

**Abstract of the DVM thesis No....., Faculty of Veterinary Medicine, Urmia**

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**Title of thesis:** The effect of metformin on hair regeneration in chemotherapy- induced alopecia in rats

Cyclophosphamide, known for its cytotoxic properties, has been associated with an increased transition of hair follicles into the catagen and telogen phases, resulting in a pronounced incidence of alopecia. Metformin, on the other hand, has displayed protective attributes, potentially attenuating hair follicle miniaturization and fostering anagenic re-entry, which may signify a therapeutic role in promoting hair resilience and regrowth. An experimentally-driven approach, encompassing pharmacological treatment on murine models, was employed to scrutinize the in situ responses of hair follicles to drug exposure. In this research, the effects of topical Metformin on hair regrowth following Cyclophosphamide-induced damage were evaluated in Wistar rat models. A 10% Metformin cream was prepared using a special formulation of Glucophage tablets and Propylene Glycol as the cream base. The study observed the skin condition and hair growth in four groups of rats; control, metformin, cyclophosphamide, and the combination of cyclophosphamide and metformin. Quantitative assessment was conducted, measuring parameters such as follicle count and diameter across different hair cycle stages (terminal, vellus, anagen, catagen, and telogen). Histopathological examinations revealed that rats treated with Metformin cream showed significant hair growth compared to the control group treated with Cyclophosphamide, suggesting a potential targeted treatment for hair loss due to chemotherapy. The synthesis of empirical data culminates in a robust conclusion that underlines metformin's candidacy as a mitigating agent against chemotherapy-related alopecia while cautioning against its sole administration due to observed undesirable effects. This research advances the understanding of hair growth regulation under chemotherapeutic and therapeutic agent influence and paves the way for translational applications in patient-centered alopecia management.

**Keywords:** Cyclophosphamide, Metformin, Alopecia, Chemotherapy, Hair Follicle Cycle, Hair Regrowth, Chemotherapy-induced Alopecia (CIA).