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Effects of royal jelly administration on endurance training-induced mitochondrial adaptations in skeletal muscle

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Objective In this study, we investigated effect of royal jelly (RJ), which is produced by honey bees to feed to developing larvae and contains various ingredients including protein, carbohydrate, lipids and minerals, on endurance training-induced adaptations in skeletal muscle in ICR mice.

Methods Male mice received either RJ (1.0 mg/g body weight) or distilled water for 3 weeks. Mice in the training group performed treadmill running at 20 m/min for 60 min from 30 min after the administration five times a week.

Results We found a significant positive main effects of RJ treatment on the weight of tibialis anterior (TA) muscle and gastrocnemius muscle. There was a significant positive main effect of endurance training on the maximum activities of citrate synthase and β -hydroxyacyl CoA dehydrogenase, which are mitochondrial enzymes, in TA and plantaris muscle (type IIb/IIx dominant), while no significant effect of RJ treatment was found. In soleus muscle (about 40% fiber consistent with type I), the maximum activities of citrate synthase and β -hydroxyacyl CoA dehydrogenase were significantly increased by endurance training in the RJ treated group, while no significant effect of endurance training was found in the control group.

Conclusions Our results suggest that RJ treatment had positive effects on the induction of mitochondrial adaptation by endurance training in soleus muscle.