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

Supplementary Information

Acoustically-Driven Thread-Based Tuneable Gradient Generators

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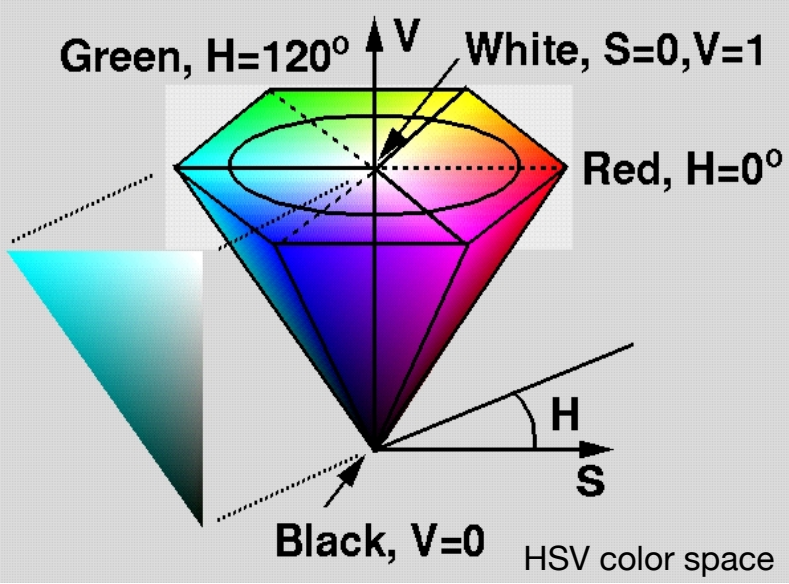

Figure S1 Hue–saturation–value (HSV) model for colourimetric analysis of the thread networks.

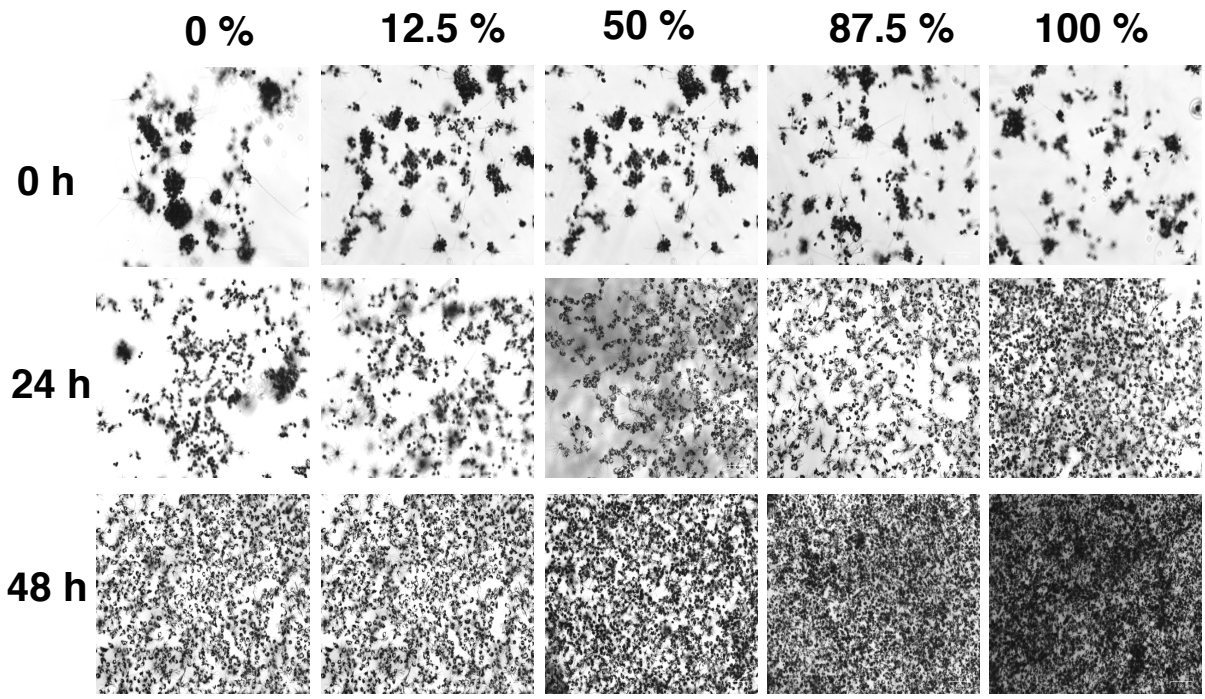

Fig. S2: Representative bright-field microscopy images at different node locations 1-5 in Fig. 1(a) (corresponding to the different concentrations 0%, 12.5%, 50%, 87.5% and 100%, respectively) at various time points, showing the formation of insoluble formazan crystals in the hydrogel due to reduction of the MTT solution by cells that are metabolically active. The number of crystals that form is then directly proportional to the number of viable cells present in the hydrogel, which can be quantified from the optical density of each image using a plate reader. Each panel represents an area of the extracted hydrogel disc construct that is approximately 1 mm x 750 µm.

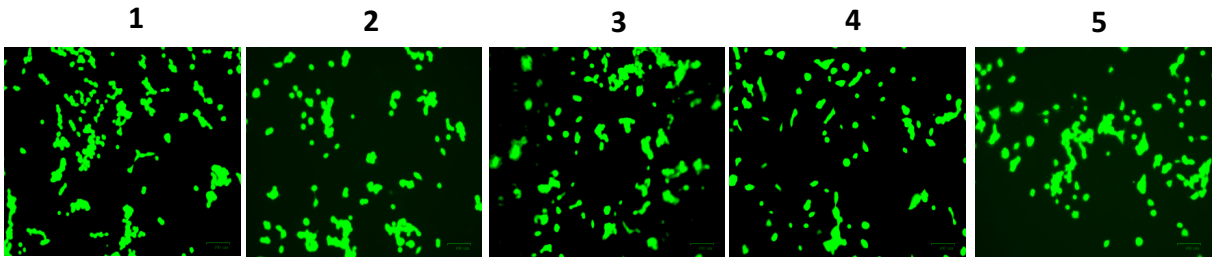

Figure S3 Live/dead fluorescently stained images of HT1080 cells in Gtn-HPA hydrogels in the absence of SAW excitation at different nodal positions (locations 1-5 in Fig. 1(a)) after 24 h. In contrast to Figure 6(a) where the number of cells correlate closely with the concentration gradient that is imposed by the SAW, it can be seen here that the number of cells observed at each nodal location appears to be similar when no gradient exists.

Supplementary Movies:

Movie S1: Time lapse video showing the transport and mixing of two coloured solutions, yellow and blue, through the serial dilution and combinatorial thread network driven by SAW nebulisation at the central position at α (see Fig. 1(a)) to produce a stable symmetric concentration gradient across the network.

Movie S2: Time lapse video showing dynamic tuning of the concentration gradient in the serial dilution thread network enabled by SAW nebulisation. The SAW device is progressively moved away from the central position at α to positions β, γ, δ and ε (see Fig. 1(a)) to increase the asymmetry in the concentration gradient.