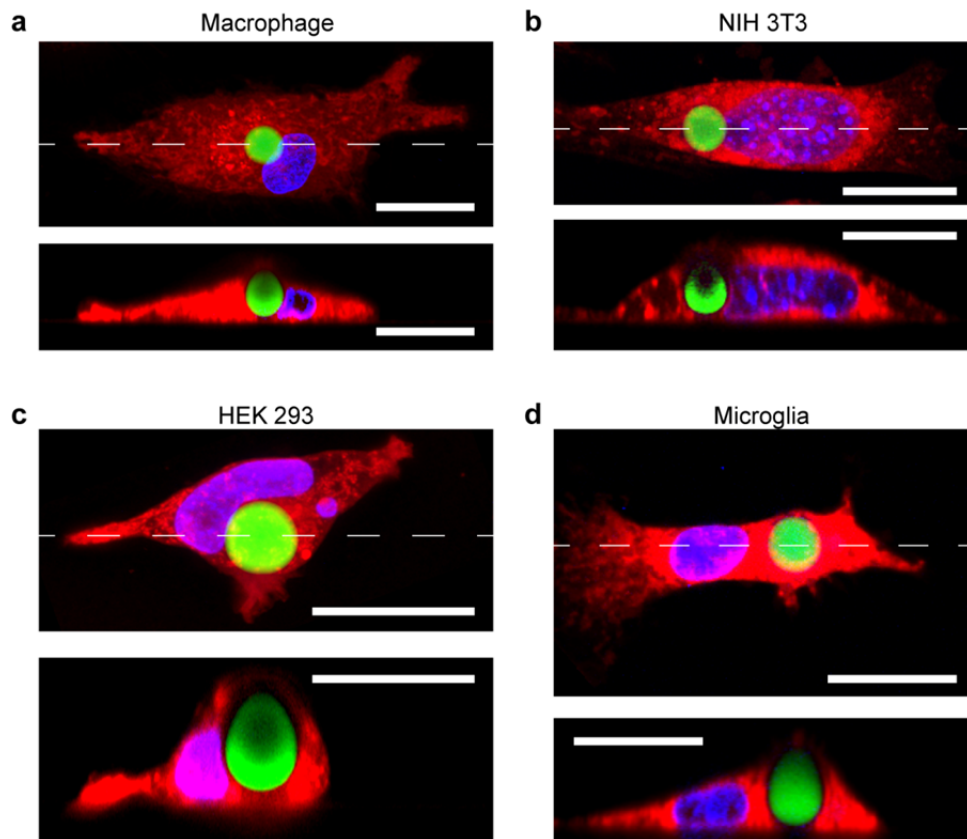
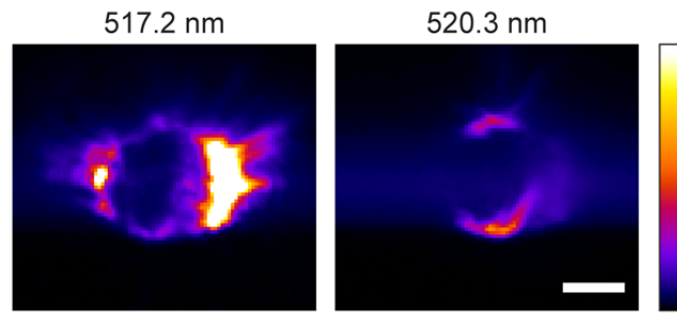


# Lasing within live cells containing intracellular optical micro-resonators for barcode-type cell tagging and tracking

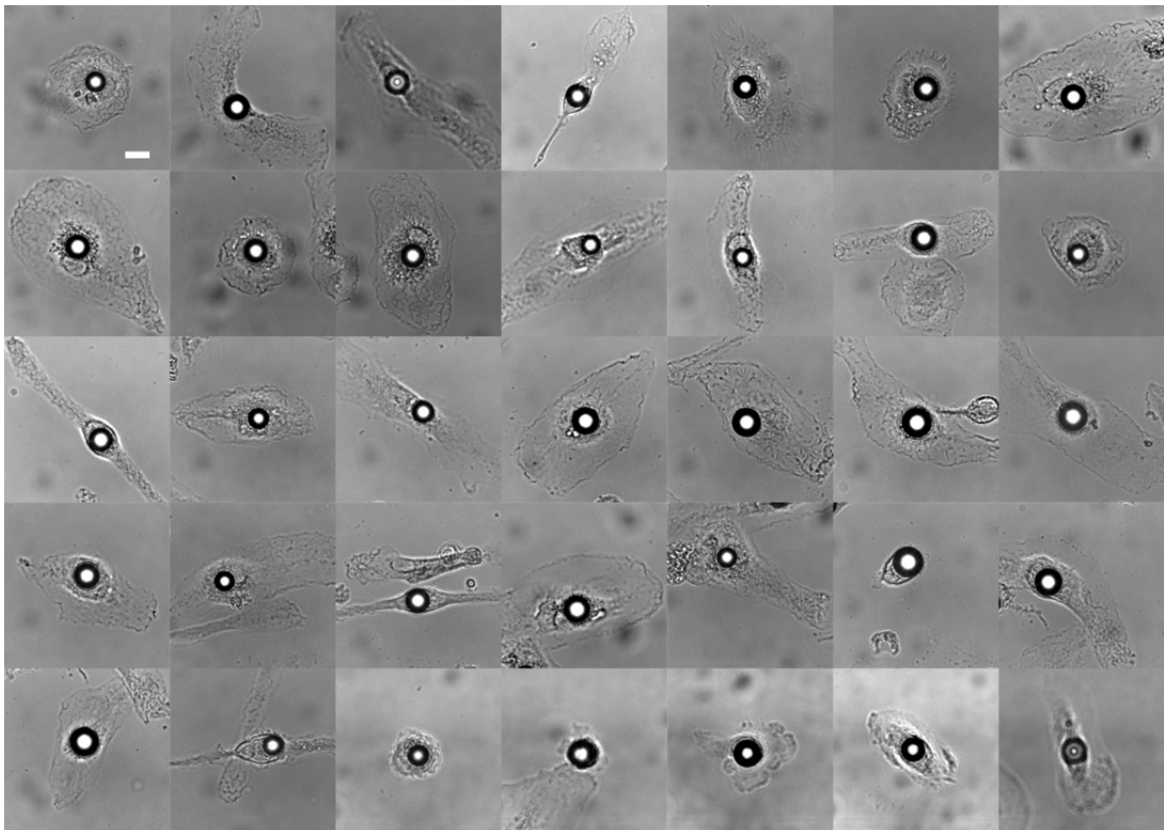
## Supplementary Information



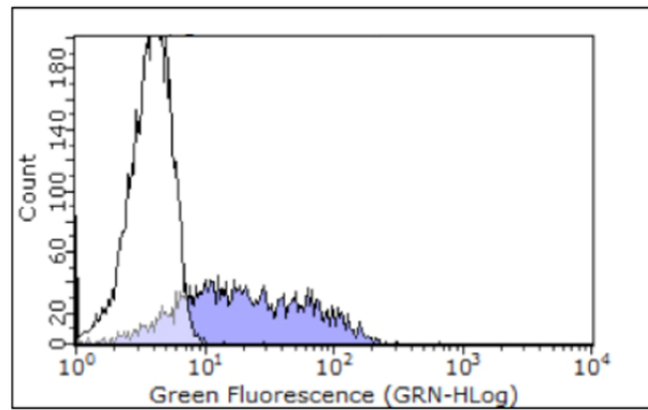
**Supplementary Fig. 1: Confocal laser scanning microscopy (CLSM) data of different cells with cytoplasm (red fluorescence), cell nucleus (blue fluorescence) and internalized micro-sphere resonator (green fluorescence). Maximum intensity projection (top) and cross section along the dashed line (bottom). **a**, primary human macrophage cells, **b**, NIH 3T3 fibroblasts, **c**, Human Embryonic Kidney 293 and **d**, primary mouse microglia. For all four cell types, spontaneous internalization of micro-sphere resonators was observed. Scale bars in all panels, 20 μm.**



**Supplementary Fig. 2: Hyperspectral images (false colour) of the spatial emission pattern of a 5.5  $\mu\text{m}$  radius cell internalized micro-sphere laser at 517.2 and 520.3 nm wavelength. Scale bar, 5  $\mu\text{m}$ . Emission at 517.2 nm is attributed to a TE mode, emission at 520.3 nm is attributed to a TM mode. The definition of TM and TE is with respect to the surface of the micro-sphere.**



**Supplementary Fig. 3: Bright field images of the cell lasers discussed in Fig. 3c of the main text. Scale bar, 20  $\mu\text{m}$ .**



**Supplementary Fig. 4: CD14 expression of purified macrophages.** Plastic adherent cells from isolated peripheral blood mononuclear cells were recovered and stained with CD14-FITC antibody (eBioscience, Hatfield, UK), shown shaded, compared to auto-fluorescence from the same cell population without CD14-FITC antibody staining (unshaded). Analysis was performed on a Guava 8HT flow cytometer (Millipore, UK).

**Supplementary Video 1:** Representative time-lapse video of a macrophage cell, starting 1 h after addition of micro-spheres to the culture dish. Video 50x accelerated. During its random migration, the cell reached a micro-sphere and within less than five minutes internalized the entire sphere. Afterwards, the cell remained motile, dragging the internalized sphere along.

**Supplementary Video 2:** Confocal Laser Scanning Microscopy image stack of macrophage with cytoplasm (red fluorescence), cell nucleus (blue fluorescence) and internalized micro-sphere resonator (green fluorescence).

**Supplementary Video 3:** Time lapse video of the macrophage cells investigated in Fig. 3a and b of the main text over the whole 19h time period of the experiment.