



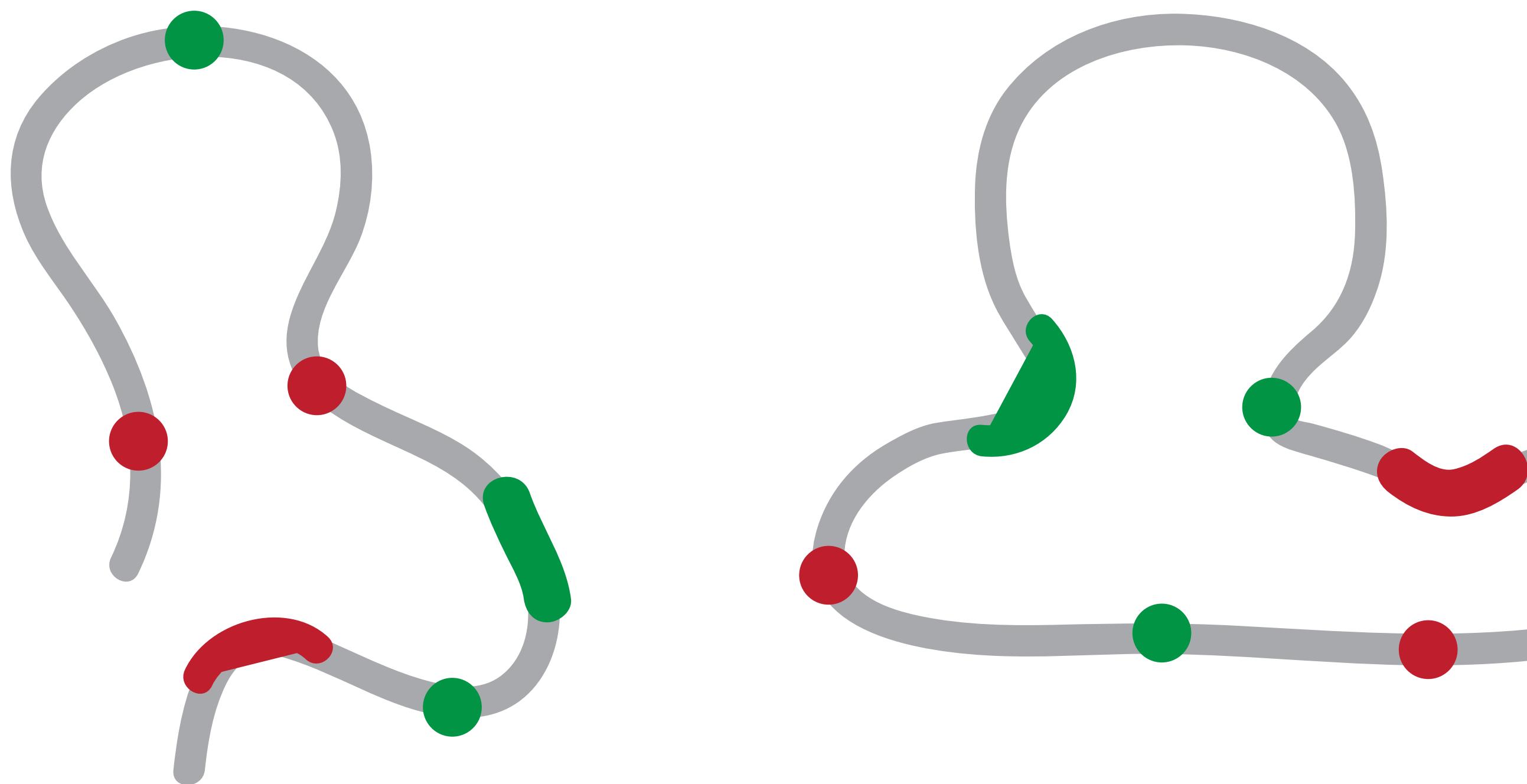
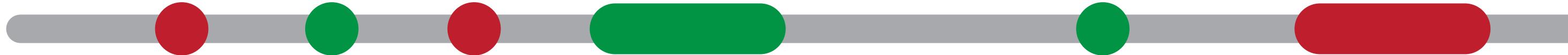
Photo by David Oliete - www.davidoliете.com

3D Genomes

Marc A. Martí-Renom
CNAG-CRG · ICREA

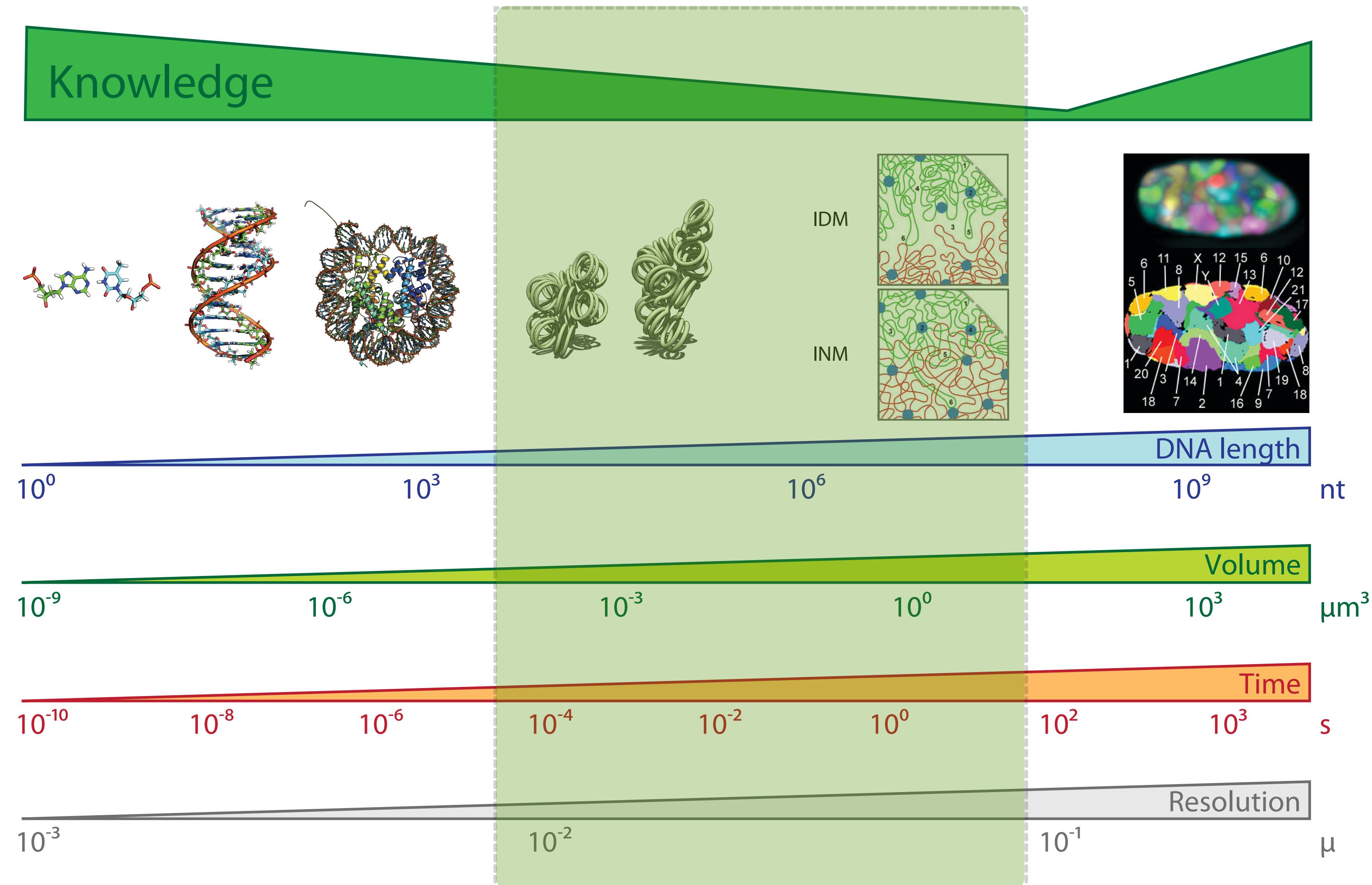
<http://marciuslab.org>
<http://3DGenomes.org>
<http://cnag.crg.eu>

cnag CRG · ICREA



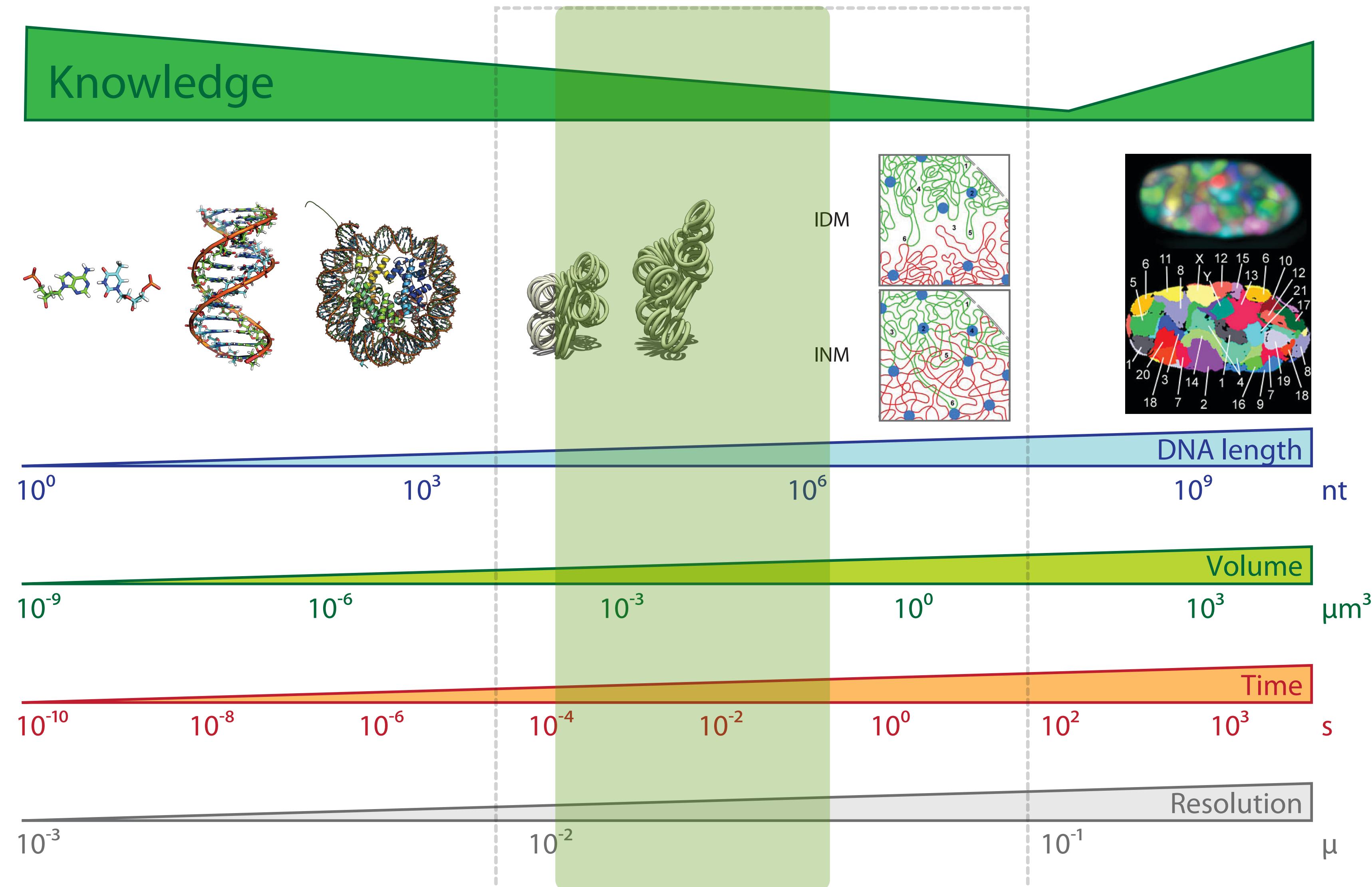
Resolution Gap

Marti-Renom, M. A. & Mirny, L. A. PLoS Comput Biol 7, e1002125 (2011)



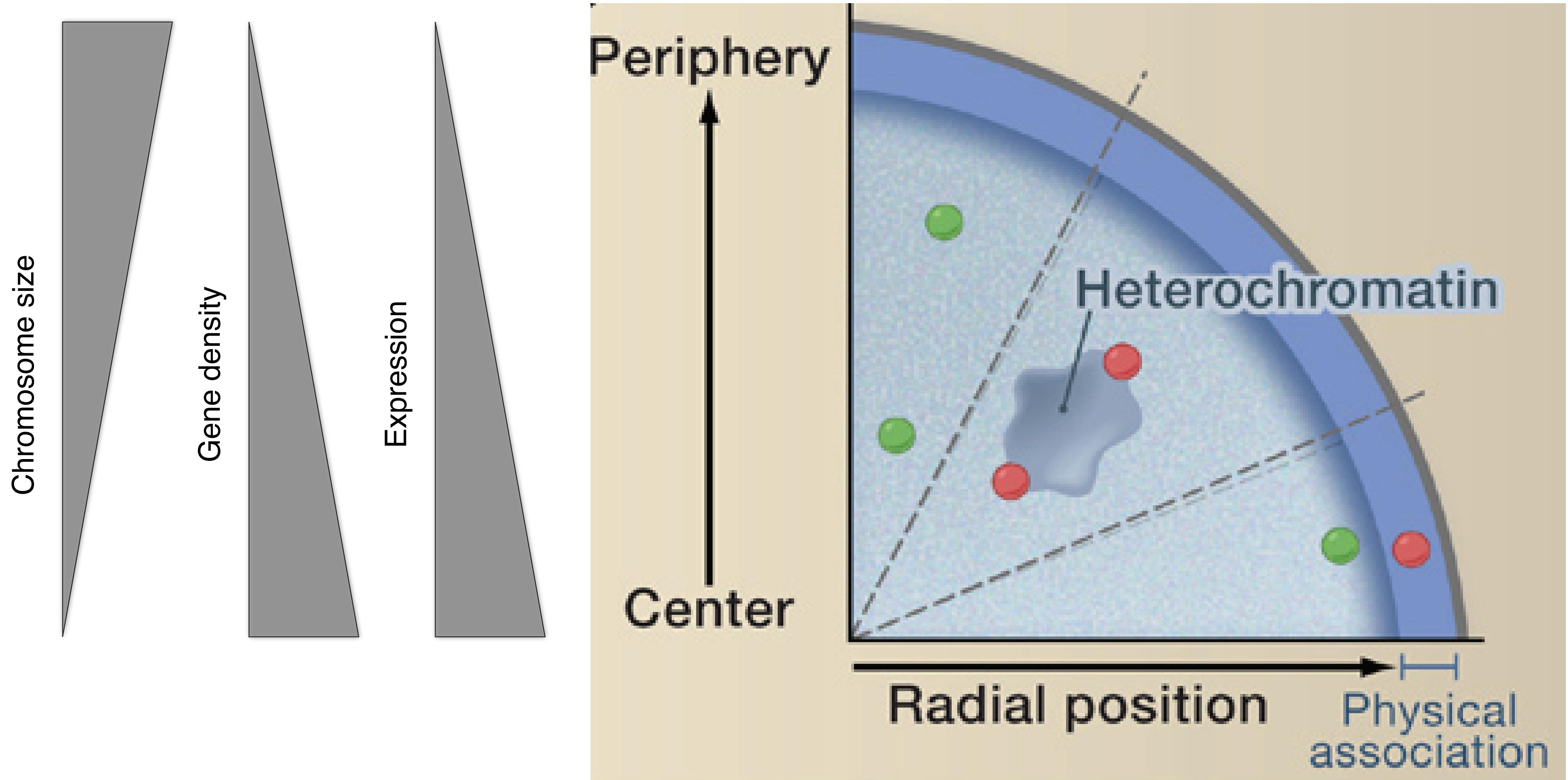
Resolution Gap

Marti-Renom, M. A. & Mirny, L. A. PLoS Comput Biol 7, e1002125 (2011)



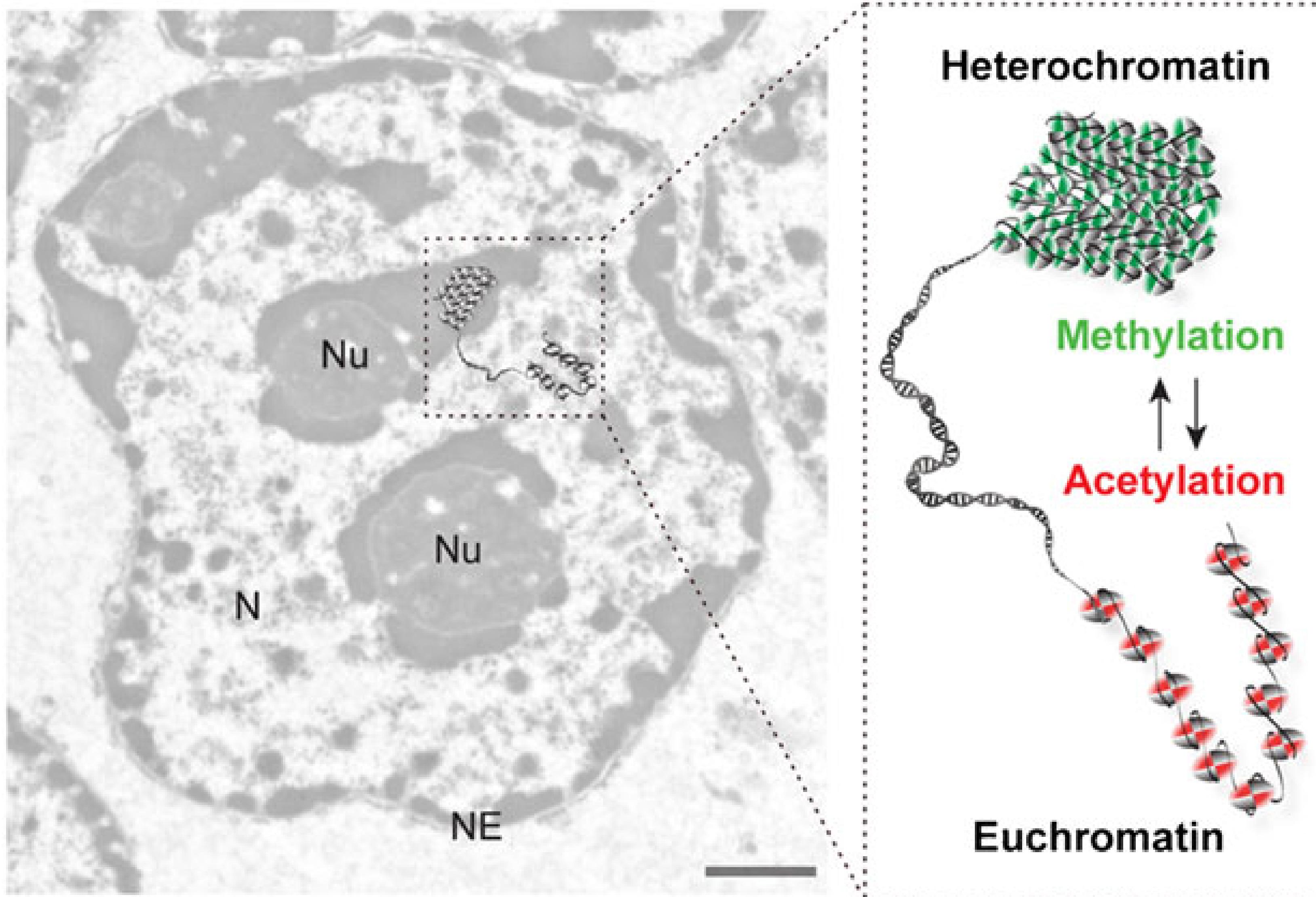
Level I: Radial genome organization

Takizawa, T., Meaburn, K. J. & Misteli, T. The meaning of gene positioning. Cell 135, 9–13 (2008).

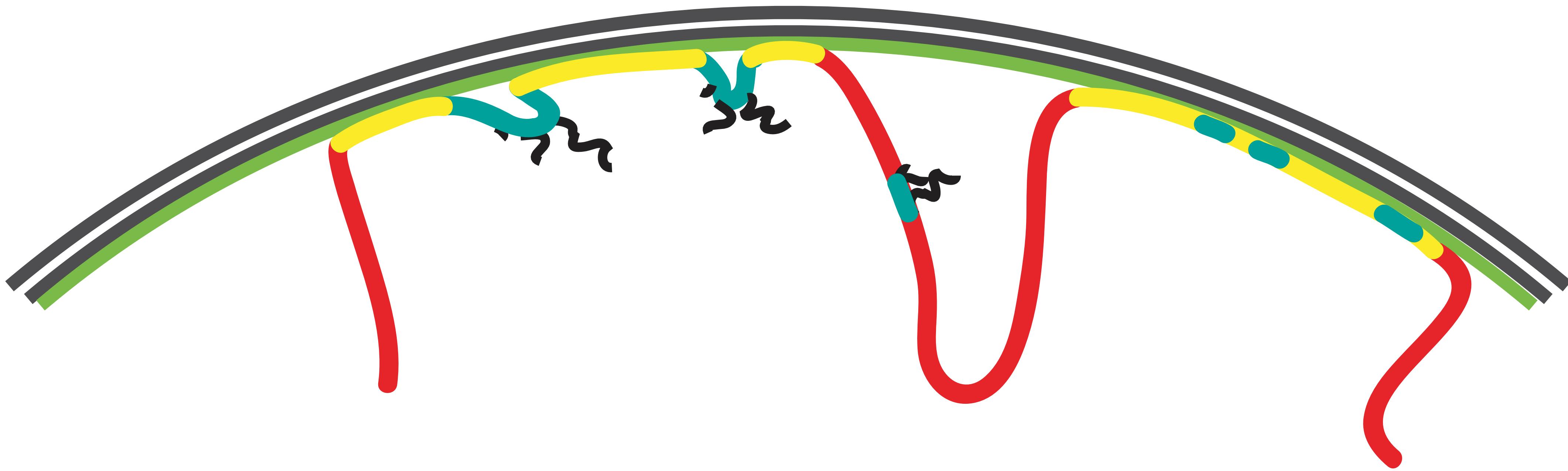


Level II: Euchromatin vs heterochromatin

Electron microscopy



Level III: Lamina-genome interactions

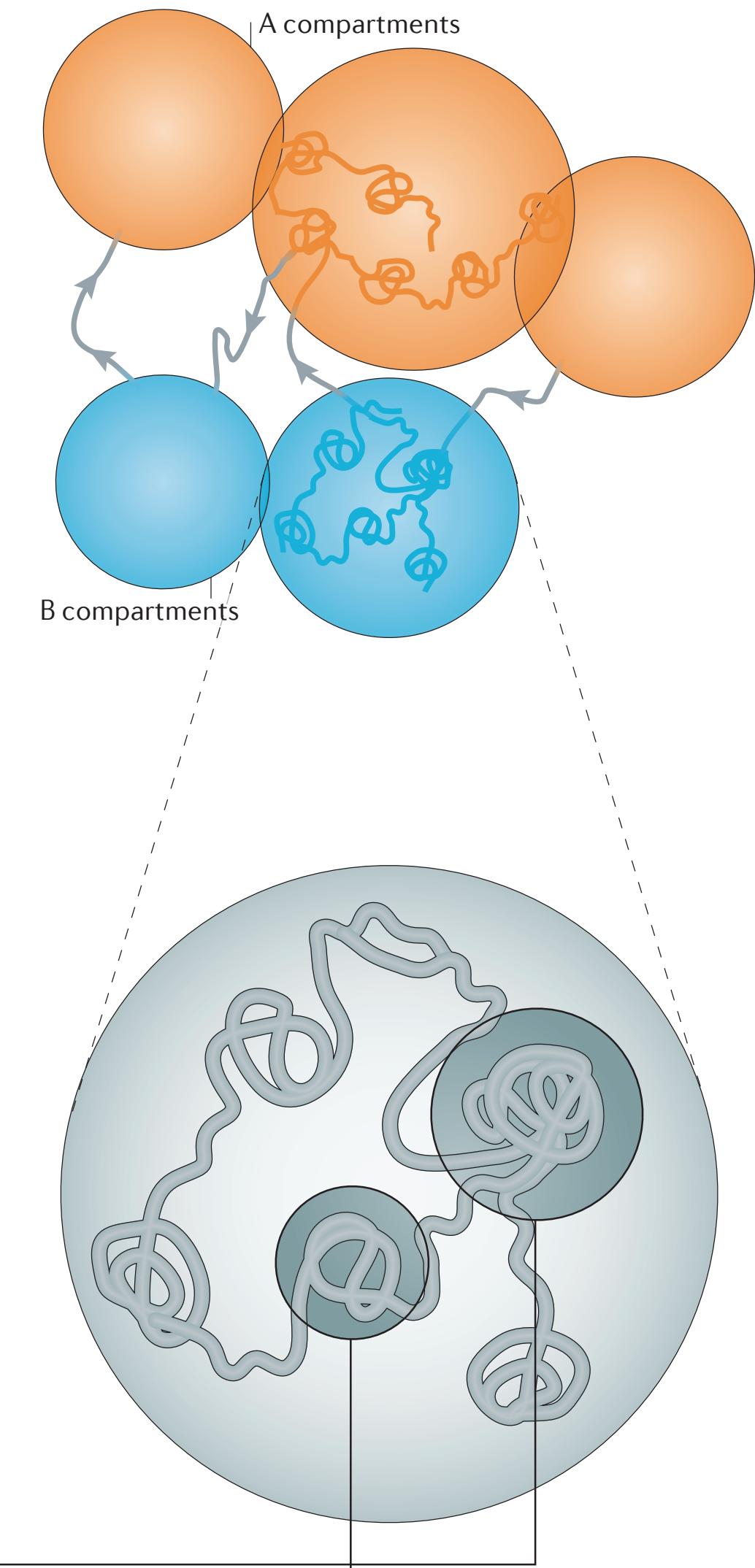
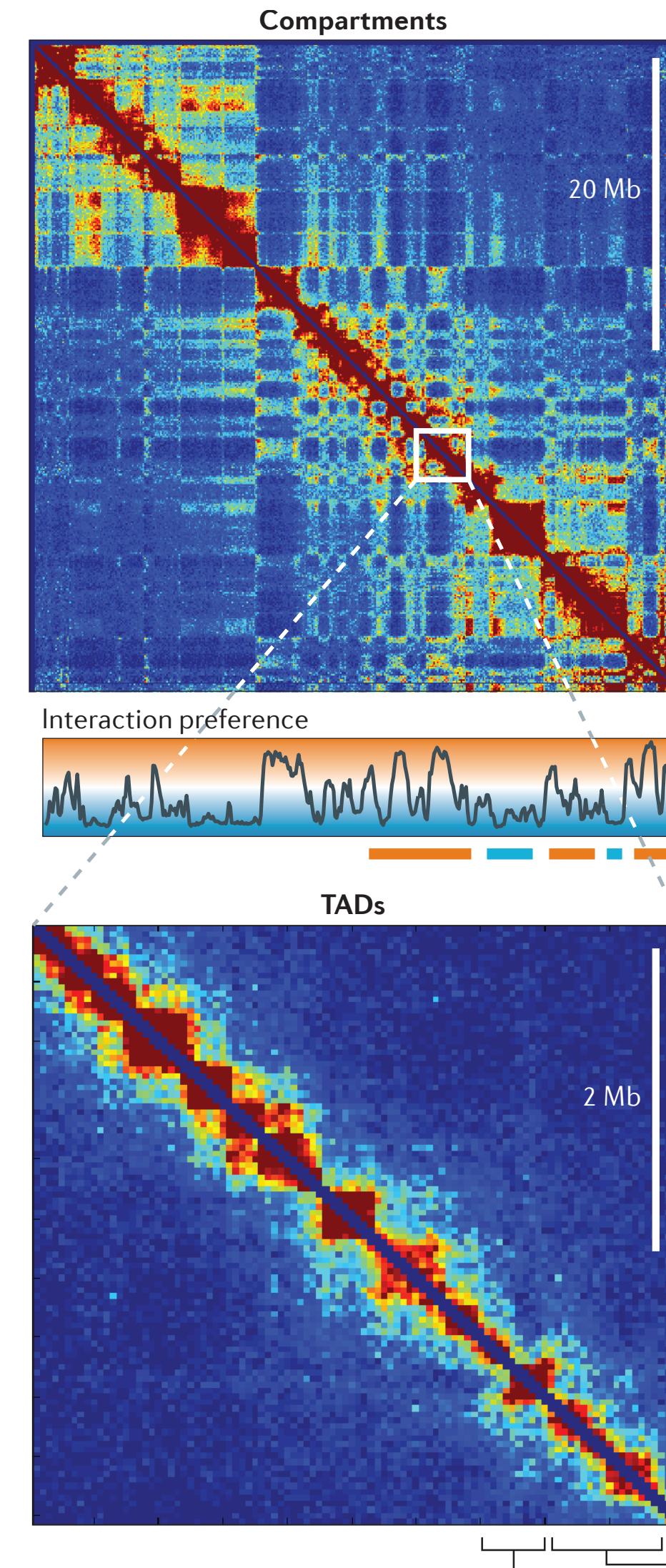
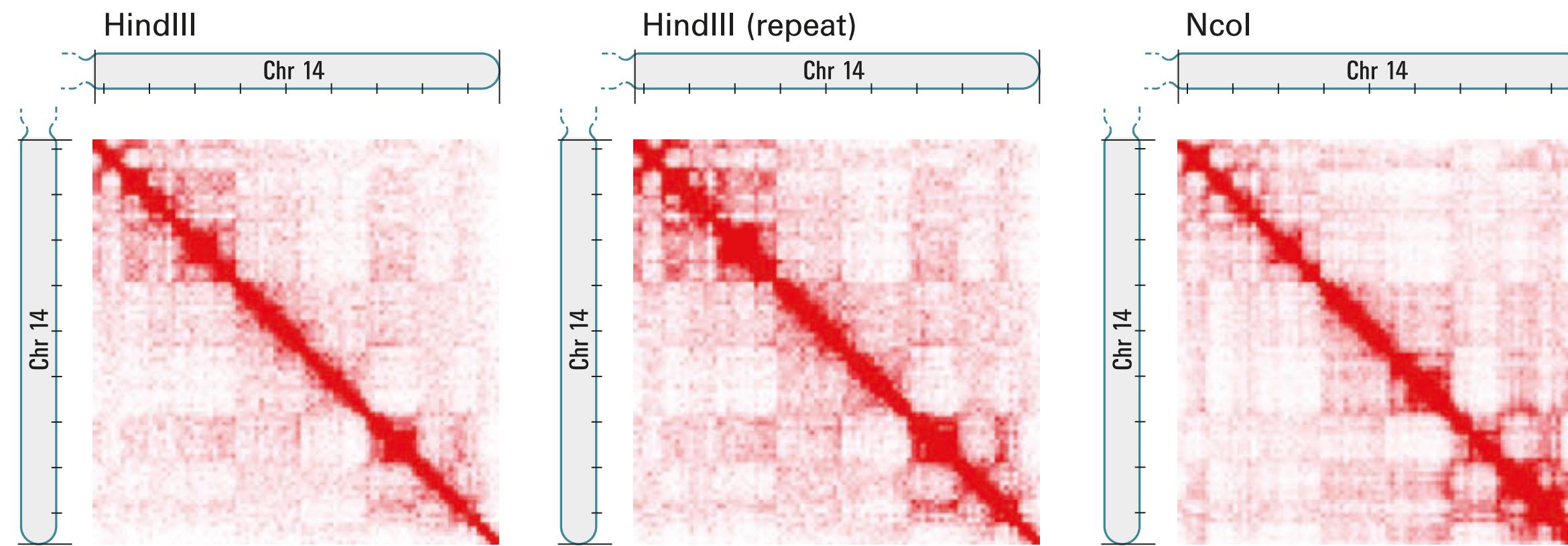
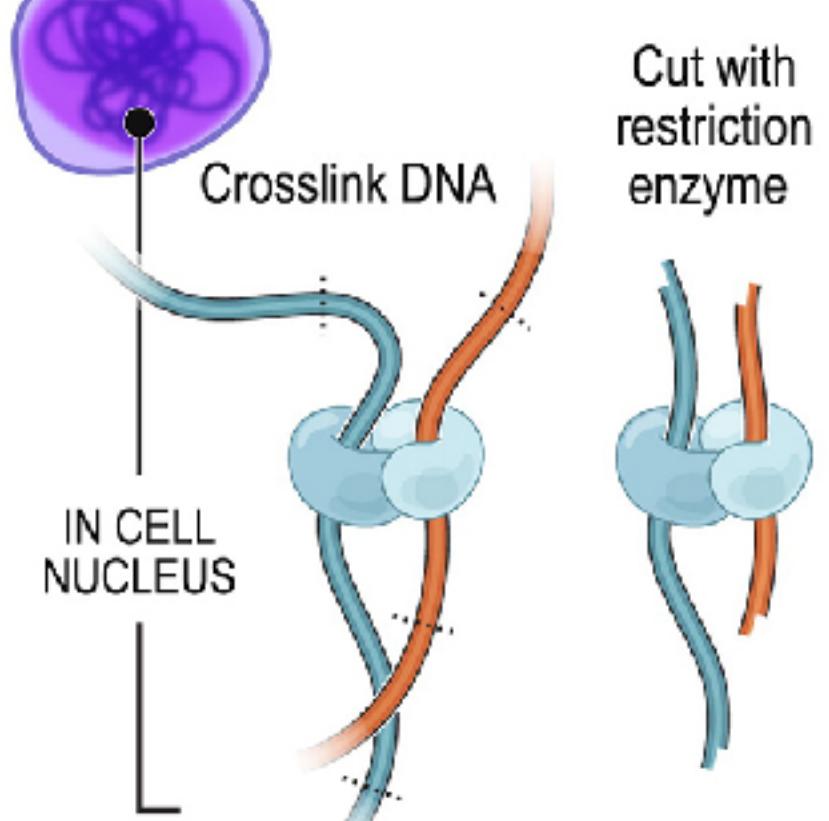


- nuclear membrane
- nuclear lamina
- internal chromatin (mostly active)
- lamina-associated domains (repressed)
- Genes
- mRNA

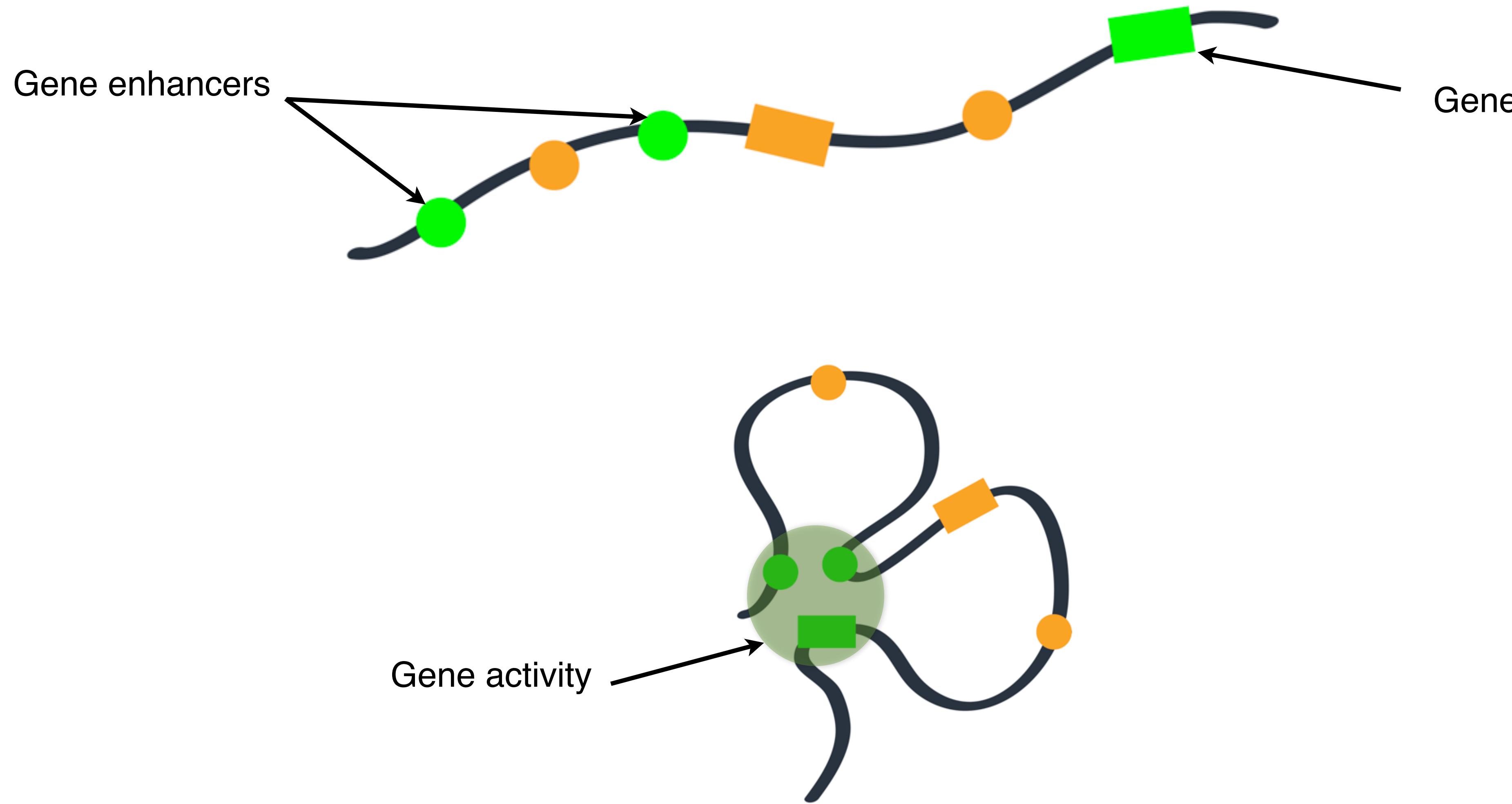
Adapted from Molecular Cell 38, 603-613, 2010

Level IV: Higher-order organization

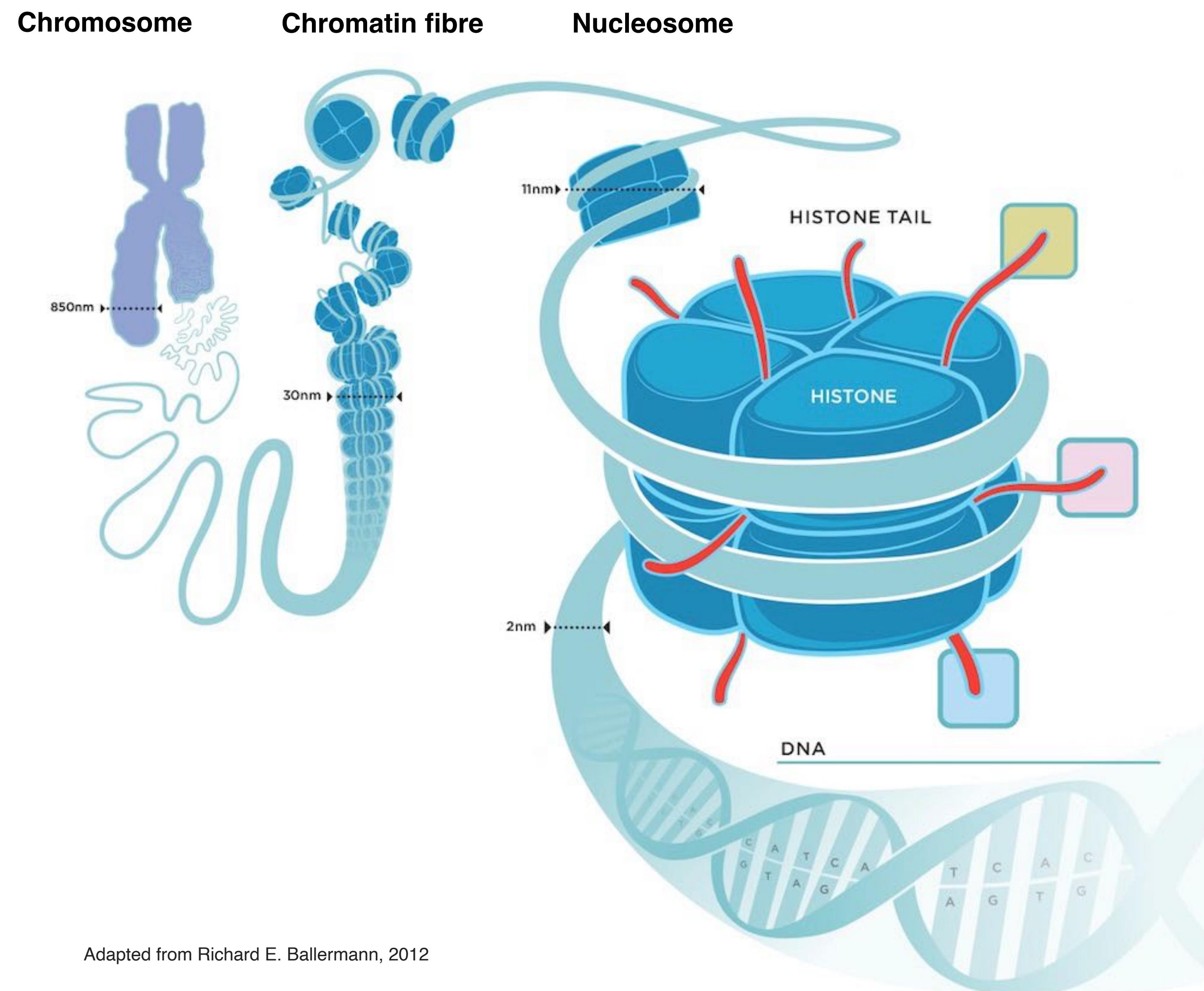
Dekker, J., Marti-Renom, M. A. & Mirny, L. A. Nat Rev Genet 14, 390–403 (2013).



Level V: Chromatin loops



Level VI: Nucleosome



Adapted from Richard E. Ballermann, 2012

Complex genome organization

Cavalli, G. & Misteli, T. Functional implications of genome topology. *Nat Struct Mol Biol* 20, 290–299 (2013).

