Detecting morphology changes in activated NK cells using holographic fingerprinting

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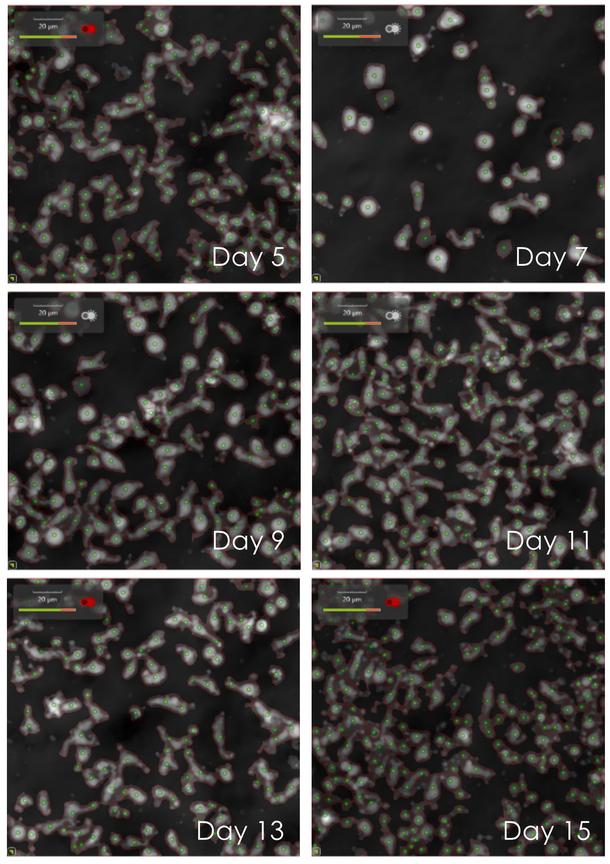
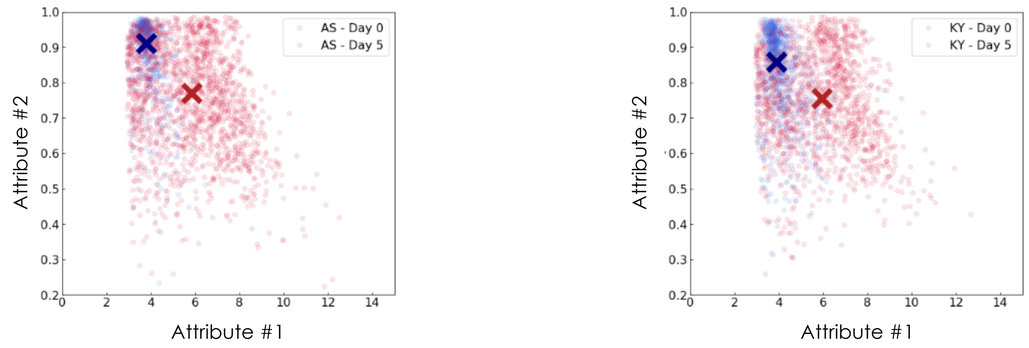
Natural Killer **(NK)** cells are large cytotoxic granular lymphocytes that play a key role in immunity by recognizing and killing stressed cells in the absence of MHC Class 1 marker or antibodies. NK cells are important in tumor surveillance and response which makes them highly interesting for anti-cancer therapy. Medigen has developed Magicell-NK®: activated NK cells.

Magicell-NK® is manufactured with Medigen's Cellxpert®-NK medium in a GTP grade cell processing unit (CPU). Magicell-NK® has been approved for use in the clinical treatment of cancer patients with stage IV solid tumors under "Specific Act" in Taiwan. Monitoring their expansion and activation can be done using Ovizio **holographic camera** and its associated software: OsOne.

Individual identification / segmentation of NK cells over the duration of the expansion



Morphological changes during activation



Tracking Active NK over time, for 3 different donors

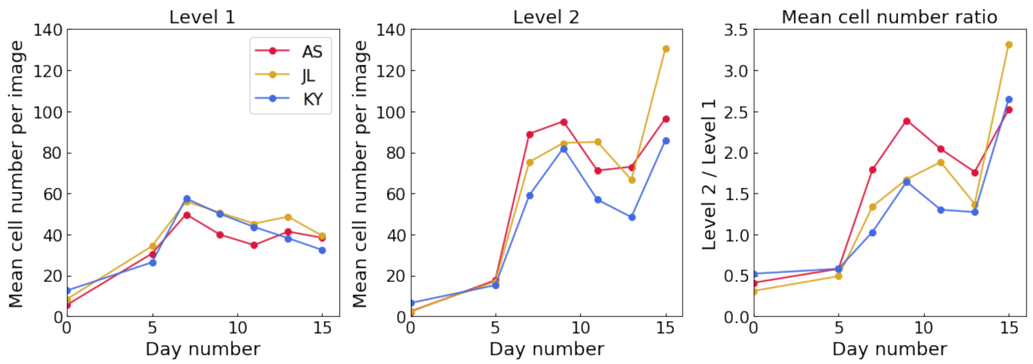
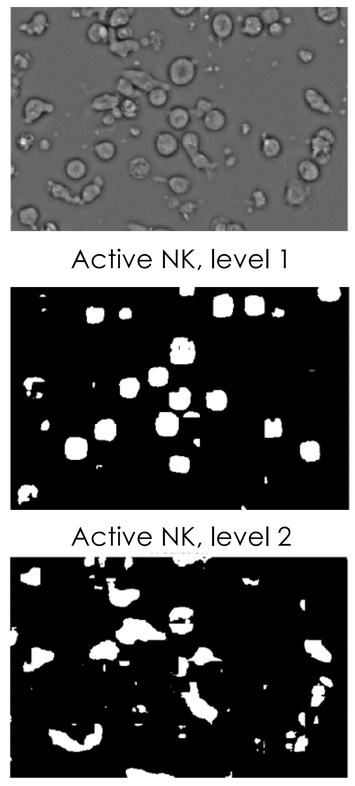
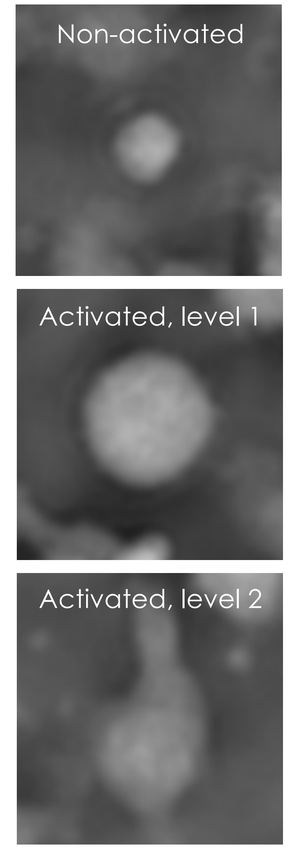


Image analysis (mask detection) of different level of activation



Different morphologies for different levels of activation



Using holographic microscopy, **Ovizio's OsOne software generates a large number of attributes for every cell** that can be classified in 4 categories: morphology, optical, phase texture and intensity texture. These attributes can then be used to detect, identify and count NK cells at various levels of activation.

During activation, cells undergo morphological changes that can be captured and analyzed. Here, only 2 attributes were used to illustrate this shift. **2 levels of activation** were thus observed and can be quantified directly in the culture.

The use of Ovizio's holographic camera and its associated software allowed for the development of an algorithm for the monitoring of NK cells growth. No sampling or staining is required

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