



## Exercise Biochemistry Review

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Proceedings of IBEC 2018, Beijing, China, October 23-25  
PO-146

### Effects of aerobic exercise training on GTT and ITT in apelin Knockout mice

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**Objective** Aerobic exercise training is important to prevent and cure chronic diseases such as diabetes, cardiovascular diseases and so on. Apelin has been identified as a novel myokine in recent years, and the exogenous supplementation of apelin can promote the glucose absorption, the biosynthesis of mitochondria and the oxidation of fatty acids in skeletal muscle. Intraperitoneal glucose (GTT) and insulin tolerance tests (ITT) are useful in vivo assays that provide approximations of glucose metabolism and homeostasis. The bigger area under the curve (AUC) confirmed the decreased glucose clearance, which is evaluated by GTT. However, the mechanism of apelin mediating glucose metabolism during aerobic exercise training is not clear. Our study was to investigate the differences of GTT and ITT after four weeks training between wild-type (WT) mice (C57BL/6J) and apelin Knockout (KO) mice.

**Methods** Two-month-old WT and KO were divided into trained and control groups (n=8-10/group) respectively. There are four groups: WT control (WC), apelin KO control (KC), WT trained (WT), and apelin KO trained (KT). The trained groups were trained on treadmills for four weeks (six days per week and one hour per day). In order to maintain the exercise intensity, the speed is at 70%-75%  $VO_2$ max with an incline of 5 degrees. The control groups were kept at a sedentary condition. After four weeks of interventions, glucose was measured at 0, 15, 30, 45, 60, 90, 120min following GTT. Glucose was also measured at 0, 30, 60, 90, 120min following ITT.

**Results** (1) blood glucose levels and AUC of the KC were significantly bigger than those of WC. ITT showed that KC also had slower insulin-stimulated glucose clearance compared with the WC. (2) Following 4-week training, KT had lower blood glucose levels and AUC of the KT was significantly smaller than those of KC. KT had faster insulin-stimulated glucose clearance compared with KC.

**Conclusions** Without apelin, glucose tolerance and insulin tolerance in mice will decrease. And aerobic exercise training improves them in apelin deficiency mice.