

Navigation Links
Biology News
Medicine News
Biology Products
Medicine Products
Biology Definition
Medicine Definition
Biology Technology
Medicine Technology
Biology Dictionary
Medicine Dictionary
Biology Navigation
AIDS/HIV
Bioinformatics
Biotechnology
Biochemistry
Cancer
Cell Biology
Developmental Biology
Ecology
Environment
Evolution
Food Technology
Gene
Genetics
Genomics
Health/Medicine
Medical Navigation
Abortion
Aches
ADHD
Addiction
Alcohol
Allergy
Alternative Medicine
Alzheimer's Dementia
Anxiety/Stress
Arthritis
Autism
Bacteria
Blood
Bird Flu/Avian Flu
Bones

HOME >> [BIOLOGY](#) >> [TECHNOLOGY](#) [M](#)

Molecular machine could hold key to more efficient manufacturing

Date: 1/10/2013 [[RSS & Subscription](#)] [0](#)

[Molecular Biology Tools](#)

www.SinoBiological.com
10000+Protein,Antibody, ELISA, cDNA
Save Time, Save Cost, Save Trouble



AdChoices ▾

development of this machine which uses molecules to make molecules in a synthetic process is similar to the robotic assembly line in car plants. Such machines could ultimately lead to the process of making molecules becoming much more efficient and cost effective. This will benefit all sorts of manufacturing areas as many manmade products begin at a molecular level. For example, we're currently modifying our machine to make drugs such as penicillin."

The machine is just a few nanometres long (a few millionths of a millimetre) and can only be seen using special instruments. Its creation was inspired by natural complex molecular factories where information from DNA is used to programme the linking of molecular building blocks in the correct order. The most extraordinary of these factories is the ribosome, a massive molecular machine found in all living cells.

Professor Leigh's machine is based on the ribosome. It features a functionalized nanometre-sized ring that moves along a molecular track, picking up building blocks located on the path and connecting them together in a specific order to synthesize the desired new molecule.

First the ring is threaded onto a molecular strand using copper ions to direct the assembly process. Then a "reactive arm" is attached to the rest of the machine and it starts to operate. The ring moves up and down the strand until its path is blocked by a bulky group. The reactive arm then detaches the obstruction from the track and passes it to another site on the machine, regenerating the active site on the arm. The ring is then free to move further along the strand until its path is obstructed by the next building block. This, in turn, is removed and passed to the elongation site on the ring, thus building up a new molecular structure on the ring. Once all the building blocks are removed from the track, the ring de-threads and the synthesis is over.

Professor Leigh says the current prototype is still far from being as efficient as the ribosome: "The ribosome can put together 20 building blocks a second until up to 150 are linked. So far we have only used our machine to link together 4 blocks and it takes 12 hours to connect each block. But you can massively parallel the assembly process: We are already using a million million million (10¹⁸) of these machines working in parallel in the laboratory to build molecules."

Professor Leigh continues: "The next step is to start using the machine to make sophisticated molecules with more building blocks. The potential is for it to be able to make molecules that have never been seen before. They're not made in nature and can't be made synthetically because of the processes currently used. This is a very exciting possibility for the future."

Contact: Morwenna Grills
Morwenna.Grills@manchester.ac.uk
44-161-275-2111
[University of Manchester](#)
Source: [Eurekalert](#)

0

[GOOD](#)

[Related biology technology :](#)

- [1. Scientists design, control movements of molecular motor](#)
- [2. Study identifies targeted molecular therapy for untreatable NF1 tumors](#)
- [3. Caris Sponsors CancerCare Connect Education Workshop on Molecular Profiling in the Treatment of Breast Cancer](#)
- [4. Karmanos Cancer Center first in Midwest to offer latest Molecular Breast Imaging](#)
- [5. Caris Life Sciences mejora la evaluación por perfil molecular con los biomarcadores ROS1 y MGMT-metilación](#)
- [6. Caris Life Sciences Enhances Molecular Profiling Service with Addition of ROS1 and MGMT-Methylation Biomarkers](#)
- [7. A firm molecular handshake needed for hearing and balance](#)

Breaking Biology Technology:

[0] [Verify Brand Enhances VB Enterprise Platform for Greater Supply Chain Security Across Industries](#)

[0] [PharmAthene To Present At The Noble Financial 9th Annual Equity Conference On Tuesday, January 22, 2013](#)

[0] [BioFit Helps Lab Specifiers Resolve to Improve Worker Safety and Productivity in 2013 through Ergonomic Seating Use](#)

[0] [INRS acquires a groundbreaking advanced imaging infrastructure](#)

Breaking Biology News(10 mins):

[0] [Study offers new insights into the mechanics of muscle fatigue](#)

[0] [Vaginal delivery is the safest option for women with pelvic girdle pain](#)

[0] [Deodorants: Do we really need them?](#)

8. [USC Center For Applied Molecular Medicine To Honor Sumner Redstone And Murray Gell-Mann, Ph.D. At The Inaugural REBELS WITH A CAUSE Gala](#)
9. [Merrimack Pharmaceuticals To Present Preliminary Clinical Data For Novel Therapies Targeting Molecular Pathways In Advanced Cancers](#)
10. [Indian Pharma MNC Piramal Investing in German Molecular Imaging Technology](#)
11. [Spectrometry Market \(Atomic, Molecular and Mass Spectrometry\) - Global Scenario, Trends, Industry Analysis, Size, Share & Forecast 2011 - 2017](#)

[DNA Testing for Patients](#)

www.cellmark.co.uk/GPs



Trusted & Ethical DNA Testing. ISO Accredited & Recommended by GAdChoices

Post Your Comments: ([View All Comments](#))

*Name:

*Comment:

*Email:

Copyright © 2003-2012 Bio-Medicine. All rights reserved.
[ABOUT](#) | [CONTACT US](#) | [DISCLAIMER](#) | [PRIVACY POLICY](#) | [TERMS AND CONDITIONS](#)

[BIO-MEDICINE.ORG](#)
latest biology and medical news/technology