Arrangement of deoxyribonucleic acid (DNA) structures within the nucleus of eukaryotic cells is ensured via DNA packaging in chromatin: a complex of dynamic macromolecules that includes core particles with approx. 147 base pairs of superhelical DNA wrapped 1.7 times around each particle. These nucleosome cores consist of a basic protein octamer of histones composed of a (H3-H4) tetramer and two H2A-H2B dimers. The cores are connected with a linker domain, containing the linker DNA (20-60 bp) and histone H1, which contacts the exit/entry of the DNA strand (MacAlpine and Almouzni 2013).

The correct term for this evolutionary highly conserved structure is nucleosome or chromatosome. Due to post-translational modification of histones (methylation/acetylation) and appearance of various histone variants, nucleosomes are highly flexible allowing regulatory responses to external signaling and transgenerational epigenetic inheritance. Chromatin compaction and its dynamics is essential for different processes such as DNA repair, transcription, replication, recombination, control of gene expression and chromatin packaging during mitosis (Maeshima et al. 2014).

The chronic inflammatory systemic autoimmune disease systemic lupus erythematosus (SLE) belongs to the collagenosis group and typically involves several organs. Clinical presentation is extremely variable and heterogeneous. Mostly the skin (butterfly rash), vessels (Raynaud’s Disease), pleura (pleuritis) or joints (arthritis) are involved. SLE is characterized by production of a broad, heterogeneous group of autoantibodies including antinuclear antibodies (ANAs) and extractable nuclear antibodies (ENAs). ANAs are present in up to 95% of SLE patients and especially chromatin is a highly potent immunogenic stimulus (up to 88%) (Cozzani et al. 2014).

Anti-nucleosome antibodies (ANuAs) represent one of the most sensitive and often the first serological marker of SLE (Chabre et al. 1995). They have adequate accuracy for SLE, equal specificity but higher sensitivity than anti-dsDNA antibodies (Cozzani et al. 2014), and appear before onset of any other autoantibodies.

Nevertheless, anti-dsDNA antibodies are also considered to be an exclusive marker for the diagnosis of SLE. These autoantibodies react mainly with epitopes in the deoxyribose backbone of the double helix. Their prevalence is up to 55% before diagnosis and 70-98% at the time of diagnosis (Cozzani et al. 2014).

In addition to a variety of recombinant ENAs for detection of SLE-specific autoantibodies and dsDNA, DIARECT is introducing nucleosome antigen purified from calf thymus that shows excellent lot-to-lot consistency and quality characteristic of DIARECT antigens.

References:
Cozzani et al. (2014) Autoimmune Dis 2014: 321359

In some countries the use of certain antigens in diagnostic tests may be protected by patents. DIARECT is not responsible for the determination of these issues and suggests clarification prior to use.