

## Monocyte and Cytokine Responses are improved by Baker's Yeast $\beta$ -Glucan Supplementation following Exercise in a Hot, Humid Environment

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### ABSTRACT

Strenuous exercise is known to suppress the immune system, which can increase the chances of getting sick in the hours after exercise. The purpose of this study was to determine if 10-d of supplementation with yeast  $\beta$ -glucan alters monocyte concentration, LPS-stimulated cytokine production, and plasma cytokine concentration in recreationally active subjects. Recreationally active subjects (29 men, 31 women,  $22 \pm 4$  y) completed  $49 \pm 6$  min of cycling ( $37 \pm 2^\circ\text{C}$ ,  $45 \pm 5\%$  relative humidity) after consuming either yeast  $\beta$ -glucan (250 mg/d, BG) or a placebo (sugar pill, PL) for 10-days prior to each exercise session. The investigators were blinded to the supplement conditions until all data was collected and analyzed. Venous blood was collected at baseline (prior to supplement), pre-, post-, and 2-hours (2H) post exercise. Total and subset monocyte concentration was measured by flow cytometry. LPS-stimulated production of 12 cytokines was measured using a whole blood assay. Plasma concentration of 13 cytokines was measured using a high-sensitivity MagPix assay. Monocyte (CD14+) concentration was significantly greater at 2H ( $P=0.05$ ) with BG. Also, compared to PL, BG boosted LPS-stimulated production IL-2, IL-4, IL-5, and IFN- $\gamma$  at PRE and POST ( $P<0.05$ ). Plasma concentration of IL-2, IL-4, IL-5, IL-7, IL-10, and IFN- $\gamma$  were significantly greater at 2H in the BG compared to PL. In the placebo condition we observed the traditional response to strenuous exercise (rise at POST and suppression at 2H). It appears that 10-days of supplementation with BG primed blood leukocytes for the production of IL-2, IL-4, IL-5, and IFN- $\gamma$ . These cytokines were elevated prior to and immediately after exercise in LPS-stimulated cultures and subsequent elevation were observed at 2H with unstimulated plasma measures. In addition to cytokine changes, BG appeared to blunt post-exercise reduction in blood monocyte concentration, which may have implication of immune-surveillance. The key findings of the present study demonstrate that BG may be a suitable countermeasure to protect and boost the immune system following stressful exercise. Such boost is likely to lower the duration of the "open window" response. This study was funded by Biothera, The Immune Health Company.