

# Stem cell De-Programmation by Shockwaves

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We submitted in vitro cell cultures of human precursors from bone and heart to SW treatment, to evaluate the effects on bone mineralization and Extra Cellular Matrix deposition as well as on the activation of regeneration potential of human heart precursors.

Cultures of human osteoblasts and cardiac cell lineages were submitted to SW and compared to control untreated groups. We studied Ca<sup>++</sup> deposition, ALP and NOS activities, growth rate and differentiation of human osteoblasts. The precursors and progenitors of cardiomyocyte, smooth muscle, fibroblasts and endothelial cells were identified by immunocytochemistry, and the expression of mRNA and proteins was studied by western blot and RT-PCR.

Shockwaves can inhibit both growth rate and Ca<sup>++</sup> deposition. They modulate the osteoblasts NOS activity presumably affecting ALP. SW changed the relative number of cardiac precursors and progenitors of all cardiac cell lineages and enhanced the expression of cytoplasmic proteins.

The low rate of Ca<sup>++</sup> deposition may be due to changes in Ca<sup>++</sup> intra and extracellular flow as well as to decreased enzymatic activities, such as ALP activity, linked to bone mineralization retardation. In regard to the human heart, SW positively influence the differentiation of cardiac primitive cells and could possibly inhibit or retard pathological remodelling and functional degradation of the heart.