

Acne vulgaris is aggravated by cow's milk by activating mTORC1 and suppressing FoxO1 pathways

Yelyzaveta Svyrydovska, Laura Doepker*

This literature review explores the connection between the consumption of cow's milk and *acne vulgaris* flare-ups, focusing on the influence of milk proteins on hormones that activate mTORC1 and deactivate FoxO1 pathways. A better understanding of the mechanisms by which dietary choices influence acne is essential because the presence of acne is associated with low self-esteem, anxiety, social impairment, and anger. This review discusses studies that tested whether milk impacts the amount of acne in an individual, how milk impacts hormone levels in the bloodstream, and how hormones affect acne-producing mechanisms. Studies on teenage boys and girls indicated that milk indeed increases acne. Mechanistically, milk casein proteins increase IGF-1 hormone levels and milk whey proteins increase insulin levels in the blood. In turn, insulin and IGF-1 hormones inhibit the FoxO1 transcription factor, ultimately leading to an overexpression of genes related to sebum production in sebaceous glands. In addition, mTORC-1 is stimulated by insulin, IGF-1, and the absence of suppression by FoxO1. mTORC1 signals the epithelial cells, keratinocytes, in a sebaceous gland to grow faster and produce more sebum. Excessive sebum and dead keratinocytes clog pores, allowing bacteria to grow and trigger an inflammatory response. All four factors: excessive sebum secretions, increased keratinocyte differentiation, bacterial overgrowth, and inflammation of the *acne vulgaris* disease are affected by milk consumption. By including a dietary intervention in treating acne, patients can save money on prescription drugs and avoid side effects associated with medications.