

# **Influence of ESWT on Migration, Cell-Formation and Cell-Differentiation of Endothelial Progenitor-Cells**

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The microbiological working-mechanism of ESW has developed to be the main working hypothesis in the last years to understand how shockwaves induce all our good results in clinical studies pointing out different indications to be treated.

At this point mainly the release of several growth-factors could be shown and therefore the model of bioengineering replaced the mechanical effect postulated in the early stages of shockwave application.

It has been shown that shockwave application induces the release of biologically active substances such as NO, VEGF, bFGF.

Our group is following a working-model on mechanotransduction which underlines the direct effect of ESW on the cell. Mechanotransduction does play a role in the regulation of cell-volume, -shape, -motility and –differentiation.

As stem- and progenitor-cells have shown their role in cell and tissue-regeneration we tried to point out the influence of a mechanical stress on endothelial progenitor cells (EPC), induced by shockwaves. These effects are shown in an in-vitro-Trial.

We have shown an induction of endothelial progenitor cells by ESW. This could be related to a vessel-protective and –regenerative effect of shockwave. The positive influence of ESW could be generated by the activation of stem- and progenitor-cells as well as the release of the mentioned biological active substances, VEGF, EPO, bFGF.

These factors have proved their influence on migration and cell differentiation to the endothelial cell-type.

The influence of shockwave on progenitor-cells together with the idea of a chemotactic influence activating the treated tissue and supporting the migrative activity will be one of the points of interest understanding the working-mechanism of shockwaves.