

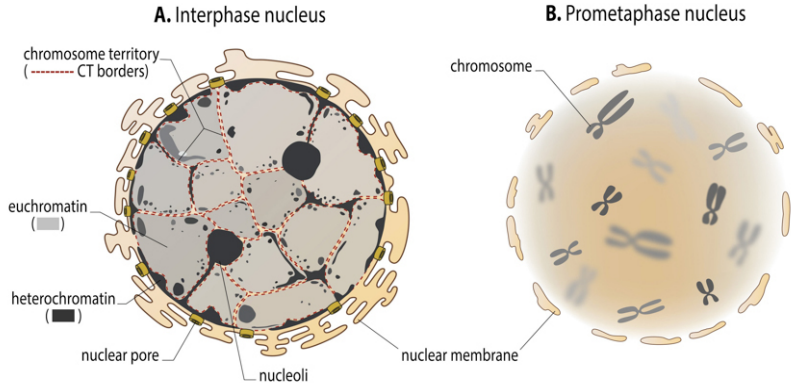
Interaktionen von RNAs und Proteinen

Sonja Prohaska

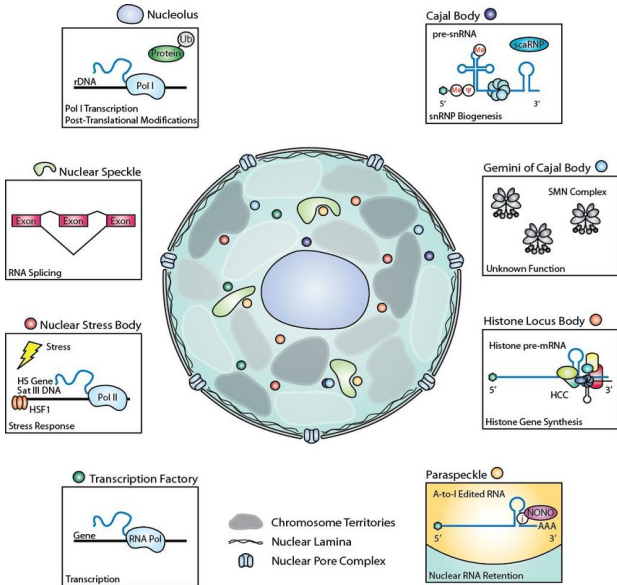
Computational EvoDevo group
Universität Leipzig

SS2018

DNA-DNA Interactions: Nuclear Organization



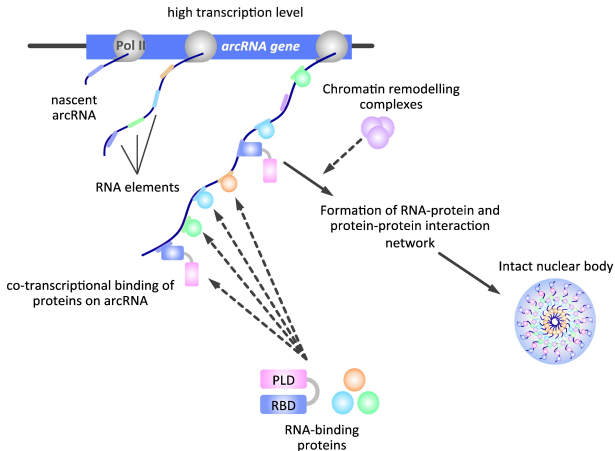
Nuclear Bodies Associated and Their Function



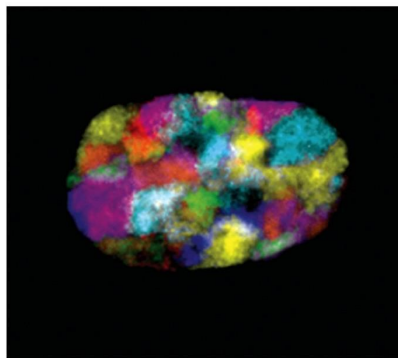
Organization of Nuclear Bodies by Long Noncoding RNAs

arcRNAs: architectural long noncoding RNAs

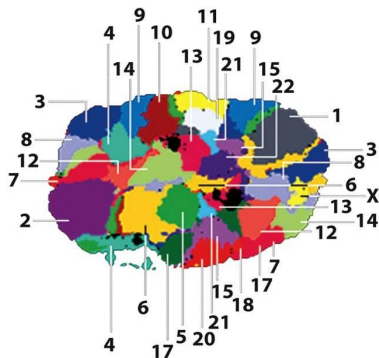
- ▶ nascent arcRNA serve as scaffold for RNA binding proteins
- ▶ results in strong local enrichment of specific factors



Chromosome Territories

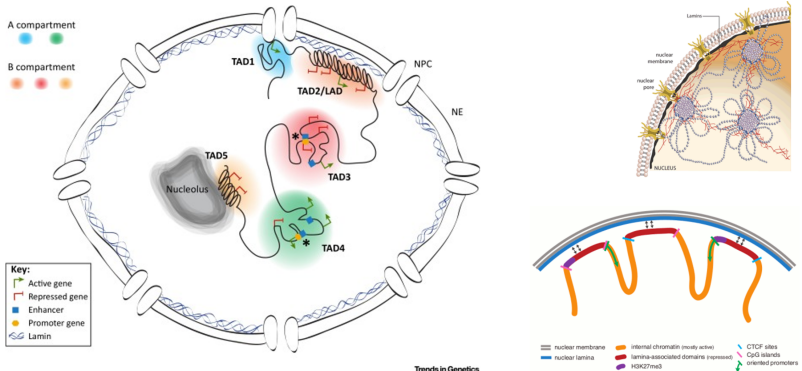


10 μm



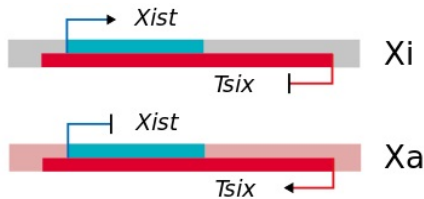
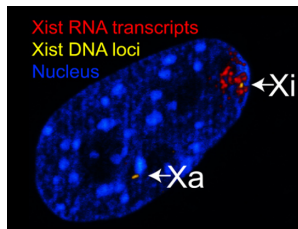
Attachment of Chromatin to Nuclear Membrane

► S/MARs: Scaffold/Membrane attachment regions



A Special Territory: X Chromosome Inactivation

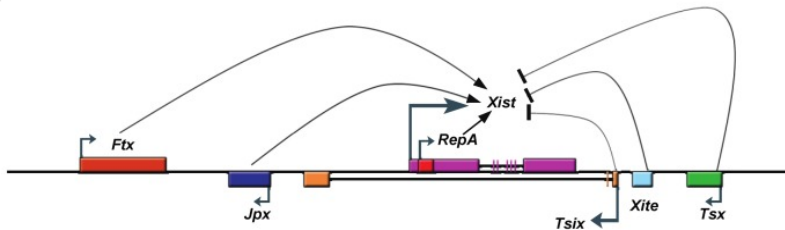
- ▶ problem: dosage compensation
- ▶ default state inactivation of X, Cix responsible for counting
- ▶ **random X-inactivation** X_i (inactive), X_a (active)
- ▶ lncRNA **Xist** (X-inactive specific transcript)
 - expressed from inactive X chromosome
 - is responsible for silencing the X in *cis* $\rightarrow X_i$ (inactive)
- ▶ lncRNA **Tsix** (antisense of Xist)
 - expressed from active X chromosome
 - is responsible for silencing Xist (in *cis* $\rightarrow X_a$ (active))



The Xist Gene Locus on Chromosome X

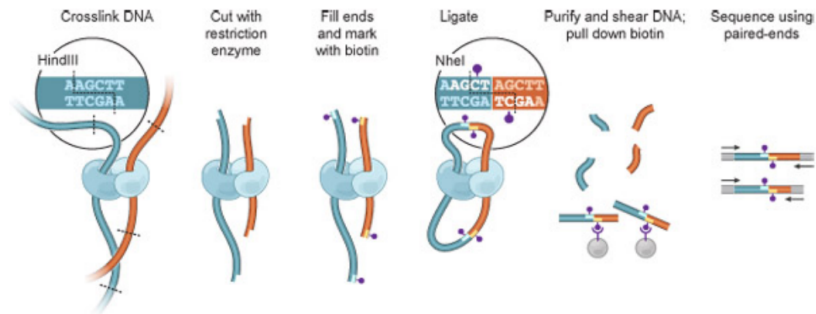
- ▶ **Xist**: X-inactivation specific transcript
- ▶ **Tsix**: antisense of Xist
- ▶ **Tsx**: testis-specific X-linked gene
- ▶ **Xite**: X-inactivation intergenic transcription element
- ▶ RepA
- ▶ Jpx, also known as Enox (Expressed Neighbor of Xist)

A



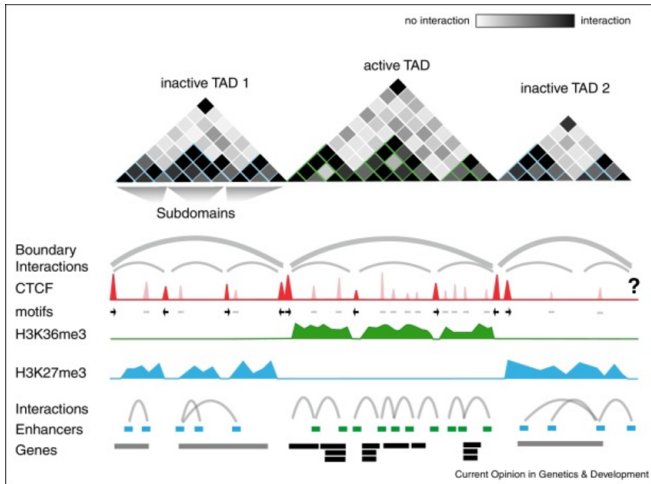
Measuring Chromatin Interactions

Chromosome Conformation Capture Hi-C



Topologically Associated Domains (TADs)

Structure of TADs



Topologically Associated Domains (TADs)

Functional/Regulatory Relevance

