



## URINARY SUPPORT:

*GRAMINEX Flower Pollen Extract*

### Effects of Pollen-Extract Components, Diamines and Derivatives of Feruloylputrescine on Isolated Bladder and Urethral Smooth Muscles of Mice

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The contracting or inhibitory effects of pollen-extract components, diamines and derivatives of feruloylputrescine (FP) were investigated on the isolated bladder or urethral smooth muscles of mice. Among the nine diamines ( $\text{NH}_2(\text{CH}_2)_n\text{NH}_2$ ,  $n = 2-10$ ) tested, five of them with shorter carbon chains ( $n = 2-6$ ) (0.1-30.0 mM) only slightly contracted the bladder strips and to some extent inhibited the noradrenaline (NA, 1.77  $\mu\text{M}$ )-induced contraction of urethral strips. 1,5-Diaminopentane (C5), a component of the pollen-extract, inhibited most effectively the NA-induced contraction of urethral strips with an  $\text{IC}_{50}$  value of 2.3 mM (95% confidence limit: 2.0-2.6 mM). FP, also a component of the pollen-extract, inhibited the NA-induced contraction of urethral strips in a non-competitive manner, producing 32.5  $\pm$  5.5% ( $N = 5$ ) inhibition at 378  $\mu\text{M}$ . Among the derivatives of FP, feruloylcadaverine inhibited urethral contraction most potently, producing 46.3  $\pm$  7.1% ( $N = 5$ ) inhibition at 359  $\mu\text{M}$ . These derivatives had no effect on bladder contraction. In contrast, four diamines with longer carbon chains ( $n = 7-10$ ) contracted the bladder strips (3-30 mM) and potentiated the NA-induced contraction of urethral strips (10  $\mu\text{M}$ -3 mM). Thus, the components of the pollen-extract, FP and C5, potently inhibited urethral contraction, which may facilitate the discharge of urine in vivo.

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