

Cambridge University Press

978-0-521-03895-9 - The Physiology and Biochemistry of Cestodes

J. D. Smyth and D. P. McManus

Index

[More information](#)

Index

Numbers in **bold type** indicate a **figure** on that page. Numbers in *italics* indicate a *table* on that page. Well-known experimental species are sometimes quoted in an abbreviated form. **Bold italic** is used for easy identification of *species names* in entries.

- Abramis brama*, 18, 196
- Absorption
 - amino acids, 9, **131**
 - mechanisms, 42–4
- Acanthobothrium filicolle*, 159, 160
 - fertilisation, 166
- quadripartum*, insemination, 164
- Acanthocyclops robustus*, 200
- Acerina cernua*, 196
- Acetate
 - as crowding factor, 247
 - formation, 105
 - production, *H. microstoma*, 78
- Acetylcholine, 25, 30, **32**
- AChE, oncosphere, 226
- Acid mucopolysaccharide, 58
- Acipenser stellatus*, 18
- Actin, 22
- Active transport
 - defined, 43–4
 - general account, 43–4
 - glucose, cestodes, 80
 - intestine, 44
- Acyl-CoA carboxylase, 105
- Acyl-CoA transferase, 105
- Adenine nucleotide(s), (AMP, ADP, ATP), 62
 - content, cestodes, 62
- Adenosine triphosphatase, 215
- Adenylylate charge, 62
- Adrenaline (epinephrine), 174, *175*, **176**
- Adult cestodes
 - chemical composition, 56
 - immunity to, 286–95
 - invasion of intestine, 232
 - special features reviewed, 5
- tegument, 6
 - vaccination against, 302
- Aerobic metabolism, eggs, 194
- Age, coracidia, 207, **208**
- Alkaline fast green, 180
- Alcian blue/yellow, 28, *168*, 180
- Alcohol:NAD oxidoreductase, 206
- Alimentary canal
 - as a biotope, 35–7
 - Eh, 46
 - pH 46, 47
 - pO₂, 47, **48**
- Allocholanic acid, 49
- Aminergic neurones, 25
- Aminergic synapses, 25, 27
- Amines, as neurotransmitters, 25
- Amino acid(s)
 - absorption, by cestodes, 9, 130, *131*
 - as neurotransmitters, 31
 - catabolism, in cestodes, 133
 - content, cestodes, 126
 - uptake
 - by *H. diminuta*, 13
 - by intestine, 42–45
- L-amino acid oxidase, *Hymenolepis*, 134
- 4-Aminobutyrate pathway, *Moniezia*, 134
- γ-Aminobutyric acid (GABA), 31
- Amoebotaenia cuneata*, amino acids, 126
- Amphytyches urna*, egg shell formation, 171
- Amplification factor, 7, 8
- Amylase, host, 10
 - α*-Amylase adsorption and contact
 - digesting, 123
- Anaerobic conditions, *in vitro*, 78, **278**
- Anaerobic electron flow, cestodes, 110
- Anaerobic metabolism, eggs, 194

Index

- Anguilla anguilla*, 18, 200
Anomotaenia constricta
 oncosphere, 222
 ultrastructure, 7
Anoplocephala
magna
 composition, 56
 transaminases, 133
perfoliata
 glucose-6-phosphate dehydrogenase, 112
 6-phosphogluconate dehydrogenase, 112
 PEPCK, 92
 pyruvate kinase, 88
Anoplotaenia dasyuri
 egg formation, 174
 self-insemination, 162
Antibody, 284
 antipolysaccharide, 285
 isotype, 294
 specificity, 294
Anti-complementary factor, 58
Antigen(s)
 5, *E. granulosus*, 65, 117–18
 B, *E. granulosus*, 65, 117–18
 cloning, *T. taeniaeformis*, 150
 E/S (excretory/secretory), 303
 functional, 302–3
 oncospheres, 303
 preparation, 303
 uptake by mucosa, 288, 289
Antigenic alteration, evasion mechanism, 301
‘Apical massif’, 277, 278
Aploparaksis (= *Aploparaxis*)
filum, oncosphere, 222
furcigera, 18, 171
polystictae, lipids, 67
Apocrine secretion, 17, 19
Arachidonic acid, in mast cells, 289
Archigetes (sp.), 170
limnodrili, 207
sieboldi, 18
Arginine, 43
 egg, *Hymenolepis*, 180
Artificial intestinal juice, 192
Asexual/sexual differentiation
Echinococcus, 267–268
Mesocestoides corti, 254–256
Aspartate transcarbamylase, 140
Aspartic acid, 31
ATP
 in coracidia, 205
 synthesis, 91
ATP/ADP ratio, 65
Atriotaenia (sp.), 35
Avitellina (sp.), 170
 shell formation, 171
centripunctata, chemical composition, 55
lahorensis
 egg formation, 174–5
 sperm cytochemistry, 160
Axenic culture, defined, 257
Axonemes, in sperm, 158, 159
Axons, 24
Azoalbumin, 11
Azoreductase activity, 136
Azure A, 181
B cell, 284, 287, 296
Barium ions, 33
Basal bodies, in spermatogenesis, 159
Benzoyl-DL-arginine-p-nitroanilide, 11
Beta-oxidation enzymes
H. diminuta, 72
Ligula intestinalis, 72
Schistocephalus solidus, 72
Bile
 acids, 49–51
 alcohols, 51
 amphibia, 50
 cat, 50, 51
 composition, 37
 dog, 50, 51
 ducts, cestode species in, 35
 evagination stimulus, 234
 fish, 51
 gall-bladder, 50
 general account, 48, 49, 50, 51
 hepatic, 50
 importance to parasites, 48
 in culture media, 267
 in hatching, 192–3
 reptiles, 51
 role in evagination, 233, 234
 salts, 51, 233
 secretion, 49
Bilirubin, 50
Biochemical ‘anatomy’, of enterocyte, 39
Biochemical composition
 cestodes, 56
 protoscoleces, *E. granulosus*, 55
Biphenyl, 173
Blood agar base (NNN), 266
Bone marrow, 284
Bothria, 17

Index

- Bothriate scolex, 16, 17
 Bothridia (phyllidea), 17
Bothridium pithonis, egg shell formation, 171
Bothriomonas sturnionis, spermatozoa, 159
Bothriocephalusacheilognathus, adult
 scolex glands, 18
 coracidium, 196, 197, 199, 208
 egg hatching and light, 189
 host-parasite interface, 240
 procercoid, growth, 207
 pyruvate kinase, 88
 ultrastructure, SEM, TEM, 7
claviceps (syn. *clavibothrium*?)
 coracidium, penetration glands, 202
 egg shell formation, 171
 copepod hosts, 200
 intermediate host, 197
 procercoid, growth, 207
 spermatozoa, 159
gowkonensis (syn. *acheilognathus*?)
 chemical composition, 54
 eggs killed by ovicide, 187
 glycolytic enzymes, activities, 86
 PEPCK, 92
 pyruvate kinase, 88
 scolex glands, adult, 18, 19
 synonym, 18, 19
 TCA cycle enzymes, 104
opsariichthydis (syn. *acheilognathus*?), 196, 197
rarus
 coracidium, 196
 procercoid, growth, 207
scorpii
 amino acids, 126
 binding to C-reactive protein, 117
 collagen, 114
 egg shell formation, 171
 enzyme electrophoresis, 125
 hexokinase, 85
 host-parasite interface, 240
 methylbutyrate production, 93
 neurosecretion, 28
 phosphorylcholine hapten, 117
 protein electrophoresis, 125
 Bovine pancreatic polypeptides, 29
 Branched chain fatty acids, 93
 Brush border
 microvilli, 7
 protein constituents/synthesis, 123
 Budding
E. multilocularis, 278
Mesocestoides corti, 255, 256
 Buffalo, 274
 Bursa equivalent, 284
 Ca²⁺-ATPase
 effect on muscle, 33
 in brush border, 119–21
 Cadmium ions, 33
 Calcareous corpuscles
 Ca²⁺ accumulation, 61
 cells, 215
 functions, 61–2
 phosphate content, cestodes, 60
 Calcium, effect on muscles, 32, 33
Callibothrium verticillatum
 fatty acids, 69, 70, 71
 glucose uptake, 81
 lipids, 66
 osmotic pressure, 51
 phospholipids, 68
 urea, 52
 Calmodulin
 Ca²⁺ receptor, 119
 effect on ATPase, *Hymenolepis*, 121
H. diminuta, properties, 121
 Camel, 55, 274
 Capsule formation, reviewed, 166
 Capsule (= shell, shell/capsule), 157, 166
 formation, pseudophyllid, 172
Taenia, 182
 Carbazethion, 187
 Carbohydrate
 competition for, *Hymenolepis*, 245–6
 major energy substrate for cestodes, 77
 metabolism
 acetate production, 84
 chemotherapy, 77
E. granulosus, horse/sheep strains, 100
E. multilocularis, 100
 ethanol production, cestodes, 84
Hymenolepis microstoma, 78
 lactate production, cestodes, 84
 malate production, cestodes, 84
 propionate production, cestodes, 84
 pyruvate production, cestodes, 84
 strain differences, 79
 succinate, production, cestodes, 84
 Carbohydrate utilisation
in vitro, 80–3
in vivo, 79–80
 Carbon dioxide, see CO₂
 Cardiolipin, 68
 Carrier molecules, glucose, 42

Index

- Caryophyllaeus laticeps**
 chemical composition, 54
 egg shell formation, 171
 scolex gland, 18, 19
- Caryophyllidae, 19**
- Caryophyllidea**
 oogenesis, 161
 spermatogenesis, 158, 159
- Cat**
 bile, 51
 bile acids, 49
 crypt size, 37
E. multilocularis in, 254, 255
 gut turnover time, 39
T. taeniaeformis, immunity, 294
- Catechol test**, for phenol oxidase, 172
- Catecholamines**, cytochemistry, 23
- Catenotaenia pusilla**
 egg formation, 174
 neurophysiology, 32
 oncosphere, 222
 spermatozoa, 159
- Cattle**
 bile acids, 49
 hydatid cysts in, 274
 intestinal gases, 47
- C3b**, in cysticercosis, 299
- cDNA**, *see* DNA
- Cell(s)**
 culture, 281
 doubling time, 215
 enteroendocrine, 40
 kinetics, 36
 M, 40
 neurosecretory, 28, 226
 Paneth, 40
- Cell-free**, homologous protein synthesis, cestodes, 138
- Cellular responses**, *see* Immune responses
- Cellulose tubing**, in culture, 40, 263
- Cementing substance**, embryophore, 157, 191
- Ceramide choline-phosphotransferase**, 75
- Cercomer**, 204–5
- Cerebrosides**, cestodes, 68
- Cestodaria**, egg formation, 169
- Cestode nucleic acids**
 isolation, 145–8
 manipulation, 148–153
- Chemical composition**, 54–56
- Anoplocephala magna*, 56
 - Avitellina centripunctata*, 55
 - Bothrioccephalus gowkongensis*, 54
 - Caryophyllaeus laticeps*, 54
 - Cittotaenia perplexa*, 56
- Dioecocestus asper**, 55
- Diphyllobothrium** sp., 56
dendriticum, 56
latum, 54, 56
macroovatum, 55
- Diplogonoporus balaenopterae**, 55
- Diplothe laevis**, 55
- Diplydium caninum**, 54, 56
- Dubinolepis furcifera**, 55
- Echinococcus granulosus**, 55, 56
- Eubothis rugosum**, 54, 56
- Hymenolepis**
citelli, 56
diminuta, 55, 56
- Ligula intestinalis**, 54, 55, 56
- Moniezia**
benedini, 55
expansa, 55, 56
- Multiceps multiceps**, 56
- Pariectoetaenia porosa**, 55
- Proteocephalus** spp., 54
- Raillietina**
cesticillus, 56
echinobothridia, 55
tetragona, 55
- Schistocephalus solidus**, 56
- Stilesia globipunctata**, 55
- Taenia**
cerebralis, 55
crassiceps, 56
hydatigena (marginata), 55, 56
pisiformis, 55
saginata, 56
solium, 55, 56
(Hydatigera) taeniaeformis, 55, 56
- Thysanezia giardi**, 55
- Thysanosoma actinoides**, 56
- Triaenophorus**
crassus, 54
nodulosus, 55, 56
- Chemotherapy**, cestodes, 77
- Chicken**, 235
- Chenodeoxycholic acid**, 49, 51
- Choanotaenia**
exigua, self-insemination, 162
porosa, adult scolex glands, 18
- Cholesterol**
 in bile, 50
 uptake by cestodes, 73
- Cholic acid**, 49, 51
- Choline**, in cestodes, 137–8
- Choline:tetrazolium oxidoreductase**, 206
- Cholinergic neurones**, 30
- Cholinergic synapses**, 25

Cambridge University Press

978-0-521-03895-9 - The Physiology and Biochemistry of Cestodes

J. D. Smyth and D. P. McManus

Index

[More information](#)*Index*

- Cholinesterase, cytochemistry, 22, **23**, 30
 Chromalum-haematoxylin/phloxine, 28
 Chymotrypsin inhibition
 by cestodes, 58
 by *Hymenolepis*, 11
 by *T. pisiformis*, 301
 by *T. taeniaeformis*, **59**
 Ciliated receptors, **24**, 31, 32
 Circadian migration, 236
 Cirrus 'bulge', 274, **275**
Cittotaenia sp., shell formation, 183
 perplexa, chemical composition, 56
 variabilis, egg formation, 174
 Clear vesicles in nerve terminals, **26**
 Cloning of specific DNA fragments
 E. granulosus, 150
 T. solium, 150
 mitochondrial genome, *T. hydatigena*, 150
 CO_2
 as trigger, 47
 in intestine of vertebrates, 46, 47
 mucosal, **48**
 CO_2 -fixation
 H. microstoma, 79
 importance in cestode metabolism, 47, 92
 Cobalt chloride, effect on muscle, **32**, 33
 Coelenterates, 29
 Colchicine binding
 for measuring mitosis, 215
 H. diminuta, **116**
 Collagen
 amino acid composition, *T. solium*, **115**
 in cestodes, 114
 Collagenase, 212
 Colon, pH, **46**
 Colostrum, 44
 Coomassie brilliant blue, 168, 180
 Complements components, 294
 Complementary DNA (cDNA), definition 154
 Compression, insemination requirement, 40, 273
 Computerised image analysis, 7
 Conjugation of bile salts, 51
 Contact (= membrane) digestion, 10, 14, 123
 Copulatory activity, 251
 Copepods
 as intermediate hosts, 197
 coracidia infections, 197, 200
 Coracidium
 adaptations, 195
 Bothriocephalus, **197**
 defined, 170
 embryophore, **203**
 glands in, 196, 201
 lipids, 66
 metabolism, 205–206
 oxygen consumption, **205**
 penetration glands, 201
 phospholipids, 69
 survival, **198**
 ultrastructure, SEM, **197**, **203**
 Coracidium/procercoide transformation, 202–3
Coregonus albula, 18, 196
Cotugnia digonopora
 egg formation, 174
 endproducts, 84
 intermediary metabolism, 83
 lipids, 65, 66
 Covalent links, **173**
 Crane's gradient hypothesis, 12
 C-reactive protein, bound by *B. scorpii*, 117
Crossbothrium squali, self-insemination, 162
 Cross-insemination, 163–165
 Crowding effect, 243, **244**, 247
 competition for carbohydrates, 79, 247
 Cryopreservation, *E. multilocularis*, 282
 Crypt
 hyperplasia, 36
 of Lieberkühn, 39, 239, 272
 size, 37
Ctenocephalides felis felis, cysticercoid, 228
 Cultivation *in vitro*, 257–82; *see individual species*
 Culture tube, for *Schistocephalus*, **263**
 Cyanide-insensitive respiration in cestodes, 107
 Cyanocobalamin
 binding to microtriches, **121**
 receptor, *Spirometra mansonioides*, **121**
Cyatocephalus truncatus, scolex glands, 18
 Cyclic nucleotide, cGMP, 247
 Cyclophyllidea(n)
 egg, 156, **157**
 formation, general, **169**
 hatching, 189, **190**, 191
 reviewed, 166
 survival, 185, **186**
 embryonic development, **167**
 oncosphere, morphology, **222**
 shell/capsule, 167

Index

- Cyclophyllidean-type egg, 174–83
Cyclops
bicuspidatus thomasi, 202, 207, 208–209
scutifer, 200
strenuus, 196
vicinus, 196
Cyprinus carpio, 18
Cysteine protease, 132
Cysteinyl residues, 173
Cysticerci
lipids, 66
phospholipids, 68
Cysticercosis
human immune responses, 298, 299
immunoelectrophoresis, 298
T. oris, vaccination, 302
Cysticercus
bovis
calcareous corpuscles, 60
in cattle, 230
proteolytic activity, 230
cellulosae
collagen, 114; (amino acids), 115
larval *T. solium*, 298
phosphate in calcareous corpuscles, 60
fasciolaris, calcareous corpuscles, 60
pisiformis, calcareous corpuscles, 60
tenuicollis, nitrogen excretory products, 135
Cystine linkage, 173
Cytochrome(s), 106–11
 α_3 , 107–10
in coracidia, 207
 α , 107–10
oxidase, 206, 207
Cytokines, 287
Cytoplasmic layer
egg, histochemistry, 180
H. diminuta, 190
Cytons, 13
Cytotoxic cells, 290
Davainea proglottina, scolex glands, 17
De novo synthesis, cestodes, 140
Dedifferentiation, 36
Definitive host, development in, 232
Dendrites, 24
Denmark, *T. saginata*, egg survival, 185
Dense bodies, 21
Dense core vesicle, in nerve terminals, 25, 26
Density-dependent growth, procercoids, 207
Deoxycholic acid, 49, 51
lysing effect on cestodes, 51
Development, defined, 241
Developmental biology, larvae, 195
Dialysis tubing, in culture, 262, 263
Dichlorophen, 187
Dicranotaenia cornula, 171
Diel migration, 236
Diet, 37
effect on *H. diminuta* growth, 247
maize gluten, 43
soya bean, 43
Differentiation
asexual/sexual, *Echinococcus*, 268, 271
cystic, 268, 271
strobilar, 268, 271
Mesocestoides corti, 278, 280
Mesocestoides lineatus, 280
Diffusion, passive, 43
Digestion
intestinal, 41–2
membrane (=contact) digestion, 10, 14, 123
Diglycine, uptake by intestine, 44, 45
Digamma interrupta, sexual maturity, 214
3 α -6 β -Dihydroxycholanic acid, 49
3 β -6 α -Dihydroxycholanic acid, 49
3 α -12 α -Dihydroxy-7-oxocholanic acid, 49
7 α -12 α -Dihydroxy-7-oxocholanic acid, 49
Dioecocestus (sp.) as bisexual sp., 156
acutulus, egg formation, 174
asper, chemical composition, 55
Dinobothrium septariae, self-insemination, 162
Diorchis ransomi, 171
Dipeptides, mucosal uptake, 42, 44, 45
Diphasic medium, for *Echinococcus* culture, 272
Diphyllobothrium (sp.)
amino acids, 126
chemical composition, 56
egg, 157
egg hatching, light, 188
egg shell formation, 171
microtriches, 19
crassum, protein electrophoresis, 125
dendriticum
chemical composition, 56
cholinesterase, 30
coracidium, 196, 202
coracidium/procercoid transformation, 203
crowding effect, 249
end-products, 84
5-HT (serotonin) in, 25, 136–7

Index

- D. dendriticum** (cont.)
 in hamsters, 249
in vitro culture, 28
 larval/adult transformation, 250
 lipids, 67
 migration in gut, 236
 neurobiology, 23
 neuropile, 24
 neurosecretion, 28
 peptidergic neurosecretion, 250
 procercoid, 30, 211, 213
 procercoid glands, 196, 213, 214
 prepatent period, 242
 procercoid/plerocercoid transformation, 212
 scolex attachment, 235
 serotonin, neurotransmitter, 136–7
 synapses, 25, 26
 ultrastructure, SEM, TEM, 7, 27, 29, 30
- ditremum**, 212
- latum**
 chemical composition, 54–56
 cholinesterase in, 30
 cobalamin (vitamin B₁₂) uptake, 122
 copepod hosts, 197
 coracidium
 enzymes, 206
 glands, 196, 202
 metabolism, 205–6
 O₂ consumption, 205
 cytochemistry, sperm, 160
- egg**
 hatching, 188–9
 histochemistry, 194
 SEM, 172
 shell formation, 171
- lipids, 66, 67
- mitochondrial oxidation, 109
- phosphate, calcareous corpuscles, 60
- phospholipids, 68
- plerocercoid glands, 196, 213, 214
- prepatent period, 242
- procercoid
 glands, 196, 209, 210
 growth, 207
 microtriches, 204
- procercoid/plerocercoid transformation, 212
- spermatozoa, 159, 161
- ultrastructure, SEM, TEM, 7
- osmeri**, cell population, kinetics, 214, 215
- vogeli**, lipids, 67
- Diphylloidea, spermatozoa, 158–159
- Diplogonoporus balaenopterae**, 55
- tetrapterus**, egg shell formation, 171
- Diplosthe bifaria**, growth, 243
- laevis**
 chemical composition, 55
 growth, 243
- Dipylidium caninum**
 chemical composition, 54, 56
 cholinesterase in, 30
 cysticeroid in flea, 228–9
 eggs formation, 169
 glucose-6-phosphate dehydrogenase, 112
 lipids, 66
 neurobiology, 23
 oncosphere, 222
 PEPCK, 92
 6-phosphogluconate dehydrogenase, 112
 phospholipids, 68
 pyruvate kinase, 88
 scolex, 16
 shell formation, 183
- Disc-shaped bodies, 203
- Disodium chromoglycate, 290
- Distal cytoplasm, 13, 203
- Disulphide bonds, 172, 173, 180
- Di-tyrosine, 172, 173
- Diurnal migration, 236
- DMAB method, 180
- DNA
 analysis, *E. granulosus* strains, 152–153
 cestode identification, 150–3
 characteristics, *H. diminuta*, 144
 expression library, *T. taeniaeformis*, 150
 probes, cestode classification, 150, 152, 153
- technology, vaccine development, 283, 304
- Dog
 anti-*Echinococcus* antibody, 239, 286
 bile composition, 49, 50, 51
 crypt size, 37
E. granulosus in gut, 240
 immunity to
 adult *E. granulosus*, 294–5
 Multiceps glomeratus, 294
 T. taeniaeformis, 294–5
 intestinal gases, 47
 intestine, pH, 46
 vaccination against, *E. granulosus*, 302
- Dolichols, *H. diminuta*, 73
- Dopa, 174, 175, 176
- Dopamine, 27, 174, 175, 176
- Dopaquinone, 173

Cambridge University Press

978-0-521-03895-9 - The Physiology and Biochemistry of Cestodes

J. D. Smyth and D. P. McManus

Index

[More information](#)*Index*

- Drug development, 77
Dubinolepis furcifera, chemical composition, 55
Duck
 host for *Schistocephalus*, 235
 intestinal amino acids, 42–43
Duthiersia fimbriata, cytochemistry, 160
Dwarf mice, 219

Early gametogony, 251
Early immunity, 296, 297
Earthworms, 186
Eccrine secretion, 17, 19
Ecdysone, *Moniezia expansa*, 73
Ecdysteroids
 fractionation, 74
 in cestodes, 73
Echeneibothrium beauforti
 cytochemistry, 160
 egg shell formation, 172
 spermatozoa, 159, 160
Echinatrium filosomum, 243
Echinobothrium
affine, 159
typus, 159
***Echinococcus* (sp.)**
Echinococcus-specific cloned DNA, strain characterisation, 153
Echinococcus-specific DNA fragments, cloned in plasmids, 150
 intermediary metabolism, 83
 malic enzyme, 99
 mitochondrial DNA, 142
 PEPCK, 92
 respiratory pathways, 99
 strains, variation, carbohydrate metabolism, 98
granulosus
 actin in cultured cells, 115
 adenine nucleotide content, 63
 adult metabolism, 98
 adult worm, 268
 amino acids, 126
 uptake, 126
 and *E. multilocularis*, distinguished by DNA analysis, 152
 antibody to, 239, 286
 antigen **5**, 65, 117–18
 antigen **B**, 65, 117–18
 antigens, E/S, 303
 functional, 303
 asexual/sexual differentiation, 268
 brood capsules, 3
 cat, as host, 37
 cell culture, 281
 cell-free, homologous protein synthesis, 138
 chemical composition, 56
 cholinesterase in, 30
 cyst fluid, parasite antigens, host components, 117, 118
 DNA, 55
 ecdysteroids, 73
egg
 formaldehyde survival, 187
 formation, 175
 hatching, 3, 191
 immunodiagnosis, 304
 survival, 185–6
 end-products, 84
E/S antigens, 295
 excystment/evagination requirements, 233
 farnesol synthesis, 73
fox, as host, 37
 genomic DNA library construction, 149
 glycocalyx, 9, 10
 glycolytic enzymes activities, 86
 mass action ratios, 87
 gut contact, 39
 hexokinase, 85
 horse strain
 carbohydrate metabolism, 100
 glycocalyx, 10
in vitro culture, 269–70
 immune responses, larvae, 296, 297
 immunodiagnosis in dogs, 295
***in vitro* culture**
 cystic stages, 270
 general, 267–76
 insemination, 163
 horse strain, 274
 Medium S.10E, 272
 oncospheres to cysts, 281
 protoscolecs to adult, 271
 reviewed, 268, 272
 sexual (strobilar) differentiation, 272
 technique, 271, 272
 translation of RNA, 139
 laminated membrane, 3, 58, 269
 life cycle, 3
 lipids, 55, 65, 66
 microtubules in cultured cells, 115
 neurobiology, 23
 neurosecretion, 28

Index

nitrogen excretory products, 135
 nucleic acid composition, 142
 oncosphere
 immune responses, 296–7
 immunofluorescence, 304
 migration in tissues, 229
 ultrastructure, 223
 pentose-phosphate pathway enzymes, 112
 phosphate, in calcareous corpuscles, 60
 phospholipids, 68
 phosphorycholine hapten, 117
 polysaccharide, 55
 prepatent period, 242
 protein, 55
 polymorphism, 125–9
 profiles, brush border fractions, 119
 proteolytic activity, 132
 protoscolex, differentiation, 268, 269, 270
 pyruvate kinase, 88
 RNA, 55
 characteristics and formation, 143
 ribosomal, 145
 separated by electrophoresis, 146
 rostellar glands, 18, 240
 scolex, 16
 attachment, 235, 240
 establishment, 239
 evagination, 234
 glands, 18
 secondary cysts, 268
 self-insemination, 162
 sheep strain
 carbohydrate metabolism, 100
 glycocalyx, 10
 in vitro culture, 267–76
 spermatozoa, 159
 stages in maturation, 251, 252
 strains (isolates), 53, 254
 chemical composition, 55
 distinguished by DNA analysis, 152, 153
 enzyme isoelectric focusing, 125–7
 glucose phosphate isomerase
 zymograms, 129
 in Australia, 127
 in Kenya, 128
 synapses, 25
 TCA cycle, 103, 104
 tegument, 14
 ultrastructure, 7
 vaccination, 302

multilocularis
 adenine nucleotide content, 63
 carbohydrate metabolism, 100
 cats, as hosts, 254, 255
 cell culture, 281
 cryopreservation, 281–2
 cyst fluid, host proteins, 117
 cysts, vaccination against, 302–3
 dogs, as hosts, 254, 255
 egg
 formation 175
 temperature survival, 186
 excystment/evagination requirements, 233
 glucose-6-phosphate dehydrogenase, 112
 glycolytic enzymes
 activities, 86
 mass action ratios, 87
 guanine + cytosine (G + C) content, DNA, 143
 hosts, 37
 immune responses, 297
in vitro culture, 267, 270, 274, 275, 276
 insemination, 163
 Medium S.10E, 272
 requirements, 39
 translation of RNA, 139
 lipids, 66
 monozoic forms, 274, 275, 276
 nucleic acid composition, 142
 phosphate in calcareous corpuscles, 60
 6-phosphogluconate dehydrogenase, 112
 prepatent period, 242
 pyruvate kinase, 88
 secondary cyst, 268
 self-insemination, 162
 spermatogenesis, 159
 strains, 254
 TCA cycle
 enzymes, 104
 intermediates, 103
 ultrastructure, 7
oligarthus, self-insemination, 162
Echinocotyle rosseteri, 171
 Eel, 200
 Effector T cell, 284
 Egg
 cyclophyllidean
 general, 156–157
 survival, 184, 185, 186
 temperature, effect on, 186
 cytoplasmic layer, histochemistry, 180

Index

- formation 171, 174
 - Cyclophyllidea, 174–183
 - Pseudophyllidea, **170**
 - see under individual species*
- general account, 156
 - hatching
 - Cyclophyllidea, 189
 - output, *H. nana*, 247, **248**
- production**
 - Hymenolepididae, 247, **248**
 - H. diminuta*, 183, **248**
- pseudophyllid, general, 156, **157**
 - Pseudophyllidea, 187, **188**
- shell (capsule)
 - formation, reviewed, 166
 - Hymenolepididae, 177, **178**, 179, 180
 - pseudophyllid-type, formation, 171
 - types, **169**, 170
 - variation in different groups, 183
- Eh, gut, **37**, 46
- Electrical activity, 33
- Electrodes, 40
- Electron transport system
 - aerobic animals 106
 - H. diminuta*, 107
 - M. expansa*, 107
 - Taenia* spp., 107
- Electrophysiology, 33
- ELISA (enzyme-linked immunosorbent assay)
 - in cysticercosis, 299
 - in echinococcosis in dogs, 295
- Embryonation, pseudophyllid eggs, 183, **184**
- Embryonic envelopes
 - formation, 166, **167**
 - histochemistry, 168
- Embryonic membranes (=envelopes), **157**
- Embryophore, **3**, **157**
 - chemical resistance, 187
 - coracidium, **157**, **203**
 - development, **167**
 - H. diminuta*, **178**, 180
 - H. nana*, 168, **178**
 - synthesis, 179
 - ultrastructure, **178**
 - variations in, 183
- Endocytosis
 - in cestodes, 14, 119
 - in enterocytes, **38**, 44
- Endoplasmic reticulum, **21**
- End-products, carbohydrate metabolism, 78
- Energy metabolism
- adaptations to pO₂ and CO₂, 97
 - homolactate fermentation, **91**
 - malate dismutation, **91**
 - strain variations, 97–8
- Enterocytes, 37, **38**
- Enteroenocrine cells, 40
- Envelopes, defined, 166
- Enzyme
 - electrophoresis, cestodes, 125
 - histolytic, 3, 212, **213**
 - host, 7
 - isoelectric focusing, strain identification, 126, **128**
 - larval excystment, 233
- Eosinophil, 36, **287**, **293**, 298
 - colony-stimulating factor, 298
- Eosinophilia, **293**, 294
- E/S antigens
 - E. granulosus*, 295, 302, 303
 - Taeniidae, 303
 - T. pisiformis*, 296–7
- Esox lucius*, 18, 196
- Establishment, in gut, 234, **235**, **236**
- Eubothrium* (sp.), plerocercoid, 211
 - acipenserium*, adult, 18
 - crassum*
 - lipids, 66, 67
 - phospholipids, 68
 - protein electrophoresis, 125
 - scolex glands, adult, 18
- rugosum*
 - chemical composition, 54, 56
 - plerocercoid, glands, **196**, **213**
 - procerco, glands, **196**, 209, **210**
 - scolex glands, adult, 18
 - ultrastructure, 7
- salvelini*
 - plerocercoid, glands, **196**
 - scolex glands, 18
 - ultrastructure, 7
- Eucylops serrulatus*, 200
- Eutetrahyynchus ruficollis*, egg shell formation, 171
- Evagination, scolex, 233, **234**
- Evasion, of immune response, reviewed, 299
- Excretory system, 20
- Excystment
 - CO₂ role, 47
 - Cyclophyllidea, 233
 - role of enzymes, 233
- Exocytosis, in enterocyte, **38**
- Facilitated diffusion, 43
- Factors affecting growth/differentiation, 253

Cambridge University Press

978-0-521-03895-9 - The Physiology and Biochemistry of Cestodes

J. D. Smyth and D. P. McManus

Index

[More information](#)*Index*

- Farnesol synthesis
H. diminuta, 73
T. hydatigena, 73
- Fasciola***, egg shell, 172
- Fast Red Salt B, phenolic stain, 172
- Fatty acids
 in cestodes, 69–73
 synthesis, 70
 uptake in cestodes, 69
- Fc-like receptors, 300
- Fertilisation, 166
 canal, 170
 compression requirement, 40, 263
- Fimbriaria fasciolaris***, egg formation, 175
- Fish
 parasitic castration by *Ligula*, 220
 parasitised by *Schistocephalus*, 221
- Fixation
 host–parasite interface, 239–40
 Zenker's fluid, 240
- Flame cells, 20
- Flavoprotein dihydrosphingosine reductase, 75
- Fluid mosaic model, 10
- Fluorescent technique, catecholamines, 23, 28
- FMRF-amide, 29, 30, 31
- 'Foreign', 1
- Formaldehyde, effect on eggs, 187
- Fox
 bile acids, 49
 crypt size, 37
- Freeze-clamping, for metabolite data, 85
- Freeze-etch studies, 14
- Frontal glands
 plerocercoid, 214
see also Scolex glands
- Frozen-thawed oncospheres, as vaccines, 303
- Fructose
 effect of *H. diminuta* growth, 247
 uptake in cestodes, 83
- Fucose, 59
- Fumarase, 93
- Fumarate reductase, 93, 101
- Functional antigens
E. granulosus, 303
T. saginata, 302
T. taeniaformis, 302
- GABA (γ -aminobutyric acid), 31
- Galactosamine, 59
- Galactose, 59
 effect on *H. diminuta* growth, 247
- α -D-Galactosidase, 161
- GALT (gut-associated lymphoid tissue), 287
- Gangesia*** spp., amino acids, 126
- Ganglion, 24
- Gas-liquid chromatography, 58
- Gasterosteus aculeatus***, 196
- Gastrin, 29
- Gelatinous layer, egg, histochemistry, 180, 190
- Gene
 definition, 154
 library construction with λ gt11, 151
- Genome size, *H. diminuta*, 142
- Genomic DNA library construction, 149
 λ gt, gene library construction, 151
- Genetic studies, 164, 165
- Genital anlagen, 261
- Genital pore formation, 251
- Genotype, effect on immune responses, 294
- Gentamycin, 272
- Germany, *T. saginata*, egg survival, 185
- Germinative cells, oncosphere, 222
- Glands
 apocrine, 17, 19
 frontal, 214
 green, 214
 in adult scolex, 18, 19, 240
 in coracidium, 196
 in larvae 196
 in plerocercoids, 196, 213
 in procercooids, 196, 209, 210
- Glaridacris catostomi***, egg shell formation, 171
- Globule leukocytes, 290
- Glucophosphate isomerase, in enzyme analysis, 164
- Glucosamine, 59
- D-Glucosaminic acid, 247
- Glucose
 effect on *H. diminuta* growth, 247
 intestinal uptake, 42
 oncosphere survival, 227, 228
- Glucose-6-phosphate dehydrogenase, 112
- Glucose phosphate isomerase polymorphism, 129
- Glucose-6-phosphate:NADP oxidoreductase, 206, 207
- Glucose-1-phosphate uridylyl transferase, 57
 transport, 8
 uptake
Calliobothrium verticillum, 81
H. diminuta, 80, 81

Index

- H. microstoma*, 81
 inhibitor of, 81
Taenia crassiceps, 81
 spermatozoa, 161
 β -D-Glucosidase, 161
 β -Glucuronidase, 161
 Glutamate dehydrogenase, *H. diminuta*, 134
 L-Glutamate:NAD oxidoreductase, 206
 Glutamic acid, 31
 γ -Glutamyl cycle, *Moniezia benedini*, 130
 D -Glyceraldehyde-3-phosphate:NAD oxidoreductase, 161
 L -Glycerol-3-phosphate:NAD oxidoreductase, 206
 α -Glycerophosphate oxidase, 161
 Glycine, 31, 43, 51
 Glycocalyx, 6
 general properties, 9
 PAS-positive components, 119, 120
 plasma membrane, 10
 ‘unstirred water’ layer, 42
 Glycoconjugates, 58
 Glycogen fixation, 19
 larval cestodes, 57
Ligula intestinalis, 19
Moniezia expansa, 57
 particles (α , β , γ), 57
 phosphorylase, *H. diminuta*, 88
Schistocephalus solidus, 19
 spermatozoa, 161
 synthase, 57
 Glycolipids, 10, 65
 Glycolytic enzymes, 85–91
 in cestodes, specific activities, 86
 mass action ratios, 87
 Glycoprotein
 H. diminuta, 11
 mucus, 41
 Glycoproteins, 9, 40, 57, 58
 Glyoxylate cycle, cestodes, 113
 Goat, 47, 274
 Goblet cell, 36, 38–9, 287
 Gold-labelled lectins, 58
 Golgi complex (apparatus), 6, 13, 226
 oncosphere, 226
 Goose, intestinal gases, 47
 Gradient hypothesis (Crane’s), 12
 Granular endoplasmic reticulum (GER), 6
 Granulomatous hypersensitivity, 294
 Great Britain, *Taenia saginata* egg survival, 185
 Green gland, plerocercoids, 214
 GRF (growth hormone releasing factor), 29
Grilliotia
 dollfusi, ultrastructure, 7
 erinaceus, serotonin as neurotransmitter, 137
 Growth
 adult cestodes, 241, 244, 245
 defined, 241
 density dependent, 207
 Growth hormone releasing factor, 29
 Guanidine, 63
 Guanine + cytosine (G + C) content in cestode DNA’s, 143
 Guinea-pig, bile acids, 49
 Gut, *see* intestine
Gyrocotyle, neuromuscular physiology, 33
Gyrocotylidea, egg shell formation, 171
 Haemin, in culture medium, 267
 Hamster
 Diphyllobothrium in, 236
 Schistocephalus in, 235
Haplobothrium globuliforme
 microvilli, 204
 plerocercoid, 211
 procercoid glands, 209–10
 Hatching (egg)
 CO₂ role, 47
 Cyclophyllidea, 189
 factors affecting, 187
 oncosphere penetration gland secretions, 224, 225
 Pseudophyllidea, 185, 187, 188, 189
 Hatching-sites, 164
 HCO₃⁻, 46–48
 Heart, 230
 Hédon–Fleig medium, 14
 Helper T cell, 284
Hepatotaenia, 35
 Heterolysomes, 6
 Hexacanth embryo, *see* Oncosphere
 Hexokinase
 in cestodes, 85
 Hexose uptake, 80–3
 Histamine, 36, 289, 290
 Histidine, 43
 Histolytic secretions, *Spirometra*, 212
 Holdfast, *see* Scolex
 Holosecretory mechanism, 18
 Homolactate fermentation, 91, 92
 Hooks
 histochemistry, 180
 oncosphere, 225
 Hormones, mammalian growth, 218, 219
 Horse

Index

- Horse (*cont.*)
 intestinal gases, 47
 strains, *E. granulosus*, 53, 254
 chemical composition, 55
 DNA analysis, 153
 in vitro culture, 274
- Host
 antigens, synthesised, 300
 enzymes, 10
 immune reactions, 283
 proteins
 adsorbed on tegument, 123
 in cyst fluid of taeniids, 117
 specificity, 36, 37, 200
- Host-like antigens, synthesis by parasites, 300–1
- Host-parasite
 interaction, 283
 interface, 1, 239
- Human growth factor gene, 219
- Human growth hormone, 218, 219
- Hydatid cyst, 3, 268, 269
 differentiation, 269
 immune responses, 298
 laminated membrane, 3, 269, 270
 morphology, 3
 sites in body, 230
 organisms, *see Echinococcus* spp.
- Hydatidosis, role of cats, 254
- Hydatigera*
krepikogarski, ultrastructure, 7
(*Taenia*) *taeniaformis* chemical
 composition, 56
 ultrastructure, 7
- Hydrocarbons, 66–67
- Hydrogen, in intestine, 47, 48
- Hydrogen peroxide formation, *Moniezia*, 111
- 3α-Hydroxyl-7,12α-diocholanic acid, 49
- 3α-Hydroxyl-7-oxocholanic acid, 49
- 3α-Hydroxyl-12-oxocholanic acid, 49
- 3α-Hydroxyl-6-oxocholanic acid, 49
- 3-Hydroxybutyrate:NAD oxidoreductase, 206
- 5-Hydroxytryptophan (5-HT = serotonin)
 as muscle transmitter, 33
 in cestodes, 25
 in *D. dendriticum*, 25
 in gut, 36
 in host, 25
 role in *H. diminuta* migration, 238
 synthesis, 25
- Hymenolepididae
 immunobiology, 291–293
- cholinesterase in, 30
 osmotic pressure, 51
 scolex glands, 17, 18
 synapses, 25
- Hymenolepis* (sp.), transaminase, 133
- citelli*
 chemical composition, 56
 egg hatching, 189
 excystment/evagination requirements, 233
 growth, worm load, 245
 guanine + cytosine (G+C) content of DNA, 143
in vitro culture, oncospheres/cysticercoids, 267
 lipids, 66
 phospholipids, 68
 satellite DNA, 142
 transport of nucleosides, 141
- diminuta*
 adenine nucleotide content, 63
 adenosine deaminase activity, 140
 adenosine kinase activity, 140
 amino acid(s), 130
 transport systems, 131
 uptake, 129
 uptake loci, 130
 L-amino acid oxidase, 134
 amino sugars, 59
 AMP deaminase, 140
 ANU (Australian) strain, metabolism, 92
 ATPase, effect on calmodulin, 120
 attachment site, 246
 beta-oxidation enzymes, 72
 brush border, plasma membrane, 67–9
 protein(s), 11
 protein synthesis, 123, 124
 Ca²⁺-ATPase in, 119–21
 calmodulin, properties, 121
 cell-free homologous protein synthesis, 138
 chemical composition, 55, 56
 colchicine binding, 116
 ¹⁴CO₂ production from ¹⁴C-labelled amino acids, 133
 cross-insemination, 163–165
 cytochemistry, sperm, 160
 de novo synthesis
 of phospholipids, 74
 of pyrimidines, 140
 differences in end-products in strobila, 98
 diurnal migration, 22, 236, 237

Cambridge University Press

978-0-521-03895-9 - The Physiology and Biochemistry of Cestodes

J. D. Smyth and D. P. McManus

Index

[More information](#)*Index*

- DNA characteristics, 144
 dolichols, 73
 ecdysteroids, 73
 effect on intestinal pH, 46
 egg
 formation, 175
 hatching, 189, 190
 output, 248
 production, 183, 245, 246
 structure 177, 178, 179
 electron transport system, 107
 end-products, 84
 energy production, 110–11
 excretory products, 95
 excretory system, 20
 excystment/evagination requirements, 233
 expulsion in mice, 291, 292
 farnesol synthesis, 73
 fertilisation, 165, 166
 fumarate reductase, 101
 genome size, 142
 glucose
 absorption, 80
 uptake, 80, 81
 glutamate dehydrogenase, 134
 glycogen
 phosphorylation, 88
 spermatozoa, 161
 synthesis, 57
 glyoxylate cycle, 113
 growth, 241, 244, 245, 291, 292
 guanine + cytosine (G+C) content in
 DNA, 143
 hexokinase, 85
in vitro culture
 adult, 265–6
 general comment, 260
 oncospheres to cysticercoids, 267
 inhibitor of proteolytic enzymes, 11
 Irish variety, 181
 mouse as host, destabilisation, 291, 292
 intermediary metabolism, 83
 intramitochondrial malate
 metabolism, 102
 lactate dehydrogenase, 89, 91
 life span, 183
 lipids, 65, 66
 major respiratory end-products, 95
 malic enzyme, 98–9
 membrane transport, 1, 131
 methionine uptake, 13
 migration, 22, 137
- mitochondria and oxidative phosphorylation, 109
 mitochondrial DNA, 142
 monoamine oxidase activity, 136
 nervous system, 23
 neurobiology, 23
 neuromuscular physiology, 32, 33
 neurosecretion, 28
 neutral sugars, 59
 nicotinamide nucleotide levels, 62
 nitrogen excretory products, 135
 nucleic acids synthesis, salvage pathways, 140
 O_2 consumption, oncosphere, 205
 oncosphere
 development in *Tribolium*, 228
 morphology, 222
 penetration, 224, 225, 226
 protein synthesis, 123
 secretions stained in neutral red, 224–225
 paramyosin, 115
 penetration glands, oncosphere, 222–224
 nicotinamide levels, 64
 PEPCK, 92–3
 PEPCK/Pyruvate kinase branchpoint, 94–8
 phospholipids, 68
 polysaccharides, 58
 prepatent period, 242
 protein constituents, brush border, 123
 protein synthesis in cysticercoid, 138
 purine and pyrimidine transport systems, 141
 pyruvate dehydrogenase, 105
 pyruvate kinase, 88, 90
 rat system, 291, 292
 renaturation of DNA, 145
 repetitive DNA, 142
 respiratory control of mitochondria, 109
 shell, histochemistry, 180
 sodium pump, 12
 spermatozoa, 159, 160
 sphingomyelin synthesis, 74, 75
 strain(s)
 general comment, 53, 253–4
 metabolic differences, 97–8
 migration, 237
 strobila, protein synthesis, 123
 subshell membrane, egg, 179
 succinate accumulation, 96–97

Index

- Hymenolepis diminuta* (cont.)**
- superoxide dismutase, 111
 - TCA cycle enzymes, 104
 - thymidine kinase activity, 140–1
 - transhydrogenases, 101
 - transport of nucleosides, 141
 - trypsin adsorption, 125
 - tubulin isolation, 116
 - unstirred water and glucose uptake kinetics, 82
 - values for acid secretion, 97
 - worm load, 243, 244, 245
- microstoma***
- adenine nucleotide content, 63
 - amino acids, 130
 - carbohydrate metabolism, 78
 - CO₂-fixation, 79
 - crowding effect, 247, 248
 - cytochemistry, sperm, 160
 - egg
 - hatching, 189
 - output, 248
 - end-products, 84
 - glucose uptake, 81
 - glycolytic enzymes, mass action ratios, 87
 - glycoconjugates, 58
 - guanine + cytosine (G+C) content in DNA, 143
 - habitat in bile ducts, 35
 - in vitro* culture
 - adults, 266
 - oncospheres, 267
 - intermediary metabolism, 83
 - intracellular bodies, 18
 - lactate dehydrogenase, 89, 91
 - malic enzyme, 99
 - neuromuscular physiology, 33
 - neurosecretion, 28
 - prepatent period, 242
 - satellite DNA, 142
 - spermatozoa, 159
 - tegument, 14
 - transhydrogenase, 101
 - transport of nucleosides, 141
- nana***
- crowding effect, 247, 248
 - cysticercoid-induced immunity, 293
 - egg
 - formation, 175
 - hatching, 189, 191
 - membranes, histochemistry, 168
 - structure, 177, 178
 - ultrastructure, 177, 178
 - egg-induced immunity, 293
 - endocytosis, 14
 - excystment/evagination, 233
 - glycoconjugates, 58
 - immunity to, 286
 - immunobiology, 292–4
 - in mouse, 292, 293
 - in rat, 292
 - in vitro* culture
 - adult, 265–267
 - oncospheres/cysticercoids, 267
 - life cycle, 2, 293
 - mouse-derived cysticercoids, 294
 - mouse strain, 254
 - nervous system, 24
 - neuromuscular physiology, 32
 - neurosecretion, 28
 - oncosphere
 - penetration, 229
 - polar filament, 178, 182
 - ultrastructure, 178, 222
 - prepatent period, 242
 - rat strain, 254
 - receptors, 32
 - rodent systems, 297
 - scolex, 16
 - spermatozoa, 159
 - strains, general comment, 254
- palmarum*, amino acids, 130**
- (sp.) transaminase, 133
- Hymenolepis*-type egg, 169, 174–182**
- Hypergammaglobulinaemia, 294
- Humoral responses, *see* Immune responses
- Hypochlorite, use in egg hatching, 193
- Hypodermic insemination, 164
- IEL (intra-epithelial lymphocytes), 287, 290
- IgA
- characteristics, 285
 - dimer, 287
 - in bile, 289
 - in cysticercosis, 299
 - in *H. diminuta* infections, 292
 - monomer, 287
 - receptors, 289
 - structure, 287
 - synthesis, 287, 288
 - transportation, 288
- IgD, characteristics, 285
- IgE
- characteristics, 285
 - in cysticercosis, 299
 - in gut, 287
 - in *H. diminuta* infections, 292

Index

- in mast cells, 290
- in oncosphere invasion, 297
- IgG**
 - characteristics, 285
 - in cysticercosis, 299
 - in *H. diminuta* infections, 292
 - in *Taenia* spp. infections, 297
- IgM**
 - characteristics, 285
 - in cysticercosis, 299
 - in *H. diminuta* infections, 292
 - in *T. crassiceps* infections, 300
- Ileum, 46**
- Immune response(s)**
 - and genotype, 294
 - evasion of 299–301
 - to larval cestodes, 295–9
 - to oncosphere, 296
- Immunisation**
 - against, adult cestodes, 301–2
 - E. granulosus*, 301
 - general 301–4
 - larval cestodes, 302–4
 - T. pisiformis*, 297
 - T. taeniaeformis*, 297
 - see also* Vaccination
- Immunity**
 - basic concepts reviewed, 284
 - to adult cestodes, 286, 287, 294
 - to adult *E. granulosus*, 294–5
 - to cestodes in general, reviewed, 286
 - to *Echinococcus* spp., 286
 - to *H. nana*, 286
 - to helminths, reviewed, 286
 - to Taeniidae, 294
- Immunobiology, 283–304**
- Immunocytochemical techniques**
 - in analysis of cestode surface 122
 - in protein and antigen characterisation, 117
- Immunocytology, in cestodes and turbellarians, 22, 31**
- Immunodepression, 294**
- Immunodiagnosis**
 - of *E. granulosus* in dogs, 295
 - reviewed, 304
- Immunofluorescence of *E. granulosus* eggs, 304**
- Immunoglobulins (Ig)**
 - general characteristics, 285
 - in gut, 36, 287
 - in lumen, 36
 - see individual immunoglobulins*
- Immunoperoxidase-antiperoxidase (PAP) technique, 29, 30**
- Immunosuppression, by *T. crassiceps*, 300**
- Inermicapsifer madagascarensis*, spermatozoa, 159**
- Inermiphyllidium pulvinatum*, osmotic pressure, 52**
- Infectivity, coracidium, 199**
- Inflammatory response, 287**
- Inhibitor**
 - of protease (taeniasatin), 58, 59
 - of trypsin, 301
- Inhibitory neurotransmitter, 30**
- Inner envelope (egg), 167, 178, 179, 190**
- Insect, spermatozoa, 160**
- Insects, egg transmission, 186**
- Insemination**
 - compression requirement, 40, 262, 263
 - failure *in vitro*, 273
 - in vitro*, 40, 259, 262, 263
 - reviewed, 162
 - tube for *in vitro* culture, 263
- Intermediary metabolism, cestodes species studied, 83**
- Intestinal mastocytosis, 294**
- Intestinal mucosa**
 - glucose transport, 8
 - uptake of dipeptides and tripeptides, 44, 45, 129
- Intestine**
 - effects of parasites on, 36
 - Eh*, 46
 - endocytosis, 38, 44
 - immunobiology, 286, 287
 - parameters and host specificity, 37
 - pH, 37, 45, 46
 - physiology, 41–51
- Intra-epithelial leukocytes, 290**
- Intra-epithelial lymphocytes (IEL), 287, 290**
- Intramitochondrial metabolism of malate, *H. diminuta*, 102**
- Intranuclear bodies, *Hymenolepis*, 18**
- Introvertus raipurensis*, 126**
- Invertebrate immunity, reviewed, 286**
- In vitro* culture (cultivation), 257–82**
 - basic problems, 258
 - cestode cells, 281
 - criteria for growth, 252, 259
 - experiments, pitfalls, 77
 - limitations, 53
 - nutritional requirements, 258
 - of Cyclophyllidea, 265–79
 - of *Echinococcus*, 272, 273, 274, 275, 276
 - monozoic forms, 275, 276

Cambridge University Press

978-0-521-03895-9 - The Physiology and Biochemistry of Cestodes

J. D. Smyth and D. P. McManus

Index

[More information](#)*Index*

- In vitro* culture (cont.)
 of *Hymenolepis*
diminuta, 265–6
microstoma, 266
nana, 265–267
Ligula intestinalis, 260, **264**
 of *Mesocestoides*
corti, 278–**279**, **280**
lineatus, 280
 of oncospheres to cysticerci
Hymenolepis spp., 267
Taeniidae, 281
 of procercooids, 265
 of *Pseudophyllidea*, 260
 of *Schistocephalus solidus*, 261–262, **263**
 of *Spirometra mansonioides*, 264
 of *Taeniidae*, 280–1
 terminology, 257
 uses, 257
see also individual species
- Ions, in egg hatching, 189
 Isocitrate:NAD oxidoreductase, 206
 Isoenzyme analysis, cestodes, 164
 Isoenzymes (isozymes), 88, **90**
PEPCK, 92
 use in parasite identification, 123–9
 Isolation of cestode nucleic acids, 145–6,
147, 148
 Isoleucine, 43
- J chain in IgA, **287**
 Janicki Cercomer Theory, 205
 Janus B Green, 193
 Jejunum, pH, 46
- Keratin
 blocks in embryophore, **3**, **157**, 182, 191
 embryophore, histochemistry, 180, 182
 structure, **173**
- Khawia*
iowensis, egg shell formation, 171
sinensis
 glycolytic enzyme activities, 86
PEPCK, 92
 pyruvate kinase, 88
 scolex glands, adults, 18
 TCA cycle enzymes, 104
- Kidney, 230
 Killer cells, 290
 Kupffer cells, 289
- Lacistorhynchus tenuis*
 cytochemistry, sperm, 160
 guanine + cytosine (G + C) content of
- DNA, **143**
 lipids, 66
 nitrogen excretory products, 135
 osmotic pressure, 52
 phospholipids, 68
 spermatozoa, 159
 urease activity, 134
- Lactic dehydrogenase
 coracidia, 207
H. diminuta, 89, 91
H. microstoma, 89, 91
 in isoenzyme analysis, 164
Schistocephalus solidus, 88
- L-Lactate: NAD oxidoreductase, 206, 207
 Lactate production, *H. microstoma*, 78
 Lagodeoxycholic acid, 49
 Lake Koljushkovoe, 201
 Lake Lergi, 200
 Lamina propria, 38, 239, **288**
 Laminated layer (membrane), **3**, 58
 Lanthanum nitrate, 14
 Laridae, 18
 Large compound potential (LCP), 33
 Larva ('metacestode'), biology reviewed, 195
 Larva/adult transformation, *D. dendriticum*, 250
- Larval cestodes
 glands, 196
 immunity to, 295
- Late immunity, **296**, 297
 Leu-enkephalin, 29, 31
 Leukotrienes, 36
 Lieberkühn, crypt of, 39, 239, **240**
 Lift, for *in vitro* culture, **273**
- Ligula intestinalis*
 adenine nucleotide content, 63
 amino acids, 126
 beta-oxidation enzymes, 72
 chemical composition, 54–56
 coracidium, 196
 enzymes, 206
 metabolism, 205
 survival, 199
 endocytosis, 14
 endproducts, 84
 enzyme electrophoresis, 125
 glucose-6-phosphate dehydrogenase, 112
 glycogen, 19
 glycolytic enzymes, 86, 87
in vitro culture, 40, 263–**264**
 isoenzyme analysis, 164
 intermediary metabolism, 83
 lipids, 67
 synthesis, 74, 75

Cambridge University Press

978-0-521-03895-9 - The Physiology and Biochemistry of Cestodes

J. D. Smyth and D. P. McManus

Index

[More information](#)*Index*

- malic enzyme, 99
 maturation, 235
 parasitic castration, 220
 PEPCK, 92
 phosphate content/calcareous corpuscles, 60
 6-phosphogluconate dehydrogenase, 112
 phosphoglucomutase polymorphism, 125
 phospholipids, 68
 plerocercoid, 211, 264
 glands, 196
 polymorphic variation, 164
 prepatent period, 242
 procercoid/plerocercoid transformation, 212
 proteolytic activity, 132
 pyruvate kinase, 88
 scolex, 234–5
 scolex glands, adult, 18
 sexual maturation, 214
 TCA cycle
 enzymes, 104
 intermediates, 103
 Light
 intensity, effect on egg hatching 188
 wavelength, effect on egg hatching, 188
 Linoleic ($C_{18,2}$) acid, 69
 Lipase activity, 70, 233
 Lipids
 acylglycerols, 66, 67
 adult and larval cestodes, 65, 66, 67
 egg, *H. diminuta*, 180
 free fatty acids, 66, 67
 localisation, 67
 predominant metabolic pathways, 76
 sterols, 66, 67
 synthesis, 74
 Lipoprotein(s), 65
 antigens, 117
 scolex secretion, 18
 Lithocholic acid, 49, 51
 Liver, 288
Lota lota, 18
Lucknowia indica, amino acids, 126
 Lumen, immunoglobulins in, 36, 287
 Lymphatics, 288
 β -Lymphocytes, 285
 Lymphokines, 284
 Lysophosphatidic acid, 68
 Lysophosphatidylcholine, 68
 Lysophosphatidylethanolamine, 68
 Lysine, 43
 Lysosomes, 6, 38, 241
Lytocestus indicus
- amino acids, 126
 cytochemistry, sperm, 160
 transaminases, 133
- Macrocallista nimbosa*, 29
Macrocylops
 albidus, 200
 funcus, 200
 Macrophages, 36, 284, 287, 297
 activation of, 294
 Magnesium, 33
 Major basic protein (MBP), 298
 Malate dehydrogenase
 in carbohydrate metabolism, 93
 in isoenzyme analysis, 164
 polymorphism, *M. expansa*, 125
 Malate dismutation, 91, 93
 L-Malate:NAD oxidoreductase, 206
 Malic enzyme
 in carbohydrate metabolism, 93
 in cestodes, species studied, 99
 Mammalian embryo, 1
 Mammalian growth hormone, 218, 219
 Mammary glands, 288
 Man
 bile composition, 49, 50
 immune responses
 in cysticercosis, 298, 299
 in hydatidosis, 298
 mucosa turnover time, 39
 Manganese ions, 33
 Mannose
 effect on cysticercoid growth, 247
 in *H. diminuta*, 59
 Masking of host antigens, 300
 Masseter muscle, 230
 Mast cells
 differences, 289, 290
 in mucosal infections, 287
 in oncosphere invasion, 297
 Mastocystosis, 36
 Maturation
 defined, 241
 stages of, 251, 252
 Meal, meat, 47
 Mechanoreceptors, 31
 Mediators, 284
 Medium S10E for *Echinococcus* culture, 272
 Mehlis' gland, 170
 Membrane
 α -amylase adsorption, cestodes, 123
 (= contact) digestion, 10, 14
 structure, 10
 transport, 42–3

Index

- Menadine reductase, 206
 Mercuric bromophelon blue, 168, 180
Mesocestoides (sp.)
 neurobiology, 23
 paruterine organ, 183, 279
corti
 adult, 279
 apical massif, 277, 278
 asexual division, 277
 budding, 256, 277
 calcareous corpuscles, 61
de novo purine synthesis, purines/pyrimidines, 140
 end-products, 84
 evagination requirements, 233
 glycolytic enzymes, activities, 86
 immune responses, tetrathyridia, 297
 insemination, 163
 intermediary metabolism, 83
 life cycle, 254–256
 malic enzyme, 99
 PEPCK, 92
 phosphate content, calcareous corpuscles, 60
 pyruvate kinase, 88
 TCA cycle enzymes, 104
lineatus
 egg formation, 175
 evagination requirements, 233
in vitro culture, 280
 prepatent period, 242
Mesocritetus auratus, 18
Mesocyclops oithonoides, 201
Metabolism
 coracidia, 205
 eggs, 193
 fatty acids, 70–3
 larvae, 231
Metacestode, *see* larval cestode
 Met-enkephalin, 3/
 Methane, in intestine, 47, 48
Methanobacterium rumentum, 48
 Methionine, in duck, gut, 43
 uptake, 13
 L-Methionine:tetrazolium oxidoreductase, 206
 Methylbutyrate production, 93
 Methylmalonyl-CoA mutase, propionate formation, 105, 122
 Methylene blue, 193
 Microapocrine secretion, 17, 19
Microtriches
Diphyllobothrium, 19
 formation, 204, 212
 size, 7
 ultrastructure, 9
Microtrix (singular), *see* Microtriches
Microtubules
 in spermatozoa, 158, 160
 procercoïd, 204
Microvilli, 7, 37
Migration in gut
D. dendriticum, 236
Hymenolepididae, 236, 237, 238
 role of 5-HT, 27
 triggers, 238
Millon reaction, 180
Mitochondria, 6
 granular, 160
 in coracidium, 203
 structural characteristics, 107
Mitochondrial DNA (mtDNA)
Echinococcus spp., 142
H. diminuta, 142
Taenia spp., 142
Mitosis
 in *Diphyllobothrium*, 215
 in epithelium, 39
 in nerve cells, 24
Modulation of host defences, 301
Molecular biology, terms defined, 140, 154–5
Molecular mimicry, 117, 300
Molecular weights, proteins, 11
Molluscs
 as intermediate hosts, 171
 neuropeptide in, 29
Moniezia
benedini
 aspartate transcarbamylase activity, 140
 chemical composition, 55, 56
 glucose-6-phosphate dehydrogenase, 112
 α-glutamyl cycle; amino acid transport, 130
 PEPCK, 92
 6-phosphogluconate dehydrogenase, 112
 pyruvate kinase, 88
denticulata, lipids, 66
expansa
 adenine nucleotide content, 63
 ‘aerobic’ mitochondria, 94, 105
 4-aminobutyrate pathway, 134
 ‘anaerobic’ mitochondria, 95, 105
 azoreductase activity, 136
 chemical composition, 55, 56

Index

- ecdysone, 73
 ecdysteroids, fractionation, 74
 egg formation, 175
 electron transport system, 107
 end-products, 84
 enzyme electrophoresis, 125
 glycogen, 57
 glycolytic enzymes, mass action ratios, 87
 hydrogen peroxide formation, 111
 20-hydroxyecdysone, 73
 intermediary metabolism, 83
 lipids, 65, 66
 malate dehydrogenase polymorphism, 125
 malic enzyme, 99
 mitochondria, 109
 neurobiology, 24
 nitro-reductase activity, 136
 osmotic pressure, 51
 oxygen as external electron acceptor, 110
 pathway, carbohydrate metabolism, 94
 PEPCK, 92–3
 PEPCK/pyruvate kinase branchpoint, 94–5
 phosphofructokinase, 88
 phospholipids, 68
 prepatent period, 242
 presence of rhoquinone, 109
 proposed electron transport system, 108
 proteolytic activity, 132
 pyruvate kinase, 88
 scolex glands, 17
 superoxide dimutase, 111
 transaminases, 133
 Monoamine oxidase activity, *H. diminuta*, 136
 Monoclonal antibodies, 219
Monocestes
americanus
 egg formation, 175
 spermatozoa, 159
thomasi, cross-insemination, 164
 Monophenol *o*-diphenol:oxygen oxidoreductase, 172
Monorygma macquariae, self-insemination, 162
 Monozytic culture, 257
 Monozoic *E. multilocularis*, 274, 275, 276
 Monozoic forms, 211
 Mortality, copepods, 202, 209
 Mouse, bile acids, 49
 MTT, 192–193
 Mucopolysaccharides
 in cestodes, 57
 in egg, 168, 180
 Mucoproteins, 57
 Mucosa
 enterocyte, 37, 38
 epithelium, 288
 IgA in, 288
 immunobiology, 286, 287
 Mucus
 gland
 in Mehlis' gland, 170
 secretion stimulus, 289
 secretion, 36, 39
 structure, 40, 41
Multiceps
endotoracicus, ultrastructure, 7
glomeratus, adult, immunity to, 294
multiceps (*Coenurus cerebralis*),
 chemical composition, 56
 α -and β -Muricholic acid, in bile, 49
 Muscle(s) contraction, 32–3
 oncospheres, 225
 physiology, 22
 retractor, 24
 ultrastructure, 21
 Myeloperoxidase, 36
 Myocytes, 19, 20, 21
 Myofibrils, 20, 21
 Myosin, 22
Myxocephalus quadricornis, 18
 Myzorhynchus, 17
 Na⁺, 8; *see also* sodium
 Na⁺/K⁺-ATPase, 12
 NAD, 62
 NADH, 62
 NAHD:tetrazolium oxidoreductase, 206
 NADPH:tetrazolium oxidoreductase, 206
 NADPH:NAD transhydrogenase, 206
 Neberkern, 160
 Negative binomial, 202
 Neotenic, neoteny, defined, 211
 Nervous system
Diphyllobothrium, 23
Dipylidium caninum, 23
E. granulosus, 23
 general account, 22, 23–24
Hymenolepis
diminuta, 23
nana, 23, 24
Mesocestoides sp., 23
 oncosphere, 225–6

Index

- Neurites, 24
 Neurocysticercosis,
 immunolectrophoresis, 298
 Neurocytology, 24
 Neuroendocrine systems, 22, 25
 Neuromuscular physiology, 82
 Neurones
 aminergic, 25, 27
 peptidergic, 28, 29, 30
 Neuropeptides, 22, 29
 Neutrophils, 36
 Neurpile, 24
 Neurosecretion
 E. granulosus, 272
 H. diminuta, 28
 Neurosecretory cells, 28
 in oncosphere, 226
 Neurosecretory system, 29, 31, 250, 251
 Neurotenisin, in *D. dendriticum*, 29, 31
 Neurotransmitters, 25
 Neutral lipids, 66, 67
 Neutral red, 193
 staining penetration glands, 223, 234, 235
 Neutrophils, 287, 297
 Nickel, 33
 Nicotinamide
 levels, *H. diminuta*, 64
 nucleotides, 62
 Nile blue sulphate, 193
 Nitrogen
 excretory products of cestodes, 135
 in vertebrate intestine, 47, 48
 Nitro-reductase activity, *M. expansa*, 136
 Non-cloned receptor, 24, 31–2
 Non-permissive host, 292
 Non-self tissue, 1, 300
 Noradrenaline (norepinephrine), 27
 Nuclear magnetic resonance (n.m.r.)
 analysis, 95
 Nucleic acid
 composition, *Echinococcus* spp., 142
 synthesis in cestodes, 140
 Nucleoside transport in Hymenolepididae,
 141
 Nucleotides, 62
 Nucleus, secretion from, 18
***Nybelinia* spp.**
 amino acids, 126
 collagen, 114
 O₂ consumption
 coracidia, 205
 oncospheres, 205
 intestine, vertebrates, 47
 mucosal, 48
 Oleic (C_{18:1}) acid, 69
Oncorhynchus
 kisutch, 18
 nerka, 196
 tschawytscha, 18
Onchobothrium uncinatum, spermatozoa, 159
 Oncospheral membrane
 cyclophyllid, 157
 general, 166, 167, 168
 H. diminuta, 190
 ultrastructure, 178, 182
 Oncosphere
 activation, 189, 190
 agglutination, 297
 as vaccine, 302
 cyclophyllidean, 157
 developing, 167
 formation, 253
 H. diminuta, protein synthesis, 123
 immune responses, 296
 in vitro culture, 230, 281
 muscles, 225
 nervous system, 225–6
 O₂ consumption, 205
 penetration, vertebrates, 229, 230
 proteolytic activity, 223
 pseudophyllid, 157
 secreting activities, 223, 224, 225
 secretions as vaccines, 224
 sonicated, as vaccines, 303
 survival, 192, 226, 227
 Oocapt, 170
Ochorististica
 anolis
 egg formation, 175
 uterine capsules, 183
 sigmodies, neurobiology, 24
 symmetrica, excystment/evagination, 233
 Oogenesis, reviewed, 161
 Ootype, 170
Ophryocotyle insignis, self-insemination,
 162
Ophryocotyloides corvorum, spermatozoa,
 159, 160
 Ornithine (Krebs–Henseleit) cycle, 136
***Orygmatobothrium* (sp.)**, guanine + cytosine
 (G + C) content of DNA, 143
 musteli
 lipids, 66
 phospholipids, 68
 self-insemination, 162

Cambridge University Press

978-0-521-03895-9 - The Physiology and Biochemistry of Cestodes

J. D. Smyth and D. P. McManus

Index

[More information](#)*Index*

- Osmerus eperlanus*, 196
 Osmoreceptors, 31
 Osmotic relationships, 51
 Ostracods, 171
 Ouabain, 12, 8
 Outer envelope, egg, 157, 167, 168
 Overdispersion, 202
 Ovaries, suppressed by larva, 220–1
 Ovicides, 186
 Oviduct, 170
 Ox, bile, 49
 Oxidation-reduction potential, 37, 46
 Oxidative deamination, 134
 Oxidative phosphorylation, 106
 Oxidoreductase, spermatozoa, 161
 3-Oxosphinganine reductase, 75
 Oxygen tension, alimentary canal, 47, 48
 Oxytocin, 29
 Pancreatin, 192, 233
 Papain, 11
Parabothrium gadi-pollachi, scolex, 17
 Paraldehyde-fuchsin (PAF), 28, 180, 226
 Paraldehyde-thionin, 28
 Paramyosin, 115
 Parasite antigens and host components,
 cyst fluid, 118
 Parenchyma, 19
Paricterotaenia (Polycercus)
paradoxa
 excystment/evagination, 233
 oncosphere, 222
 microtriches, formation, 204
porosa
 chemical composition, 55
 ultrastructure, 7
Parionella spp., amino acids, 126
 Parotid gland, 230
 Paruterine organ, 183, 279
 PAS (periodic acid-Schiff) positive
 egg envelopes, 180
 hydatid cyst, 269, 270
 interproglottidal glands, 17
 polysaccharide protein complex, 58
 Pathogenesis, adults, 241
 pCO₂
 egg hatching, 192
 gut, 37
Pelichnobothrium speciosum, neurobiology,
 24–5
 Penetration gland
 coracidium, 196, 201
 functions, 223–4
 oncosphere, *H. diminuta*, 180, 222, 223–4
Penetrocephalus (sp.), plerocercoid, 211
ganapatii, phenol oxidase, 176
 ubiquinone, 109
 vitamin K, 109
 Pentose-phosphate pathway, 112
 in coracidia, 207
 in *E. granulosus*, enzymes, 112
 PEPCK (phosphoenol pyruvate
 carboxykinase)
 in cestodes, 92
 isoenzymes, 92
 see also under individual species
 PEPCK/pyruvate kinase branchpoint, 94–8
 Penicillin, 272
 Pepsin
 action on *E. granulosus*, 12
 in egg hatching, 192
 in excystment/evagination, 233
 resistance to, 11
 Peptide(s)
 as neurotransmitters, 25
 carrier system, 44
 histidine isoleucine, 29
 intestinal uptakes, 42–45
 Peptidergic nerve fibre, 26
 Peptidergic neurones, 28, 29, 30
Perca fluviatilis, 18, 196
 Perikarya, 13
 Perinuclear cytoplasm, 13
 Periodic acid-Schiff, *see* PAS
 Permeability
 anomalous, 51, 52
 intestinal, 36
 Peroxidase activity, 111, 206
 PGM-2, in *Ligula*, 164
 pH
 alimentary canal, 45, 46
 intestinal, affected by *H. diminuta*, 46
 methionine uptake, 13
 mucosal, 40
 phenol oxidase, 174
 Phagocytosis, of oncospheres, 40
 Phagolysosome, in enterocyte, 38
 Phagosome, in enterocyte, 38
 Phe-Met-Arg-Phe-NH₂, 31
 Phenol oxidase
 catechol test for, 172
 from *Penetrocephalus ganapatii*, 174,
 175, 177
 in quinone tanning, 172, 173
 zymogram, 176
 Phenols, cytochemical staining, 172
 Phenylalanine, 43
 Phlorizin, 8, 12, 81

Cambridge University Press

978-0-521-03895-9 - The Physiology and Biochemistry of Cestodes

J. D. Smyth and D. P. McManus

Index

[More information](#)*Index*

- Phosphagen phosphotransferase, 63, 65
 Phosphatidic acid, 68
 Phosphatidylcholine (lecithin), 68
 Phosphatidylethanolamine (cephalin), 68
 Phosphatidylinositol, 68
 Phosphoenolpyruvate carboxykinase, *see* PEPCK
 Phosphofructokinase
 in *Moniezia expansa*, 88
 in *Schistocephalus solidus*, 88, 89
 Phosphoglucomutase
 in *H. diminuta*, 57
 polymorphism in *Ligula intestinalis*, 125, 164
 6-Phosphogluconate dehydrogenase, 112
 6-Phosphogluconate:NADP oxidoreductase, 206, 207
 Phospholipase, 36
 Phospholipids
 in cestodes, 68
 in coracidia, 198, 203, 205
 Phosphorylase system, spermatozoa, 161
 Phosphorylcholine hapten, cestodes, 117
***Phyllobothrium* (sp.)**
 guanine + cytosine (G + C) content of DNA, 143
 insemination, 162, 164
 foliatum, osmotic pressure, 52
 gracile, cytochemistry, sperm, 159, 160
 Pig,
 bile acids, 49
 intestinal gas, 47
 Pigeon, host for *Schistocephalus*, 235
 Pinocytosis, cysticercus, 231
 Pinosome, 6
 Pituitary, in fish with *Ligula*, 220
 Placenta, 285
 Plasma cells, 36, 284
 Plasmagens, 68
 Plerocercoid
 chemical composition, 56
 development, 211
 glands in, 196, 213
 growth, 211
 in vitro culture
 general comments, 257
 see also individual species
 lipids, 67
 phospholipids, 68
 somatic/genital differentiation, 214
 Polar filament, histochemistry, 168
 Pollena Jod k, 187
Poly cercus paradoxa*, *see Paricercotaenia paradoxa
 Polyisoprenoid synthesis, 73
 Polymorphic enzymes, *L. intestinalis*, 164
 Polyphenol oxidase, *see* Phenol oxidase
 Polysaccharides
 in cestodes, 57
 in coracidia, 203, 205
 Polyzenic culture, 257
 Population
 density, *H. diminuta*, 246
 dynamics, 201
 Pore canals, 15
Porogynia, 35
 Post-encystment (= late) immunity, 296, 297–8
 Posterior bladder, 269–270
 Pre-encystment (= early) immunity, 296, 297
 Pre-patent periods of cestodes, 242
 Prevalence
 dynamics, 201
 procercooids in copepods, 209
***Priapoccephalus* spp.**, 60
 Proboscoides, 17
 Procercooid
 development, 207
 glands, 196, 209, 210
 growth, 207
 lipids, 67
 phospholipids, 68
 prevalence in copepods, 201
 Procercoid/plerocercoid transformation, 211–12
***Progamo taenia* sp.**, 35
 Progenesis, defined, 211
 Progenetic plerocercoids, 235
 Proglottides, 5
 Propionate
 formation, in cestodes, 105, 106
 production, *H. microstoma*, 78
 Propionyl-CoA carboxylase, *S. mansonioides*, 105
 Prostaglandins, 36, 287
 Protease(s)
 VII, 11
 in mast cells, 289, 290
 inhibitors of, 58
 S. erinacei, function 132
 taeniaestatin as inhibitor, 58
 Protein
 electrophoresis, cestodes, 125
 in brush border membranes, 119
 molecular weights, brush border, 11
 synthesis
 in cestodes, 138–9
 in *H. diminuta*, 123
 Protein-carbohydrate complexes, 58

Cambridge University Press

978-0-521-03895-9 - The Physiology and Biochemistry of Cestodes

J. D. Smyth and D. P. McManus

Index

[More information](#)*Index*

- Proteocephalus* (sp.)**, chemical composition, 54
- ambloplitis***
procercoid/plerocercoid transformation, 212
ultrastructure, 7
- exiguus***
chemical composition, 54
coracidium, 196
lipids, 66
phospholipids, 68
- filicollis***
coracidia, 196
prevalence in copepods, 200, 201
procercoid, prevalence, 201
- longicollis***
cytochemistry, sperm, 161
egg shell formation, 172
spermatozoa, 159
- percae***
coracidia, 196
scolex glands, adults, 18
- tidswelli***, ultrastructure, 7
- Proteoglycans, 58, 289, 290
- Proteolytic activity
E. granulosus, 132
L. intestinalis, 132
M. expansa, 132
oncosphere, 223
S. erinacei, 132, 213, 231
S. solidus, 132
T. saginata, 132
inhibition of, 11, 58
- Protoscoleces
Echinococcus spp., chemical composition, 56
in vitro differentiation, 269, 270
lipids, 66
phospholipids, 68
- Proximal cytoplasm, 13
- Pseudanthobothrium* sp.**, sperm, 159
- Pseudophyllidea(n) egg, 156, 157, 170, 174
formation, 169
viability, 183, 184
- Pseudophyllidean-type egg, 170, 171, 174
- Pterobothrium lintoni***, urease activity, 134
- Pungitius pungitius***, 200–1
- Purine and pyrimidine transport, 141
- Pyruvate dehydrogenase, 93
in *H. diminuta*, 105
in *S. solidus*, 105
- Pyruvate kinase, in cestodes, 88
- o*-Quinone, in tanning egg, 172, 173
- Rabbit
bile acids, 49
intestinal gases, 47
- Raillietina* (sp.)**
amino acids, 126
neurobiology, 24
self-insemination, 162
- carmeostrobilata***, sperm, 159
- cesticillus***
chemical composition, 56
excystment/evagination requirements, 233
lipids, 65
phosphate content, calcareous corpuscles, 60
transaminases, 133
- echinobothridia***
chemical composition, 55
cytochemistry, sperm, 161
egg formation, 175
lipids, 65
- fuhrmanni***, lipids, 65, 66
- johri***, cytochemistry, sperm 161
- kashiwarensis***, excystment/evagination requirements, 233
- tetragona***
chemical composition, 55
cytochemistry, sperm, 161
egg formation, 175
enzyme electrophoresis, 125
lipids, 65
- Raja* spp.**, 36
- Rana ridibunda***, 196
- Rat
bile acids, 49
gut turnover times, 39
host for *Schistocephalus*, 235
intestinal pO₂, 47
mast cell protease (RMCP), 290
- Receptaculum seminis, 170
- Receptors, 24, 31
- Recombinant DNA libraries, 148–50, 155
- Red blood cells, antibody to, 301
- Regulation of respiratory metabolism, 85
- Rejection of *H. diminuta*, 291, 292
- Relative humidity, 228
- Renaturation of DNA in *H. diminuta* and *Dugesia tigrina*, 145
- Repetitive DNA, *H. diminuta*, 142
- Resorcin-fuchsin, 28
- Respiration, large species, 54
- Respiratory control, *H. diminuta*, 109
- Restriction endonucleases
defined, 154
digestion, 152

Index

- Retroviruses, 300
 Rhamnose, 59
 Rheoreceptors, 31
Rhinebothrium flexile, insemination, 164
 Rhodoquinone, 107–9
 in *H. diminuta*, 73
 Ribose, 59
 Ribosomal RNA, *E. granulosus*, 145
 Ribosomes, egg, 182
 RMCP I/II, 290
 RNA
 and molecular mimicry, 300–1
 characteristics and formation, *E. granulosus*, 143–5
 electrophoretic separation, *E. granulosus*, 146
 Roach, castrated by *Ligula intestinalis*, 220
 Roller tube culture technique, 266
 Rostellar pad, 16, 240
 Rostellum, 16, 24
 Rumen, cattle, 48
 Ruthenium red, 14
 Sakaguchi reaction, 180
 Salivary glands, 288
Salvelinus alpinus, 18
 Sapocholic acid, 49
 Satellite DNA in *Hymenolepis* spp., 142
 Schiff test (PAS), see PAS, 17
***Schistoccephalus* (sp.)**
 glycogen, 19
 guanine + cytosine (G + C) content of DNA, 143
solidus
 adenine nucleotide content, 63
 beta-oxidation enzymes, 72
 chemical composition, 56
 coracidia, survival, 199
 egg shell formation, 171
 end-products, 84
 endocytosis, 14
 enzyme electrophoresis, 125
 fertilization, 262, 263
 glucose-6-phosphate dehydrogenase, 112
 glycolytic enzymes, 86, 87
 in vitro culture 40, 262, 263, 265
 insemination, 259, 262, 263
 intermediary metabolism, 83
 isoenzyme analysis, 164
 lactate dehydrogenase, 88
 lipids, 67
 malic enzyme, 99
 maturation *in vivo*, 17, 235
 neurohormonal peptides, 31, 251
 osmotic pressure, 51
 PEPCK, 92
 6-phosphogluconate dehydrogenase, 112
 plerocercoid, 211, 261
 glands in, 196
 in fish, 221
 prepatent period, 242
 procercoid/plerocercoid transformation, 212
 proteolytic activity, 132
 lipid synthesis, 74
 phosphagen (taurocyamine)
 phosphotransferase, 65
 phosphofructokinase, 88, 89
 phospholipids, 68
 pyruvate dehydrogenase, 105
 pyruvate kinase, 88
 scolex, 17, 234, 235
 scolex glands, adult, 18
 self-insemination, 162–3, 263
 serotonin in, 251
 sexual maturation, 214
 superoxide dismutase, 111
 TCA cycle
 enzymes, 104
 intermediates, 103
pungitii
 coracidium, 196
 prevalence in copepods, 200, 201
Schistosoma mansoni, 47
 Sclerotin, chemical structure, 172, 173
 Scolex
 attachment, 235–6
 deformatus, 17
 E. granulosus, in dog gut, 240
 evagination, 233, 234
 general account, 15–18
 glands
 adult, 17, 18, 19, 240
 larval, 196, 209, 210, 213
 host specificity, 36
 immunocytology, *D. dendriticum*, 29
 SDS/polyacrylamide gel electrophoresis (SDS/PAGE); proteins, 119
 Secretion
 rostellar glands, *E. granulosus*, 18, 240
 scolex glands, 17–19
 Secretory antibody, 288
 Secretory component (SC), 287, 288
 Secretory IgA, 288
 in gut secretion, 297
 Segmentation, 251
 Segments, 5
 Self and non-self tissue, 300

Index

- SEM (scanning electron microscopy), *see individual species*
- Sense organs, 31
- Septic tank, egg survival in, 186
- Serine, palmitoyl-transferase, 74
- Serine protease, 290
- Serotonin (5-HT)
- hormonal role in metabolic regulation, 137
 - immunocytochemical technique for, 22, 31
 - in cestodes and turbellarians, 31
 - role
 - as neurotransmitter, 136–7
 - in migration, 238
 - synthesis, 137
- Serous gland cells, in Mehlis' gland, 170
- Sewage, egg survival in, 185, 186
- Sex differences, copepods, 208
- Sexual differentiation
- E. granulosus*, 250, 268, 272–275
 - E. multilocularis*, 274, 275
 - M. corti*, 254–256, 278, 280
 - M. lineatus*, 250, 280
 - triggers inducing, 249–50
- SH groups, 241
- Sheep
- bile acids, 49
 - intestinal gases, 47
- Shell (= capsule), 157
- formation
 - cyclophyllidean-type egg, 174
 - pseudophyllid-type, 171–4
 - H. diminuta*, 190
 - X-ray microanalysis, 172
- Shipleya inermis*, egg formation, 175
- Silic acid, 10
- Singer–Nicolson membrane model, 10
- Site selection, 234, 235–237
- Skrjabinia* spp., amino acids, 126
- Sludge, egg survival in, 186
- Snell mice, 219
- Sodium pump, 12
- Sodium sulphide, 193
- Sodium transport system, 8
- Somatic antigens, *T. hydatigena*, 302
- Somatostatin, 31
- Sonicated oncospheres, as vaccines, 303
- Southern hybridisation technique and cestode identification, 152
- Soviet Union, *T. saginata* eggs, 185
- Spargana (= plerocercoids), 212–13
- Spathebothrium*, 17
- Sperm transfer, 162; *see also* Insemination
- Spermatocytes, 252
- Spermatogenesis, reviewed, 157
- Spermatozoa
- biochemistry, 160–1
 - cytochemistry, 160
 - morphology, 157, 158, 159
 - one/two axoneme types, 158, 159
- Sphingomyelin, 68
- synthesis, 74, 75, 76
- Spirometra erinacei*
- cysteine protease, 132
 - growth in mice, 218
 - growth-promoting effect, 218, 219
 - PEPCK, 92, 93
 - plerocercoid, 211–213
 - glands, 196
 - procercoid/plerocercoid transformation, 212
 - protease, 132, 212–213
 - pyruvate kinase, 88
 - ultrastructure, 7
- mansonoides*
- acyl-CoA carboxylase, 105
 - acyl-CoA transferase, 105
 - cobalamin
 - uptake, 121–122
 - conversion to adenosyl-cobalamin, 122
 - coracidium, 196
 - coracidium/procercoid transformation, 203
 - cyanocobalamin receptor, 121
 - end-products, 84
 - evagination requirements, 233
 - growth factor, synthesis, 300
 - in vitro* culture, 264–5
 - lipids, 66
 - malic enzyme, 99
 - methylmalonyl-CoA mutase, 105
 - and propionate formation, 122
 - microtriches, formation, 204
 - phosphate content of calcareous corpuscles, 60
 - phospholipids, 68
 - plerocercoid
 - biology reviewed, 211
 - growth factor, 218, 219
 - prepatent period, 242
 - procercoid/plerocercoid transformation, 212
 - propionyl-CoA carboxylase, 105
 - rhodoquinone, 109
 - transhydrogenases, 101
 - ubiquinone, 109
- Squalene, 73
- Staining, penetration glands, 223

Cambridge University Press

978-0-521-03895-9 - The Physiology and Biochemistry of Cestodes

J. D. Smyth and D. P. McManus

Index

[More information](#)*Index*

- Staphylepis rustica***, amino acids, 130
 Stearic ($C_{18:0}$) acid, 69
Stem cell, 284
 Stenoxenous, 197
 Sterocholesterol, 49
 Sternberger's PAP technique, 29, 30
 Steroid biosynthesis, 73
***Stilesia* (sp.)**
 bile duct, 35
 egg formation, 169, 171
globipunctata
 chemical composition, 55
 egg formation, 175
Strains
 cestodes, 53
 differences in carbohydrate metabolism, 79
E. granulosus, chemical composition, 55
 host effects, 53, 253
 of *H. diminuta*, 253–4
Streptomycin, 272
Strobilisation, triggers, 249–50
Strobilocercus
 chemical composition, 56
 lipids, 66
 phospholipids, 68
 protease inhibitor, 58
Subshell membrane, 157, 166, 179
Substrate, for *E. granulosus* culture, 39
Subtilisin, 11
Succinate
 as 'crowding factor', 247
 decarboxylase, 93
 dehydrogenase, 206
 production by *H. microstoma*, 78
Succinic dehydrogenase, 161
Sudan Black, 180
Sugars, intestinal digestion, 42
Sulphydryl groups, 180
Superdioxide dismutase, in cestodes, 111
Suppressor T cell, 284
Surface amplification factor, 7
Surface layer, 13
Survival
 coracidium, 198
T. saginata eggs, 185, 186
Susceptibility, copepods, 200
Switch, larva/adult, 28
Synapses, *D. dendriticum*, 25, 26
Syncytial layer, 13
T cell, 284, 287, 296
T-tubule system, 21
***Taenia* (sp.)**
- egg**
 formation, 169, 171, 182–3
 morphology, 157
enzyme electrophoresis, 125
mitochondrial DNA, 142
protein electrophoresis, 125
cerebralis, chemical composition, 55
crassiceps
 adult, ultrastructure, 7
 amino acid uptake, 129
 chemical composition, 56
 cyst fluid, host proteins, 117
 egg formation, 175
 endocytosis, 14, 119
 glucose uptake, 81
 immune responses, larvae, 297
in vitro
 culture, 281
 translation of mRNA, 138–9
lipids, 65
oncosphere, TEM, 223
phosphate content, calcareous
 corpuscles, 60
prepatent period, 242
protein synthesis, cell-free homologous
 system, 138
scolex, 17
strains, 53
tegument, 14
hydatigena
 adult, immunity to, 294–5
 amino acids, 126
 egg hatching, 191
 electron transport system 107
 farnesol synthesis, 73
in vitro culture, 281
lipids, 66
 (= *marginata*), chemical composition,
 55, 56
 membrane, of cyst, 58
 mitochondrial DNA cloned, 142
 oncosphere, 223
 penetration, 229
 phospholipids, 68
 prepatent period, 242
 somatic antigens, 302
 spermatozoa, 159, 160
***marginata* (= *hydatigena*)**, lipids, 66
(*Multiceps*) *multiceps*
 egg, hatching, 191
 prepatent period, 242
 vaccination, larvae, 302
ovis
 egg hatching, 191

Index

- in vitro* culture, oncospheres/cysticerci, 281
- oncosphere penetration, 229
- prepatent period, 242
- vaccination, 302–3
- pisiformis*
 - chemical composition, 55
 - egg, hatching, 191
 - survival, 187
 - excystment/evagination requirements, 233
 - glucose-6-phosphate dehydrogenase, 112
 - in vitro* culture, 281
 - larval immunity, 231
 - liver migration phase, **231**, 296
 - oncosphere
 - early work, 223
 - in vitro* culture, 230
 - migration/penetration, **229**, 230, **231**
 - passive immunisation, 303
 - PEPCK, 92
 - phosphate content, calcareous corpuscles, 60
 - 6-phosphogluconate dehydrogenase, 112
 - prepatent period, 242
 - pyruvate kinase, 88
 - secretory gland, postoncosphere larva, **231**
- plicata*
 - chemical composition, 66
 - lipids, 56
- saginata*
 - chemical composition, 56
 - cholinesterase in, 30
 - cysticerci, body sites, 230
 - egg
 - formation, 175
 - hatching, 191, 192
 - survival, 185, 186
 - excystment/evagination requirements, 233
 - functional antigens, 302
 - glucose-6-phosphate dehydrogenase, 112
 - in cattle, vaccination, 303
 - in vitro* culture, 281
 - lipids, 66
 - microtriches, formation, 204
 - oncosphere, 223
 - phagocytosis of, 40
 - phosphate content of calcareous corpuscles, 60
- phospholipids, 68
- 6-phosphogluconate dehydrogenase, 112
- prepatent period, 242
- proteolytic activity, 132
- tissue contacts, 283
- serialis*
 - egg, hatching, 191
 - in vitro* culture, 281
 - oncosphere, 223
 - migration, 230
- soltum*
 - and *T. saginata*, distinguished by DNA analysis, 152
 - chemical composition, 55, 56
 - cloning of specific DNA fragments, 150
 - collagen, 114–15
 - cysts, vaccination, 302
 - egg
 - formation, 175
 - hatching, 191
 - morphology, 157
 - excystment/evagination requirements, 233
 - IgG specificity, 301
 - immune responses, human cysticercosis, **298**, 299
 - in vitro* translation of RNA in *Cysticercus cellulose*, 139
 - lipids, 66
 - prepatent period, 242
 - scolex glands, 17
 - synthesis of host-like immunoglobulin in cyst, 139
- taeniaeformis*
 - adult, immunity to, 294
 - anti-complementary factor, 58
 - Ca^{2+} accumulation, **61**
 - cDNA expression library in *Agt11amp³*, 150
 - chemical composition, 54, 56
 - cholinesterase in, 30
 - cloning of antigens, 150
 - cyst fluid, host proteins, 117
 - egg, hatching, 191
 - electron transport system, 107
 - eosinophil reaction, 298
 - excystment/evagination requirements, 233
 - functions antigens, 302
 - glycosaminoglycan, 58
 - IgA response, 297
 - immune response, 294, 301

Index

- T. taeniaeformis** (*cont.*)
 immunisation, passive, 303
 lipids, 65, 66
 nitrogen excretory products, 135
 oncosphere, penetration, 229
 oxidative phosphorylation, failure to demonstrate, 109
 phosphate content of calcareous corpuscles, 60
 phospholipids, 68
 prepatent period, 242
 prostaglandins, 70
 protease inhibitor, 58, 59
 protein antigen synthesis, larvae and oncospheres, 138
 respiratory control, failure to demonstrate it, 109
 superoxide dismutase, 111
 tegument, 14
 transaminases, 133
 ultrastructure, 7
- Taeniaestatin, protease inhibitor, 58
- Tanned protein (sclerotonin), 172, 173
- Taurine, 51
- TCA (tricarboxylic acid) cycle, enzymes in cestodes, 103, 104
in mammals, 105
- Technique
 egg hatching, 190
in vitro culture
E. granulosus, 271, 273
E. multilocularis, 274
Hymenolepis spp., 266, 267
Ligula intestinalis, 262–264
Schistocephalus solidus, 262–263
- PAP, 30
- Sternberger's immunoperoxidase-antiperoxidase, 30
- Tegument
 compared with mucosa, 8
 freeze-etch studies, 14, 15
 functions, 5, 7
 permeability, 51
 terminology, 13
 ultrastructure, 6
- Tegumental cells, 13
- Tegumental enzymes, 119–23
- TEM (transmission electron microscopy), *see individual species*
- Temperature
 coracidia survival, 199
 cysticeroids in *Tribolium*, 228
 effect on *Schistocephalus* enzymes, 215
 inducing *Schistocephalus* maturation, 17
- Tenebrio molitor**, oncosphere development, 224, 225, 226
- Ternary complex, 42
- Tetrabothrius** spp., ultrastructure, 7
erostris, 52
- Tetraphyllidea
 egg production, 169
 host-parasite interface, 240
 spermatozoa, 158, 159
- Tetrarhynchidea, spermatozoa, 158, 159
- Tetrathyridia
in vitro culture, 278, 279, 280
 multiplication, asexual, 254–256
 of *Mesocestoides*, differentiation, 256
- Tetrazolium salt, 192–3
- Tetrodotoxin, 32
- Theophylline, 290
- Threonine, 43
- Thymidine
 incorporation into DNA, 247
 kinase, activity in *H. diminuta*, 140–1
- Thymus, 284
- Thysanotria giardi**
 chemical composition, 55
 lipids, 66
- Thysanosoma**
actinoides, chemical composition, 56
 (sp.), in bile ducts, 35
- Thysanosominae, egg formation, 169, 176
- Toluidine blue, 181
- Total lipid content, in cestodes, 66–67
- Transaminases in cestodes, 133
- Transamination, limited capacity in cestodes, 133
- Transcription, definition, 154
- Transformation, procercoid/plerocercoid, 211–12
- Transhydrogenases, in cestodes, 101
- Transit time, 36
- Transmitter molecules, 25, 31
- Transport systems, tissue, 12
- Trehalase, *Stilesia globipunctata*, 79
- Trematoda, muscle, 21
- Triacanthophorus**
crassus
 chemical composition, 54
 copepod mortality, 202
 coracidium, 196
 glycolytic enzymes, activities, 86
 lipids, 67
 PEPCK, 92
 plerocercoid, 211
 glands, 196
 procercoid growth, 207, 208, 209

Cambridge University Press

978-0-521-03895-9 - The Physiology and Biochemistry of Cestodes

J. D. Smyth and D. P. McManus

Index

[More information](#)

Index

- pyruvate kinase, 88
 - scolex glands, adult, 18
 - TCA cycle enzymes, 104
 - meridionalis*, scolex glands, adult, 18
 - nodulosus*
 - chemical composition, 55, 56
 - coracidium 196, 199
 - enzymes, 206
 - metabolism, 205
 - egg
 - formation, 171
 - hatching, 189
 - glyoxalate cycle, 113
 - larvae, glands, 196
 - life span, 183
 - lipids, 66
 - phospholipids, 68
 - plerocercoid, 211
 - procercoid glands, 209, 210
 - scolex glands, adult, 18
 - ultrastructure, 7
- Tribolium confusum*, *Hymenolepis* in**, 202
- Tricarboxylic acid (TCA) cycle,
importance to cestodes, 102
- Trickling filter, egg survival in, 186
- Trigger
 - for differentiation, 259
 - for egg hatching, 47
 - for migration, 238
- Trypanorhyncha
 - egg formation, 169
 - muscle, 21
 - spermatozoa, 159
- Tripeptides, intestinal uptake, 42
- Trypsin
 - action on mucus, 41
 - adsorption, *H. diminuta*, 125
 - excystment/evagination role, 233
 - in egg hatching, 192
 - inactivation by cestodes, 58
 - inhibition
 - by *Hymenolepis*, 11
 - by *T. pisiformis*, 301
 - sexual differentiation stimulus, 250
- Tryptophan, 25
- Tubifex tubifex***, 18
- Tubulin
 - binding by benzimidazoles, 115
 - isolation, *H. diminuta*, 116
- Turnover rate
 - glycocalyx, 9
 - mucosa, 39
- Two-dimensional polyacrylamide electrophoresis, 124
- Turbellaria, 21, 31
- Tyrosine
 - egg, *H. diminuta*, 180
 - in quinone tanning system, 173
 - phenol oxidase substrate, 175
- Ultrastructure
 - muscle, 20, 21
 - nervous system, 22–31
 - see also individual species*
- Unstirred water layer, 9, 42
 - effect on transport kinetics, 81
- Uptake
 - by enterocyte, 38
 - by *H. diminuta*, methionine, 13
 - by intestine
 - amino acids, 42, 44, 45
 - vitamins, 43
- Urea
 - in cestodes, 52
 - Krebs-Henseleit cycle, 136
 - metabolism of, 52
- Urease activity, in cestodes, 134
- Uronic acids, 57
- Ursodeoxycholic acid, 49
- Uterus, role in shell formation, 171, 183
- USSR, prevalence of procercooids, 201
- Vaccination
 - against adult *E. granulosus*, 302
 - against cysticercosis, 302–4
 - against larval cestodes in general, 302–4
 - and DNA technology, 304
- Vaccine(s)
 - development, general comment, 283
 - oncosphere secretions, 224
 - sonicated oncospheres, 303
- Vagina, 170
- Valine, 43
- Vasocytin, 29, 31
- Vector, definition, 154–5
- Vertebrates
 - lower, immunity, reviewed, 286
 - neuropeptides, 29
- Vesicles
 - clear/dense-core, in nerve terminals, 25, 26
 - in oncospheres, 222
- Viability
 - egg, 183, 184, 185, 186
 - oncosphere, 192
- Villous atrophy, 36
- Villus size, 37, 229
- VIP (vaso-active intestinal polypeptide), 31

Cambridge University Press

978-0-521-03895-9 - The Physiology and Biochemistry of Cestodes

J. D. Smyth and D. P. McManus

Index

[More information](#)

Index

- Viral transduction, *Spirometra*, 220
- Vitamin B₁₂ (cobalamin)
 - conversion to adenosyl-cobalamin, 122
 - uptake by pseudophyllids, 121–122
- Vitamin K, 107–9
- Vitellaria, 169, 170
- Vitelline cells
 - Cyclophyllidea, 157, 167, 175
 - Pseudophyllidea, 169, 172
- Vitelline gland, 279
- Vitelline reservoir, 170
- Worm conditioned saline, 247
- Worm load, *H. diminuta*, 243, 244
- Yeast extract, in medium, 265
- Yolk, role in egg formation, 172
- X-ray analysis, shell, 172
- Xylose, 59
- Zymogram technique, in cestode identification, 123