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Editorial

Uterine Contraction and Ca^{2+} Mobilization in Rats in Vivo and in Vitro

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EDITORIAL NOTE

Dysmenorrhea is straight connected to elevate prostaglandin F (PGF)2α levels. In Western medicine, this condition is treated using nonsteroidal antiinflammatory drugs. Because nonsteroidal antiinflammatory drugs produce many side effects, Chinese medicinal therapy is considered as a feasible alternative for treating dysmenorrhea. Many special physiological components used in Chinese medicine, such as resveratrol, have been isolated and recognized. Resveratrol has many physiological functions, such as antioxidation and anticarcinogenic belongings. Though, the relationship between uterine smooth muscle contraction and resveratrol remains unknown. Here, we studied the in vitro and in vivo effects of resveratrol on uterine smooth muscle contraction. The uterus was separated from a female Sprague Dawley rat, and uterine smooth muscle contraction activity was measured and recorded. The results demonstrated that 1: Resveratrol treatment inhibited PGF2α-oxytocin-acetylcholine and carbachol-induced uterine contractions in rats; 2: Resveratrol inhibited uterine contractions stimulated by the Ca^{2+} channel activator (Bay K 8644) and depolarization in response to high K+ (KCl); 3: Resveratrol inhibited PGF2α-induced increases in the $[Ca^{2+}]i$ in human uterine smooth muscle cells; 4: Resveratrol could mimic Ca2+ channel blockers to block Ca^{2+} influx through voltage-operated Ca2+ channels in the plasma membrane; and 5: Resveratrol inhibited PGF2α-induced uterine contractions in rats in vivo. Resveratrol inhibited uterine contractions induced by PGF2α and high K^+ in a concentration-dependent manner in vitro; furthermore, it inhibited Ca^{2+}-dependent uterine contractions.

Thus, resveratrol consistently suppressed the increases in intracellular Ca2+ concentrations ($[Ca^{2+}]i$) induced by PGF2α and high K^+ concentrations. It can be assumed that resveratrol probably inhibited uterine contraction by blocking external Ca^{2+} influx, leading to decreased $[Ca^{2+}]i$. Therefore, resveratrol can be considered as a feasible alternative therapeutic agent for dysmenorrhea.

AHM is a crude extract comprising many specific chemical components that regulate endocrine functions. To confirm which chemical compounds inhibit the PGF2α-induced uterine contractions, we separated AHM-EA into 11 fractions. The results specified that AHM-EA-E and AHM-EA-F have a greater potential to decrease the PGF2α-induced uterine contractions. It has been stated that AHM possesses some low-molecular-weight and moderately polar substances that have antioxidative effects. Furthermore, at least of the following six classes of chemical constituents of AHM have been demonstrated: lignan, phenolic acid, phytosterols, polyphenols, polysaccharides, and flavonoids. Quantified the components of the AHM-EA fraction; it contained naringenin, quercetin, vanillin, syringaldehyde, gallic acid, syringic acid.

The present data demonstrate that the obtained fractions of resveratrol could inhibit the PGF2α-induced uterine smooth muscle contraction both in vitro and in vivo. The inhibition of uterine smooth muscle contraction is, in part, due to the blockade of the ROCs and VOCs in the rat. Thus, resveratrol seems to be of potential use in the treatment or improvement of dysmenorrhea. However, we need additional clinical experiments to further support this finding in the future.

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