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Exercise and metformin effect on glucose homeostasis and gastrointestinal hormone levels in rats

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This study aimed to determine the effects of exercise and metformin on glucagon-like peptide-1 (GLP-1), glucose-dependent insulinotropic polypeptide (GIP), insulin (INS), ghrelin (GHRL), and blood glucose levels. Forty-two male Wistar rats were divided into 6 groups as control (CONT), exercise only (EXE), metformin 100 mg/kg (Met100), metformin 200 mg/kg (Met200), metformin 100mg+exercise (Met100+EXE), and metformin 200mg+exercise (Met200+EXE). Metformin was administered intraperitoneally. Rats were subjected to an incremental exercise protocol. A 12-week study was conducted, including an adaptation period for exercise. At the end of the study, serum samples were obtained from the rats, and the levels of GLP-1, GIP, insulin, and ghrelin were determined using the ELISA method. The blood glucose levels of the Met200 group were lower than CONT, EXE, and combination groups. INS levels of the metformin and combination groups were lower than CONT group. GLP-1 level of EXE was higher than all groups. GIP levels of EXE and combination groups were higher than CONT and Met100 groups. The ghrelin levels of the exercise and Met200 group were higher than CONT group. As a result, it was determined that exercise and metformin had significant effects on glucose homeostasis and caused significant results on GIP, GLP-1, INS, and GHRL.

Keywords: Metabolism, Glucose, Diabetes, Incretin hormones