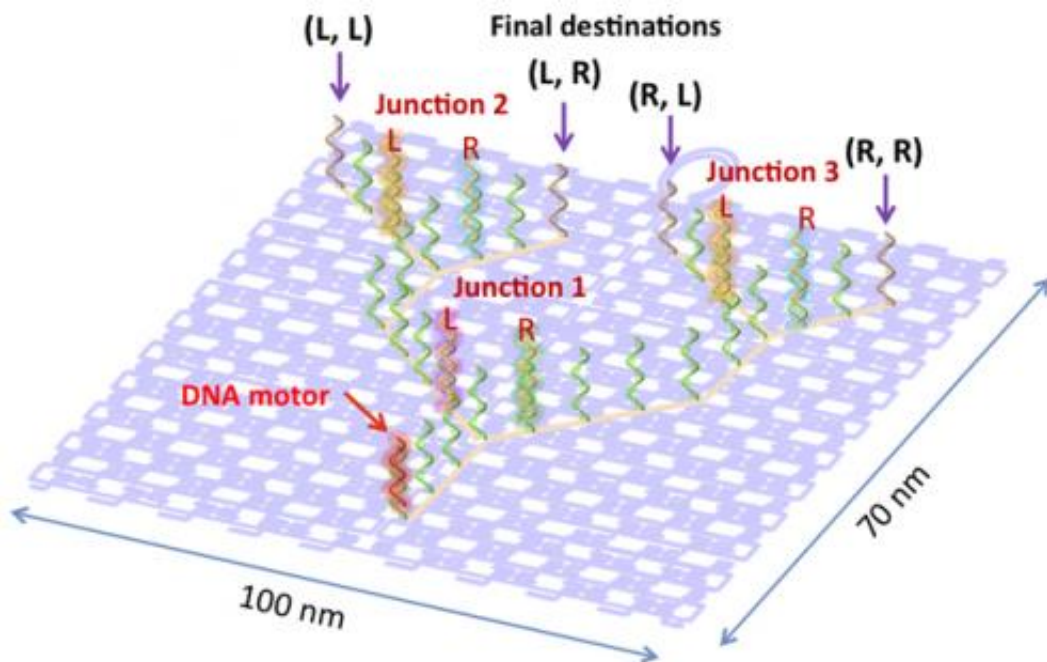


DNA motor programmed to navigate a network of tracks

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A depiction of a DNA origami tile with a built-in network of tracks. The DNA engine or motor, in red, can be programmed to navigate a series of junctions to reach one of four desired end points. Credit: Sugiyama Lab, Kyoto University iCeMS.

Expanding on previous work with engines traveling on straight tracks, a team of researchers at Kyoto University and the University of Oxford have successfully used DNA building blocks to construct a motor capable of navigating a programmable network of tracks with multiple

switches. The findings, published in the January 22 online edition of the journal *Nature Nanotechnology*, are expected to lead to further developments in the field of nanoengineering.

The research utilizes the technology of DNA origami, where strands of [DNA molecules](#) are sequenced in a way that will cause them to self-assemble into desired 2D and even [3D structures](#). In this latest effort, the scientists built a network of tracks and switches atop DNA origami tiles, which made it possible for [motor molecules](#) to travel along these rail systems.

"We have demonstrated that it is not only possible to build [nanoscale devices](#) that function autonomously," explained Dr. Masayuki Endo of Kyoto University's Institute for Integrated Cell-Material Sciences (iCeMS), "but that we can cause such devices to produce predictable outputs based on different, controllable starting conditions."

The team, including lead author Dr. Shelley Wickham at Oxford, expects that the work may lead to the development of even more complex systems, such as programmable molecular assembly lines and sophisticated sensors.

"We are really still at an early stage in designing DNA origami-based engineering systems," elaborated iCeMS Prof. Hiroshi Sugiyama. "The promise is great, but at the same time there are still many technical hurdles to overcome in order to improve the quality of the output. This is just the beginning for this new and exciting field."

More information: The article, "A DNA-based molecular motor that can navigate a network of tracks" by Shelley F. J. Wickham, Jonathan Bath, Yousuke Katsuda, Masayuki Endo, Kumi Hidaka, Hiroshi Sugiyama, and Andrew J. Turberfield was published online in the January 22, 2011 issue of *Nature Nanotechnology*. DOI:

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