

Nucleosome Software for 3D visualization of DNA-Nucleosome interactions of the bakery yeast *Saccharomyces cerevisiae*

The software displays a 3D model of DNA-Nucleosome interactions of experimental validated Nucleosome positions of the bakery yeast *Saccharomyces cerevisiae*. It displays the nucleosome core particle H3,H4,H2A,H2B and the 146 bp long DNA fragment. As template for the DNA-Nucleosome complex the pdb file 1AOI of <http://www.rcsb.org> had been used (Luger et al. 1997).

The nucleosome positions are experimental evaluated by Brogaard et al. 2012. They used a modified BY4741 yeast strain. The yeast genome of the BY4741 is based on the SGD database (Cherry et al. 2012).

The bakery yeast has 16 chromosome (including mitochondrium). The position and the chromosome can be chosen. In the upper rows the DNA sequence, the DNA position, Nucleosome positions and the nucleosome number are displayed. To display the 3D model of a specific nucleosome, type the number in the textbox at the left bottom and click display.

File About Yeast Nucleosome

ATATTGATGAAGATAAGTATGATGAAAAAGTCCACAGAATTCCATCGATTATACAAGAGAAACTGGTAGGAAGTAAAAATACTATTAATAATCAATGACGAAAAACAGAATCTCCGACAGATTCTGCTAGTAAAAATATTGGGA

88900 89000

A: DNA sequence

B: Chromosome Position

C: Nucleosome

D: Nucleosome Number

888

Chromosome Position

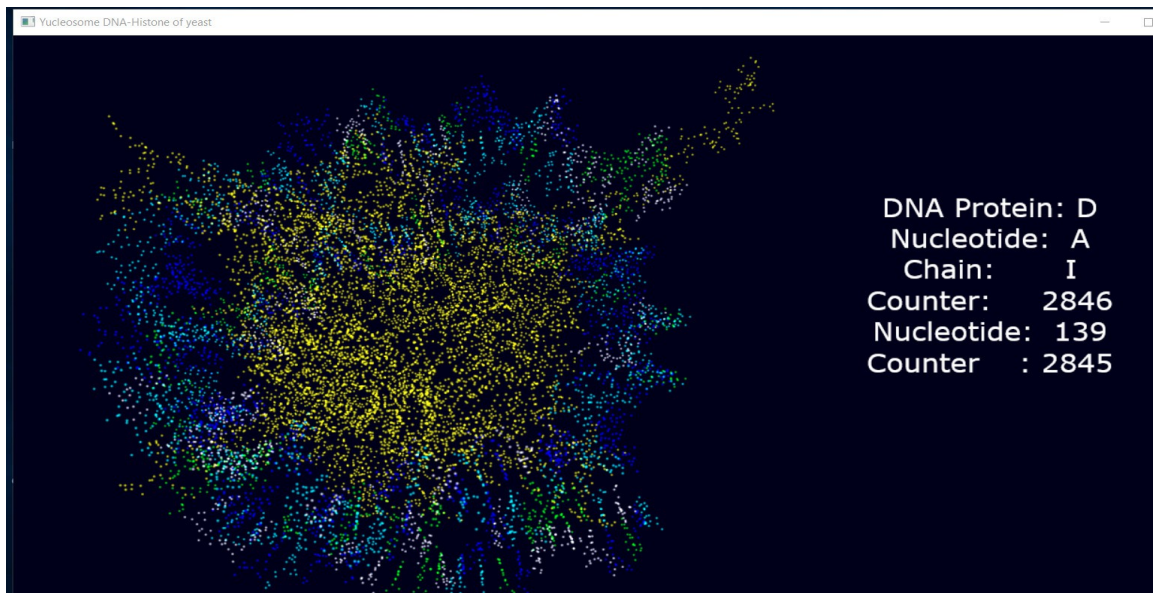
Display

Chromosome 1
Chromosome 2
Chromosome 3
Chromosome 4
Chromosome 5
Chromosome 6
Chromosome 7
Chromosome 8
Chromosome 9
Chromosome 10
Chromosome 11
Chromosome 12
Chromosome 13
Chromosome 14
Chromosome 15
Chromosome 16

88888

Chromosome Position

A message box opens, showing the 146 bp of the DNA wound around the nucleosome. Click OK to open the 3D Window. The view of perspective can be changed with the W, A, D, X and the arrow buttons. To get information about a special molecule, point with the mouse on it.



System Requirement:

Windows 10 x64

Development system

C++ on Visual Studio 2015 using D3D12

References

Cherry JM, Hong EL, Amundsen C, Balakrishnan R, Binkley G, Chan ET, Christie KR, Costanzo MC, Dwight SS, Engel SR, Fisk DG, Hirschman JE, Hitz BC, Karra K, Krieger CJ, Miyasato SR, Nash RS, Park J, Skrzypek MS, Simison M, Weng S, Wong ED. 2012. Saccharomyces Genome Database: the genomics resource of budding yeast. *Nucleic Acids Res.* 40.

Kristin Brogaard, Liqun Xi, Ji-Ping Wang, Jonathan Widom. 2012. A map of nucleosome positions in yeast at base-pair resolution. *Nature* 486: 496-501

Luger, K., Mader, A.W., Richmond, R.K., Sargent, D.F., Richmond, T.J. 1997. Crystal structure of the nucleosome core particle at 2.8 Å resolution. *Nature* 389: 251-260