

Extracorporeal shockwaves manifest themselves as biological mechanotransduction

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Device and producing company:

No special apparatus was used

Introduction:

The impact of extracorporeal shockwaves (ESWs) on living tissue results in the conversion of mechanical stimuli into biochemical and/or molecular-biological signals. These signals in turn induce a certain flow of information. Subsequent signals are viewed as a biological information unit that brings about certain biological changes in the cell for which the signals are meant. These sequences are referred to as mechanotransduction. The tissue structures mainly involved in mechanotransduction are part of the extracellular matrix that transfers information via so-called adhesion molecules, as connecting links to the cytoskeleton. The signals are transmitted to the cell nucleus via the constituent components of the cytoskeleton, thereby inducing gene transcription and expression. In case of destruction of the cytoskeleton, mechanotransduction is rendered impossible. Relevant for the mechanotransduction are the frequency, amplitude, intensity and duration of the extracorporeal stimuli which determine - as if by code - the concentration of certain second messengers and thus turn on the gene expression.