Click chemistry creates new 'stealth' DNA links

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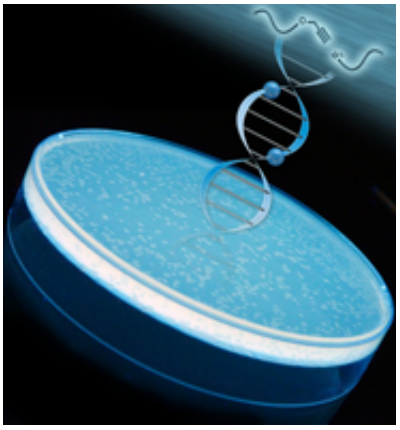

Colonies of E.coli were used to research biocompatibility

Scientists at the University of Southampton have pioneered a chemical method of linking DNA strands that is tolerated by living organisms.

The researchers have developed an artificial DNA "stealth" linkage using click chemistry, a highly-efficient chemical reaction, to join together DNA strands without disrupting the genetic code.

The breakthrough, published online in the journal *PNAS* this week (27 June), means long sections of DNA can be created quickly and efficiently by chemical methods.

DNA strands are widely used in biological and medical research, and

clean and effective methods of making longer sections are of great value. Current techniques rely on the use of enzymes as biological catalysts. Joining DNA chemically is particularly interesting as it does not depend on enzymes so can be carried out on a large scale under a variety of conditions.

Co-author of the paper Tom Brown, Professor of Chemical Biology at the University of Southampton, says: "We believe this is the first example of a chemical method of joining together longer strands of DNA that works well.

"Typically, synthesised DNA strands will be up to 150 bases; beyond that they are very difficult to make. We have doubled that to 300 and we can go further. We can also join together heavily modified DNA strands, used in medical research for example, which normal enzymes might not want to couple together."

The Southampton team investigated whether the artificial links would be tolerated biologically within the bacteria E.coli.

"The genetic code could still be correctly read," says co-investigator Dr Ali Tavassoli.

"The artificial linkages act in stealth as they go undetected by the organism; the gene was functional despite containing 'scars' in its backbone. This opens up all sorts of possibilities."

The team is now hoping to secure funding to explore potential applications of the technology.

More information: The paper "Biocompatible artificial DNA linker that is read through by DNA polymerases and is functional in Escherichia coli" by Afaf H. El-Sagheer, A. Pia Sanzone, Rachel Gao,

Ali Tavassoli and Tom Brown, of the University of Southampton, is published online by *PNAS*, 27 June 2011.

Provided by University of Southampton