Indian Journal of Experimental Biology
Vol. 63, April 2025, pp. 301-311
DOI: 10.56042/ijeb.v63i04.15230

Establishing PCOS in Wistar rats: A reliable model for understanding polycystic ovary syndrome

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Received 22 November 2024; revised 26 December 2024

Polycystic ovary syndrome (PCOS) is a complex endocrine disorder affecting reproductive-age women, characterised by metabolic and reproductive abnormalities. This study aimed to develop and evaluate a comprehensive rat model of PCOS that accurately replicates both the metabolic and reproductive facets of the syndrome. Female Wistar rats were treated with dehydroepiandrosterone (DHEA), high-fat diet (HFD), and a combination of both for 20 and 30 days. The study assessed body weight, estrous cyclicity, serum biochemistry, hormone levels, and ovarian histology. The DHEA+HFD combination model effectively mimicked PCOS characteristics and exhibited significant increases in body weight, disrupted estrous cycles, blood glucose, lipid levels, testosterone, estrogen, and LH levels, with decreased FSH levels. Liver and kidney function markers were also altered, indicating systemic effects. Further, histological examination of ovaries revealed cyst-like follicles and reduced corpus luteum formation, resembling PCOS ovarian morphology. Moreover, DHEA alone induces reproductive changes without significant metabolic alterations, and HFD alone showed slow progression of metabolic features, but the combination group rapidly induced both metabolic and reproductive abnormalities within 20 to 30 days. The synergistic effect highlights the potential role of diet in exacerbating PCOS symptoms. Current study presents a rat model that comprehensively replicates PCOS features in a shorter timeframe. This combination model is valuable for investigating PCOS pathophysiology and potential therapeutic interventions. Furthermore, these findings underscore the importance of considering nutritional factors in PCOS management and open new avenues for research into the intricate relationship between PCOS-related metabolic and reproductive abnormalities.

Keywords: PCOS, Estrous cycle, Hyperandrogenism, Metabolic alterations, Obesity, Di...