Electronic supplemental materials (ESM) titles, descriptions, and captions for:

“Aerobic scope falls to nil at *P*crit and anaerobic ATP production increases below *P*crit in the tidepool sculpin, *Oligocottus maculosus*”

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**File 1**: Electronic supplemental materials and methods

Description:

* Web link to raw data/R scripts on Figshare, dataset descriptions
* Supplemental methods (lactate analysis, additional respirometry details, and full details of statistical analyses)
* Supplemental tables S1-S5
* Supplemental figure legend
* Supplemental literature cited

**File 2**: Figure S1

Figure caption:

Figure S1: Raw Ṁo2 data collected using intermittent respirometry used to estimate normoxic Ṁo2,Max and Ṁo2,Standard for each fish in the study. Ṁo2 data were collected for (A) either 48 h (2018) or (B) 70 h (2019). For every fish except fish 8 in the 2019 study group, Ṁo2,Max was estimated based on the first Ṁo2 value obtained following the placement of the fish in the respirometer after the exhaustive chase protocol used to elicit maximal Ṁo2. Fish 8 from the 2019 study group exhibited an Ṁo2 value higher than the immediate post-chase maximum during the Ṁo2,Standard estimation period, so this value was used as the Ṁo2,Max value for this fish. After 16.5 h (2018) or 10 h (2019) of recovery in the respirometer, the remaining Ṁo2 data were used to estimate Ṁo2,Standard. Following the Ṁo2,Standard estimation period, a closed-style *P*crit trial was started by sealing the respirometer and allowing the fish to consume the remaining O2 in the respirometer to produce a progressive hypoxia exposure.

**File 3**: Figure S2A

Figure caption:

Figure S2: Raw Ṁo2-Po2 data used to estimate *P*crit for each fish in the (A) 2018 and (B, C) 2019 experiments. The Fry hypothesis-based *P*crit, calculated as described by Claireaux and Chabot [3], successfully identified a breakpoint in the Ṁo2-Po2 relationship in all but 3 fish (B, labelled with an \*). *P*crit in these fish was estimated using a segmented regression (described in supplementary methods) (C). Including these 3 fish in the main analysis did not alter any statistical outcome or conclusion, so all 10 fish were used in the analysis presented in the main text.

**File 4**: Figure S2B

Figure caption:

Figure S2: Raw Ṁo2-Po2 data used to estimate *P*crit for each fish in the (A) 2018 and (B, C) 2019 experiments. The Fry hypothesis-based *P*crit, calculated as described by Claireaux and Chabot [3], successfully identified a breakpoint in the Ṁo2-Po2 relationship in all but 3 fish (B, labelled with an \*). *P*crit in these fish was estimated using a segmented regression (described in supplementary methods) (C). Including these 3 fish in the main analysis did not alter any statistical outcome or conclusion, so all 10 fish were used in the analysis presented in the main text.

**File 5**: Figure S2C

Figure caption:

Figure S2: Raw Ṁo2-Po2 data used to estimate *P*crit for each fish in the (A) 2018 and (B, C) 2019 experiments. The Fry hypothesis-based *P*crit, calculated as described by Claireaux and Chabot [3], successfully identified a breakpoint in the Ṁo2-Po2 relationship in all but 3 fish (B, labelled with an \*). *P*crit in these fish was estimated using a segmented regression (described in supplementary methods) (C). Including these 3 fish in the main analysis did not alter any statistical outcome or conclusion, so all 10 fish were used in the analysis presented in the main text.

**File 6**: Figure S3

Figure caption:

Figure S3: Contrary to the prediction that Ṁo2 should decrease if residual body O2 elevated Ṁo2,Max in hypoxia, we saw a significant increase in Ṁo2 over time in fish exposed to Po2=*P*crit following an exhaustive normoxic chase (F1,11=6.00, P=0.03). However, Ṁo2 under these conditions did not exceed (4/6 fish) or were comparable to (2/6 fish) Ṁo2,Standard after approximately 30 minutes (F3,15=2.64, P=0.09) in the 2018 experiment.

**File 7**: Figure S4

Figure caption:

Figure S4: Training effect on Ṁo2,Max at *P*crit + 15.5% air saturation units. The \* symbol indicates a significant increase in Ṁo2 between the first and second trial (t=-3.66, df=8, P=0.0064, mean difference=3.2 µmol h-1, Cohen’s d=1.22).

**File 8**: Figure S5

Figure caption:

Figure S5: Mass effects on Ṁo2 at each state in (A) 2018 and (B) 2019. Note that in the 2019 figure legend (B), each state is in reference to a Po2 at which Ṁo2,Max data were collected, except “SMR” and “MMR”, which were collected in normoxia. The regression model exponents (i.e., scaling exponents) are reported in Table S4.

**File 9**: Figure S6

Figure caption:

Figure S6: *P*crit was not significantly related to mass in either 2018 or 2019.

**File 10**: Figure S7

Figure caption:

Figure S7: Effect of mass and Po2 on chase duration in (A) 2018 and (B) 2019. We did not detect relationships between mass or Po2 and chase duration in 2018. Chase duration varied between Po2s in 2019 but all chase durations for the determination of hypoxic Ṁo2,Max were within the variation in chase duration observed in the normoxic Ṁo2,Max assay, indicating that variation in chase duration did not drive relationships between Ṁo2,Max and Po2.

**File 11**: Figure S8

Figure caption:

Figure S8: Ṁo2,Max *vs*. Po2 data plotted by individual fish from the 2019 study. Ṁo2,Standard for each individual are also plotted as a dashed line.

**File 12**: Figure S9A

Figure caption:

Figure S9: (A) *P*crit trial duration *vs*. body mass and (B) *P*crit *vs*. *P*crit trial duration. Although *P*crit trial duration decreased with increasing body mass due to smaller body mass-to-respirometer volume ratios (Table S2, item number 4), *P*crit trial duration did not affect *P*crit in either 2018 (F1,4=1.40, P=0.30) or 2019 (F1,8=0.19, P=0.67). *P*crit data from the 2020 analysis are included for visual comparison.

**File 13**: Figure S9B

Figure caption:

Figure S9: (A) *P*crit trial duration *vs*. body mass and (B) *P*crit *vs*. *P*crit trial duration. Although *P*crit trial duration decreased with increasing body mass due to smaller body mass-to-respirometer volume ratios (Table S2, item number 4), *P*crit trial duration did not affect *P*crit in either 2018 (F1,4=1.40, P=0.30) or 2019 (F1,8=0.19, P=0.67). *P*crit data from the 2020 analysis are included for visual comparison.