Effects of Racing on Systemic Cytokine mRNA Expression in 2-Year-Old Thoroughbreds

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This is the first study evaluating the effects of racing on cytokine profiles in 2-year-old Thoroughbred racehorses. This study confirms a major role of the immune system on the adaptation of young equine athletes to strenuous exercise. Authors’ addresses: Department of Veterinary Clinical Sciences, Washington State University, Pullman, WA 99164 (Sanz, Bayly); and Maxwell H. Gluck Equine Research Center, University of Kentucky, Lexington, KY 40546 (Page, Horohov); e-mail: macarena@wsu.edu.

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1. Introduction
Two-year-old Thoroughbreds are more susceptible to developing respiratory disease, but the effect of racing on their immune system is not well described. Systemic mRNA cytokine expression before and after racing was evaluated.

2. Materials and Methods
Two-year-old Thoroughbreds (n = 98) were included with owner consent. Blood was collected before (up to 24 hours) and after (within 2 hours) racing for mRNA expression of 12 cytokines with roles in inflammation and immune system function. No furosemide was administered preracing. A paired t-test/Mann–Whitney test was used to compare before and after racing samples. Relationships between cytokines were assessed with Pearson correlation. Significance was set at p < .05.

3. Results
After racing, CCAAT enhancer binding protein beta (CEBPB), hypoxia-inducible factor (HIF)-1α, interleukin (IL)-8, IL-10, and IL-17 increased, whereas insulin-like growth factor-1 and vascular endothelial growth factor, decreased (p < 0.001). Interferon-γ, IL-1β, IL-4, IL-6, and tumor necrosis factor-α did not change with strenuous exercise. Strong correlations (p < .001) were found between CEBPB and HIF-1A (0.81), HIF-1A and IL-10 (0.64) and IL-1β and vascular endothelial growth factor A (0.61).

4. Discussion
Racing induced significant changes in cytokine expression. Like that seen in older racehorses, pro-inflammatory and anti-inflammatory cytokines were increased. Cytokines involved with muscle repair and growth also changed. These
cytokines have not been evaluated in young racehorses and the findings may represent a new conduit for the investigation of fitness, and the impact of training programs on equine health.

Acknowledgments

Declaration of Ethics
The Authors have adhered to the Principles of Veterinary Medical Ethics of the AVMA.

Conflict of Interest
The Authors have no conflicts of interest.