

Effects of a 10 km race on physiological and immunological responses

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Introduction: The number of 10 km running race has been increasing in Brazil and the number of finishers almost triplicated in the last decade in this kind of race. However, there is limited amount of data showing the relationship between this event and immune system response. **Aim:** Investigate the effects of a 10 km running race on physiological and immunological response in healthy well trained male volunteers. **Methods:** Fourteen male participants ($32,21 \pm 10,24$ years old, $78,80 \pm 9,30$ kg) took part in this study. The race started at 8am and the participants completed it in $49,85 \pm 7,04$ min (pace = 4'57"). Ratings of perceived exertion (RPE), visual analog scale (VAS), heart rate (HR) and blood samples were taken before, immediately and 24 hours after the race. Lactate, glucose, creatine kinase and C-reactive protein, as well as leukocyte number and subpopulation of T cell ($CD4^+$ and $CD8^+$) were analyzed in the blood samples. **Results:** As expected, there was a significant increase pre-race compared to post-race for HR (67 ± 9 to 159 ± 21 bpm) and RPE (6 ± 0 to 15 ± 2) and lactate (3.6 to 6.6 mmol/dL). Glucose level did not present any significant changes. The number of circulating white blood cell ($5,83 \pm 0,89$ to $9,15 \pm 1,77$ $10^3/\mu\text{L}$), neutrophil ($2,96 \pm 0,49$ to $4,34 \pm 0,73$ $10^3/\mu\text{L}$), lymphocyte ($2,21 \pm 0,57$ to $3,92 \pm 1,27$ $10^3/\mu\text{L}$), monocyte ($0,46 \pm 0,10$ to $0,64 \pm 0,23$ $10^3/\mu\text{L}$) and basophil ($0,05 \pm 0,02$ to $0,09 \pm 0,03$ $10^3/\mu\text{L}$) increased immediately after the race, returning to the basal level at the 24 h post-race time point. There was no difference in circulating eosinophils number. Creatine Kinase serum level did not change immediately after the race, but was significantly higher ($131,21 \pm 62,50$ to $286,85 \pm 234,35$ U/L) at the 24 h post-race time point. Interestingly, C-reactive protein (CRP) did not reduce immediately after the race but was lower at the 24 h post-race time point ($8,37 \pm 2,23$ to $4,50 \pm 2,28$ mg/dL). The circulating number of lymphocytes expressing $CD3^+$ ($1673,64 \pm 442,70$ to $2719,76 \pm 939,54$) increased immediately after running. The number of $CD4^+$ absolute ($828,5 \pm 215,8$ to $1063,2 \pm 235,3$) and $CD8^+$ absolute ($766,92 \pm 347,79$ to $1470,30 \pm 782,90$) also increased immediately after the race returning to basal level at 24 hours after that. However, a significant reduction of the $CD4^+/CD8^+$ lymphocyte subpopulation ratio ($1,21 \pm 0,45$ to $0,85 \pm 0,33$) was observed post-race with values returning to basal level at the 24 h post-race time point. **Conclusion:** These results suggest that a 10 km running race induces an increase in CK but reduces CRP serum levels 24 hours after exercise. In addition, the number of total and differential white blood cells increased immediately after the run, returning to basal level 24 hours later. Therefore, there is a close relationship between intense running and leukocyte behavior.