**Title:** The effects of inspiratory muscle training on interleukin-6 concentration during cycling exercise and volitional hyperpnoea

Mr. Dean 22298 Mills dean.mills@ntu.ac.uk †, Dr. Michael 22299 Johnson michael.johnson@ntu.ac.uk †, Mr. Martin 22300 McPhillimey Martin.McPhillimey@warwickshire.nhs.uk †, Mr. Neil 22301 Williams neil.williams@ntu.ac.uk †, Mr. Javier 22302 Gonzalez javier.gonzalez@northumbria.ac.uk ‡, Prof. Yvonne 22303 Barnett yvonne.barnett@ntu.ac.uk † and Dr. Sharpe 22304 Graham graham.sharpe@ntu.ac.uk †. † Sport, Health and Performance Enhancement (SHAPE) Research Group, School of Science and Technology, Nottingham Trent University, Nottingham, Nottinghamshire, United Kingdom and ‡ School of Life Sciences, Northumbria University, Newcastle upon Tyne, Newcastle, United Kingdom.

**Body:** The plasma concentration of interleukin-6 (IL-6) increases during cycling exercise (EX) (Starkie et al. J. Physiol 2001; 533:585-591) and inspiratory resistive breathing (IRB) (Vassilakopoulos et al. Am. J. Physiol 1999; 277:R1013–R1019). Whether inspiratory muscle training (IMT) can attenuate the magnitude of the IL-6 response to EX and volitional hyperpnoea (VH) rather than IRB is unknown. Therefore, we tested the hypothesis that IMT would reduce the IL-6 response to EX and/or VH. Twelve male participants performed either 6 weeks of pressure-threshold IMT (n=6) or placebo (PLA) training (n=6). Before and after training, participants undertook three 1 hour experimental trials on separate days: (i) passive rest; (ii) EX; and (iii) VH. EX was performed at maximum lactate steady state power. In VH, participants voluntarily mimicked at rest the breathing and respiratory muscle recruitment pattern attained during EX. IL-6 peaked immediately after EX for both the IMT and PLA groups (6.75 ± 1.6 and 5.64 ± 1.76 pg·mL⁻¹). Following training, this response was reduced (-33%; P=0.027) for the IMT but not the PLA group. Blood lactate concentration ([Lac⁻]B) during EX was also reduced (-35%; P=0.009) for the IMT group only. IL-6 and [Lac⁻]B increased (P<0.05) during VH in both groups, but there was no effect of training on these responses. There were no increases in IL-6 or [Lac⁻]B over time for either group during passive rest. In conclusion, 6 weeks of IMT reduces IL-6 during EX but not VH. The reduction in IL-6 concentration following IMT may be related to a decreased carbohydrate utilisation as indicated by the post-IMT reduction in [Lac⁻]B during EX but not VH.