CORONARY BLOOD FLOW IN TROUT: CONTROL AND IMPORTANCE FOR CARDIAC FUNCTION

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Cardiac output (Q), heart rate (f_H), stroke volume (V_S) and dorsal aortic pressure (P_{da}) were measured in trout with intact and ablated coronary arteries at rest and following the administration of epinephrine (0.2 - 2.0 ug kg^{-1}). Coronary ablation had little effect on resting or post-injection cardiovascular parameters at any dose, suggesting that the coronary artery transport of oxygen and catecholamines is not essential for epinephrine-stimulated cardiac performance during normoxia. The relationship between cardiac performance and coronary blood flow (CF) was subsequently examined before and after epinephrine injection (1.0 ug kg^{-1}) under conditions of normoxia and hypoxia. CF for resting trout was 0.14 ± 0.2 ml min^{-1} kg^{-1} (0.85% of Q). When exposed to hypoxia, resting Q and CF increased by 17% and 36%, respectively. Although the capacity of hypoxic trout to increase Q following epinephrine injection was 50% lower than that in normoxic trout, absolute post-injection Q was identical because Q was already elevated with hypoxia. In contrast, the capacity to increase CF following epinephrine injection was the same for normoxic and hypoxic trout. Analysis of the relationship between post-injection coronary resistance, P_{da}, Q, and CF indicates that α-adrenergic constriction and metabolic vasodilation of the coronary vasculature, and P_{da} are all important determinants of CF in trout.