

New molecular robot can be programmed to follow instructions

March 9 2011

Scientists have developed a programmable "molecular robot" -- a submicroscopic molecular machine made of synthetic DNA that moves between track locations separated by 6nm. The robot, a short strand of DNA, follows instructions programmed into a set of fuel molecules determining its destination, for example, to turn left or right at a junction in the track.

The report, which represents a step toward futuristic <u>nanomachines</u> and nanofactories, appears in ACS's <u>Nano Letters</u>.

Andrew Turberfield and colleagues point out that other scientists have developed similar DNA-based robots, which move autonomously.

Some of these use a biped design and move by alternately attaching and detaching themselves from anchor points along the DNA track, foot over foot, when fuel is added.

Scientists would like to program DNA robots to autonomously walk in different directions to move in a programmable pattern, a key to harnessing their potential as cargo-carrying molecular machines.

The scientists describe an advance toward this goal — a <u>robot</u> that can be programmed to choose among different branches of a molecular track, rather than just move in a straight line.

The key to this specialized movement is a so-called "fuel hairpin," a



molecule that serves as both a chemical energy source for propelling the robot along the track and as a routing instruction.

The instructions tell the robot which point is should move to next, allowing the selection between the left or right branches of a junction in the track, precisely controlling the route of the robot — which could potentially allow the transport of pharmaceuticals or other materials.

More information: "A Programmable Molecular Robot", *Nano Letters*.

Provided by American Chemical Society

Citation: New molecular robot can be programmed to follow instructions (2011, March 9) retrieved 27 April 2024 from <u>https://phys.org/news/2011-03-molecular-robot.html</u>

This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.