Conformational transmission in DNA

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CONFORMATIONAL TRANSMISSION IN DNA

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This poster presents our recent results on DNA dimers in which a stable trigonal bipyramidal pentacoordinated phosphorus (P^V) structure forms the internucleoside linkage. Conformational analysis of the systems 1-4 with 300 and 500 1H NMR has shown that the P^V structure results in a distorted conformation of the backbone structure (1).

The preferred conformation changes from g^+ (O_5 located above the 2'-deoxyribose ring) toward the unusual g^- rotamer (O_5 located away from the 2'-deoxyribose ring) when the phosphorus coordination is increased from P^{IV} into P^V . This conformational transmission effect is operative only when a hydrogen-bond disrupting solvent (DMSO, HMPT) is used. The results provide support to our earlier proposition that conformational changes in natural DNA (e.g., the conversion from right-handed B DNA into left-handed Z DNA) can be initiated by activation of the backbone phosphate groups via a P^{IV} into P^V coordinational transition.

- (1) L.H. Koole, M.H.P. van Genderen, H.M. Buck, *J. Org. Chem.* **53**, 5266 (1988).