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BOVINE COLOSTRUM SUPPLEMENTATION ENHANCES SENSITIVITY OF THE *IN VIVO* IMMUNE RESPONSE TO A NOVEL ANTIGEN FOLLOWING PROLONGED EXERCISE

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INTRODUCTION

Prolonged exercise significantly reduces both the induction and elicitation of *in vivo* cell-mediated immune responses. The aim of the present study was to determine the effect of supplementation with bovine colostrum on *in vivo* immune induction using experimental contact hypersensitivity with the novel antigen DPCP.

METHODS

In a double-blind design, 31 males were randomly assigned to either bovine colostrum (COL, 20 g/day, $n = 15$, age 23 ± 5 years, VO_2max : $57 \pm 8 \text{ mL}\cdot\text{kg}^{-1}\cdot\text{min}^{-1}$) or placebo (PLA, $n = 16$, age 25 ± 6 years, VO_2max $56 \pm 5 \text{ mL}\cdot\text{kg}^{-1}\cdot\text{min}^{-1}$) for 58 days. Exactly 28 days into supplementation, participants took part in 2 h of running at 60% VO_2max . Within 20 min of exercise completion, all participants were sensitised to DPCP using a single patch applied to the mid-lower back for 48 h. Following the induction of immune-specific memory (sensitisation), participants reported to the laboratory 28 days later for a dose series of DPCP

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patches to be applied in a randomly allocated order to the volar aspect of their right upper arm for 6 h. Participants returned to the laboratory 24 h and 48 h following the application of patches for skin responses (oedema) to be measured at each DPCP patch site using modified skinfold callipers. Standardised diets (for the day pre-trial) and breakfasts (3.5 h pre-trial) were provided. Subjects were provided a 5 mL·kg⁻¹ bolus of water 20 min before and immediately after exercise and 2 mL·kg⁻¹ every 15 min during exercise.

RESULTS

There was no difference in total oedema responses (sum of all skinfold sites) between COL (1.84 ± 1.79 mm) and PLA (1.01 ± 0.92 mm, $p > 0.05$) at 24 h or 48 h (COL, 3.36 ± 3.32 mm; PLA, 2.83 ± 1.64 mm, $p > 0.05$). Analysis of the dose response curves allowed for the minimum dose (threshold) for a positive response in each group to be determined (i.e. sensitivity). Sensitivity at 24 h was 0.8 µg·cm⁻² for PLA compared to 0.4 µg·cm⁻² for COL, and at 48 h 0.7 µg·cm⁻² for PLA compared to 0.4 µg·cm⁻² for COL (i.e. greater sensitivity in COL). This was supported by greater oedema response ($p < 0.05$) to the lowest dose-response dose (which was 1.24 µg·cm⁻²) in COL at 24 h and 48 h (0.22 ± 0.25 mm and 0.42 ± 0.50 mm, respectively) vs PLA (0.06 ± 0.11 mm and 0.16 ± 0.19 mm, respectively).

CONCLUSION

These findings suggest that COL enhances sensitivity of antigen-specific memory/cell-mediated immunity. Although there was no effect on the summed response, there were clear differences at the lowest dose and increased sensitivity in the COL group. Taken together this supports previous evidence from our laboratory where COL has been shown to act as a nutritional countermeasure to the decreased immunity (and increased susceptibility to illness) following prolonged exercise^(1,2).

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