

Table S1. Estimates of repeatability of metabolic rate for a range of animals

Variable	Repeatability	N	Interval (days)	Animal	Group	Reference
MMR	0.538	50	2	Reptile	Ectotherm	Garland and Else, 1987
RMR	0.796	242	1	Reptile	Ectotherm	Garland and Bennett, 1990
RMR	0.38	23	2.5	Insect	Ectotherm	Chappell and Rogowitz, 2000
MMR	0.64	22	2	Insect	Ectotherm	Rogowitz and Chappell, 2000
MMR	0.64	22	4	Insect	Ectotherm	Rogowitz and Chappell, 2000
MMR	0.69	22	2	Insect	Ectotherm	Rogowitz and Chappell, 2000
MMR	0.067	21	2	Insect	Ectotherm	Rogowitz and Chappell, 2000
MMR	0.63	21	4	Insect	Ectotherm	Rogowitz and Chappell, 2000
MMR	0.19	21	2	Insect	Ectotherm	Rogowitz and Chappell, 2000
RMR	0.53	85	30	Insect	Ectotherm	Nespolo et al., 2003
RMR	0.22	13	25	Insect	Ectotherm	Marais and Chown, 2003
RMR	0.28	7	0.3	Insect	Ectotherm	Terblanche et al., 2004
RMR	0.37	7	0.3	Insect	Ectotherm	Terblanche et al., 2004
RMR	0.87	7	0.3	Insect	Ectotherm	Terblanche et al., 2004
RMR	0.93	7	0.3	Insect	Ectotherm	Terblanche et al., 2004
RMR	0.41	6	0.3	Insect	Ectotherm	Terblanche et al., 2004
RMR	0.08	7	0.3	Insect	Ectotherm	Terblanche et al., 2004
RMR	0.89	7	0.3	Insect	Ectotherm	Terblanche et al., 2004
RMR	0.85	7	0.3	Insect	Ectotherm	Terblanche et al., 2004
RMR	0.60	7	0.3	Insect	Ectotherm	Terblanche et al., 2004
RMR	0.67	6	0.3	Insect	Ectotherm	Terblanche et al., 2004
RMR	0.68	26	30	Fish	Ectotherm	Maciak and Konarzewski, 2010
RMR	0.017	30	183	Fish	Ectotherm	Seppänen et al., 2010
RMR	0.314	24	244	Fish	Ectotherm	Seppänen et al., 2010
RMR	0.255	29	29	Insect	Ectotherm	Schimpf et al, unpublished
RMR	0.121	34	39.8	Insect	Ectotherm	Schimpf et al, unpublished
RMR	0.121	86	94.7	Insect	Ectotherm	Schimpf et al, unpublished
RMR	0.057	32	51.875	Insect	Ectotherm	Schimpf et al, unpublished
RMR	0.625	17	1	Insect	Ectotherm	Schimpf et al, unpublished
RMR	0.61	15	152.5	Arachnid	Ectotherm	Lardies et al., 2008
RMR	0.38	44	15	Snail	Ectotherm	Artacho and Nespolo, 2009
RMR	0.25	33	15	Snail	Ectotherm	Artacho and Nespolo, 2009
RMR	0.569	33	35	Fish	Ectotherm	Norin and Malte, 2011
RMR	0.579	33	35	Fish	Ectotherm	Norin and Malte, 2011
RMR	0.517	33	35	Fish	Ectotherm	Norin and Malte, 2011
RMR	0.163	33	70	Fish	Ectotherm	Norin and Malte, 2011
RMR	0.416	33	70	Fish	Ectotherm	Norin and Malte, 2011
RMR	0.093	33	105	Fish	Ectotherm	Norin and Malte, 2011
MMR	0.316	33	35	Fish	Ectotherm	Norin and Malte, 2011
MMR	0.362	33	35	Fish	Ectotherm	Norin and Malte, 2011
MMR	0.38	33	35	Fish	Ectotherm	Norin and Malte, 2011
MMR	0.253	33	70	Fish	Ectotherm	Norin and Malte, 2011
MMR	0.346	33	70	Fish	Ectotherm	Norin and Malte, 2011
MMR	0.225	33	105	Fish	Ectotherm	Norin and Malte, 2011
MMR	0.787	61	1	Mammal (L)	Endotherm	Hayes et al., 1992
MMR	0.4	50	11.5	Mammal (W)	Endotherm	Chappell and Bachman, 1995
MMR	0.38	34	11.5	Mammal (W)	Endotherm	Chappell and Bachman, 1995
MMR	0.47	21	547.5	Mammal (W)	Endotherm	Chappell and Bachman, 1995
MMR	0.02	19	547.5	Mammal (W)	Endotherm	Chappell and Bachman, 1995
FMR	0.261	11	42	Mammal (W)	Endotherm	Berteaux et al., 1996
RMR	0.69	30	21	Mammal (W)	Endotherm	Hayes et al., 1998
MMR	0.39	34	68	Mammal (W)	Endotherm	Hayes and O'Conner, 1999
RMR	0.35	17	30.3	Bird	Endotherm	Bech et al., 1999
FMR	0.64	32	1	Bird	Endotherm	Fyhn et al., 2001
RMR	0.86	28	4	Bird	Endotherm	Hörak et al., 2002
RMR	0.87	28	8	Bird	Endotherm	Hörak et al., 2002
RMR	0.63	14	120	Bird	Endotherm	Hörak et al., 2002
RMR	0.56	64	30	Mammal (W)	Endotherm	Labocha et al., 2004
MMR	0.64	41	1	Mammal (L)	Endotherm	Chappell et al., 2004
MMR	0.77	16	2	Mammal (L)	Endotherm	Chappell et al., 2004
MMR	0.74	7	3	Mammal (L)	Endotherm	Chappell et al., 2004
RMR	0.62	41	1	Mammal (L)	Endotherm	Chappell et al., 2004
RMR	0.55	16	2	Mammal (L)	Endotherm	Chappell et al., 2004
RMR	0.71	7	3	Mammal (L)	Endotherm	Chappell et al., 2004
MMR	0.792	19	28	Mammal (L)	Endotherm	Rezende et al., 2004
MMR	0.78	19	56	Mammal (L)	Endotherm	Rezende et al., 2004
MMR	0.741	19	28	Mammal (L)	Endotherm	Rezende et al., 2004
MMR	0.312	20	28	Mammal (L)	Endotherm	Rezende et al., 2004
MMR	0.572	20	56	Mammal (L)	Endotherm	Rezende et al., 2004
MMR	0.551	20	28	Mammal (L)	Endotherm	Rezende et al., 2004
RMR	0.72	40	35	Mammal (L)	Endotherm	Książek et al., 2004
RMR	0.567	36	915	Bird	Endotherm	Rønning et al., 2005
RMR	0.571	39	48	Bird	Endotherm	Rønning et al., 2005

MMR	0.844	47	1	Mammal (L)	Endotherm	Rezende et al., 2005
MMR	0.42	48	1	Mammal (L)	Endotherm	Rezende et al., 2005
MMR	0.134	47	1	Mammal (L)	Endotherm	Rezende et al., 2005
MMR	0.982	47	1	Mammal (L)	Endotherm	Rezende et al., 2005
MMR	0.816	48	1	Mammal (L)	Endotherm	Rezende et al., 2005
MMR	-0.098	47	1	Mammal (L)	Endotherm	Rezende et al., 2005
RMR	0.49	48	1	Mammal (L)	Endotherm	Rezende et al., 2005
RMR	0.868	48	1	Mammal (L)	Endotherm	Rezende et al., 2005
RMR	0.492706	66	2	Mammal (W)	Endotherm	Sadowska et al., 2005
RMR	0.548447	284	2	Mammal (W)	Endotherm	Sadowska et al., 2005
RMR	0.599836	87	2	Mammal (W)	Endotherm	Sadowska et al., 2005
RMR	0.616453	222	2	Mammal (W)	Endotherm	Sadowska et al., 2005
MMR	0.39342	116	2	Mammal (W)	Endotherm	Sadowska et al., 2005
MMR	0.472356	284	2	Mammal (W)	Endotherm	Sadowska et al., 2005
MMR	0.532445	87	2	Mammal (W)	Endotherm	Sadowska et al., 2005
MMR	0.431666	222	2	Mammal (W)	Endotherm	Sadowska et al., 2005
MMR	0.476033	116	2	Mammal (W)	Endotherm	Sadowska et al., 2005
MMR	0.588353	66	2	Mammal (W)	Endotherm	Sadowska et al., 2005
MMR	0.333231	284	2	Mammal (W)	Endotherm	Sadowska et al., 2005
MMR	0.654189	87	2	Mammal (W)	Endotherm	Sadowska et al., 2005
MMR	0.540366	222	2	Mammal (W)	Endotherm	Sadowska et al., 2005
RMR	0.007	85	60.5	Mammal (W)	Endotherm	Russell and Chappell, 2007
RMR	0.003	59	60.5	Mammal (W)	Endotherm	Russell and Chappell, 2007
RMR	0.059	61	60.5	Mammal (W)	Endotherm	Russell and Chappell, 2007
RMR	0.099	26	60.5	Mammal (W)	Endotherm	Russell and Chappell, 2007
RMR	0.177	13	60.5	Mammal (W)	Endotherm	Russell and Chappell, 2007
RMR	0.014	26	60.5	Mammal (W)	Endotherm	Russell and Chappell, 2007
RMR	0.061	72	60.5	Mammal (W)	Endotherm	Russell and Chappell, 2007
RMR	0.404	65	28	Bird	Endotherm	Broggi et al., 2009
RMR	0.356	93	154	Bird	Endotherm	Broggi et al., 2009
RMR	0.324	48	380	Bird	Endotherm	Broggi et al., 2009
RMR	0.77	22	25.01	Mammal (W)	Endotherm	Larivée et al., 2010
RMR	0.77	11	23.3	Mammal (W)	Endotherm	Larivée et al., 2010
RMR	0.09	27	192.2	Mammal (W)	Endotherm	Larivée et al., 2010
RMR	-0.001	15	195.34	Mammal (W)	Endotherm	Larivée et al., 2010
RMR	0.72	12	192.1	Mammal (W)	Endotherm	Larivée et al., 2010
RMR	0.55	13	12.5	Mammal (W)	Endotherm	Szafrańska et al., 2007
RMR	0.07	19	16.8	Mammal (W)	Endotherm	Szafrańska et al., 2007
RMR	-0.099	22	142.3	Mammal (W)	Endotherm	Bozinovic, 2007
RMR	0.34	43	5.4	Mammal (W)	Endotherm	Boratyński and Koteja, 2009
RMR	0.23	99	56.4	Mammal (W)	Endotherm	Boratyński and Koteja, 2009
MMR	0.34	54	5.4	Mammal (W)	Endotherm	Boratyński and Koteja, 2009
MMR	0.21	107	56.4	Mammal (W)	Endotherm	Boratyński and Koteja, 2009
RMR	0.143	72	30	Bird	Endotherm	Bouwhuis et al., 2011
RMR	-0.05	55	91.5	Bird	Endotherm	Bouwhuis et al., 2011
MMR	0.9	11	0.083	Bird	Endotherm	Chappell et al., 1996
MMR	0.901	31	28	Bird	Endotherm	Chappell et al., 1996
MMR	0.93	30	56	Bird	Endotherm	Chappell et al., 1996
MMR	0.517	22	180	Bird	Endotherm	Chappell et al., 1996

RMR, resting metabolic rate; FMR, field metabolic rate; MMR, maximum metabolic rate; L, lab; W, wild.

## REFERENCES

- Artacho, P. and Nespolo, R. F.** (2009). Natural selection reduces energy metabolism in the garden snail, *Helix aspersa* (*Cornu aspersum*). *Evolution* **63**, 1044-1050.
- Bech, C., Langseth, I. and Gabrielsen, G. W.** (1999). Repeatability of basal metabolism in breeding female kittiwakes *Rissa tridactyla*. *Proc. R. Soc. Lond. B* **266**, 2161-2167.
- Berteaux, D., Thomas, D. W., Bergeron, J. M. and Lapierre, H. L.** (1996). Repeatability of daily field metabolic rate in female meadow voles (*Microtus pennsylvanicus*). *Funct. Ecol.* **10**, 751-759.
- Boratyński, Z. and Koteja, P.** (2009). The association between body mass, metabolic rates and survival of bank voles. *Funct. Ecol.* **23**, 330-339.
- Bouwhuis, S., Sheldon, B. C. and Verhulst, S.** (2011). Basal metabolic rate and the rate of senescence in the great tit. *Funct. Ecol.* **25**, 829-838.
- Bozinovic, F.** (2007). Long-term repeatability of body mass and body temperature (but not basal metabolism) in the free-ranging leaf-eared mouse. *Evol. Ecol. Res.* **9**, 547-554.
- Broggi, J., Hohtola, E., Koivula, K., Orell, M. and Nilsson, J.-Å.** (2009). Long-term repeatability of winter basal metabolic rate and mass in a wild passerine. *Funct. Ecol.* **23**, 768-773.

- Chappell, M. A. and Bachman, G. C.** (1995). Aerobic performance in Belding's ground squirrels (*Spermophilus beldingi*): variance, ontogeny, and the aerobic capacity model of endothermy. *Physiol. Zool.* **68**, 421-442.
- Chappell, M. A. and Rogowitz, G. L.** (2000). Mass, temperature and metabolic effects on discontinuous gas exchange cycles in eucalyptus-boring beetles (Coleoptera : Cerambycidae). *J. Exp. Biol.* **203**, 3809-3820.
- Chappell, M. A., Zuk, M. and Johnsen, T. S.** (1996). Repeatability of aerobic performance in red junglefowl: effects of ontogeny and nematode infection. *Funct. Ecol.* **10**, 578-585.
- Chappell, M. A., Garland, T., Jr, Rezende, E. L. and Gomes, F. R.** (2004). Voluntary running in deer mice: speed, distance, energy costs and temperature effects. *J. Exp. Biol.* **207**, 3839-3854.
- Fyhn, M., Gabrielsen, G. W., Nordoy, E. S., Moe, B., Langseth, I. and Bech, C.** (2001). Individual variation in field metabolic rate of kittiwakes (*Rissa tridactyla*) during the chick-rearing period. *Physiol. Biochem. Zool.* **74**, 343-355.
- Garland, J. T. and Else, P. L.** (1987). Seasonal, sexual and individual variation in endurance and activity metabolism in lizards. *Am. J. Physiol.* **252R**, 439-449.
- Garland, T., Jr and Bennett, A. F.** (1990). Quantitative genetics of maximal oxygen consumption in a garter snake. *Am. J. Physiol. Regul. Int. Comp. Physiol.* **259**, R986-R992.
- Hayes, J. P. and O'Conner, C. S.** (1999). Natural selection on thermogenic capacity of high-altitude deer mice. *Evolution* **53**, 1280-1287.
- Hayes, J. P., Garland, T., Jr and Dohm, M. R.** (1992). Individual variation in metabolism and reproduction of *Mus*: are energetics and life history linked? *Funct. Ecol.* **6**, 5-14.
- Hayes, J. P., Bible, C. A. and Boone, J. D.** (1998). Repeatability of mammalian physiology: evaporative water loss and oxygen consumption of *Dipodomys merriami*. *J. Mammal.* **79**, 475-485.
- Hörak, P., Saks, L., Ots, I. and Kollist, H.** (2002). Repeatability of condition indices in captive greenfinches (*Carduelis chloris*). *Can. J. Zool.* **80**, 636-643.
- Książek, A., Konarzewski, M. and Łapo, I.** (2004). Anatomic and energetic correlates of divergent selection for basal metabolic rate in laboratory mice. *Physiol. Biochem. Zool.* **77**, 890-899.
- Labocha, M. K., Sadowska, E. T., Baliga, K., Semer, A. K. and Koteja, P.** (2004). Individual variation and repeatability of basal metabolism in the bank vole, *Clethrionomys glareolus*. *Proc. R. Soc. Lond. B* **271**, 367-372.
- Lardies, M. A., Naya, D. E., Berríos, P. and Bozinovic, F.** (2008). The cost of living slowly: metabolism,  $Q_{10}$  and repeatability in a South American harvestman. *Physiol. Entomol.* **33**, 193-199.
- Larivée, M. L., Boutin, S., Speakman, J. R., McAdam, A. G. and Humphries, M. M.** (2010). Associations between over-winter survival and resting metabolic rate in juvenile North American red squirrels. *Funct. Ecol.* **24**, 597-607.
- Maciak, S. and Konarzewski, M.** (2010). Repeatability of standard metabolic rate (SMR) in a small fish, the spined loach (*Cobitis taenia*). *Comp. Biochem. Physiol.* **157A**, 136-141.
- Marais, E. and Chown, S. L.** (2003). Repeatability of standard metabolic rate and gas exchange characteristics in a highly variable cockroach, *Perisphaeria* sp. *J. Exp. Biol.* **206**, 4565-4574.
- Nespolo, R. F., Lardies, M. A. and Bozinovic, F.** (2003). Intrapopulational variation in the standard metabolic rate of insects: repeatability, thermal dependence and sensitivity ( $Q_{10}$ ) of oxygen consumption in a cricket. *J. Exp. Biol.* **206**, 4309-4315.
- Norin, T. and Malte, H.** (2011). Repeatability of standard metabolic rate, active metabolic rate and aerobic scope in young brown trout during a period of moderate food availability. *J. Exp. Biol.* **214**, 1668-1675.
- Rezende, E. L., Chappell, M. A. and Hammond, K. A.** (2004). Cold-acclimation in *Peromyscus*: temporal effects and individual variation in maximum metabolism and ventilatory traits. *J. Exp. Biol.* **207**, 295-305.
- Rezende, E. L., Chappell, M. A., Gomes, F. R., Malisch, J. L. and Garland, T., Jr** (2005). Maximal metabolic rates during voluntary exercise, forced exercise, and cold exposure in house mice selectively bred for high wheel-running. *J. Exp. Biol.* **208**, 2447-2458.
- Rogowitz, G. L. and Chappell, M. A.** (2000). Energy metabolism of eucalyptus-boring beetles at rest and during locomotion: gender makes a difference. *J. Exp. Biol.* **203**, 1131-1139.

- Rønning, B., Moe, B. and Bech, C.** (2005). Long-term repeatability makes basal metabolic rate a likely heritable trait in the zebra finch *Taeniopygia guttata*. *J. Exp. Biol.* **208**, 4663-4669.
- Russell, G. A. and Chappell, M. A.** (2007). Is BMR repeatable in deer mice? Organ mass correlates and the effects of cold acclimation and natal altitude. *J. Comp. Physiol. B* **177**, 75-87.
- Sadowska, E. T., Labocha, M. K., Baliga, K., Stanisiz, A., Wróblewska, A. K., Jagusiak, W. and Koteja, P.** (2005). Genetic correlations between basal and maximum metabolic rates in a wild rodent: consequences for evolution of endothermy. *Evolution* **59**, 672-681.
- Seppänen, E., Piironen, J. and Huuskonen, H.** (2010). Consistency of standard metabolic rate in relation to life history strategy of juvenile Atlantic salmon *Salmo salar*. *Comp. Biochem. Physiol.* **156A**, 278-284.
- Szafrańska, P. A., Zub, K. and Konarzewski, M.** (2007). Long-term repeatability of body mass and resting metabolic rate in free-living weasels, *Mustela nivalis*. *Funct. Ecol.* **21**, 731-737.
- Terblanche, J. S., Klok, C. J. and Chown, S. L.** (2004). Metabolic rate variation in *Glossina pallidipes* (Diptera: Glossinidae): gender, ageing and repeatability. *J. Insect Physiol.* **50**, 419-428.