MSc Thesis Seminar

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The effects of chronic hypoxia and nitric oxide on myocardial contractility in steelhead trout (Oncorhynchus mykiss)

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C.W. Andrews Room (SN-3125A)

Abstract

Environmental hypoxia has been intensifying and spreading in recent years due to climate change, and there is accumulating evidence that the cardiac function of hypoxia-intolerant fish is negatively affected by long-term exposure to low oxygen conditions. However, the cause of this reduced heart performance has not been conclusively identified, and it is unknown whether nitric oxide (NO)-mediated effects are involved. This thesis examined how chronic hypoxia (> 8 weeks at ~8 kPa O₂) influenced the contractility (i.e., work and power) of steelhead trout (Oncorhynchus mykiss) spongy myocardial strips upon exposure to graded hypoxia (21 – 1.5 kPa), and influenced NO-mediated performance. Hypoxic-acclimated strips produced less shortening power (by ~35%) as compared to those from normoxic-acclimated conspecifics, but experienced similar reductions in contractility during acute hypoxia and did not recover as well upon re-oxygenation. The effects of NO on myocardial function were not greatly affected by hypoxic-acclimation, but were found to be highly dependent on contraction frequency and strain.