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1 kHz sound stimulates nitric oxide and prostaglandin E2
production by rat mesenchymal stem cells

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Pulsed ultrasound has become a common therapy for delayed unions and non unions. Currently available clinical devices use modulated (1 kHz) 1.5 MHz ultrasound stimulation that produces a 1 kHz radiation force vibration. It was hypothesized that this radiation force is responsible for the stimulatory effect on bone formation. Therefore, we have investigated the effect of 1 kHz stimulation in rat mesenchymal stem cells (MSCs) by measuring the production of on nitric oxide (NO) and prostaglandin E2 (PGE2). Continuous wave 1 kHz low power sound was applied to cultured rat MSCs for 20 minutes. NO concentration was determined by amperometry and PGE2 was assayed by ELISA in the supernatant. The stimulation produced a significant increase in both NO and PGE2 concentration compared to controls. We conclude that rat MSCs respond to the mechanical stress produced by 1 kHz continuous wave as evidenced by the increase in NO and PGE2 production. This study provides evidence for the action of 1 kHz stimulation on bone cells.