BIOMATERIALS

Dynamic DNA materials in a DASH

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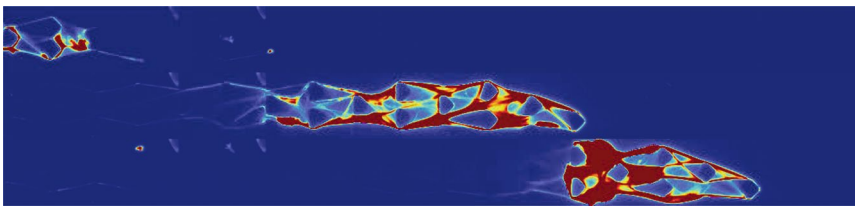

Credit: AAAS

Metabolism is necessary in living organisms in order to maintain form and function: old cells and waste must be removed and new cells must be generated through biodegradation and biosynthesis. Metabolism could also inspire the development of a new generation of artificial self-reproducing and self-sustaining biomolecular machines. As a first step, Shogo Hamada, Dan Luo and colleagues at Cornell University, Suzhou Institute of Nano-Tech and Nano-Bionics CAS and Shanghai Jiao Tong University have created dynamic biomaterials powered by artificial metabolism.

The researchers developed an approach termed DASH (DNA-based assembly and synthesis of hierarchical materials) that mimics how nature uses metabolism to build materials with structural hierarchy through the processes of biochemical synthesis and dissipative assembly. The approach can be used to self-assemble DNA into predictable structures with programmable dynamic behaviour. With these artificial biomaterials, Hamada and colleagues demonstrate emergent locomotion similar to that of a slime mould. These materials could, in principle, be integrated into future biomolecular robots in order to provide self-sustaining locomotion.

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