TABLE 1. *Ratios of CNS metabolism to resting body metabolism*

Animal	Weight, g				Metabolic Rate, $cm^3 O_2 \cdot 100\ g^{-1} \cdot min^{-1}$			Metabolism, $cm^3 O_2/min$				Metabolic Ratio[i]
	A Body$_1$	*B* Brain	*C* Spinal	*D* Body$_2$[a]	*E* Body[h]	*F* Brain[c]	*G* Spinal[d]	*H* Body[e]	*I* Brain[f]	*J* Spinal[g]	*K* CNS[h]	
Goldfish, *Carassius auratus*	9.52 (20)	0.097 (20)	0.014[j]	7–140 (6)	0.44 (6)	2.77	2.77	0.042	0.0027	0.00039	0.0031	0.074
Toad, *Bufo* sp	44.50 (22)	0.073 (22)	0.0339[k]	61 (75)	0.092 (75) 0.099	2.94	2.84	0.0441	0.0021	0.000963	0.0031	0.070
Frog (small), *Rana pipiens*	45.86 (56)	0.097 (56)	0.045 (56)	45 (21)	0.15 (21)	2.83	2.60 (82)	0.069	0.0027	0.0012	0.0039	0.057
Trout, *Salvelinus fontinalis*	230.1 (20)	0.466 (20)	0.312 (1)	250 (5)	0.253 (5)	2.31	1.57	0.582	0.0108	0.00490	0.0157	0.0270
Bullfrog, *Rana catesbiana*	519.9 (20)	0.4625 (20)	0.368[m]	350 (21)	0.072 (21) 0.065	2.31	1.52	0.338	0.0107	0.00560	0.0163	0.048
Turtle, *Chrysemys* sp	839.79 (56)	0.727 (56)	0.874 (56)	779 (33)	0.0677 (33)	2.18	1.24	0.5685	0.0158	0.0108	0.0266	0.0467
Shark, *Squalus acanthias*	4,200 (69)	3.87 (69)	2.71[n]	2,600–7,000 (81)	0.0802 (81)	1.75	0.84	3.37	0.0677	0.0227	0.0904	0.027
Alligator, *Alligator mississipiensis*	52,400 (18)	7.23 (18)	20.08[o]	52,000 (7)	0.012 (7)	1.69	0.59	6.29	0.122	0.118	0.240	0.038
Shrew, *Sorex* sp	5.3 (4)	0.11 (4)	0.022 (92)	3.6 (70)	17.67 (70) 16	9.7	9.7	0.85	0.011	0.0021	0.013	0.015
Mouse, *Mus musculus*	16.5 (52)	0.425 (52)	0.075 (52)	17.0 (70)	2.83 (70)	8.10	6.89	0.467	0.0344	0.0052	0.0396	0.0848
Swallow, *Hirundo* sp	18 (52)	0.535 (52)	0.08 (52)	18 (31)	6.39 (31)	7.86	6.60	1.15	0.042	0.0053	0.047	0.041
Bat, *Desmodus* sp	28.0 (20)	0.936 (20)	0.183[p]	29.4 (75)	3.7 (75)	7.31	5.41	1.04	0.0684	0.00990	0.0784	0.0754
Sparrow, *Passer domesticus*	27 (52)	1.0 (52)	0.085 (52)	25.5 (40)	5.88 (40)	7.24	6.01	1.6	0.072	0.0051	0.077	0.048
Mole, *Scalopus aquaticus*	39.6 (20)	1.16 (20)	0.244 (92)	69.0 (70)	3.17 (70) 3.64	7.11	4.98	1.44	0.0825	0.0122	0.0947	0.0658
Rat, *Rattus* sp	278 (20)	2.3 (20)	0.83 (59)	280 (8)	1.32 (8)	7.6 (68)	4.41	3.67	0.17	0.037	0.21	0.057
Pigeon, *Columba* sp	326 (52)	1.79 (52)	0.575 (52)	300 (8)	1.45 (8)	6.72	4.10	4.73	0.120	0.0236	0.144	0.030
Crow, *Corvus* sp	337 (20)	9.3 (20)	0.82 (92)	640 (54)	1.79 (54) 2.11	5.6	3.25	7.11	0.52	0.027	0.55	0.077
Guinea pig, *Cavia* sp	649.44 (60)	4.0062 (60)	1.1249 (60)	624 (51)	1.00 (51)	6.048	3.387 (65)	6.50	0.2423	0.03810	0.2804	0.0431
Hedgehog, *Erinaceus europaeus*	747.8 (12)	3.8 (12)	1.1 (92)	684.0 (47)	1.22 (47)	6.1	3.4	9.12	0.23	0.037	0.27	0.030
Squirrel, *Citellus* sp	878 (20)	5.63 (20)	1.31[q]	880 (86)	0.90 (86)	5.79	3.13	7.9	0.326	0.0410	0.367	0.046
Opossum, *Didelphis* sp	1,147 (20)	4.8 (20)	1.3[r]	1,200 (26)	0.757 (26)	5.9	3.2	8.68	0.28	0.042	0.32	0.037
Chicken, *Gallus domesticus*	1,800 (52)	3.68 (52)	2.175 (52)	1,800 (8)	0.844 (8)	6.12	3.06	15.2	0.225	0.0666	0.292	0.0192
Marmot, *Arctomys marmota*	1,980 (52)	13.2 (52)	4.15 (52)	1,868 (47)	0.729 (47)	5.18	2.33	14.43	0.684	0.0967	0.781	0.0541
Rabbit, *Oryctolagus* sp	2,480.0 (61)	9.755 (61)	3.945 (61)	2,460 (62)	0.702 (62)	5.39	2.43	17.4	0.524	0.0959	0.620	0.0356
Cat, *Felis domestica*	2,673.13 (57)	27.56 (57)	7.96 (57)	3,000 (8)	0.733 (8) 0.754	4.5 (30)	1.8	20.2	1.2	0.143	1.3	0.064
Fox, *Vulpes lagopus*	3,385 (20)	44.50 (20)	7.35[s]	4,000 (86)	0.846 (86) 0.882	4.42	1.81	29.9	1.97	0.133	2.1	0.070
Macaque, *Macaca rhesus*	3,627 (20)	93.1 (20)	6.52 (52)	3,700 (14)	0.765 (14)	3.7 (84)	1.55	27.8	3.4	0.101	3.5	0.13
Baboon, *Papio papio*	6,619 (80)	147 (80)	10.3[t]	6,760 (14)	0.670 (14)	3.79	1.48	44.3	5.57	0.152	5.72	0.129
Dog, *Canis familiaris*	10,784 (56)	78.07 (56)	12.89 (56)	10,300 (8)	0.597 (8)	3.4 (32)	1.3	64.4	2.65	0.17	2.8	0.043
Orangutan, *Pongo* sp	21,000 (52)	316 (52)	9.5 (52)	16,200 (14)	0.515 (14) 0.482	3.43	1.34	101	10.8	0.13	10.9	0.11
Chimpanzee, *Pan* sp	25,850 (20)	430.5 (20)	12.9[u]	24,500 (14)	0.419 (14)	3.29	1.22	108	14.2	0.157	14.4	0.133
Seal, *Phoca* sp	39,680 (20)	255 (20)	12.8 (92)	29,000 (43)	0.913 (43) 0.84	3.52	1.30	333	8.98	0.166	9.15	0.0275
Sheep, *Ovis* sp	40,230 (20)	108.8 (20)	32 (52)	40,000 (8)	0.370 (8)	3.94	1.3	149	4.29	0.42	4.71	0.0316
Pig, *Sus scrofa*	51,500 (53)	100.0 (53)	29.4[v]	50,000 (13)	0.428 (13)	3.98	1.31	220	3.98	0.385	4.37	0.0199
Human, *Homo sapiens*	54,333 (52)	1,273.7 (52)	29.7 (52)	54,000 (8)	0.383 (8)	3.3 (50)	1.1	208	42	0.37	42	0.20
Dolphin, *Tursiops truncatus*	120,000 (79)	1,296 (79)	36 (79)	170,000 (42)	0.588 (42) 0.642	2.85	0.903	770	36.94	0.33	37.2	0.048
Ostrich, *Struthio camelus*	123,000 (20)	42.11 (20)	69.9[w]	100,000 (54)	0.333 (54) 0.316	4.45	1.29	389	1.87	0.902	2.77	0.00712
Camel, *Camelus* sp	453,590 (20)	569.5 (20)	227.8[x]	407,000 (85)	0.1654 (85) 0.161	3.175	0.762	730	18.08	1.736	19.82	0.0272
Cattle, *Bos* sp	506,000 (20)	420 (20)	168[x]	500,000 (8)	0.174 (8)	3.30	0.83 (37)	880	13.9	1.4	15.3	0.0174
Horse, *Equus caballus*	548,870 (76)	650 (76)	260 (52)	587,000 (8)	0.246 (8)	3.12	0.72	1,350	20.3	1.9	22.2	0.0164
Elephant, *Elephas* sp	3,048,000 (15)	4,717 (15)	NA[y]	3,672,000 (8)	0.193 (8) 0.202	2.41	NA[y]	6,160	114	10.3[y]	124	0.0201
Whale, *Balaenoptera physalus*	48,000,000 (73)	8,100 (73)	188.9 (89)	31,000,000 (46)	0.098 (46) 0.071	2.25	0.54	34,000	182	1.02	183	0.0054

Nos. in parentheses are reference nos. CNS, central nervous system. [a] Body$_1$ weight is for animal from whom CNS weight was determined. Body$_2$ weight is for animal from whom body metabolic rate was determined. If body$_1$ weight and body$_2$ weight differ by more than 10%, the expected metabolic rate for an animal of body$_1$ weight is calculated as explained in footnote b and is used in column *H*. [b] Metabolic rate conversion: when two body metabolic rate values appear, the bottom value (corresponding to body$_1$ weight) will be used in all later calculations, and it is calculated from the top metabolic rate (corresponding to body$_2$ weight) according to $\log BM_2 - \log BM_1 = 0.75 (\log BW_2 - \log BW_1)$ where BM is body metabolism and BW is body weight (*Eq. 5*). When necessary metabolic values are converted from calories to cubic centimeters of O_2 according to: 4.8 cal = 1 cm^3 O_2; when converted from grams of O_2 to cubic centimeters of O_2: 1.32 mg O_2 = 1 cm^3 O_2. [c] Direct determinations are used where available, in which case the source is footnoted. Indirect determinations for cold-blooded vertebrates are derived from *Eq. 3*: log brain metabolic rate = 0.32 − 0.13 log brain weight. Indirect determinations for warm-blooded vertebrates are derived from *Eq. 1*: log brain metabolic rate = 0.86 − 0.13 log brain weight. [d] Direct determinations are used where available, in which case the source is footnoted. Indirect determinations are derived from *Eq. 4*: log spinal metabolic rate − log brain metabolic rate = −0.25 − 0.16 log spinal cord weight. [e] Body metabolism (*H*) calculated as $E \times A/100$. In this figure, as well as in the figure calculated for *I* and *J*, the number of significant digits is determined as follows. If the number of significant digits in the two figures substituted into the equation are the same, then the same number of significant digits are used in *H*, *I*, and *J*. If they are different, then the number of digits used in *H*, *I*, or *J* is one greater than the smallest number of significant digits in any figure substituted into the equation. [f] Brain metabolism (*I*) calculated as $F \times B/100$. [g] Spinal cord metabolism (*J*) calculated as $G \times C/100$. [h] Central nervous system metabolism (*K*) calculated as $I + J$. [i] Metabolic ratio calculated as K/H. In this figure, the number of significant digits is limited to the smallest number of significant digits in any figure substituted into the equations used to calculate *H*, *I*, and *J*, with the exception that it is not limited by figures used to calculate *J* when *J* is an order of magnitude smaller than *I*. [j] Based on direct observation of *Carassius auratus*. Spinal cord weight was found to be 14% of brain weight. [k] Extrapolated from brain-to-spinal cord weight ratio of *Rana pipiens* [Latimer (56)]. [l] Based on direct observation of *Perca flavescens*. Spinal cord weight was found to be 67% of brain weight. [m] Based on direct observation of *Rana catesbiana*. Spinal cord weight was found to be 79.6% of brain weight. [n] Based on direct observation of *Squalus acanthias*. Spinal cord weight was found to be 70% of brain weight. [o] Extrapolated from the brain-to-spinal cord volume ratio of *Alligator mississipiensis* (77). [p] Extrapolated from the brain-to-spinal cord weight ratio of *Vespertilio serotinus* (92). [q] Extrapolated from brain-to-spinal cord weight ratio of *Sciurus vulgaris* (92). [r] Extrapolated from brain-to-spinal cord weight ratio of *Cavia porcellus* (60). [s] Extrapolated from average brain-to-spinal cord weight ratio of *Canis familiaris* (52). [t] Extrapolated from brain-to-spinal cord weight ratio of *Macaca sinicus* (52). [u] Extrapolated from brain-to-spinal cord weight ratio of *Homo sapiens* (52). [v] Extrapolated from brain-to-spinal cord weight ratio of *Ovis aries* (52). [w] Extrapolated from brain-to-spinal cord weight ratio of *Dromaeus novae-hollandiae* (35). [x] Extrapolated from brain-to-spinal cord weight ratio of *Equus caballus* (52). [y] Estimated spinal cord metabolism of *Elephas* extrapolated from spinal cord-to-brain metabolic ratio in other large mammals (see METHODS).