Supplementary Material (ESI) for Lab on a Chip
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Acoustic actuation of bioinspired microswimmers

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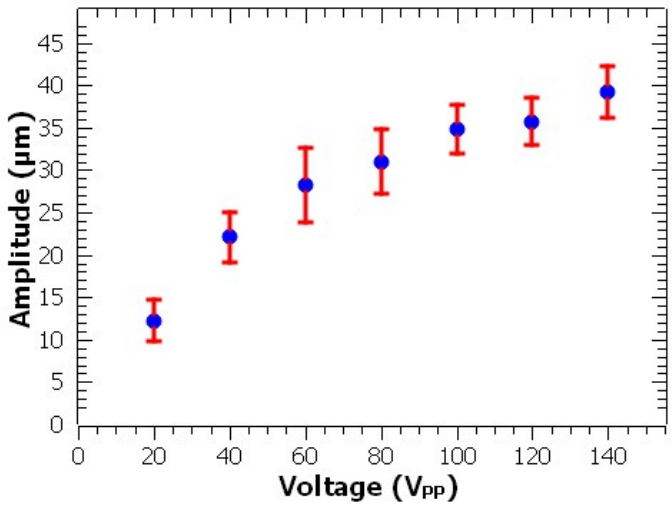

Figure S1: Oscillation amplitude analysis of rotational microswimmers. Error bars represent the standard deviation of five or more videos at each VPP.

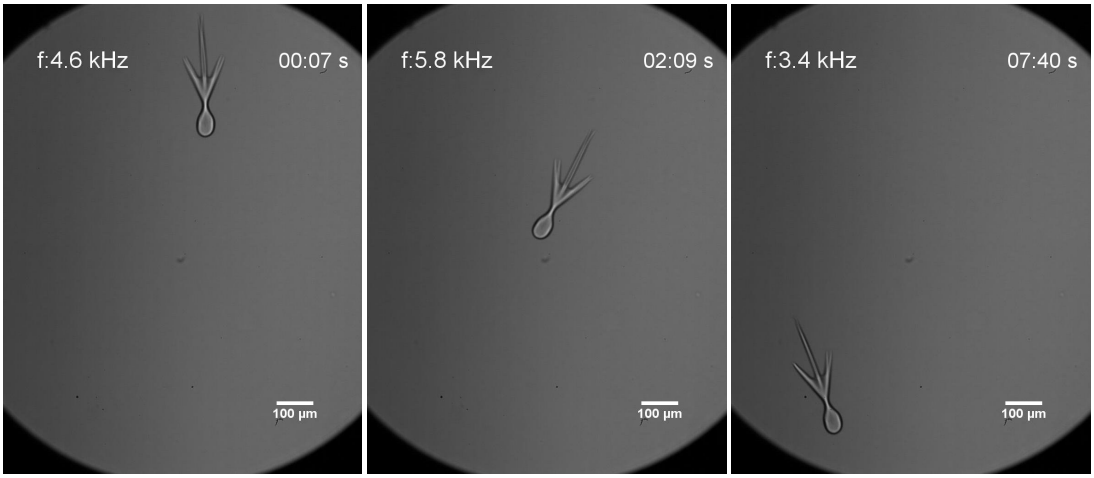

Figure S2: A two-branch-one-tail microswimmer steering its direction upon the frequency change.

Video Captions

Video 1: Flagellum oscillation

The tail of the microswimmer oscillates at much higher amplitude than the head, due to its greater flexibility.

Video 2: Microswimmer without flagellum

A microswimmer without a tail is not able to swim due to lack of flagellum which generates acoustic streaming under acoustic field.

Video 3: Directional motility

The flagellum oscillates and induces directional motion along the head-tail axis.

Video 4: Rotation at different directions

Rotational microswimmers are pre-programmed for clockwise or counter-clockwise rotation according to which side of the structure hosts the flagellum.

Video 5: Swimming towards each other

The microswimmers are motionless in the absence of acoustic excitation in the beginning of the movie. After application of an external acoustic field, each swims directly towards the other. Then, the swimmers pass each other and continue along their directions of motion.

Video 6: Microswimmer changes directions

The two-branch-one-tail microswimmer starts swimming directionally at 4.6 kHz. It then changes the direction to the left and right, respectively, with varying frequencies at 5.8 kHz and 3.4 kHz.

Video 7: Rotation of a microswimmer

The flagellum is at rest in the absence of acoustic excitation. It then begins to oscillate and rotate the body of the swimmer when the acoustic transducer is activated.