

The importance of a standardized model for shock wave in-vitro trials - a proposal plus preliminary results of cardiac cells

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Device and producing company:

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Introduction:

Literature reveals very diverse methods of applying shock waves onto cell cultures. Since results of equal cells treated in different ways are not comparable, establishing a standardized model for future in-vitro trials would be useful.

Methods:

Primary cell cultures of endothelial cells and fibroblasts were established from native rat hearts. Additionally H9C2-cardiomyocytes (American Tissue Culture Collection) were used. All cell types were cultured using DMEM medium supplement with different nutrients and growth factors. A thermostatically controlled water bath was designed to avoid distracting physical effects, in particular, reflections. Adherent cells in common cell culture flasks filled with culture medium were dunked into the water bath. Various energy flux densities of unfocused SWT were applied in different distances to the cells. Number of cells and their vitality then were analysed over a period of 7 days.

Results:

The water bath is a good method to avoid reflections and negative pressure of the shock waves. SWT stimulates every cardiac cell type to a different extent. Each cell type reacts at a different timepoint after treatment. The distance between the applicator and the cells, as well as the energy flux density have a strong influence on the cells' behaviour.

Conclusion: SWT stimulates growth of cardiac cells. The thermostatically controlled water bath is a useful and recommendable tool for further shock wave in-vitro trials.