

P012 High-Density and Selective Functionalisation of DNA
**P.M.E. Gramlich, J. Gierlich, G.A. Burley,
D.M. Hammond, C.T.M. Wirges and T. Carell**
*Department of Chemistry and Biochemistry, Ludwig-
Maximilians University Munich, Butenandtstr. 5-13,
Haus F, D-81377 Munich, Germany. Fax: (+49)089-2180
77756, email: Thomas.Carell@cup.uni-muenchen.de*

The property of DNA to self-assemble according to the Watson-Crick base-pairing rules is not only useful for the storage of information, but also for the construction of DNA-based nanoassemblies. In order to functionalise DNA we developed a modular approach using the Huisgen 1,3-dipolar cycloaddition (click reaction) to attach a variety of functional molecules onto DNA. This post-synthetic approach can be used for labelling with a variety of reactive and sensitive moieties, which can not be incorporated into DNA directly. A variety of nucleotides bearing a terminal alkyne has been synthesised, which are available as triphosphates for the enzymatic incorporation and as phosphoramidites for synthetic oligonucleotide synthesis. We currently pursue two major aims: Firstly, the synthesis of long DNA strands with a high density of functionalisation and secondly the selective placement of different labels in a site-selective manner. Functionalities appended so far include protected aldehydes and sugars for site-selective deposition of silver via the Tollens reaction, which can be used for ultra-sensitive detection of DNA and for the generation of thin, uniform silver nanowires.