

Insights Into The Molecular Mechanisms of Shockwave Mediated Analgesia

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The biologic action of shock wave application on the musculoskeletal system is understood poorly. To prove the hypothesis that alterations of tissue concentrations of substance P and prostaglandin E2 are involved in biologic actions - such as pain and analgesia - of shock waves, shock waves with energy flux density of 0.9 mJ/mm² (1500 pulses at 1/second) were applied in vivo to the distal femur of rabbits. The concentrations of substance P and prostaglandin E2 eluted from the periosteum of the femur were measured. Compared with the untreated contralateral hindlimbs, substance P release from the periosteum from the femur was increased 6 hours and 24 hours after extracorporeal shock wave application, but was decreased 6 weeks after extracorporeal shock wave application. Remarkably, there was a close relationship between the time course of substance P release found here, and the well-known clinical time course of initial pain occurrence and subsequent pain relief after shock wave application to tendon diseases. Accordingly, substance P might be involved in the biologic action of extracorporeal shock wave application on tissue of the musculoskeletal system.