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## Effects of standardized isopropanolic black cohosh and estrogen on salivary function in ovariectomized rats.

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#### Abstract

Oral dryness is a common feature in menopausal women. **Estrogen** therapy can relieve this symptom; however, the underlying mechanism was not clear. **Standardized isopropanolic black cohosh** (*Actaea racemosa*; Remifemin) can also relieve menopausal symptoms, such as hot flashes and sweating. Our previous study showed that **standardized isopropanolic black cohosh** could protect the submandibular gland structure. To investigate the **effects** and possible mechanisms of action of **estrogen** and **standardized isopropanolic black cohosh** on submandibular gland **function** in **ovariectomized (OVX) rats**, we measured body weight, daily water consumption, and blood flow in the submandibular glands. Immunohistochemistry and western blotting were used to detect the expression of muscarinic acetylcholine receptors 1 (M1) and 3 (M3), and aquaporin 5 (AQP5) in the submandibular gland. OVX increased daily water consumption and reduced vasodilation in the submandibular gland. It suggested that ovariectomy could damage the salivary **function**. Moreover, the expression of M1 and M3 receptors decreased, whereas that of AQP5 increased. These changes may explain the dysfunction of saliva secretion in menopause. **Estrogen** and **standardized isopropanolic black cohosh** treatment had the same effect on daily water consumption and vasodilation in the submandibular gland. It indicated that **estrogen** and **standardized isopropanolic black cohosh** could relieve oral dryness in menopause. However, the mechanism of the two treatments may differ because **standardized isopropanolic black cohosh** only protected against changes in M1 expression, whereas **estrogen** protected against variations in M1, M3, and AQP5 expression.

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**KEYWORDS:** AQP5; *Actaea racemosa*; **Estrogen**; M receptor; Vasodilation; Water consumption

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