The purpose of the study was to study the activity of the phytoestrogen genistein (GEN) acting on FSHR and LHR in rat ovaries with polycystic ovary syndrome (PCOS). Sixty rats were divided into six groups. Rats in the dose group received genistein at a concentration of either 5 (low genistein dose group, L-gen), 10 (middle genistein dose group, M-Gen) or 20 (high genistein dose group, H-Gen) mg per kg of body weight per day. Estrogen group (EG, received 0.5 mg/kg Diethylstilbestrol). Concentration of sex hormones in serum was quantified by enzyme-linked immunosorbent assay (ELISA). Expressions of follicle-stimulating hormone receptor (FSHR) and luteinizing hormone receptor (LHR) protein were determined by immunohistochemistry. Treatment with genistein resulted in a strong stimulation of the concentration of sex hormone in serum. The concentration of progesterone and FSH was significantly higher in H-Gen when compared to the PCOS model control group (MG) ($P < 0.01$). In contrast, the concentration of testosterone, LH and the ratio of LH/FSH decreased in GEN treatment groups compared to MG, the effect was statistically significant, tested by the ANOVA test ($p<0.01$). For hormone receptor activity, treatment with genistein resulted in an improvement of ovarian function with LHR protein expression being enhanced and FSHR protein expression being suppressed. Our results demonstrate that Genistein played a significant role in regulating FSH and LH receptor expression to improve perimenopausal ovarian and uterine function.

**Key words:** genistein, polycystic ovary syndrome, follicle-stimulating hormone receptor, luteinizing hormone receptor, female rat