The hop phytoestrogen, 8-prenylnaringenin, reverses the ovariectomy-induced rise in skin temperature in an animal model of menopausal hot flushes

James Bowe, Xiao Feng Li, James Kinsey-Jones, Arne Heyerick\textsuperscript{1}, Susan Brain\textsuperscript{2}, Stuart Milligan and Kevin O’Byrne

Division of Reproduction and Endocrinology, King’s College London, 2.36D New Hunt’s House, Guy’s Campus, London SE1 1UL, UK
\textsuperscript{1} Laboratory of Pharmacognosy and Phytochemistry, Faculty of Pharmaceutical Sciences, Ghent University, Harelbekestraat 72, B-9000 Ghent, Belgium
\textsuperscript{2} Cardiovascular Division, New Hunt’s House, King’s College London, Guy’s Campus, London SE1 1UL, UK

(Requests for offprints should be addressed to K O’Byrne; Email: kevin.o’byrne@kcl.ac.uk)

The mechanisms underlying menopausal hot flushes are poorly understood, although it is generally assumed they result from disturbances of thermoregulatory centres in the hypothalamus. 8-Prenylnaringenin (8-PN) has been identified as a potent phytoestrogen in hops (\textit{Humulus lupulus}) and there are claims that hop-containing preparations can reduce hot flushes. We have investigated the site of action of 8-PN in a rat model of menopausal hot flushes, in which the tail skin temperature (TST) is increased after oestrogen withdrawal induced by ovariectomy. Daily s.c. administration of either 17ß-oestradiol (E\textsubscript{2}; 4 µg/kg) or 8-PN (400 µg/kg) significantly reduced the elevated TST after 2 days of treatment. Subcutaneous co-administration of either E\textsubscript{2} or 8-PN with the oestrogen receptor (ER) antagonist, ICI 182,780 (200 µg/kg), which is thought not to cross the blood–brain barrier, completely blocked the effect of E\textsubscript{2} and 8-PN on TST. The ER- and ER\textsubscript{B}-specific agonists, 4,4',4''-(4-propyl-[1H]-pyrazole-1,3,5-triy)trisphenol (100 µg/kg) and 2,3-bis(4-hydroxyphenyl)-propionitrile (60 µg/kg) respectively, both significantly reversed the raised TST in ovariectomised rats. These observations suggest that the regulation of the vasomotor response by oestrogens and phytoestrogens is mediated, at least in part, by peripheral mechanisms involving both ER and ER\textsubscript{B}. 