Capillary Based Patterning of Cellular Communities in Laterally Open Channels

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**Video S-1.** Blue food dye is injected into the port located at the bottom of the chip while the red dye is injected from the top of the chip as shown. After injection, the solutions move through the shallow channel via capillary action without flooding. "Banked channels" were not used in this design. The height of the shallow channel in this case is 20  $\mu$ m, the height of the deep channel is 40  $\mu$ m and the width of shallow channel is 100  $\mu$ m. The video is shown in real time.

**Figure S-1.** Open channel sender-receiver microfluidic device for small molecule diffusion studies. PLL is patterned over a long narrow area that enters a wide half circle area. Sender cells were patterned in the narrow area while receiver cells were pattered in the half circle area. (A)(i) Sender-receiver circuit diagrams in which 3-oxo-hexanoyl-HSL produced by sender cells turns on expression of the GFP gene. (ii) Labeled chip showing the direction of small molecule diffusion. (B)(i) Open channel receiver device shown immediately after flooding (ii) After 30 minutes the receiver shows a visible increase in fluorescent intensity. (Scale bar: 200 μm)

**Figure S-2.** Fluorescence intensity measurement for control. For the control experiment we added fresh LB medium with 100  $\mu$ g/ml ampicillin into sender port and maintained the same volume during measurement. (i)-(iv) LB medium with 100  $\mu$ g/ml ampicillin was added instead of sender *E.coli* cells. The brightness of the receiver and inverse receiver slightly increases due to growth in the device. (Scale bar: 200  $\mu$ m)

**Table S-1.** Fluorescence (pixel) intensity for the sender, receiver, inverted receiver community over period of 12 hours with control data



No barrier

Figure S-1.



Figure S-2.

	Receiver				Inverse receiver				
Hour	Intensity Average		Standard Deviation		Hour	Intensity Average		Standard Deviation	
	w/ Sender	Control	w/ Sender	Control	nour	w/ Sender	Control	w/ Sender	Control
0	3.68	5.97	0.86	1.53	0	9.82	9.06	1.07	1.21
0.5	13.42	8.01	4.35	2.38	0.5	8.74	9.70	0.63	1.56
1	32.28	9.30	6.31	1.63	1	8.47	8.87	0.49	0.15
1.5	48.40	6.73	6.31	0.16	1.5	7.62	8.31	0.27	3.29
2	60.33	7.11	8.23	1.87	2	7.02	7.54	1.07	1.75
2.5	76.31	7.16	10.33	2.89	2.5	6.57	7.07	0.39	1.00
3	93.44	7.92	11.11	1.72	3	6.48	6.93	0.56	1.31
6	150.44	12.48	8.05	2.77	6	5.11	17.48	1.08	4.36
9	152.08	14.31	10.11	2.38	9	4.57	27.25	1.69	5.34
12	149.35	15.82	7.77	1.34	12	4.40	31.83	0.81	11.26

Table S-1.