**Supplementary Information.**

**Supplementary Figure 1.** Microfluidic Lithography can be used as a general method for patterning a variety of alkanethiols rapidly and inexpensively. Scanning electron micrograph (SEM) data shown were created by flowing 0.1mM of an alkane thiol through the microfluidic cassette for 15 s. (A) Tetra(ethyleneglycol) undecane thiol SAM surface; (B) 11-mercapto-undecanol SAM surface; (C) 11- Ferrocenyl-undecanethiol SAM surface; D) Hydroquinone-tetra(ethylene glycol) undecanethiol SAM surface. (scale bar = 200µm).
**Supplementary Figure 2.** The corresponding cyclic voltammograms of the redox active alkanethiols patterned via microfluidic lithography in supplementary figure 1C and 1D. After microfluidic lithography the remaining bare gold regions were backfilled with tetra(ethylene)glycol alkanethiol. Cyclic voltammetry data were obtained in 1M perchloric acid solution. A) CV of oxidation/reduction of hydroquinone to quinone. B) CV of oxidation/reduction of ferrocene and ferrocenium. C) An example of using microfluidic lithography to pattern a mixed SAM of hydroquinone and ferrocene (1:1). The green CV represents a surface composed of 1:1 ferrocene-alkanethiol and hydroquinone-alkanethiol. The black CV represents a microfluidic lithography generated pattern of 1:1 ferrocene-alkanethiol and hydroquinone-alkanethiol. The microfluidic lithography strategy is capable of generating mixed patterned SAMs rapidly and are highly reproducible.
Supplementary Figure 3. Directed, dynamic migration of cells on SAMs patterned with microfluidic lithography. (A) Bottom third of pattern is blocked with a PDMS mask to which cells were centrifuged and allowed to adhere. (B) Upon removal of the mask cells grew and migrated towards the newly available adhesive regions. (C) Cells continued to grow and migrate. Time course of 24 hours from A to C micrographs.
Supplementary Figure 4. Contiguous co-culture on SAMs patterned with microfluidic lithography. (A) Phase contrast image showing complete patterning of cells on the rings of a spiral pattern. (B) Fluorescent image showing two distinct population of cells are present on the pattern. The patterns and methodology to visualize the cells is described in the experimental section and figure 6 in the main text.