Quantitative Comparison between Microfluidic and Microtitre Plate Formats for Cell-Based Assays.

HuabingYin[1], Nicola Pattrick[3], Xunli Zhang[2], Norbert Klauke[1], Hayley.C.Cordingley[3], Steven J. Haswell[2], Jonathan M. Cooper[1]

[1] University of Glasgow, Department of Electronics, Glasgow, G12 8LT, UK,

[2] University of Hull, Department of Chemistry, Hull, HU6 7RX, UK.

[3] GlaxoSmithKline Pharmaceuticals**,** Harlow, CM19 5AW, UK.

SUPPORTING INFORMATION:

Buffers for Ca^{2+} flux assay: The Tyrode buffer was prepared from a stock containing 145 mM NaCl, 2.5 mM KCl, 10 mM HEPES, 10 mM D-glucose, 1.2 mM $MgCl_2$, pH 7.4. Final concentrations of 2.5 mM probenecid and 1.5 mM $CaCl_2$ were added shortly before the buffer was used. The Ca^{2+} fluorescent dye solution was prepared by adding a stock containing 1mM Fluo-4 AM in DMSO into a Tyrode buffer to give a final 2 µM.

Assembly of Microfludic Chips: The microfluidic device was fabricated as a reusable PDMS patterned gasket which spontaneously forms a good seal against a dry, clean surface, such as a glass or plastic substrate. The use of the jig that applies a small mechanical force serves to prevent rupture of the gasket seals during handling of the device after the inlet and outlet tubes have been connected. This formation allows direct assembly of substrates with surface modifications that promote cell adhesion (The oxygen plasma enhanced PDMS bonding would otherwise destroy the surface modification on the substrate). In addition, all the gasket and microfluidic connections can be sterilized and after assembly, no leakage of the structure was observed at a flow rate of 400 µl/min (with a calculated shear stress of 82 dynes/cm2 in the microfluidic channels).

Figure Captions:

Figure S1. Representative fluorescence images of CHO cell response to UTP in a traditional well-plate assay. (A) shows adherent cells in a traditional well-plate before UTP addition and (B) shows response of the adherent cells after UTP addition (final UTP concentration 1.0 μM).

Figure S2. Representative fluorescence images of suspended CHO cell on chip in response to UTP. (A) shows suspended cells in a microfluidic channel before loading UTP and (B) shows response of the suspended cells to 1.0 μM UTP.

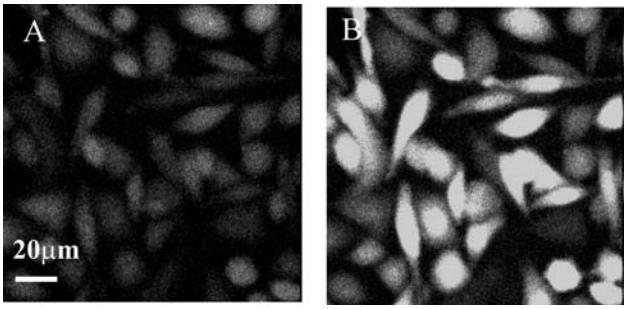

Figure S1

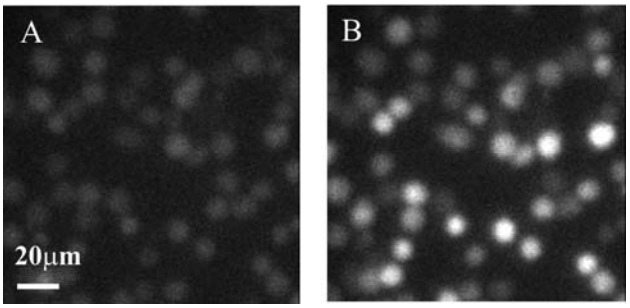

Figure S2