EUROPEAN **S**YNCHROTRON **R**ADIATION **F**ACILITY

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ESRF	**Experiment title:** **Structural characterization of multicomponent lipoplexes containing complexed and condensed DNA**	**Experiment number**: **SC-3121**
Beamline:	**Date of experiment**: from: 6-05-2011 to: 9-05-2011	**Date of report**:
Shifts: 9	**Local contact(s)**: Manuel Fernandez-martinez	*Received at ESRF:*

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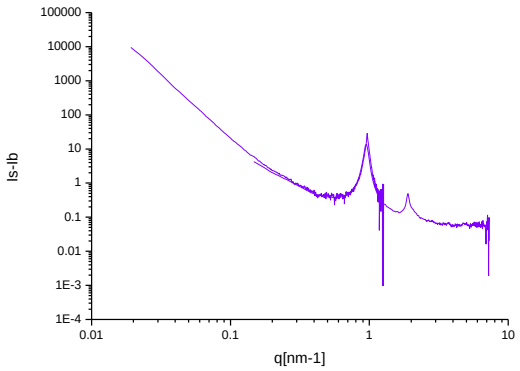
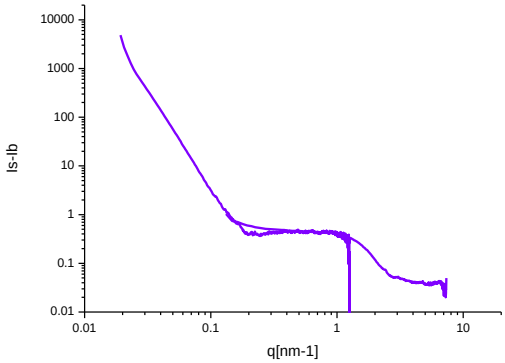
Report:

We performed SAXS experiments on ID02 on the following systems:
-Lipoplexes obtained from the electrostatic interaction between DNA and cationic liposomes, composed by neutral (DOPE, DOPC) and cationic (DOTAP, Dc-Cholesterol) lipids. Lipoplexes were made with different R=DNA/cationic lipid charge ratio: R= 0.5, 1, 2, 3 and with cationic liposomes parent solutions with two different concentration (80mg/ml, 20mg/ml). it was no possible to follow the mixing process.



Saxs profile of a lipoplex solution R=1. Detector distance 0.8 and 5 m

- Multicomponent Envelope-type Nanoparticle System (MENS) obtained from the electrostatic interaction between a preformed core made by DNA condensed with protamine sulfate (P/DNA), and anionic liposomes composed by neutral (DOPE, DOPC) and anionic (DOPG, DOPA) lipids. DNA and protamine have been mixed at two charge ratio, in order to realize positive and negative cores. P/DNA and anionic liposomes solutions were mixed in order to realize systems with different charge In particular there were realized systems with R= 0.5, 1, 1,5 (R= core/anionic liposomes charge ratio). This intermediate MENS systems were then functionalized with different poly-cationic molecules: poly-L-arginine, chitosan, poly-L-arginine. it was no possible to follow the mixing process.



Saxs profile of aMENS solution R(P/DNA)=1. Detector distance 0.8 and 5 m

MENS systems have shown interesting features even in their intermediate states (only P/DNA without lipids). In particular the P/DNA core SAXS profile exhibits a shape that doesn't depend on the P/DNA charge ratio. Nevertheless, adding liposomes solution (cationic or anionic depending on the P/DNA charge) it seems that core features doesn't change but it becomes more defined.

We plan to deeply investigate MENS structural and geometrical properties. In particular we intend to perform light scattering measurements in order to access MENS properties on the aggregate scale and WAXS measurements in order to access local properties. The role of the lipid component has a primary importance, because of the interaction with the cell membranes. It will be taken into account the

importance of the lipid component role especially in its relative concentration and composition in the MENS system.