



Coverage of Science and Technology having high potential for disruption & Analysis of plans, policies and technology to enable radical improvements.

Home

Improving your student's experience
 Learn about Dell's next generation learning solutions at Bett 2013
[More info >](#)

JANUARY 11, 2013

Proof of concept molecular machine that slowly mimics the work of a ribosome to assemble peptides

Biology Research Reagents

www.SinoBiological.com
 10000+ Proteins, Antibody, Kits, cDNA,
 Save Time, Save Cost, Save Trouble



12

[Share](#)

Peptide 2.0 (USA) - \$2/aa

Peptide2.com
 Peptide Synthesis from \$2/a.a. Best
 Peptide from USA with MS/HPLC



GENEWIZ Gene Synthesis

www.genewiz.com
 Simply submit your target sequence &
 Receive your gene in 8 Days (<1.5Kb)



AdChoices

[Tweet](#) The field of molecular machines has taken a new bio-inspired turn to assemble another molecule, in this case linking up individual amino acids into a peptide. While this molecular

peptide synthesiser

+5 Recommend this on Google

isn't going to rival a ribosome for speed any time soon, it does suggest a way to make multicomponent polymers.

Researchers mimic the ribosome, a cellular machine that can build proteins. 'The ribosome uses a track where a machine moves along it processively,' Leigh says. So when the group started thinking about how to build a synthetic version they naturally thought of the rotaxane architecture of a ring on a track. However, Leigh is keen to stress this is not intended as an artificial alternative for the ribosome, especially as his machine is much slower than its biological counterpart – it took 36 hours to synthesise a three amino acid peptide. Instead, Leigh says the work is a proof-of-concept for a molecular machine.

Lead researcher Leigh has a number of plans for the device, including increasing the number of amino acids that can be strung together. As the peptide sequence grows, says Leigh, 'it will be very interesting to, at the single

molecule level, see how these things fold as they are made'. There are also different chemistries and polymers to try, and Leigh also says he'd like to investigate keeping the information on the track so that it can be read again, just as RNA can be read more than once by a ribosome.

Journal Science- Sequence-Specific Peptide Synthesis by an Artificial Small-Molecule Machine

ABSTRACT - The ribosome builds proteins by joining together amino acids in an order determined by messenger RNA. Here, we report on the design, synthesis, and operation of an artificial small-molecule machine that travels along a molecular strand, picking up amino acids that block its path, to synthesize a peptide in a sequence-specific manner. The chemical structure is based on a rotaxane, a molecular ring threaded onto a molecular axle. The ring carries a thiolate group that iteratively removes amino acids in order from the strand and transfers them to a peptide-elongation site through native chemical ligation. The synthesis is demonstrated with $\sim 10^{18}$ molecular machines acting in parallel; this process generates milligram quantities of a peptide with a single sequence confirmed by tandem mass spectrometry.

About 80 pages - Supplementary Materials for
Sequence-Specific Peptide Synthesis by an Artificial Small-Molecule
Machine

If you liked this article, please give it a quick review on [ycombinator](#) or [StumbleUpon](#). Thanks

POSTED BY BRIAN WANG AT 1/11/2013 

LABELS: CHEMISTRY, GUIDED SELF ASSEMBLY, MOLECULAR NANOTECHNOLOGY, NANOSCALE, NANOTECHNOLOGY, PROTEINS, SCIENCE