tooth Roots	192	<i>Hippopotamidae</i>	244
Biting Behavior	192	References	247
Yinpterochiroptera	193		
<i>Pteropodidae</i>	193	14. Cetartiodactyla: 2. Cetacea	
<i>Rhinolophoidea</i>	195	Introduction	249
<i>Rhinolophidae</i>	195	Mysticete Dentitions	249
<i>Hipposideridae</i>	197	Odontoceti	249
<i>Megadermatidae</i>	197	<i>Feeding by Odontocetes</i>	250
<i>Craseonycteridae</i>	198	Odontocete Dentition	254
Yangochiroptera	198	<i>Physeteridae</i>	255
<i>Emballonuroidea</i>	198	<i>Kogiidae</i>	257
<i>Emballonuridae</i>	198	<i>Platanistidae</i>	257
<i>Noctilionoidea</i>	199	<i>Ziphiidae or Hyperoodontidae</i>	257
<i>Phyllostomidae</i>	199	<i>Iniidae</i>	259
<i>Noctilionidae</i>	205	<i>Pontoporiidae</i>	259
<i>Furipteridae</i>	205	<i>Monodontidae</i>	259

<i>Phocoenidae</i>	261	16. Teeth and Life History	
<i>Delphinidae</i>	261	Introduction	305
References	264	Incremental Markings in Dental Tissues	305
15. Carnivora		Incremental Markings in Enamel	305
Introduction	267	Daily and Subannual Incremental Markings in Dentine	308
Terrestrial Carnivora	268	Incremental Markings at the Tooth Surface	309
<i>Feliformia</i>	271	Analysis of Tooth Growth	310
<i>Felidae</i>	271	Perikyma Counts	310
<i>Hyaenidae</i>	272	Periradicular Bands	310
<i>Herpestidae</i>	274	Histological Methods	310
<i>Eupleridae</i>	275	Tooth Growth and Human Evolution	311
<i>Viverridae</i>	276	Annual Growth Lines in Age Estimation	312
Caniformia	277	Life Events	315
<i>Canidae</i>	277	Age at Death	315
<i>Mephitidae</i>	283	Time Since Burial	316
<i>Mustelidae</i>	283	Amino Acid Racemization	316
<i>Procyonidae</i>	288	Radioactive Carbon Dating	316
<i>Ailuridae</i>	289	Stable Isotope Analysis	316
<i>Ursidae</i>	290	Carbon Isotopes	316
Seals, Sea Lions, Walrus	295	Oxygen Isotopes	317
<i>Otariidae</i>	296	Nitrogen Isotopes	318
<i>Odobenidae</i>	297	References	318
<i>Phocidae</i>	300		
References	302	Index	323