

# Autoantibodies against dsDNA (plasmid), Histones and intact Nucleosomes

Histones, the major components of nucleosomes, are responsible for establishing chromatin structure in the nucleus of eukaryotic cells. The histone octamer of each nucleosome core particle contains a (H3-H4)<sub>2</sub> tetramer, organizing the central part of the DNA, and two flanking H2A-H2B dimers. Histone H1, the linker histone, is located between each nucleosome (MacAlpine *et al.* 2013).

Histones H3 and H4 have long tails protruding from the nucleosome, which can be covalently modified (methylation, acetylation, phosphorylation and ubiquitination) at several residues. The combination of those modifications and those of core histones H2A and H2B constitute the so-called histone code (Strahl *et al.* 2000, Jenuwein *et al.* 2001).

Dynamics of chromatin structure depend on posttranslational modification of histones and appearance of various histone variants. This is important for different molecular mechanisms including DNA repair, transcription, replication, recombination, control of gene expression and epigenetic responses to external signaling (Maeshima *et al.* 2014).

The chronic autoimmune disease systemic lupus erythematosus (SLE) can involve several organs and systems within the human body and is characterized by production of various autoantibodies (Cozzani *et al.* 2014).

Anti-nucleosome antibodies (ANuAs) are directed against histone epitopes, dsDNA and conformational epitopes created by the interaction between dsDNA and core histones. ANuAs have been shown to be a good diagnostic marker for systemic lupus erythematosus (SLE). Antibodies to histones (AHAs) are even more common autoantibodies seen in patients with SLE (Bizzaro *et al.* 2012) and are directed towards epitopes of histone complexes or individual histones (Burlingame *et al.* 1994, Santiago *et al.* 2007).

Complementing our dsDNA plasmid produced in *E.coli* and recently introduced nucleosome antigen from calf thymus, DIARECT now offers isolated histone antigen also purified from calf thymus.

#### References:

- Bizzaro *et al.* (2012) *Autoimmunity Reviews* 12 (2): 97–106
- Burlingame *et al.* (1994) *Journal of Clinical Investigation* 94 (1): 184–192
- Cozzani *et al.* (2014) *Autoimmune Diseases* 2014: 321359
- Jenuwein *et al.* (2001) *Science* 293 (5532): 1074–1080
- MacAlpine *et al.* (2013) *Cold Spring Harb Perspect Biol* 5 (8): a010207
- Maeshima *et al.* (2014) *Chromosoma* 123 (3): 225–237
- Santiago *et al.* (2007) *The Journal of Rheumatology* 34 (7): 1528–1534
- Strahl *et al.* (2000) *Nature* 403: 41–45

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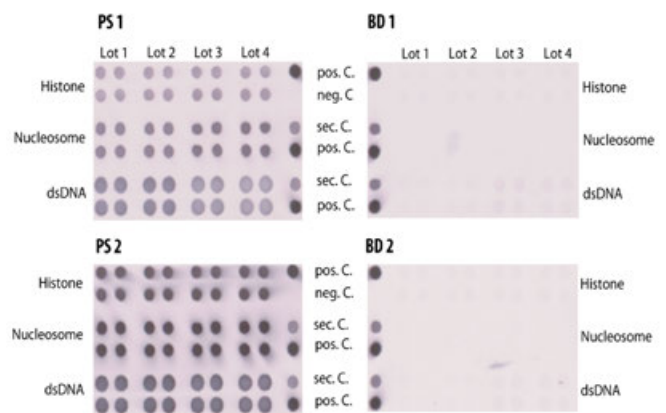


Figure 1: Immunodot analyses of DIARECT histone, nucleosome and dsDNA antigens with sera from SLE patients (PS1, PS2) and blood donors (BD1, BD2). The presence of Histone, Nucleosome, and dsDNA antibodies was determined by spotting quadruplicates of recombinant dsDNA antigen produced in *E.coli* and non-recombinant Histone and Nucleosome antigens purified from calf thymus. On one side of each array positive (pos. C.), negative (neg. C.) and secondary antibody incubation controls (sec. C.) were printed.

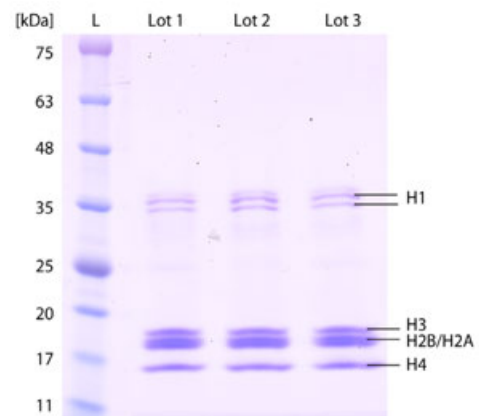


Figure 2: SDS-PAGE of three independent lots of non-recombinant DIARECT histones (including histone H1, H3, H2A, H2B and H4). The molecular weight of protein standards included in the size ladder (L) are indicated on the left.

#### Ordering Information

|       |                           |        |
|-------|---------------------------|--------|
| 12300 | dsDNA (plasmid)           | 0.1 mg |
| 12301 |                           | 1.0 mg |
| 31100 | Histone                   | 0.1 mg |
| 31101 | (non recombinant; bovine) | 1.0 mg |
| 31000 | Nucleosome                | 0.1 mg |
| 31001 | (non recombinant; bovine) | 1.0 mg |

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.

