THE PLASMA PROTEIN EXTRAVASATION INDUCED BY POLISTES LANIO LANIO WASP VENOM IN THE MICE SKIN: INVOLVEMENT OF SENSORY-C FIBERS.

1L.M. Yshii, 2,3G.H.M.F. Souza, 2S. Hyslop, 3M.N. Eberlin, 4M.T.P. Ribela, 1M.A. Barreto, 1S.K.P. Costa. 1Pharmacology Department (ICB), University of São Paulo; 2Pharmacology Department and 3Chemistry Institute, University of Campinas; 4IPEN/CNEN, São Paulo, Brazil.

Stings by Polistes sp wasps, found in Brazil, are of clinical interest as they can cause life-threatening allergic reactions, pain and inflammation (Castro et al., 1994). However, little is known about the biological activity and composition of the venom. This study was undertaken to investigate the effects evoked by Polistes lanio lanio venom (PLLv) in the cutaneous microvasculature and to identify active inflammatory peptides.

Both male and female C57BL/6 mice (25-30 g) and Wistar rats (200 g) anesthetised with urethane (25% w/v, 100 µl 10 g⁻¹) were used. ¹²⁵I-albumin (0.03 MBq/0.1 ml) was injected into the tail vein. Intradermal injection (i.d.; 0.05-0.10 ml) of test agents was made into the shaved dorsal skin. Following 30 min period accumulation, animals were killed and skin oedema was assessed via extravascular accumulation of ¹²⁵I-albumin (Costa et al., 2003). The venom was collected by compressing the venom sac and then was lyophilized and sometimes dialyzed (MW cutoff 2000). The nano-electrospray ionization analysis of venom-containing peptides was carried out via Q-TOF mass spectrometer (Micromass, U.K.) coupled to a CapLC chromatographic system. The MS/MS spectra was processed using MaxEnt3 and sequenced via PepSeq software.

PLLv (0.3-30 µg site⁻¹) caused a potent and dose-dependent oedema formation into the dorsal skin of mice (not shown; n=3-8). The venom EC₅₀ (7 µg)-induced oedema was unaffected by the bradykinin B₂ receptor antagonist HOE 140 (0.8 nmol kg⁻¹; i.v.) but partly reduced by the B₁ receptor antagonist Des-Arg⁹-[Leu⁸]-BK (3 µmol kg⁻¹, i.v.; 269 ± 28 and 94.5 ± 35* µl site⁻¹, control and treated, n=3-4). Dialysis of PLLv reduced the oedema by 50% (Fig. 1). The substance P NK₁ receptor antagonist SR140333, but not NK₂ (SR48968), markedly reduced PLLv-evoked oedema (Fig. 1). Capsaicin treatment to deplete neuropeptides inhibited PLLv-induced response in rats (not shown; n=4). Analysis by mass spectrometry (Q-TOF/CapLC) shows that PLLv contains peptides (MW 1173 – 3581) that share C-terminal sequences with mammalian tachykinins.

These findings provide new evidence that PLLv-induced inflammatory effect in the skin of rodents is largely mediated by the action of tachykinin-like peptides, in a manner similar to the endogenous neuropeptide Substance P. The venom-induced oedema may also involve activation of BK B₁ receptor in the cutaneous microvasculature.


We thank CNPq, Capes and FAPESP for financial support.