High content imaging of human primary cells cultured in a nanowell array

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Incorporating relevant human primary cells in early drug discovery is often not feasible due to their limited supply and heterogeneity. The use of miniaturised formats provides an attractive solution for scaling down the number of cells used per assay run and reducing costs associated with reagents and compounds. We present a platform for the culture and characterisation of primary human T cells in 100 µm wide and deep, circular nanowells. This consists of a chip containing 48,000 nanowells within a glass slide footprint. The controlled loading of cells into nanowells is achieved with a 'capture-and-decant' technique. We are able to image whole chips and monitor T cells for >48 hours without affecting their viability. Moreover, we can extract well occupancy and cell morphology metrics from imaging data using custom-made scripts in Definiens and Python. It is possible to map imaging to other assay readouts since positional information is extracted by these analyses.

**The human biological samples were sourced ethically and their research use was in accord with the terms of the informed consents under an IRB/EC approved protocol.*