Oleamide (cis-9,10-octadecenoamide) is a fatty acid primary amide that was originally isolated from the cerebrospinal fluid of sleep-deprived cats (Cravatt et al., 1995). Oleamide shares a structural similarity with anandamide, the first endocannabinoid to be identified, which displays a range of vasoactive properties. Oleamide has also been shown to cause cannabimetic responses and is a vasorelaxant in the rat small mesenteric artery (Hoi and Hiley, 2006). The aim of this study was to examine the vascular effects of oleamide in aortae isolated from spontaneously hypertensive rats (SHRs).

Aortic rings from SHR and normotensive WKY rats were suspended in heated (37°C) and gassed organ baths with 50ml of Krebs-Henseleit solution. Aortic segments were pre-contracted with methoxamine (10µM) having previously been equilibrated to a basal tension of 9.8mN. Concentration-response curves to oleamide were obtained.

Oleamide caused concentration-dependent vasorelaxation of aortic segments from both SHR and WKY rats. Maximal relaxation was significantly greater in SHRs (P<0.001) (Student’s t-test) when compared to the maximal response induced in WKY rats (R\text{max} = 15.7 ± 3.9%, (mean±s.e.mean) n=6 WKY; R\text{max} = 40.3 ± 3.5%, n=6 SHRs). Vasorelaxant responses to oleamide were significantly reduced in the SHR after pre-treatment with capsaicin for 1h (P<0.0001) (one-way ANOVA) (R\text{max} = 9.8 ± 1.5%, n=6, SHR). Importantly, capsaicin caused maximal responses to oleamide in the SHR and WKY to become comparable. The responses to oleamide were unaffected by 300µM L-NAME. However, relaxation was significantly enhanced in response to oleamide in the presence of 10µM indomethacin in WKY aortae. (P<0.0001) (one-way ANOVA) (n=6).

In conclusion, oleamide caused greater vasorelaxant responses in SHR aortae in comparison to normotensive controls. The oleamide responses were reduced by capsaicin pre-treatment in the SHR. COX-inhibition produced an increased oleamide response in WKY vessels. Therefore, oleamide-induced vasorelaxation may be reduced in WKY rats due to the production of vasoconstrictor prostanoids or the metabolism of oleamide. Alternatively, the increased vasorelaxant response to oleamide in hypertension may be due to a capsaicin-sensitive mechanism.

References;