Biomedical Application of Multifunctional Synthetic Cholesteric Liquid Crystal Polymers.

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Chiral Cholesteric Liquid Crystal Polymers (ChLCP) PTOBEE $[C_{26}H_{20}O_8]_n$ and PTOBDME $[C_{34}H_{36}O_8]_n$ have been synthetized in our laboratory.

These ChLCPs behave both as thermotropic and lyotropic, confering interesting macromolecular properties to these compounds indicative of potential application on the biological and engineering field.

Besides they proved to be biocompatible against macrophages and fibroblasts cellular lines.

The amphiphilic shape of their monomers makes them polymerize along helical chains, being able to entrap smaller molecules inside [2, 3], such as Lycopene.

They are also able to interact with biomacromolecules such as lipids both neutral and cationic and nucleic acids. Their structures in the complexes, identified by synchrotron radiation source [4, 5, 6], have been applied successfully as non-viral vectors in gene therapy [7].

New functionalized ChLCP have been synthesized attached to commercial DNA of increasing complexity [Poly-A]; [Poly-C], [Poly-G], [PolydT], calf thymus DNA and a plasmid.

In order to determine their interaction mechanism the complexes have been dispersed in aqueous media with three different proportions ChLCP:DNA respectively: (1:2), (1:1), and (2:1).

The structure of the complexes has been studied by SAXS at the BM16 beamline at ESRF, at room temperature. A monochromatized beam at λ= 0,9795 Å was used. A 2D detector camera was placed at 6 m from the sample. The spectra were converted into 1D and with Fit2D, and normalized.

Information about size [Rg (Guinier)] and shape could be estimated based on *Ln I(q)* versus *Ln q* slope[8].

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Figures

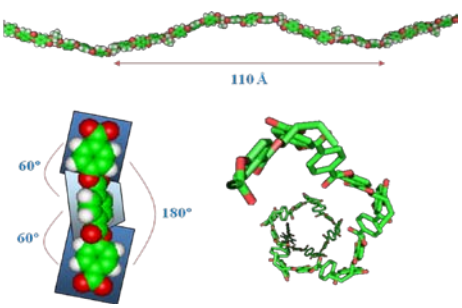

Figure1: Molecular model of PTOBEE

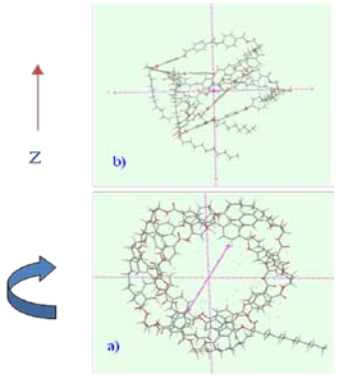

Figure 2: Molecular model of PTOBDME

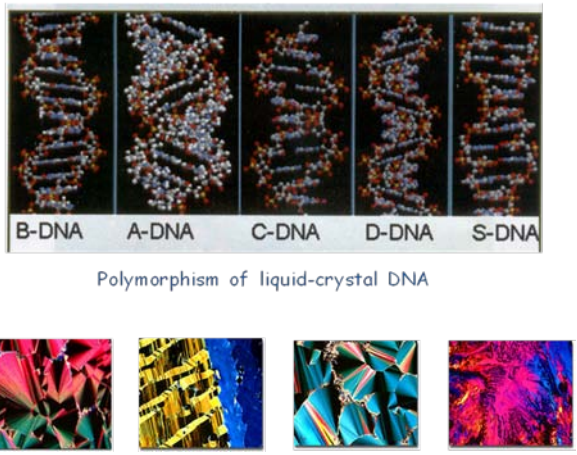

Figure 3: Cholesteric morphology of DNA