

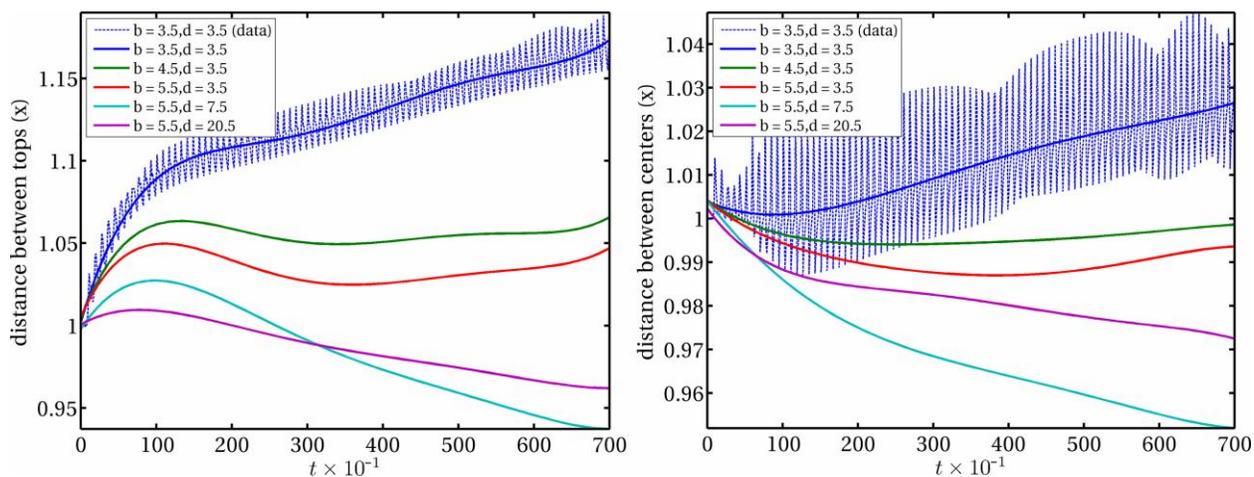
Supplementary Information 1

Early time dynamics of two cilia placed in the fluid far apart from each other ($b = 5.5$ and $d = 20.5$). The waves travel bottom-up.

Supplementary Information 2

Late time dynamics of two cilia placed in the fluid far apart from each other ($b = 5.5$ and $d = 20.5$). The traveling waves become out of phase and switch direction.

Supplementary Information 3



Distances between the tops (left) and centers (right) of the cilia for all the cases in Fig. 2f.

Supplementary Information 4

Early time dynamics of five cilia in the absence of light ($b = 5.5$ and $d = 3.5$). The waves travel bottom-up as the activator concentration in the fluid is low.

Supplementary Information 5

Late time dynamics of five cilia in the absence of light ($b = 5.5$ and $d = 3.5$). The traveling waves switch direction and the central cilia leads the oscillations within the system.

Supplementary Information 6

The variation of positions of the top surfaces of five cilia at late times in the absence of light. The movie shows the vertical displacements of the top surface of cilia that move up and down in a complex dynamical pattern.

Supplementary Information 7

Early time dynamics of five cilia when cilia 1, 2 and 3 (numbered from left to right) are illuminated by light ($\Phi = 1.5 \times 10^{-3}$).

Supplementary Information 8

The “piano” effect. The variation of positions of the top cilia surfaces at early times when cilia 1, 2 and 3 (numbered from left to right) are illuminated by light ($\Phi = 1.5 \times 10^{-3}$).

Supplementary Information 9

Late time dynamics of five cilia when cilia 1, 2 and 3 (numbered from left to right) are illuminated by light ($\Phi = 1.5 \times 10^{-3}$).

Supplementary Information 10

The variation of positions of the top cilia surfaces at late times when cilia 1, 2 and 3 (numbered from left to right) are illuminated by light ($\Phi = 1.5 \times 10^{-3}$).