Table S1. Statistical table of one-way and two-way ANOVAs (*F* statistic), and nonparametric Kruskal Wallis and Scheirer-Ray-Hare tests (*H*) for bay scallop survivorship, shell height, and under the pCO_2 × food ration challenge. Statistical results also shown for condition index, dry shell weights, and dry tissue weights for high-food scallops in response to pCO_2 on day 42 (high-food ration only).

Time	Physiological measurement	Effect	DF_{num}	DF_{den}	*F*	*H*	*P*
Day 0	Shell height	pCO_2	1	6	0.23	-	0.65
	Standard metabolic rate	pCO_2	1	6	0.07	-	0.80
Day 14	Percent survival	pCO_2	1	12	-	0.18	0.67
		food ration	1	12	-	4.38	**0.04**
		pCO_2 × food ration	1	12	-	0.14	0.71
	Shell height	pCO_2	1	12	0.09	-	0.77
		food ration	1	12	108.94	-	**<0.001**
		pCO_2 × food ration	1	12	0.09	-	0.77
	Standard metabolic rate	pCO_2	1	12	2.16	-	0.17
		food ration	1	12	2.54	-	0.14
		pCO_2 × food ration	1	12	0.68	-	0.43
Day 42	Percent survival	pCO_2	1	12	0.03	-	0.86
		food ration	1	12	230.80	-	**<0.001**
		pCO_2 × food ration	1	12	0.17	-	0.68
	Shell height	pCO_2	1	12	0.02	-	0.88
		food ration	1	12	358.67	-	**<0.001**
		pCO_2 × food ration			0.19	-	0.67
	Standard metabolic rate	pCO_2	1	12	-	0.89	0.34
		food ration	1	12	-	3.98	**0.05**
		pCO_2 × food ration	1	12	-	0.04	0.83
	Dry shell weight	pCO_2	1	-	-	5.33	**0.02**
	Dry tissue weight	pCO_2	1	6	4.50	-	*0.08*
	Condition index	pCO_2	1	6	3.64	-	0.11

bold or *italics*: P-value < 0.05 or <0.1

Table S2. Statistical table of one-way and two-way ANOVAs (*F* statistic), and nonparametric Kruskal Wallis and Scheirer-Ray-Hare tests (*H*) for bay scallop clearance rates under the pCO_2 × food ration challenge. Models are parsed by clearance rates of live algae species (*C. neogracile* and *T. chui*) and low chlorophyll seston.

Time	Clearance rates by cell type	Effect	DF_{num}	DF_{den}	*F*	*H*	*P*
Day 0	*C. neogracile* (Chaet-B)	pCO_2	1	6	7.49	-	**0.03**
	T. chui (PLY 429)	pCO_2	1	6	0.04	-	0.86
	total high-chlorophyll cells	pCO_2	1	6	10.58	-	**0.02**
	low chlorophyll (seston)	pCO_2	1	6	2.50	-	0.17
Day 14	*C. neogracile* (Chaet-B)	pCO_2	1	12	0.22	-	0.65
		food ration	1	12	3.94	-	*0.07*
		pCO_2 × food ration	1	12	0.09	-	0.78
	T. chui (PLY 429)	pCO_2	1	9	-	0.84	0.36
		food ration	1	9	-	0.45	0.50
		pCO_2 × food ration	1	9	-	0.79	0.37
	total high-chlorophyll cells	pCO_2	1	12	0.64	-	0.44
		food ration	1	12	5.95	-	**0.03**
		pCO_2 × food ration	1	12	0.00	-	1.00
	low chlorophyll (seston)	pCO_2	1	12	-	0.10	0.75
		food ration	1	12	-	0.10	0.75
		pCO_2 × food ration	1	12	-	0.04	0.83
Day 42	*C. neogracile* (Chaet-B)	pCO_2	1	10	3.23	-	0.10
		food ration	1	10	77.87	-	**<0.001**
		pCO_2 × food ration	1	10	8.62	-	**0.01**
	T. chui (PLY 429)	pCO_2	1	12	0.01	-	0.94
		food ration	1	12	23.36	-	**<0.001**
		pCO_2 × food ration	1	12	1.16	-	0.30
	total high-chlorophyll cells	pCO_2	1	9	2.09	-	0.18
		food ration	1	9	94.16	-	**<0.001**
		pCO_2 × food ration	1	9	3.19	-	0.11
	low chlorophyll (seston)	pCO_2	1	11	0.33	-	0.58
		food ration	1	11	4.02	-	*0.07*
		pCO_2 × food ration	1	11	3.61	-	*0.08*

bold or *italics*: P-value < 0.05 or <0.1

Table S3. Mean (± SE) standard metabolic rates (mol O_2 L^{-1} mm^{-1} hr^{-1}) for all animals measured and within treatments, reported with allometric scaling ('*b*') and as rate per individual shell height ('height').

Experiment data				Standard metabolic rate	
Day	pCO_2	food ration	*N*	height	*b*
Day 0	low	-	9	0.002 (±0.003)	0.17 (±0.030)
	high	-	12	0.021 (± 0.011)	0.14 (±0.060)
Day 14	low	low	14	0.014 (±0.02)	0.074 (±0.011)
	low	high	19	0.020 (±0.003)	0.086 (±0.010)
	high	low	13	0.014 (±0.004)	0.086 (±0.024)
	high	high	19	0.027 (±0.004)	0.120 (±0.017)
Day 42	low	low	7	0.010 (±0.002)	0.050 (±0.011)
	low	high	8	0.046 (±0.006)	0.067 (±0.006)
	high	low	8	0.012 (±0.002)	0.057 (±0.010)
	high	high	6	0.051 (±0.011)	0.094 (±0.020)

Table S4. Mean (± SE) clearance rates of *C. neogracile*, *T. chui*, and seston (mL^{-1} mm^{-1} hr^{-1}) for all animals measured and within treatments, reported with allometric scaling ('*b*') and as rate per individual shell height ('height').

Experiment data			*C. neogracile*			*T. chui*			seston		
Day	pCO_2	food	*N*	height	*b*	*N*	height	*b*	*N*	height	*b*
Day 0	low	-	11	2.79 (±0.47)	6.54 (±0.88)	6	4.38 (±1.02)	10.9 (±2.65)	11	2.54 (±0.38)	6.06 (±0.87)
	high	-	12	4.72 (±0.80)	11.5 (±1.87)	10	4.85 (±0.73)	12.3 (±1.94)	12	3.59 (±0.64)	8.82 (±1.51)
Day 14	low	low	18	2.63 (±0.43)	9.82 (±1.36)	5	3.40 (±1.97)	12.3 (±7.47)	15	2.77 (±0.69)	14.6 (±2.87)
	low	high	20	6.28 (±1.45)	17.5 (±3.44)	13	4.42 (±1.56)	11.8 (±3.75)	11	5.22 (±1.19)	11.2 (±3.00)
	high	low	11	2.35 (±0.70)	10.4 (±4.11)	4	2.19 (±1.21)	8.46 (±4.79)	11	4.18 (±1.58)	19.8 (±9.07)
	high	high	19	6.38 (±1.93)	18.0 (±4.70)	11	6.80 (±1.64)	19.3 (±4.11)	13	3.83 (±1.26)	10.8 (±3.12)
Day 42	low	low	3	1.97 (±0.43)	33.5 (±9.37)	7	6.11 (±1.66)	98.7 (±30.8)	6	2.74 (±0.63)	38.6 (±7.81)
	low	high	8	13.0 (±1.35)	64.7 (±8.53)	8	41.8 (±6.97)	204 (±36.2)	8	7.57 (±1.07)	38.1 (±6.60)
	high	low	7	2.07 (±0.40)	25.9 (±5.74)	7	5.22 (±0.95)	65.3 (±13.3)	6	1.88 (±0.67)	22.5 (±8.15)
	high	high	10	18.4 (±4.31)	102 (±20.2)	10	42.9 (±11.8)	245 (±67.4)	9	11.8 (±1.97)	69.8 (±13.0)

Table S5. Total mean (± SE) clearance rates of of high-chlorophyll cells (mL^{-1} mm^{-1} hr^{-1}) for all animals measured and within treatments, reported with allometric scaling ('*b*') and as rate per individual shell height ('height').

Experiment data				Total	
Day	pCO_2	food	*N*	height	*b*
Day 0	low	-	9	2.42 (±0.43)	5.47 (±0.75)
	high	-	12	4.50 (±0.08)	11.0 (±1.86)
Day 14	low	low	16	2.19 (±0.47)	7.95 (±1.42)
	low	high	20	5.78 (±1.45)	15.9 (±3.47)
	high	low	12	1.94 (±0.50)	8.48 (±2.90)
	high	high	18	6.41 (±1.92)	18.1 (±4.66)
Day 42	low	low	2	0.87 (±0.70)	15.7 (±12.6)
	low	high	8	12.9 (±1.34)	64.0 (±8.39)
	high	low	7	1.99 (±0.39)	25.2 (±5.63)
	high	high	10	18.2 (±4.36)	100 (±20.6)

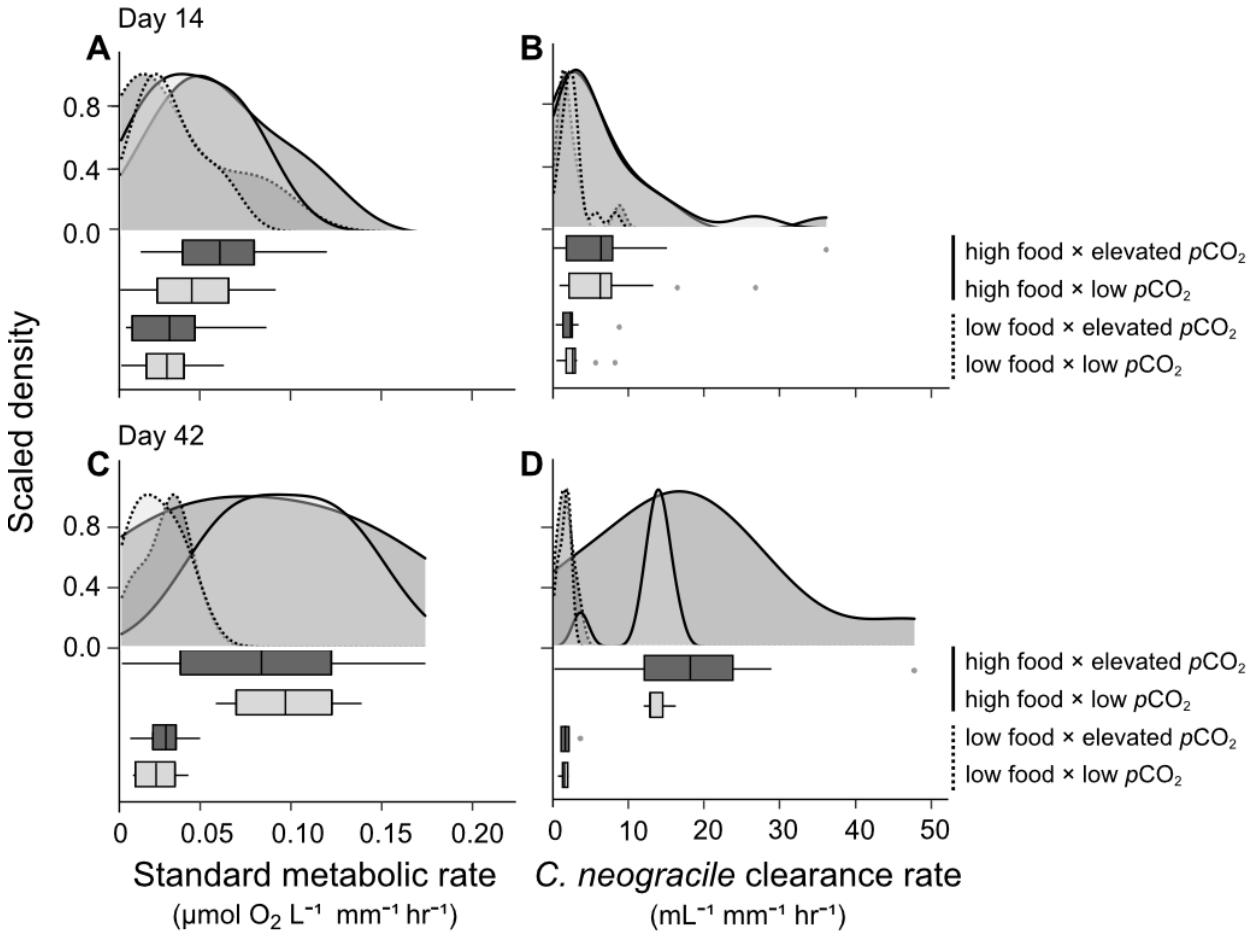

Figure S1. Standard metabolic rates (A, C) and clearance rates of *C. neogracile* cells (B, D) by juvenile bay scallops corrected for individual shell height, without use of a scaling exponent. Scaled density plots display the frequency of data grouped by treatment and scaled to 1. Box plots display the 25th and 75th percentiles (boxes), 1.5 × interquartile range (whiskers), mean (vertical line), and points outside this range (grey points). Shading of density and box plots represent pCO_2 treatment (light grey, low pCO_2; dark grey, elevated pCO_2) and line type in density plots represents food ration (solid, high food; dashed, low food).