Poster Presentation

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Scoliosis of backbone in Z-DNA nucleotides

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According to Wikipedia "scoliosis is a medical condition in which a person's spine is curved from side to side. Although it is a complex three-dimensional deformity, on an X-ray, viewed from the rear, the spine of an individual with scoliosis can resemble an 'S' or a '?', rather than a straight line". This definition fits very well with the syndrome observed in many structures of Z-DNA nucleotides. In contrast to the A- and B-forms of DNA, where the sugar-phosphate backbone smoothly follows the right-handed helical line, in Z-DNA the backbone winds as a left-handed zig-zag pattern, repeating every two base pairs. On the basis of the first structures of Z-DNA it was observed that the phosphate groups can be rotated towards the outside of the helix in the ZI type or towards the inside in the ZII type of Z-DNA. A large number of crystal structures of Z-DNA oligomers are currently available in the Protein Data Bank, where both backbone types are observed, often co-existing as alternative, partially occupied conformations. At first it was postulated that the backbone conformation adopted by Z-DNA depends on the presence of metal cations and polyamines in the crystal structures, but later it was realized that the ZI and ZII conformations are not specific to the sequence or the interactions with metal ions [1]. A comparison of larger number of high-resolution Z-DNA structures reveals that the structures can adopt a range of backbone torsion angles between the two values representing the canonical ZI and ZII types [2].

[1] *Mandal, P.K., Venkadesh, S., Gautham, N. (2008). J. Indian Inst. Sci. 88, 73-93.,* ***[2]*** *Luo, Z., Dauter, M., Dauter, Z. (2014). Acta Cryst. D70, submitted*

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