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When Topology and Biology Meets for Life

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The talk is aimed at showing that differential geometry and topological knots theory can be used notably to modelling 3-dimensional structures of DNA and protein-DNA complexes. We would like to investigate how certain topological manipulations and deformations associated to the supramolecular structures during a cell cycle take part in the dynamics of chromatin, chromosome and therefore the cells metabolism, and also how, consequently, they modulate the action of many different regulatory systems ensuring in particular the transition of this action from a local-target mechanisms to global functional processes.