Effects of Astaxanthin and L-Carnitine Supplement on Muscle Damage and Incidence of Equine Tying-Up Syndrome

Fumio Sato, DVM, PhD*; Takaya Omura, DVM; Mutsuki Ishimaru, DVM; Kenji Korosue, DVM; Yoshiro Endo, DVM; Harutaka Murase, DVM; Yasuo Nambo, DVM, PhD; and Eiji Yamashita, PhD

Continuous administration of astaxanthin and L-carnitine supplement has preventive effects on the onset of tying-up syndrome and thus may contribute to maintaining performance in Thoroughbred horses. Authors’ addresses: Hidaka Training and Research Center, Japan Racing Association, 535–1 Nahicha, Urakawa, Hokkaido 057–0171, Japan (Sato, Omura, Ishimaru, Korosue, Endo, Murase and Nambo); Life Science Division, Fuji Chemical Industry Co, Ltd, 55 Yokohoonji, Kamiichi, Nakaniikawa, Toyama 930–0397, Japan (Yamashita); e-mail: Fumio_Sato@jra.go.jp. *Corresponding and presenting author. © 2013 AAEP.

1. Introduction
Tying-up syndrome is the most common muscle disorder in training horses. We focused on both the strong antioxidant effect of astaxanthin and the enhancement of muscle fatty-acid oxidation of L-carnitine. The effects of dietary administration of astaxanthin and L-carnitine supplement on serum markers of exercise-induced muscle damage and the onset of tying-up syndrome in training horses were investigated.

2. Materials and Methods
A supplement group \((n = 31)\) received daily supplementation with astaxanthin \((75 \text{ mg})\) and L-carnitine \((3000 \text{ mg})\) for 8 weeks; a control group \((n = 32)\) received no supplementation. Blood samples were collected after exercise training before supplementation and 3 days and 8 weeks after starting supplementation. The symptoms of tying-up syndrome in both groups were retrospectively evaluated.

3. Results
Within the control group, creatine kinase activity at 8 weeks was significantly increased compared with 3 days; no significant change was observed in the supplement group. After 8 weeks, creatine kinase activity in the supplement group was significantly lower than that in the control group; lactate dehydrogenase-5 also tended to be lower in the supplement group. The incidence of tying-up syndrome in the supplement group was significantly lower than that in the control group.

4. Discussion
Continuous dietary administration of astaxanthin and L-carnitine attenuates exercise-induced muscle damage and prevents the onset of tying-up syndrome in Thoroughbred horses.

Research Abstract

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