Nucleosome distribution and conformation: from centromeres to telomeres
An illustrated overview, by Christophe Lavelle (lavelle@mnhn.fr)

Through local heterogeneities and dynamic changes in structure resulting from chemical modifications and mechanical constraints imposed by numerous actors in vivo, chromatin plays a critical role in the regulation of DNA metabolism processes. To identify the main features of nucleosome dynamics and polymorphism, we use a combination of molecular biology (chromatin immunoprecipitation and analysis by gel electrophoresis and sedimentation analysis), biophysics (electrostatic and atomic force microscopy, magnetic tweezers) and theoretical (physical modeling, sequence analysis) approaches. Thus allowed us to show how DNA sequence may influence chromatin positioning and topology, and how these local properties have repercussion on chromatin conformation and response to physiological constraints. We illustrate these results on two DNA regions made from tetradecamer repeats: centromeres and telomeres.

How do we go from a nucleosomal array to a well-defined chromatin fiber?

Chromatin (chromatine) is a polyelectrolyte linear DNA molecule, composed of nucleosomes (chromatin fibers), in your models are probably much polyelectrolyte than crystals (crystalline) [Adriano D.F.].

Why is it so important to know about chromatin structures?

Varieties aspects of nucleosome positioning and conformation can be investigated on a microscopic or nanometer scale.

To characterize chromatin positioning and configuration, we can concentrate our studies on such important molecules as histones, which are the main components of the nucleosome. In vitro analysis by electron microscopy imaging and nanometer-scale fluorescence studies to study the structure of nucleosomes is now possible for more advanced microscopy tools.