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The effects of various preparations of red raspberry leaf on the contractility of oestrogen-dominated rat’s uterus in vitro

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Red raspberry leaf (RRL) has been shown to shorten labour and decrease the incidence of forceps delivery (Simpson et al, 2001). This effect might be produced by direct action of RRL on uterine contractility. Several attempts to test this hypothesis have been made over the years, but results are inconclusive. Both excitatory and inhibitory effects of RRL on uterine contractions have been reported (Burn & Withell, 1941; Beckett et al, 1954; Bamford et al, 1970) but in no case have the effects been adequately quantified. The discrepancies between studies may be attributable to differences in experimental protocols or the type of RRL preparation utilized. The goal of this study was to use the standardized oestrogen-dominated rat’s uterus in vitro and test the effects of different commercially available forms of RRL preparations on contractility. The specific aims of this project were to determine: 1) the ability of RRL preparations alone to affect uterine contractility and 2) the ability of RRL exposure to modify oxytocin-induced contractions.

RRL was purchased in three forms; a brewable tea, a capsule and an ethanol extract (tincture), and was prepared as described by Makaji et al (2007). Uteri were collected from diethylstilboestrol-treated female Wistar rats and contractility experiments performed as described by Crankshaw (2001). Responses were expressed as a percent of those produced by 33 mM KCl. Cumulative concentration-effect curves were obtained for RRL alone and for RRL in the presence of 1 nM oxytocin (allowed to equilibrate for 10 minutes). Finally, the effect of a 10 minute pre-treatment with RRL (tea and capsule 3.2 mg/mL, tincture 34 µg/mL) on concentration-effect curves for oxytocin was determined.

All results are expressed as mean ± s.e.mean (n = 4–9, pEC50 values for RRL are g/mL, and for oxytocin are mol/L). RRL tea (pEC50 = 5.5 ± 0.8; max = 16.1 ± 2.0 % KCl) and capsule (pEC50 = 3.2 ± 0.4; max = 12 ± 2 % KCl) alone caused excitation. The magnitude of the response was small compared to oxytocin (pEC50 = 8.2 ± 0.2; max = 106 ± 26 % KCl). At 3.2 mg/mL both tea and capsule reduced oxytocin-induced uterine contractions (71 ± 16 and 78 ± 16% of control, respectively) but no concentration-effect relationship could be established. Oxytocin concentration-effect curves (pEC50 = 8.5 ± 0.1; max = 152 ± 26 % KCl) were unaffected by pre-treatment with tea (pEC50 = 8.6 ± 0.1; max = 140 ± 30 % KCl) or capsule (pEC50 = 8.4 ± 0.1; max = 125 ± 27 % KCl). RRL tincture had little effect in our assays.

We conclude that the biological activity of RRL varies depending on the form of the herbal preparation. The weak effects on the rat’s uterus in vitro do not support the hypothesis that RRL augments labour by a direct effect on uterine contractility.

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Burn, JH & Withell ER (1941) Lancet 2:1-3


Makaji, E et al (2007) BPS winter meeting
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