In the news

MANIPULATING METHYLATION

A new technique that allows scientists to modify specific sequences in DNA has been in the news following a report in *Nature Chemical Biology*. Combining chemistry with biotechnology, Saulius Klimasauskas, at the Institute of Biotechnology in Vilnius, Lithuania, and chemists at the Institute of Organic Chemistry in Aachen, Germany, have used a group of essential enzymes to add various chemical groups to DNA.

The enzymes at the heart of the study, known as DNA methyltransferases, are among the tools that cells use to turn genes on and off. By adding a methyl group to specific bases in a DNA sequence, methyltransferases can turn a gene off. But can the specificity of the enzymes be used to manipulate DNA in the laboratory?

By synthesizing chemical groups with longer carbon chains than the methyl group, the scientists showed that methyltransferases can transfer large chemical groups to DNA.

The family of DNA methyltransferases includes enzymes that recognize more than 200 distinct sequences; therefore this approach provides an unprecedented ability to experimentally manipulate DNA. As DNA is not the only molecule that is methylated in the cell, the authors proposed that "...this tool could be used as a molecular hook to fish out all molecules that would naturally be methylated in the cell" (*Science Daily News*, 29 November 2005). In addition, "One potential application might be to label various sites in the ribosome ... with bright fluorophores using RNA methyltransferases, enabling real-time dynamic studies of the complicated mechanism of protein translation," said Klimasauskas (*Science Daily News*, 29 November 2005).

As methylation is involved in embryonic development, genomic imprinting and carcinogenesis, this work could have implications for medical diagnosis and nanobiotechnology.

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