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### MEETING ABSTRACT

#### A2.39

##### Ultrasound and antibiotic induced vascular relaxation

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**Background:** Ultrasound is being used as a therapeutic modality (e.g. sonothrombolysis) [1]. By establishing the vasomodulatory effects of ultrasound, we provide the physiological basis for the development of therapeutic and rehabilitation devices. Some antibiotics (e.g. gentamycin) exhibit vasomodulatory effects [2]. Local potentiation of antibiotic-induced vascular relaxation could potentially be used to modulate blood flow to vital organs (kidney) and thus likely be used for pharmacologic renal protection and reduce the incidence of acute kidney injury [3].

**Objectives:** (1) To investigate the vasomodulatory effects of ultrasound. (2) To investigate the vasomodulatory effects of antimicrobial drugs.

**Methods:** Segments of rat (Wistar) superior and small mesenteric arteries were dissected, isolated, and transferred into cold physiological saline solution and mounted in myographs (Dual Wire Myograph System – 420A) for functional studies. The arterial segments were stretched to their optimal lumen diameters for active tension development. Ultrasound (US) waves and antibiotics—gentamycin (GEN), ciprofloxacin (CIP), piperacillin and tazobactam (PT)—were applied on the vessels, precontracted with 10 µM of noradrenalin (NA). Acetylcholine-induced (10 µM ACh) relaxation was used as control and as proof of intact endothelial function in physiological saline solution (PSS) or PSS with high potassium concentration (KPSS). The changes in isometric tension (IT) were recorded. Vascular relaxation is presented as isometric tension and percentage change in mN from plateau of vascular contraction with 10 µM NA.

**Results:** The vessel segments were obtained from 4 Wistar male rats. The IT (mN) decreased in vessels precontracted with 10 µM NA and exposed to GEN (0.16 mg/ml) by 59.93%, exposed to CIP (0.03 mg/ml) by 20.50%, and exposed to US (50 amp) by 35.03%. In KPSS GEN (0.12 mg/ml) reduced the IT by 32.00%, GEN 0.04 mg/ml did not induce vascular relaxation. US (30 amp) reduced IT by 5.43% in KPSS, while GEN (0.04 mg/ml) and US (30 amp) reduced IT by 22.46%. PT did not exhibit vasomodulatory effects.

**Conclusions:** Ultrasound waves, gentamycin and ciprofloxacin induce vascular relaxation in rat mesenteric arteries and may have therapeutic applications with regards to vasomodulatory functions.

**Keywords:** vascular relaxation – ultrasound – gentamycin

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