

Dartsch Scientific GmbH · Auf der Voßhardt 25 · D-49419 Wagenfeld

Titanium Pyramids

Purí s.r.o.

Horušice 106

28573 Horušice

Czech Republic, EUROPE

Auf der Voßhardt 25
D-49419 Wagenfeld, Germany

Fon: +49 5444 980 1322

Mobil: +49 151 2272 1294

Email: info@dartsch-scientific.com

Web: www.dartsch-scientific.com

3rd November 2024

TEST REPORT

Beneficial cellular effects of Titanium Pyramids Rotator

1 Background and question of the study

The manufacturer of the two titanium pyramids arranged as an octahedron and rotated in the Titanium Pyramids Rotator with 72 rotations per minute either clockwise or anticlockwise claims beneficial health effects based on the subjective statements of users. Especially energy, vitality and well-being is increased by the Titanium Pyramids Rotator. For a better understanding of the construction, a picture from the manufacturer's homepage is shown in Fig. 1.



Fig. 1: Two titanium pyramids arranged as an octahedron and rotated in the Titanium Pyramids Rotator.

The present study was performed to investigate whether the two 10 cm titanium pyramids arranged as an octahedron and rotated in the titanium pyramid rotator are able to induce beneficial effects on the cellular level. Moreover we examined the cellular effects when the rotations were clockwise or anticlockwise.

2 Cell culture and exposure to Titanium Pyramids Rotator

Three different cell types were used in the studies. For the clockwise rotation of the octahedron pyramids, the regeneration of connective tissue fibroblasts (cell line L-929) and intestinal epithelial cells (cell line IPEC-J2) was investigated and for the anticlockwise rotation of the two titanium pyramids arranged as an octahedron the anti-inflammatory effect by functional neutrophils (dimethylsulfoxide-differentiated HL-60 cells) was investigated. For the evaluation of the regeneration process, we examined the colononization and closure of a cell-free area and for the evaluation of the anti-inflammatory effect the endogenous radical generation of functional neutrophils as inflammation-mediating cells.

For the experiments, the Titanium Pyramids Rotator was switched on at least 24 hours prior to the tests and cells were placed within a mini-incubator about 75 cm away from the rotator. The cells were cultivated at 37 °C in this mini-incubator for the duration of the experiments (maximum 24 hours for regeneration) and 48 hours for the assessment of the anti-inflammatory potential. The corresponding control cultures were also kept in a mini-incubator at 37 °C for the same time period about 20 meters away and separated by several walls. Thus, unwanted interactions between treated and untreated cell cultures were excluded.

3 Cell regeneration

Cell regeneration is a fundamental biological process that involves the replacement of damaged or dead cells with new, healthy ones. This process is crucial for maintaining the integrity and functionality of tissues and organs throughout an organism's life. Especially the reconstitution of an intact intestinal barrier after traumatization is of great importance for systemic health and well-being.

Results: The residual cell-free area after 14 hours of regeneration was 78.9 ± 5.8 % of total area for untreated control cells and 87.9 ± 2.9 % for treated connective tissue fibroblasts demonstrating a stimulating regenerative effect of the two titanium pyramids arranged as an octahedron and rotated in the Titanium Pyramids Rotator. This effect could be also examined for intestinal epithelial cells. For this cell type, the residual cell-free area after 8 hours of regeneration was 78.5 ± 4.5 % of total area for untreated control cells and 86.3 ± 3.4 % for cells treated with the two titanium pyramids arranged as an octahedron and rotated in the Titanium Pyramids Rotator. The results clearly demonstrate that the two titanium pyramids arranged as an octahedron and rotated in the Titanium Pyramids Rotator promote cell regeneration (Fig. 2).

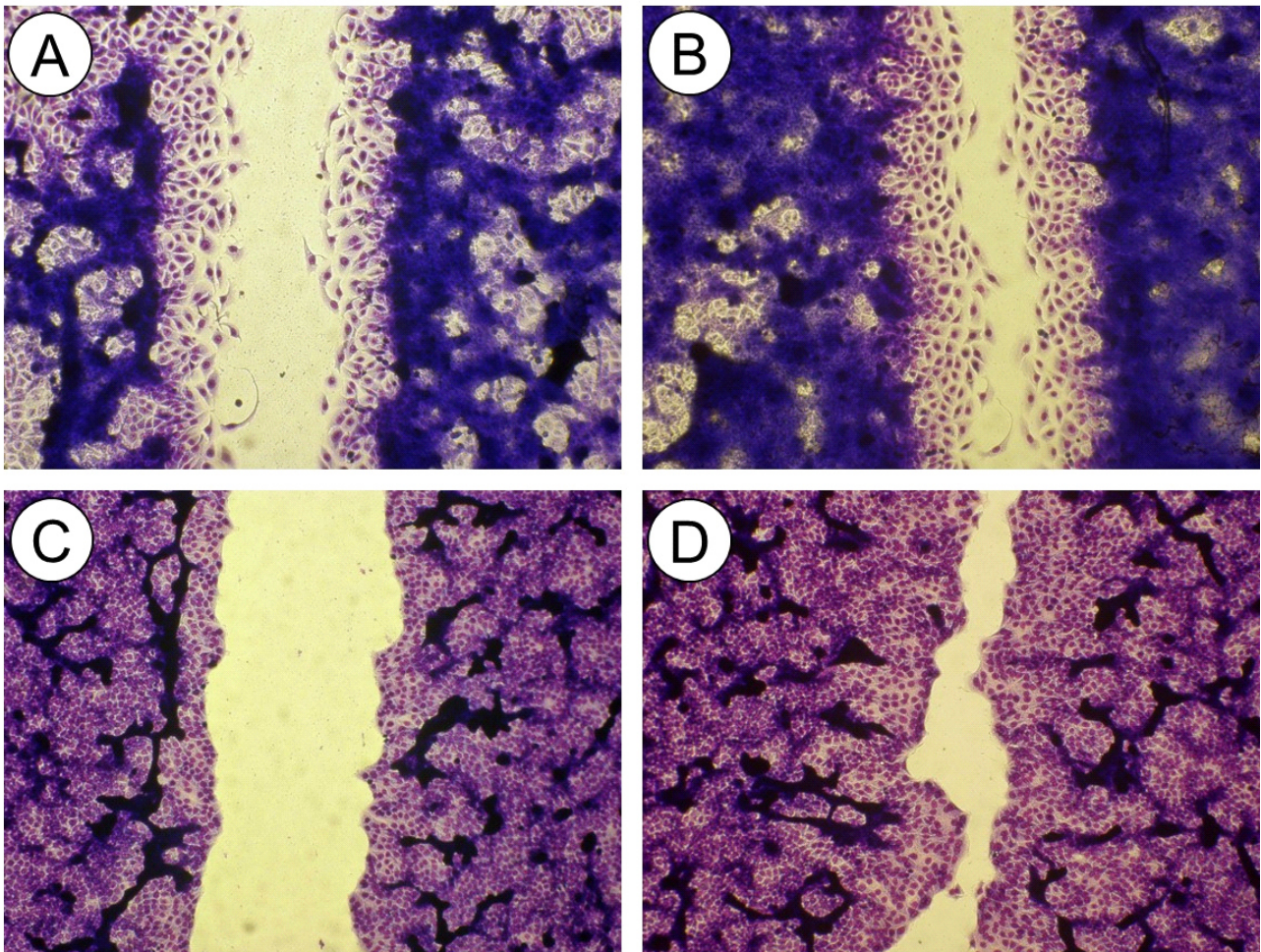


Fig. 2: Micrographs of the cell regeneration process of connective tissue fibroblasts after 14 hours (A,B) and of intestinal epithelial cells after 8 hours (C,D) of cultivation and after fixation and staining. (A,C) Cell-free area of untreated cells and (B,D) of cells treated with two titanium pyramids arranged as an octahedron and rotated clockwise in the Titanium Pyramids Rotator. Note that the width of the cell-free area is markedly smaller in B and D. Olympus IX 50 with Planachromate 10x and Olympus E-20 digital camera at 5 megapixel resolution and bright field illumination.

4 Anti-inflammatory effect of functional neutrophils

Neutrophils are the most abundant type of white blood cells in most mammals and are normally found in the bloodstream. In addition to recruiting and activating other cells of the innate immune system, neutrophils play a key role in the front-line defense against invading microbial pathogens. Also during the acute phase of inflammation, neutrophils are one of the first responders of inflammation-mediating cells which migrate from the blood into the inflamed tissue. In vitro, HL-60 cells can be used as a routine cell line and cells can be differentiated by the addition of dimethylsulfoxide for at least 5 days to become so-called functional neutrophils which are able to generate superoxide radicals in the course of an oxidative burst. This reflects the unwanted situation when neutrophils have migrated into

the inflamed tissue and generate superoxide anion radicals to induce a local oxidative stress which itself causes a prolongation of the inflammatory process.

Results: The generation of superoxide anion radicals was significantly decreased by 16.7 ± 6.7 % (mean value \pm standard deviation) after treatment of the functional neutrophils with the two titanium pyramids arranged as an octahedron and rotated anticlockwise in the Titanium Pyramids Rotator.

5 Conclusions

As a conclusion of the preliminary experiments, the two titanium pyramids arranged as an octahedron and rotated either clockwise or anticlockwise in the Titanium Pyramids Rotator caused beneficial effects on the cellular level. This might improve and maintain well-being and systemic health.



Prof. Dr. Peter C. Dartsch
Certified biochemist

Annotation: The test results presented here represent the results of single preliminary test series with several replicates. However, for a scientifically and statistically correct statement, at least three independent test series under the same test conditions are required to prove the reproducibility of the data.