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COMPARABLE NEUTROPHIL RESPONSES FOR ARM AND INTENSITY-MATCHED LEG EXERCISE

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KEYWORDS: upper body exercise, neutrophilia, CXCR2, IL-8, neutrophil degranulation

INTRODUCTION

Arm exercise is performed at lower absolute intensities than lower body exercise. This may impact on intensity dependent neutrophil responses and it is unknown whether individuals restricted to arm exercise experience the same neutrophil response as found for lower body exercise. Therefore, the aim of this study was to determine the importance of exercise modality and relative exercise intensity on the neutrophil response.

METHODS

Twelve moderately trained males performed three 45-min constant load exercise trials following determination of peak oxygen uptake for arm exercise ($\dot{V}O_{2\text{peak arms}}$) and cycling ($\dot{V}O_{2\text{peak legs}}$): ⁽¹⁾ arm cranking exercise at 60% $\dot{V}O_{2\text{peak arms}}$; ⁽²⁾ moderate cycling at 60% $\dot{V}O_{2\text{peak legs}}$; and ⁽³⁾ easy cycling at 60% $\dot{V}O_{2\text{peak arms}}$. Blood samples were taken before exercise and in the 4 h recovery period.

RESULTS

Neutrophil numbers in the circulation increased for all exercise trials, but were significantly lower for easy cycling when compared with arm exercise ($P=0.009$), mirroring the

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blunted increase in heart rate and adrenaline during easy cycling. For all trials, exercising heart rate explained some of the variation of the neutrophil number 2h post exercise ($R=0.51-0.69$), adrenaline explaining less of this variation ($R=0.21-0.34$). Stimulated neutrophil elastase release was reduced in the recovery period for all trials ($P<0.02$), with no difference between trials ($P=0.53$). The number of neutrophils expressing CXCR2 decreased in the recovery from exercise in all trials ($P<0.05$).

CONCLUSION

Arm and leg exercise elicits the same neutrophil response when performed at the same relative intensity, implying that populations restricted to arm exercise might achieve a similar exercise induced neutrophil response as those performing lower body exercise. A likely explanation for this is the higher sympathetic activation and cardiac output for arm and relative intensity matched leg exercise when compared with easy cycling, which is partly reflected in heart rate. This study further shows that the downregulation of CXCR2 may be implicated in exercise-induced neutrophilia.