Table S1. Parameters (intercept and slope β ± SE) from regression analyses of mass-specific (pmol O_2 s^{-1} mg^{-1} wet tissue) COX activity on homogenate concentration in the (a) liver and (b) muscle, and mass-specific mitochondrial leak respiration (LEAK) and phosphorylative respiration (OXPHOS) as a function of COX activity in both the liver (c, d) and muscle (e, f).

Dependent variable	Independent variable	Intercept± SE	β ± SE	r^2	p value
(a) Mass-specific liver COX	Liver homogenate concentration	-5.621 ± 0.756	103.101± 6.533	0.626	< 0.001
(b) Mass-specific muscle COX	Muscle homogenate concentration	0.246 ± 0.976	25.283± 19.563	0.044	0.803
(c) Mass-specific liver LEAK	Corrected liver COX	0.060 ± 0.016	3.590 ± 0.114	0.310	0.001
(d) Mass-specific liver OXPHOS	Corrected liver COX	0.283 ± 0.144	31.094 ± 1.054	0.105	0.058
(e) Mass-specific muscle LEAK	Mass-specific muscle COX	0.050 ± 0.006	0.090 ± 0.181	0.686	< 0.001
(f) Mass-specific muscle OXPHOS	Mass-specific muscle COX	0.433 ± 0.037	2.127 ± 1.118	0.809	< 0.001

We tested whether the mass-specific (pmol O_2 s^{-1} mg^{-1} wet tissue) cytochrome c oxidase (COX) activity – a measure of mitochondrial density - in the liver and muscle was influenced by its concentration of homogenate (mg ml^{-1} buffer) in the respirometry chamber. The auto-oxidation of ascorbate and N,N,N',N'-Tetramethyl-p-phenylenediamine dihydrochloride – molecules used to assess COX activity - generate a "chemical background" consumption of oxygen which is not due to the biological sample, so the measured mass-specific COX activities were affected by a constant noise. This chemical background may bias calculations of the oxygen flux per mass of tissue; its magnitude is indicated by the intercept of the relationship between oxygen flux and tissue mass (i.e. the calculated oxygen flux in the respirometry chamber in the absence of any tissue sample; intercepts (a) and (b) in supplemental table 2). The chemical background can normally be quantified by measuring oxygen flux after inhibition of COX with cyanide, but in the present study this was not feasible because the use of pyruvate substrate reverses the inhibition by cyanide. We used regression analyses to assess the effect of homogenate concentration in the respirometry chamber on mass-specific COX activity for each tissue. The homogenate concentration of the white muscle (mean ± SE: 20.0 ± 0.1 mg mL^{-1}) had no effect on COX activity (supplemental table 1 (b)), so the (uncorrected) mass-specific COX activity of the muscle was used in subsequent analyses. In contrast, homogenate concentration (mean ± SE: 8.5 ± 0.3 mg mL^{-1}) significantly influenced mass-specific COX activity in the liver (supplemental table 2), so corrected COX activity, calculated as the residual from this regression (regression (a)) was used as covariate in future analyses. In the case of the liver, COX activity is corrected for homogenate concentration (corrected COX activity), whereas for muscle no correction was needed for homogenate concentration. For clarity, the variable "corrected liver COX" is referred to as "liver COX" in the main article.

Table S2: Results from linear regression analyses of specific growth rate (% change in mass per day) in brown trout (*Salmo trutta*, n = 35*)* as a function of mitochondrial respiratory capacities and food intake (Model 1: Cytochrome oxidase (COX) activity, COX-normalized leak respiration rate ($LEAK_{cox}$), COX-normalized phosphorylating respiration rate ($OXPHOS_{cox}$); Model 2: Respiratory control ratio (RCR)). Bold denotes significance.

Growth in length				
Predictors	Parameter estimate ± SE	df	*t*	*p* value
Model 1				
Food intake	0.004 ± 0.001	27	4.697	***<0.001***
Liver $LEAK_{cox}$	-0.002 ± 0.031	27	-0.052	0.959
Liver $OXPHOS_{cox}$	-0.000 ± 0.003	27	-0.081	0.936
Liver COX activity	-0.000 ± 0.002	27	-0.179	0.859
Muscle $LEAK_{cox}$	0.071 ± 0.110	27	0.643	0.526
Muscle $OXPHOS_{cox}$	0.001 ± 0.018	27	0.031	0.975
Muscle COX activity	-0.004 ± 0.003	27	-1.149	0.261
Model 2				
Food intake	0.004 ± 0.001	31	8.079	***<0.001***
Liver RCR	0.001 ± 0.009	31	0.133	0.895
Muscle RCR	-0.011 ± 0.017	31	-0.651	0.520

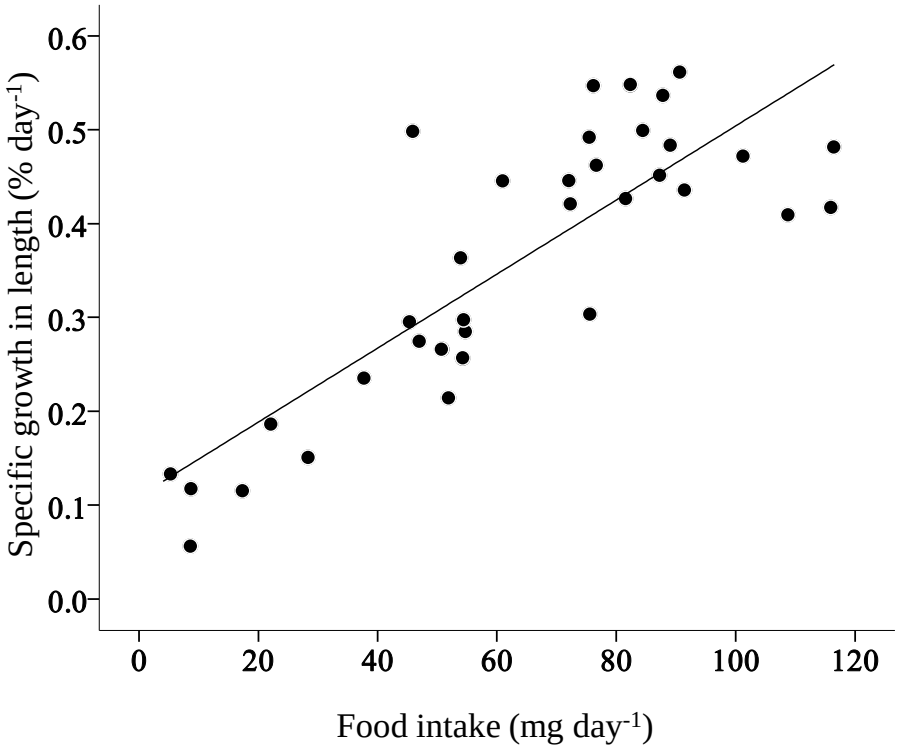

Fig. S1. Relationship between food intake and specific growth in length of brown trout (*Salmo trutta*) maintained at 19°C.