

Table S1. Incorporation of ^{13}C into 12 tissues for the three experimental groups described by one- and two-compartment models that were fitted for tissue specific $\delta^{13}\text{C}$ values collected over 256 days after a diet shift

Tissue	Group	One-compartment model ¹						Two-compartment model ²																				
		$y_t = y_\infty + a e^{-(t/\tau_{\text{one-comp}})}$						$y_t = y_\infty + a(p_1 e^{-(t/\tau_1)} + a(1-p_1) e^{-(t/\tau_2)})$																				
		y_∞	s.e.m.	y_∞	s.e.m.	a	s.e.m.	$\tau_{\text{one-comp.}}$	s.e.m.	y_∞	s.e.m.	y_∞	s.e.m.	a	s.e.m.	p	s.e.m.	p	s.e.m.	τ_1	s.e.m.	τ_1	s.e.m.	τ_2	s.e.m.	τ_2	s.e.m.	$\tau_{\text{two-comp.}}$
Small intestine ²	Control	-23.36	0.19	8.85	8.85	3.8	0.5	-23.86	0.29	9.60	0.46	0.30	0.11	21.6	11.9	2.2	0.61	8.0	2.5									
	Exercise	-23.61	0.21	9.41	0.51	3.2	0.5	-23.88	0.32	9.89	0.53	0.25	0.13	19.9	15.2	2.1	0.6	6.5	2.6									
	Cold	-23.23	0.15	8.89	0.38	2.3	0.2	-23.71	0.21	9.56	0.36	0.26	0.06	19.1	8.0	1.4	0.3	6.0	1.7									
Gizzard ²	Control	-22.53	0.21	9.20	0.37	7.6	0.9	-22.88	0.23	10.26	0.42	0.62	0.11	15.1	3.7	1.6	0.8	10.0	3.8									
	Exercise	-22.64	0.20	9.61	0.37	8.4	1.0	-22.90	0.26	10.32	0.47	0.60	0.23	15.2	5.7	2.7	1.8	10.2	1.8									
	Cold	-22.53	0.16	9.80	0.37	4.2	0.4	-22.90	0.23	10.40	0.39	0.30	0.14	17.7	9.1	2.6	0.7	7.2	1.7									
Pancreas ²	Control	-23.11	0.20	10.04	0.38	6.8	0.8	-23.69	0.21	11.44	0.38	0.52	0.08	18.4	3.8	2.0	0.6	10.6	2.6									
	Exercise	-23.26	0.20	10.49	0.42	6.7	0.8	-23.81	0.30	11.53	0.50	0.38	0.14	22.9	10.0	3.3	1.1	10.8	2.3									
	Cold	-23.35	0.18	10.50	0.43	4.6	0.5	-23.80	0.20	11.65	0.38	0.44	0.08	16.5	4.0	1.8	0.4	8.2	1.2									
Kidney ²	Control	-23.53	0.19	9.35	0.32	9.2	1.0	-23.89	0.20	10.47	0.35	0.68	0.08	16.3	2.8	1.6	0.7	11.6	3.0									
	Exercise	-23.49	0.14	9.76	0.26	7.5	0.7	-23.78	0.16	10.47	0.29	0.54	0.15	15.4	4.1	2.8	1.0	9.7	1.1									
	Cold	-23.58	0.17	9.83	0.33	6.9	0.7	-23.91	0.22	10.50	0.39	0.49	0.21	15.9	6.2	3.1	1.4	9.4	1.5									
Liver ²	Control	-23.16	0.22	9.68	0.43	5.8	0.7	-23.93	0.24	11.10	0.40	0.45	0.07	23.9	6.0	2.1	0.5	11.9	1.9									
	Exercise	-23.21	0.17	9.86	0.35	5.8	0.6	-23.92	0.23	11.03	0.36	0.35	0.08	29.8	9.5	2.9	0.6	12.2	2.3									
	Cold	-23.34	0.15	10.20	0.32	4.4	0.4	-23.96	0.18	11.11	0.29	0.28	0.06	27.5	8.8	2.7	0.4	9.6	1.7									
Proventriculus ²	Control	-22.90	0.21	9.74	0.38	7.4	0.9	-23.66	0.21	11.23	0.34	0.50	0.07	2.3	0.5	24.6	5.0	13.3	1.7									
	Exercise	-22.73	0.21	9.81	0.42	6.4	0.8	-23.81	0.31	11.42	0.44	0.36	0.06	41.3	14.0	3.0	0.6	17.0	3.9									
	Cold	-23.04	0.19	9.98	0.49	5.2	0.6	-23.65	0.23	11.35	0.49	0.39	0.08	22.2	6.5	2.2	0.6	10.1	1.8									
Heart ²	Control	-23.75	0.20	9.99	0.27	17.2	1.4	-23.83	0.20	10.60	0.37	0.91	0.04	18.7	1.7	0.2	2.0	17.0	1.4									
	Exercise	-23.49	0.22	9.85	0.31	14.8	1.5	-23.89	0.27	10.75	0.39	0.41	0.18	4.7	2.5	27.4	8.8	18.1	2.7									
	Cold	-23.48	0.21	9.31	0.33	12.0	1.3	-23.91	0.19	10.61	0.31	0.64	0.07	22.2	3.4	2.2	0.7	15.0	1.5									
Brain ²	Control	-22.66	0.35	9.48	0.46	18.5	2.6	-24.42	3.50	11.50	3.46	0.34	0.13	172.7	349.6	11.5	3.7	65.5	131.0									
	Exercise	-22.70	0.34	9.51	0.43	22.6	2.9	-23.11	0.41	10.64	0.59	0.70	0.12	35.4	9.8	3.4	2.5	26.0	4.6									
	Cold	-22.60	0.33	9.23	0.46	14.5	2.3	-23.12	0.38	10.57	0.57	0.57	0.16	31.2	12.2	3.4	2.0	19.2	4.2									
RBC ¹	Control	-24.20	0.41	11.10	0.53	19.3	2.6	-24.48	2.6	11.42	*	0.00	*	19.5	*	19.5	*	19.5	*									
	Exercise	-24.13	0.34	11.29	0.47	16.8	2.2	-24.37	2.2	11.55	*	1.00	*	17.0	*	-	*	17.0	*									
	Cold	-24.43	0.28	11.05	0.38	15.9	1.6	-24.43	1.6	11.05	*	1.00	*	15.9	*	-	*	15.9	*									
Flight muscle ²	Control	-23.63	0.26	9.43	0.33	20.9	2.1	-23.74	0.27	10.14	0.46	0.86	0.07	24.1	3.3	1.3	1.4	21.0	2.3									
	Exercise	-23.44	0.27	9.38	0.35	20.3	2.2	-23.87	0.31	10.52	0.43	0.62	0.12	36.3	10.2	4.4	2.1	24.2	3.9									
	Cold	-23.39	0.30	8.84	0.41	15.0	2.1	-23.84	0.26	10.36	0.41	0.58	0.09	30.4	7.1	2.6	1.0	18.8	2.8									
Leg muscle ²	Control	-23.32	0.35	9.99	0.42	26.0	2.9	-23.47	0.35	11.02	0.57	0.84	0.06	30.6	4.5	1.0	1.0	25.9	3.1									
	Exercise	-23.36	0.31	10.23	0.38	28.3	2.8	-23.60	0.34	11.17	0.50	0.81	0.08	35.8	5.9	2.4	1.9	29.4	3.5									
	Cold	-23.19	0.38	9.71	0.49	21.9	3.1	-23.69	0.42	11.38	0.57	0.60	0.10	42.2	13.4	3.3	1.6	26.8	5.6									
Skin ²	Control	-21.52	0.46	8.86	0.56	24.2	4.1	-21.78	0.49	10.27	0.81	0.76	0.10	32.3	8.0	1.4	1.3	25.0	5.0									
	Exercise	-21.22	0.57	8.34	0.68	28.7	6.1	-23.73	2.37	12.17	2.38	0.57	0.07	141.4	111.6	4.4	1.9	82.1	67.3									
	Cold	-20.17	0.34	8.36	0.73	5.8	1.3	-24.37	3.91	12.91	3.90	0.47	0.13	207.0	241.6	3.3	0.8	99.8	139.2									

Based on $\Delta_{\text{one-two}} (=AIC_{\text{one-comp.}} - AIC_{\text{two-comp.}})$ presented in Table 2 we used average retention time ($\tau_{\text{one-comp.}}$) for RBC, and ($\tau_{\text{two-comp.}}$) for all other tissues to perform subsequent analyses. y_t is the measured $\delta^{13}\text{C}$ value of the tissue at time t .

t is the time in days.

y_∞ is the estimated final $\delta^{13}\text{C}$ value.

a is the estimated range in tissue $\delta^{13}\text{C}$ between diets.

p_1 and p_2 are the fractional size of pools one and two for the two-compartment model.

$\tau_{\text{one-comp.}}$ is the estimated average carbon retention time for the one-compartment model.

τ_1 and τ_2 are the estimated average carbon retention times for 1st and 2nd pool of the two-compartment model.

$\tau_{\text{two-comp.}}$ is the average carbon retention time of the two-compartment model: $\tau_{\text{two-comp.}} = p\tau_1 + (1-p)\tau_2$ (Carleton et al., 2008).

¹ Average retention time from the one-compartment model was used because $\Delta_{1-2} < 2$.

² Average retention time from the two-compartment model was used because $\Delta_{1-2} > 2$.

*Nan error, no adequate curve fitting possible, p_1 and p_2 indicate this is a single pool model.