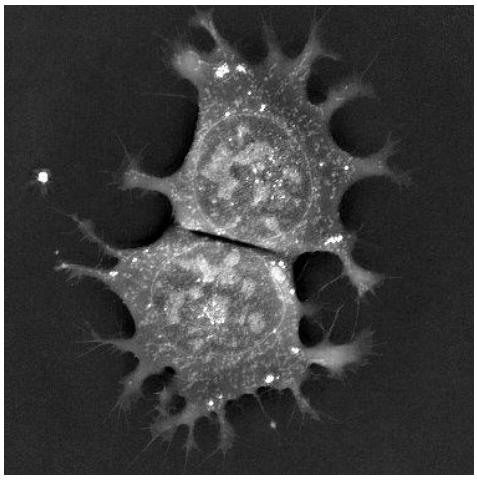
Breakthrough 3D live cell imaging technology changes the future of stem cell research

Ecublens, April 17th 2018 - Long-term imaging of fine cellular dynamics is today's biggest challenge in cell biology (Frechin et al., 2015; Kruse & Jülicher, 2005; Kueh, Champhekhar, Nutt, Elowitz, & Rothenberg, 2013; Skylaki, Hilsenbeck, & Schroeder, 2016) and studying stem cells is probably THE biggest challenge in today's biological research.

Stem cells are so sensitive, conventional fluorescence microscopy is lethal; so, imaging of live cells at high resolution over long time periods is not achievable. Instead researchers often image dead/dying cells and miss dynamic process essential to our understanding of cell biology.

Observing living stem cells under different conditions allows medical advancements in fighting cancer, degenerative diseases such as Alzheimer or organ failures such as heart diseases.



The goal is not only to acquire snapshots of dynamic biological systems, but to follow such active processes (Muzzey, Gómez-Uribe, Mettetal, & van Oudenaarden, 2009). However, fluorescence microscopy, which is the current method of choice in high-content live imaging approaches, induces phototoxicity when the sample is stimulated at various wavelengths. This stress induces cellular damages via radical-induced cellular structure alteration, which limits live imaging possibilities. Therefore, with relatively robust cell types such as cancer cell lines, a tradeoff must be found between short live cell imaging with high-frequency acquisition or long-term live cell imaging with low-frequency acquisition. With sensitive cell lines, such as mammalian embryonic stem cells, there are simply no proper long-term movies produced yet.

A Swiss company, Nanolive, developed a new revolutionary microscope, the 3D Cell Explorer, that for the first time allows scientists to image living stem cells over long time periods (days), at unmatched contrast and resolution. Last but not least, it's 3D.

Because the 3D Cell Explorer's laser injects 100 times less energy into the sample than the gentlest of the current fluorescent imaging approaches, given that proper data management and environment control are set up correctly, it is technically possible to perform endless live imaging at the maximal acquisition speed (1 image per 1.7 seconds). This certainly exceeds any live cell imaging capabilities of any other microscope and has revolutionized live cell imaging of stem cells.

Groundbraking **video material available here**: http://nanolive.ch/labelfree-stemcells/
The company is holding a **free webinar on Monday April 23rd**; RSVP here: http://nanolive.ch/stemcell-webinar/

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