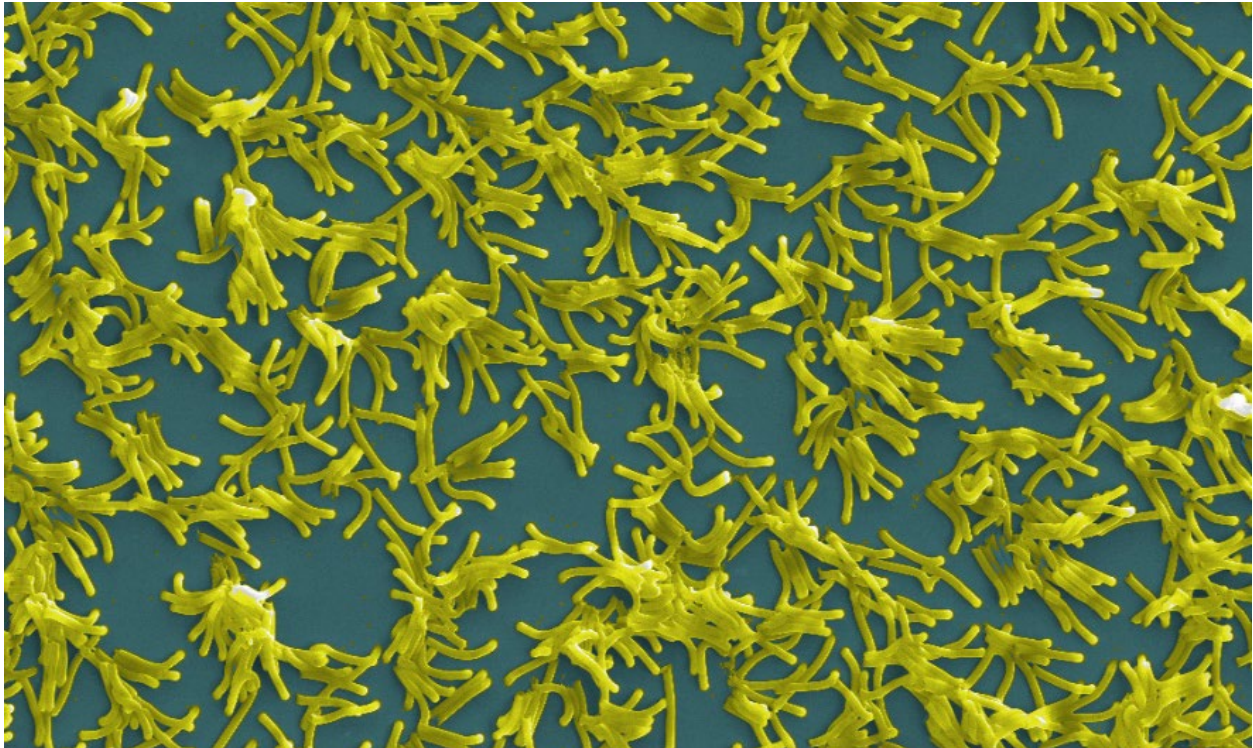


Magnetic Artificial Cilia Mimicking their Nanoscale Biological Peers

Cilia are hair-like microscopic structures present abundantly in our body and producing motions at the smallest scales. They perform a wide range of critical functions and are crucial for the normal functioning of our body. Abnormal functioning of cilia result in a number of diseases jointly known as ciliopathies. Artificially mimicking motile cilia has been a long-standing challenge while inspiring the development of new materials and methods. Mimicking cilia is aimed at understanding their normal/ abnormal functionality and at developing cilia-inspired micro/ nano engineering devices. A magnetic elastomer preparation process coupled with a tailored molding process is developed for the successful fabrication of artificial cilia with submicron dimensions showing unprecedented deflection capabilities, enabling the design of artificial cilia with high motility and at sizes equal to those of their smallest biological counterparts. This has allowed to cross the barrier of nanoscale motile cilia fabrication, paving the way for maximum control and manipulation of structures and processes at micro and nano scales.



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