Table S1. Temperature dependence of the mitochondrial-nuclear interaction effect on egg-to-adult development time

Phenotype	Factor[1]	numDF	denDf	*F*-value	*P*-value
16°C Development time	mtDNA	1	80	51.57	<0.0001
(*N*=2300, 84 vials)	Nuclear	1	80	5.91	0.0173
	mtDNA x Nuclear	1	80	0.38	0.5413
22°C Development time	mtDNA	1	76	263.60	<0.0001
(*N*= 3105, 80 vials)	Nuclear	1	76	213.20	<0.0001
	mtDNA x Nuclear	1	76	104.00	<0.0001
25°C Development time	mtDNA	1	82	1034.12	<0.0001
(*N*= 3209, 86 vials)	Nuclear	1	82	440.07	<0.0001
	mtDNA x Nuclear	1	82	274.60	<0.0001
28°C Development time	mtDNA	1	71	18.40	0.0001
(*N*= 1873, 75 vials)	Nuclear	1	71	30.00	<0.0001
	mtDNA x Nuclear	1	71	2780.20	<0.0001

[1] Mixed-model ANOVA fit using restricted maximum likelihood and including vial as a random factor

Table S2. Temperature dependence of the mitochondrial-nuclear interaction effect on larval, but not pupal, survival

Phenotype	Factor	Df	Res Df	*F*-value[1]	*P*-value
16°C Egg-to-pupae survival	mtDNA	1	81	15.30	0.0002
(*N*= 83 vials) [2]	Nuclear	1	80	53.55	<0.0001
	mtDNA x Nuclear	1	79	2.35	0.13
22°C Egg-to-pupae survival	mtDNA	1	58	5.41	0.0236
(*N*= 60 vials) [2]	Nuclear	1	57	10.26	0.0022
	mtDNA x Nuclear	1	56	8.65	0.0048
25°C Egg-to-pupae survival	mtDNA	1	79	33.86	<0.0001
(*N*= 81 vials) [2]	Nuclear	1	78	136.30	<0.0001
	mtDNA x Nuclear	1	77	6.10	0.0158
16°C Pupae-to-adult survival	mtDNA	1	56	0.03	0.8724
(*N*= 58 vials) [3]	Nuclear	1	55	4.72	0.0343
	mtDNA x Nuclear	1	54	1.37	0.2474
22°C Pupae-to-adult survival	mtDNA	1	66	6.14	0.0159
(*N*= 68 vials) [3]	Nuclear	1	65	2.20	0.1432
	mtDNA x Nuclear	1	64	0.01	0.9031
25°C Pupae-to-adult survival	mtDNA	1	51	0.04	0.8362
(*N*= 53 vials) [3]	Nuclear	1	50	0.81	0.3738
	mtDNA x Nuclear	1	49	0.38	0.5379

[1] General linear models fit using quasibinomial distribution of errors

[2] Does not include vials for which pupae count exceeded 50 (# of eggs placed in vial)

[3] Does not include vials for which eclosed count exceeded pupae count

Table S3. Temperature dependence of the mitochondrial-nuclear interaction effect on pupation height

Phenotype	Factor[1]	numDF	denDf	*F*-value	*P*-value
16°C Pupation height	mtDNA	1	36	0.28	0.5991
(*N*=1271, 40 vials)	Nuclear	1	36	23.78	<0.0001
	mtDNA x Nuclear	1	36	3.57	0.0668
22°C Pupation height	mtDNA	1	36	13.56	0.0008
(*N*= 1745, 40 vials)	Nuclear	1	36	6.21	0.0175
	mtDNA x Nuclear	1	36	8.39	0.0064
25°C Pupation height	mtDNA	1	36	13.46	0.0008
(*N*= 1588, 40 vials)	Nuclear	1	36	56.60	<0.0001
	mtDNA x Nuclear	1	36	19.14	0.0001

[1] Mixed-model ANOVA fit using restricted maximum likelihood and including vial as a random factor

Table S4. Mitochondrial-nuclear interaction effects on third-instar larval mass do not depend on development temperature

Phenotype	Factor	numDF	denDf	*F*-value	*P*-value
16°C Larval mass[1]	mtDNA	1	157	20.88	<0.0001
(*N*=161)	Nuclear	1	157	30.40	<0.0001
	mtDNA x Nuclear	1	157	8.84	0.0034
25°C Larval mass[1]	mtDNA	1	157	10.39	0.0015
(*N*= 161)	Nuclear	1	157	22.12	<0.0001
	mtDNA x Nuclear	1	157	11.93	0.0007

[1] The dependent variable is *ln*(*mass*).

Table S5. Temperature dependence of the mitochondrial-nuclear interaction effect on metabolic rate

Phenotype[1]	Genotype	Common slope (CI) [2]	Common slope y-axis intercept (CI)[3]	Shift along common slope?
16°C Metabolic Rate		1.267 (1.068,1.508)		
	(*ore*);*OreR*		**0.2245**[a] (0.0391, 0.4099)	no
	(*simw*^{501});*OreR*		**0.2452**[a] (0.0748, 0.4156)	Yes[4]
	(*ore*); *Aut*		0.1403[b] (-0.0357, 0.3163)	no
	(*simw*^{501});*Aut*		0.1614[b] (-0.0182, 0.3410)	no
25°C Metabolic Rate		0.7350 (0.6377,0.8466)		
	(*ore*);*OreR*		0.8244[c] (0.7294, 0.9194)	no
	(*simw*^{501});*OreR*		**0.8937**[d] (0.8176, 0.9700)	Yes[4]
	(*ore*); *Aut*		0.8263[c] (0.7356, 0.9170)	no
	(*simw*^{501});*Aut*		0.8042[c] (0.7079, 0.9005)	no

[1] Metabolic rate of larvae developed at 16°C and measured at 16°C or developed at 25°C and measured at 25°C.

[2] Common slope from a Type II model regression analysis of ln(metabolic rate) on ln(larval mass).

[3] Different letters denote significant differences in the y-intercept (metabolic rate) within a common slope ($P < 0.05$).

[4] The significant shift in the x-axis (mass) along the common slope reflects a downward shift in the distribution of masses for (*simw*^{501});*OreR* larvae ($P < 0.05$).

Table S6. Temperature dependence of the mitochondrial-nuclear interaction effect on metabolic plasticity

Phenotype	Factor	numDF	denDf	*F*-value	*P*-value
Mass-corrected larval metabolic rate (*N*=322)	T_{DEV}	1	306	9.219	0.0026
	$T_{MEASURE}$	1	306	651.8	<0.0001
	mtDNA	1	306	0.557	0.4560
	Nuclear	1	306	17.19	<0.0001
	T_{DEV} x $T_{MEASURE}$	1	306	40.44	<0.0001
	T_{DEV} x mtDNA	1	306	8.945	0.0030
	$T_{MEASURE}$ x mtDNA	1	306	2.755	0.0980
	T_{DEV} x Nuclear	1	306	12.93	0.0004
	$T_{MEASURE}$ x Nuclear	1	306	16.90	0.0001
	mtDNA x Nuclear	1	306	2.277	0.1323
	T_{DEV} x $T_{MEASURE}$ x mtDNA	1	306	0.917	0.3390
	T_{DEV} x $T_{MEASURE}$ x Nuclear	1	306	0.692	0.4061
	T_{DEV} x mtDNA x Nuclear	1	306	13.074	0.0004
	$T_{MEASURE}$ x mtDNA x Nuclear	1	306	0.018	0.8920
	T_{DEV} x $T_{MEASURE}$ x mtDNA x Nuclear	1	306	4.939	0.0270

Table S7. Temperature dependence of the mitochondrial-nuclear interaction effect on the Q_{10} of metabolic rate

Development temperature (T_{DEV})	Genotype	Q_{10} (CI) [1]
16°C	(*ore*);*OreR*	1.547 (1.439, 1.687)
	(*simw*^{501});*OreR*	1.316 (1.154, 1.556)
	(*ore*); *Aut*	1.860 (1.797, 1.935)
	(*simw*^{501});*Aut*	1.823 (1.689, 1.999)
25°C	(*ore*);*OreR*	1.809 (1.670, 1.990)
	(*simw*^{501});*OreR*	1.847 (1.801, 1.903)
	(*ore*); *Aut*	2.649 (2.571, 2.740)
	(*simw*^{501});*Aut*	2.283 (2.228, 2.351)

[1] Q_{10} for metabolic rate, estimated from the genotype mean mass-corrected routine metabolic rates (RMR) measured at 16 and 26°C, as $Q_{10} = (RMR_{25°C}/RMR_{16°C})^{10/(25-16)}$. Confidence intervals were calculated using the upper and lower 95% CIs of the genotype mean RMRs at each temperature.

Files S1-S5

Available for download at http://www.genetics.org/lookup/suppl/doi:10.1534/genetics.113.154914/-/DC1

File S1 Egg to adult development time in days. Each row is an individual fly.

File S2 Each row is a vial. Pupated is number pupae from 50 eggs placed in vial. Vials where the number of pupae exceeded 50 were removed.

File S3 Each row is a vial. Eclosed is number of flies eclosed from those pupated. Vials where the number of flies eclosed exceeded the number of pupae were removed.

File S4 Each row is a pupal height as described in the manuscript.

File S5 Each row is data from a sample of 5 larvae. Mass = weight of 5 larvae in mg. T1 = temperature of air as it passes through the CO2 detector. T2 = temperature of air in the measurement chambers where larvae are respiring. CO2 = VCO2 measure as described in the manuscript. CO2.MC = Mass corrected VCO2 measure as described in the manuscript.