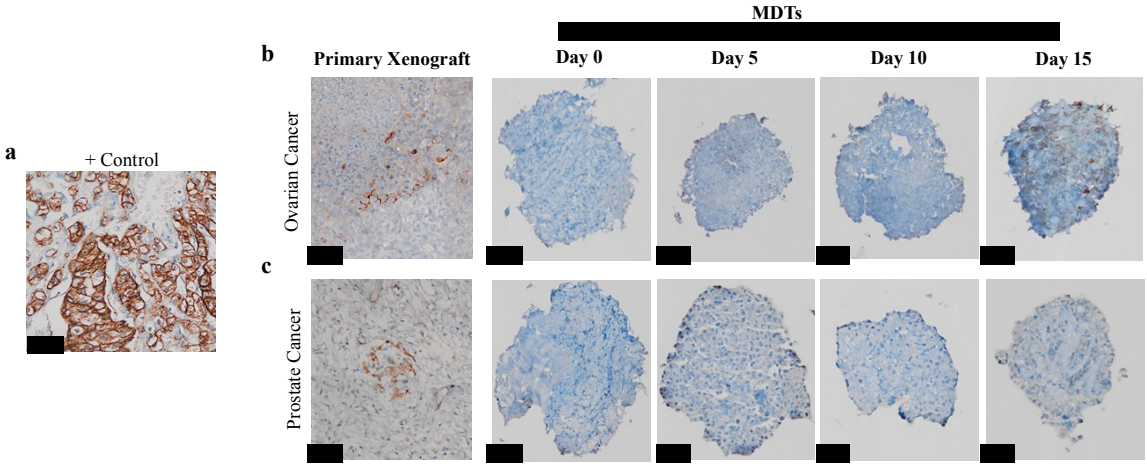
Electronic Supplementary Material (ESI) for Lab on a Chip.

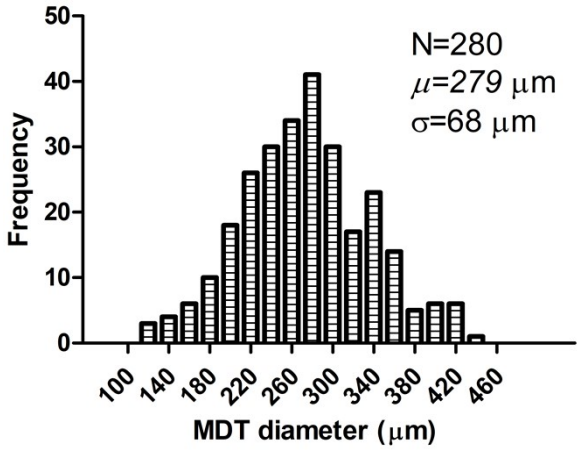
Supplementary Material

Supplementary Table 1: Description of the parameters defined for COMSOL simulations to characterize the rinsing process in the device.

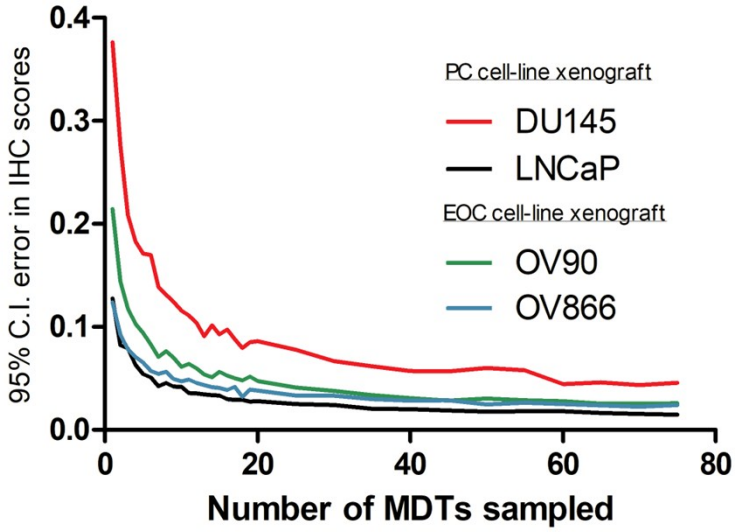
Parameter	Value	Reference
Geometry		
Channel Height	0.9 mm	-
Channel Width	1.1 mm	-
Well Height	800 µm	-
Well Width	800 µm	-
Channel length	51 cm	-
Distance between wells	4 mm	-
Diffusion coefficient		
Diffusion of ethanol in water	1.24×10^{-5} cm^2/sec	(Hills 2011)
Diffusion of glucose in water	9.6×10^{-6} cm^2/sec	(Suhaimi 2015)
Diffusion of paclitaxel in water	4.2×10^{-6} cm^2/sec	(Cremasco 2012)
Physical parameter		
Water density at 37°C	993.3 kg/m^3	(Kestin 1978)
Water viscosity at 37°C	0.692 mPa s	(Kestin 1978)



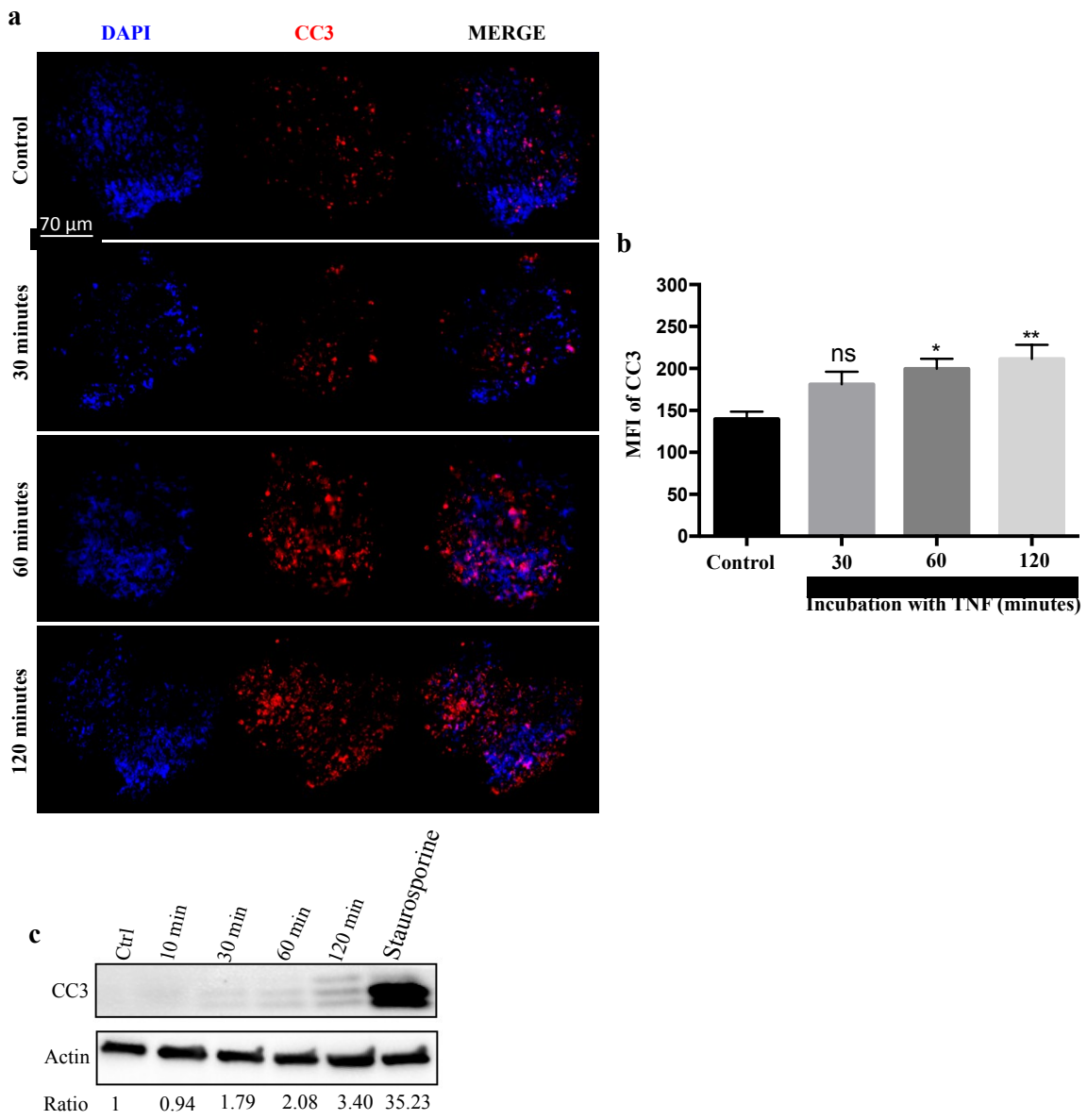
Supplementary Figure 1: Lack of hypoxia within the MDTs over a 15-day culture period. IHC of Carbonic anhydrase 9 **(**CA9), a transmembrane protein expressed through HIF-1α accumulation driven by hypoxia. a. Positive staining control for CA9 on a metastatic clear cell renal carcinoma (CCRC) sample from a patient with inactive VHL gene and overexpression of CA9. b. EOC (OV1946) and c. PC (DU145) cell line xenograft tumor specimens with corresponding MDTs at various culture time points. Micrografts of tumor tissues were selected to demonstrate rare regions of *in vivo* hypoxia. Note no evidence of hypoxia in MDTs cultured for up to 15 days.



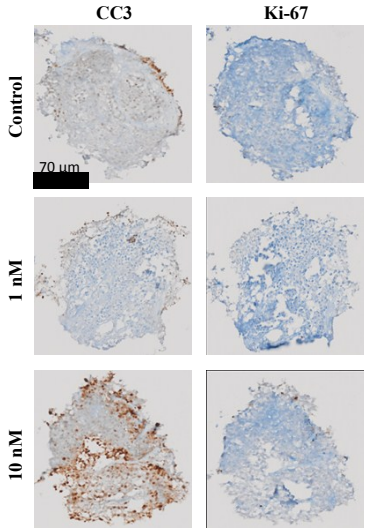
Supplementary Figure 2: Histogram of average diameter of fixed MDTs. The diameter distribution of 280 MDTs; average: μ = 297 μm, standard deviation: σ = 68 μm



Supplementary Figure 3: **Monte-Carlo simulation of the sampling process.** 95% Confidence interval for the distribution of IHC scores when sampling different number of MDTs.



Supplementary Figure 4: Caspase-3 activation induced by over induction of TNF-α stimulator. MDTs produced from EOC (OV1946) cell line xenograft tumor treated with either OSE media or TNF-α at a concentration of 10 ng/mL for 0, 30, 60 and 120 minutes. **a,** MDTs were fixed and stained with cleaved caspase-3 antibody using IF (Dapi in blue and CC3 in red) (n=20 MDTs/condition). **b,** IF analysis of overall caspase-3 activation (n=15 MDTs/ condition). All experiments were done using the same xenograft as starting material. *p<0.05, **p<0.001. **c,** Western blot of EOC (OV1946) cell line treated with TNF-α at a concentration of 10 ng/mL for 0, 10, 30, 60, 120 minutes. Staurosporine was added as a positive control. N=2.



Supplementary Figure 5: IHC of dose-response analysis in PC (LNCaP) cell line xenograft MDTs. MDTs were treated with two concentrations (1, 10 nM) of docetaxel (IC_{50} = 1 nM) for 12 hours at day 3. MDTs were fixed and analysed after 12 hours of recovery period. IHC staining of cleaved caspase-3 (CC3) and Ki-67 to monitor apoptosis and cell proliferation respectively. All experiments were done using the same xenograft as starting material.