

PRESS RELEASE

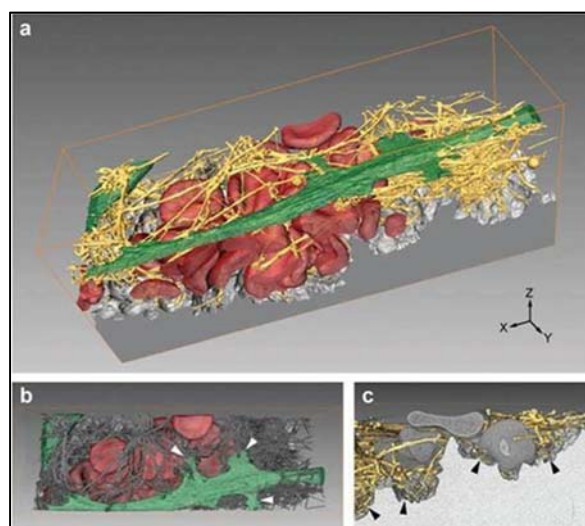
Grenchen, October 6, 2017

Breaking news on INICELL® and the importance of blood clots in fast healing

A new *in vitro* study with human mesenchymal stem cells (hMSCs) on the Thommen Medical implant surface INICELL confirmed the importance of enhanced blood clotting to create a pro-angiogenic environment.

The current study was performed at the Institute of Translational Medicine at the ETH Zurich. It identified several factors that are found in higher concentrations on Thommen Medical's implant surface INICELL compared to native sandblasted and acid etched titanium surfaces: Bone morphogenetic protein-2 (BMP-2), osteopontin, D-Dimer, pro-matrix-metallo-proteinase-9 (pro-MMP9) and vascular endothelial growth factor (VEGF). Most notably, pro-MMP9 and VEGF are pro-angiogenic factors and provide a pro-angiogenic environment by synergistic interactions of hMSCs and blood clots with entrapped blood cells the *in vitro* model used in the research work. Taken together, multifaceted mechanisms are emerging by which the pro-thrombotic alkali surface treatment (= INICELL) might directly enhance early wound healing in agreement with clinical observations. Thicker blood clot formation on the implant surface upon implantation leads to enhanced entrapment of neutrophils and monocyte-derived macrophages, or in other words, the natural wound healing cascade proceeds faster on the INICELL surface at an early stage.

Not only might this data explain why alkali-treatment (=INICELL) is beneficial for the osseointegration of dental implants, but it suggests that the physiological importance of blood clots to create pro-angiogenic environments on implants has been greatly underestimated.



3D model of hMSCs interacting with a blood clot adhering to an alkali-treated Ti surface (=INICELL) reveal tight anchorage of matrix fibers on the Ti surface. (a) A 3D model of the FIB-SEM volume illustrates hMSCs (green) interacting with matrix fibrils (yellow) and entrapped RBCs (red) adhering to an alkali-treated Ti surface (grey). (b) Top view of threshold-rendered FIB-SEM volume (grey) with surface-rendered RBCs (red) and hMSCs (green) highlight anchorage of hMSC protrusions on matrix fibrils (white arrowheads). (c) Close up of FIB-SEM stack side view (side facing top in (b)) with surface-rendered matrix fibrils (yellow) shows close attachment of matrix fibrils to rough surface features of alkali-treated Ti surface (light grey), indicated by black arrowheads. Volume of the FIB-SEM stack represented by the orange bounding box measures (x, y, z) 48.9 × 16.2 × 18.4 μm³.

Melanie A. Burkhardt, Isabel Gerber, Cameron Moshfegh, Miriam S. Lucas, Jasmin Waser, Maximilian Y. Emmert, Simon P. Hoerstrup, Falko Schlottig and Viola Vogel; Biomaterial Science, DOI: 10.1039/c7bm00276a

[Click here for the full publication](#)

[Click here for a reconstructed 3D Image of the INICELL® Surface with blood clot and human bone cells.](#)

[Click here for "Breaking News: Angiogenic potential of INICELL®"](#)

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<http://www.thommenmedical.com/en/company/media/press-releases.html>

About Thommen Medical

Thommen Medical is a Swiss designer and manufacturer of a dental implant system known for incredible precision and impactful design. We are unique with an incredible heritage of over 30 years of Swiss precision, innovation, and functional design that has formed the basis for our products. Of high quality yet simple to use, our products deliver predictable, aesthetic results without compromise. Thommen Medical's headquarters and private manufacturing facility are in Grenchen, Switzerland, a location that is the heart of Swiss precision manufacturing. Thommen Medical is an international company with subsidiaries and distributors throughout the world.