

SUPPLEMENTAL MATERIAL

Supplemental Table 1. *Partial correlations for food consumption and body composition traits prior to and following 6 days of wheel access at 8 weeks of age for the entire G₄ population*

Trait	Mass (g) <i>pre</i>	Mass (g) <i>post</i>	% Change in % Mass	% Fat <i>pre</i>	% Fat <i>post</i>	% Change in % Fat	% Lean <i>pre</i>	% Lean <i>post</i>	% Change in % Lean
Food Consumed (g)	0.042	0.362**	0.489**	-0.603**	-0.143*	0.447**	0.579**	0.164**	-0.518**
Mass (g), <i>pre</i>		0.866**	-0.559**	0.371**	0.149**	-0.247**	-0.391**	-0.130*	0.329**
Mass (g), <i>post</i>			-0.081*	0.107*	0.176**	0.040	-0.125*	-0.181**	-0.003
% Change in mass				-0.558**	0.008	0.578**	0.566**	-0.058	-0.665**
% Fat, <i>pre</i>					0.558**	-0.457**	-0.961**	-0.472**	0.700**
% Fat, <i>post</i>						0.429**	-0.537**	-0.896**	-0.092*
% Change in % fat							0.438**	-0.407**	-0.779**
% Lean, <i>pre</i>								0.474**	-0.738**
% Lean, <i>post</i>									0.241**

Pearson partial correlations (*r*) controlling for parent-of-origin, sex, and parity. **P* < 0.05, ***P* < 0.0001 following correction for multiple comparisons utilizing the false discovery rate procedure (11). Food consumption was quantified as the amount eaten over the entire 6-day access to running wheels. At 8 weeks of age body composition measures were taken immediately prior to (*pre*) and following (*post*) 6 days of wheel access. Percent body fat (and lean) was calculated as (fat mass/body mass)*100. Percent change variables were calculated as [(*post* – *pre*)/*pre*]*100.

Supplemental Table 2. *Partial correlations for body composition traits at 4, 6 and 8 weeks of age for the entire G₄ population*

Trait	<i>~4 weeks of age</i>		<i>~6 weeks of age</i>			<i>~8 weeks of age</i>		
	% Fat	% Lean	Body mass	% Fat	% Lean	Body mass	% Fat	% Lean
<i>~4 weeks of age</i>								
Body mass	0.281**	-0.302**	0.710**	0.156**	-0.156**	0.648**	0.201**	-0.231**
% Fat		-0.910**	0.134*	0.628**	-0.534**	0.117*	0.445**	-0.418**
% Lean			-0.081*	-0.568**	0.489**	-0.053	-0.391**	0.366**
<i>~6 weeks of age</i>								
Body mass				0.200**	-0.204**	0.877**	0.282**	-0.317**
% Fat					-0.886**	0.168**	0.752**	-0.702**
% Lean						-0.094*	-0.680**	0.656**
<i>~8 weeks of age</i>								
Body mass							0.367**	-0.390**
% Fat								-0.947**

Eight week measurements were prior to 6 days of wheel access. Pearson partial correlations (*r*) controlling for parent-of-origin, sex, and parity. * $P < 0.05$, ** $P < 0.0001$ following correction for multiple comparisons utilizing the false discovery rate procedure (11).

Supplemental Table 3. *QTL detected and respective statistics for body composition traits and food consumption. Values represent LOD scores from simple mapping output that were significant at the genome-wide level ($P \leq 0.05$, $LOD \geq 3.9$), but did not remain significant or suggestive ($P \leq 0.1$, $LOD \geq 3.5$) following the GRAIP procedure (and hence are not depicted in Table 2 of the primary text)*

Trait	Nearest Marker	MMU	Peak Position (Mb)	Naive LOD	GRAIP LOD	CI (Mb)	% Var	Additive \pm SE	Dominance \pm SE
<i>~4 weeks of age</i>									
Body mass (g)	JAX00573023	5	7	4.6	2.3	-25	1.5	-0.5 \pm 0.1	-0.2 \pm 0.2
	JAX00139528	6	33	6.8	2.9	22-45	1.5	0.5 \pm 0.1	-0.1 \pm 0.2
	JAX00160567	8	37	4.4	2.0	27-74	2.5	0.4 \pm 0.1	0.7 \pm 0.2
	JAX00704097	9	103	4.6	2.5	94-105	2.1	0.2 \pm 0.1	0.8 \pm 0.2
	JAX00063060	15	66	6.9	3.2	48-69	1.6	0.5 \pm 0.1	-0.1 \pm 0.2
	JAX00415862	16	24	4.3	2.1	-29	1.5	-0.4 \pm 0.1	0.4 \pm 0.2
% Fat	JAX00189941	6	119	5.5	2.8	112-127	0.5	-0.4 \pm 0.2	-0.1 \pm 0.2
	JAX00170532	9	42	5.5	2.2	30-65	2.2	0.6 \pm 0.2	0.6 \pm 0.3
	JAX00043830	13	40	4.6	1.8	34-49	1.2	0.5 \pm 0.2	-0.2 \pm 0.3
	JAX00057997	14	119	4.4	2.3	103-	1.4	-0.5 \pm 0.2	0.6 \pm 0.3
	JAX00405318	15	72	5.1	1.9	48-82	2.7	0.5 \pm 0.2	0.8 \pm 0.3
	JAX00073232	17	6	4.5	1.9	-23	2.4	-0.2 \pm 0.2	-1.0 \pm 0.3
% Lean	JAX00476173	19	35	6.8	2.5	27-43	3.5	-0.7 \pm 0.2	-1.0 \pm 0.3
	JAX00624709	6	123	4.9	2.4	104-138	0.4	0.4 \pm 0.2	0.03 \pm 0.28
	JAX00645933	7	86	5.7	2.8	74-106	3.2	0.6 \pm 0.2	-1.1 \pm 0.3
	JAX00033353	12	13	7.2	2.7	-25	3.0	0.9 \pm 0.2 [†]	-0.2 \pm 0.3
	JAX00043830	13	40	5.5	2.2	37-45	1.7	-0.6 \pm 0.2	0.5 \pm 0.3
	JAX00057997	14	119	4.1	2.2	97-	1.6	0.5 \pm 0.2	-0.7 \pm 0.3

	JAX00476173	19	34	8.7	3.2	29-44	4.7	1.0±0.2 [†]	1.1±0.3
<i>~6 weeks of age</i>									
Body mass (g)	JAX00008766	1	123	6.0	3.0	91-141	1.1	0.5±0.2	0.2±0.3
	JAX00127317	5	15	6.6	3.2	-27	0.7	-0.4±0.2	-0.3±0.3
	JAX00645408	7	83	6.0	3.0	78-85	1.5	0.3±0.2	0.8±0.3
	JAX00062446	15	58	4.4	2.1	27-71	0.6	0.4±0.2	-0.1±0.3
	JAX00415862	16	24	5.8	2.9	-27	1.3	-0.6±0.2	0.3±0.3
% Fat	JAX00567938	4	136	4.2	2.0	119-139	2.2	-0.8±0.2	-0.4±0.3
	JAX00645933	7	86	5.4	3.0	74-116	4.0	-0.8±0.2	1.3±0.3 [†]
	JAX00033353	12	13	7.0	3.3	-26	3.4	-1.1±0.2 [†]	0.3±0.3
	JAX00057997	14	119	5.3	3.2	109-	2.8	-0.9±0.2 [†]	0.7±0.3
	JAX00431384	17	10	5.7	2.8	-17	2.7	-0.04±0.22	-1.4±0.3 [†]
% Lean	JAX00474575	19	27	4.0	1.9	18-43	2.5	-0.3±0.2	-1.3±0.3
	JAX00300375	10	119	4.1	2.1	111-	2.8	1.1±0.2 [†]	-0.5±0.3
	JAX00073232	17	7	5.4	3.0	-12	2.5	-0.03±0.23	1.4±0.3
<i>~8 weeks of age</i>									
Body mass (g)	JAX00511966	2	172	4.0	1.8	168-	1.2	-0.4±0.2	-0.8±0.3
	JAX00645408	7	83	6.7	3.2	80-84	1.4	0.4±0.2	0.9±0.3
	JAX00700236	9	83	4.4	2.1	79-90	0.6	0.3±0.2	0.6±0.3
% Fat	JAX00010715	1	149	5.6	3.4	117-151	1.9	0.8±0.2	0.1±0.3
	JAX00538751	3	136	4.0	2.1	129-144	5.7	-1.5±0.2 [†]	1.1±0.3
	JAX00567938	4	135	4.0	2.1	116-139	2.2	-0.9±0.2	-0.3±0.3
	JAX00190133	7	80	5.6	3.3	68-87	5.0	-0.8±0.2	1.7±0.3 [†]
	JAX00078883	17	83	4.3	2.2	71-	1.0	0.4±0.2	-0.7±0.3
% Lean	JAX00010715	1	148	5.8	3.2	136-157	1.7	-0.7±0.2	-0.05±0.31

	JAX00608826	6	47	4.1	2.5	27-56	2.8	-0.9±0.2 [†]	-0.5±0.3
	JAX00169834	9	33	6.0	3.1	30-69	3.2	-1.0±0.2 [†]	0.4±0.3
	JAX00300375	10	119	4.1	2.2	112-122	1.6	0.6±0.2	-0.9±0.3
	JAX00078883	17	83	3.9	2.0	68-	1.0	-0.4±0.2	0.6±0.3
<i>Post exercise</i>									
Body mass (g)	JAX00511966	2	172	4.8	2.1	163-	1.2	-0.4±0.2	-0.6±0.3
	JAX00645408	7	83	5.3	2.5	77-85	1.0	0.4±0.2	0.6±0.3
	JAX00166114	8	112	4.4	2.1	95-117	0.8	-0.4±0.2	0.4±0.3
	JAX00700236	9	83	4.0	2.0	76-105	0.5	0.2±0.2	0.4±0.3
	JAX00062446	15	58	4.4	2.0	26-70	0.5	0.4±0.2	-0.2±0.3
	JAX00415862	16	24	4.8	2.2	-29	0.9	-0.5±0.2	0.09±0.28
% Fat	JAX00094839	2	60	4.3	1.9	53-66	4.6	0.8±0.1 [†]	-0.4±0.2
	JAX00619072	6	98	4.2	2.4	94-110	1.2	-0.2±0.1	-0.6±0.2
	JAX00695061	9	57	4.7	2.5	51-71	1.5	0.5±0.2	-0.002±0.218
	JAX00311892	11	57	4.3	2.1	46-61	2.2	0.4±0.1	0.6±0.2
	JAX00033353	12	13	5.3	2.5	-20	2.3	-0.6±0.1 [†]	-0.2±0.2
	JAX00405318	15	72	4.3	2.0	52-76	3.2	0.2±0.1	1.0±0.2 [†]
	JAX00071974	16	85	4.9	2.4	78-89	2.4	0.6±0.2	0.3±0.2
	JAX00474575	19	27	4.0	1.9	24-41	2.6	-0.3±0.2	-0.8±0.2
% Lean	JAX00105078	3	21	5.1	2.8	-26	4.1	0.2±0.2	-1.2±0.2 [†]
	JAX00569432	4	142	4.6	2.2	116-	3.5	0.8±0.2 [†]	-0.4±0.2
	JAX00695061	9	57	5.8	2.9	52-68	1.8	-0.6±0.2	0.2±0.2
	JAX00311892	11	57	3.9	1.9	36-61	2.6	-0.4±0.2	-0.8±0.2
	JAX00331009	12	39	5.4	3.2	28-45	4.1	0.8±0.2 [†]	-0.5±0.2
	JAX00405318	15	72	4.6	2.2	50-77	3.7	-0.1±0.1	-1.2±0.2 [†]

	JAX00071974	16	85	4.5	2.2	77-	3.0	-0.7±0.2	-0.4±0.2
	JAX00474575	19	27	4.6	2.2	24-37	3.0	0.4±0.2	0.9±0.2
% Change in body mass	JAX00707462	9	119	4.3	2.8	115-	1.8	-0.9±0.3	0.8±0.4
% Change in % fat	JAX00176095	9	117	4.4	3.0	113-	2.1	-2.9±1.0	3.6±1.4

Beginning at 8 weeks of age body composition measures were taken immediately prior to (*pre*) and following (*post*) 6 days of wheel access. Food consumption was quantified as the amount eaten over the entire 6-day access to running wheels and values are presented per gram of body mass [(*pre* wheel access + *post* wheel access) /2]. Percent body fat (and lean) was calculated as (fat mass/body mass)*100. Percent change variables were calculated as [(*post* – *pre*)/*pre*]*100. Confidence intervals (CIs) for QTL positions were obtained using a 1.0 LOD drop in Mb. CIs are relative to the GRAIP permuted LOD score with the exception of those denoted by ‡, which are relative to the naive LOD score. Percentage of phenotypic variance accounted for by the QTL effect. For additive and dominance effects: positive values indicate increasing effect of the HR allele or increasing effect of the heterozygote, respectively. †Indicates additive and dominance effects were statistically significant at $P < 0.05$. Body mass QTL at ~8weeks of age have been previously published in Kelly et al. (23) and are simply reproduced here for completeness.