Transcriptional control: from chromatin structure to phase condensates

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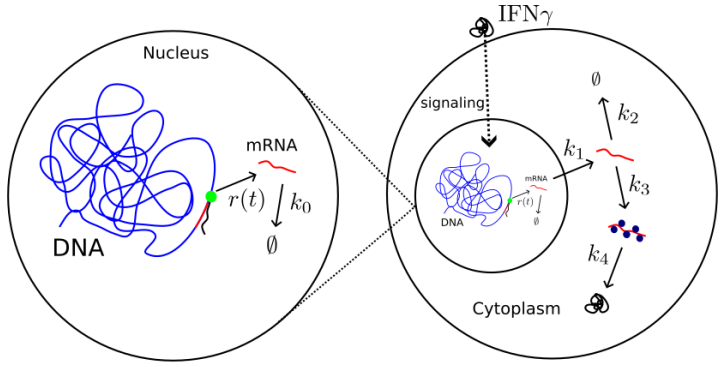
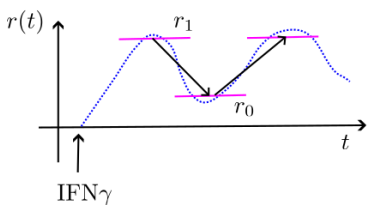
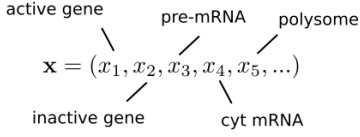
Summary

- Quick recap
- Going deeper into transcriptional control

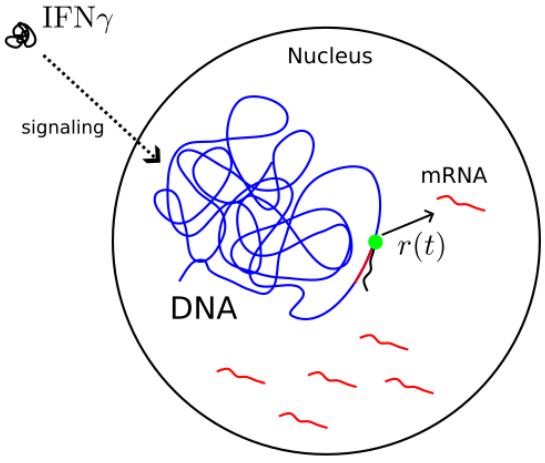
The biological question







Sources of variability in the rate of gene expression



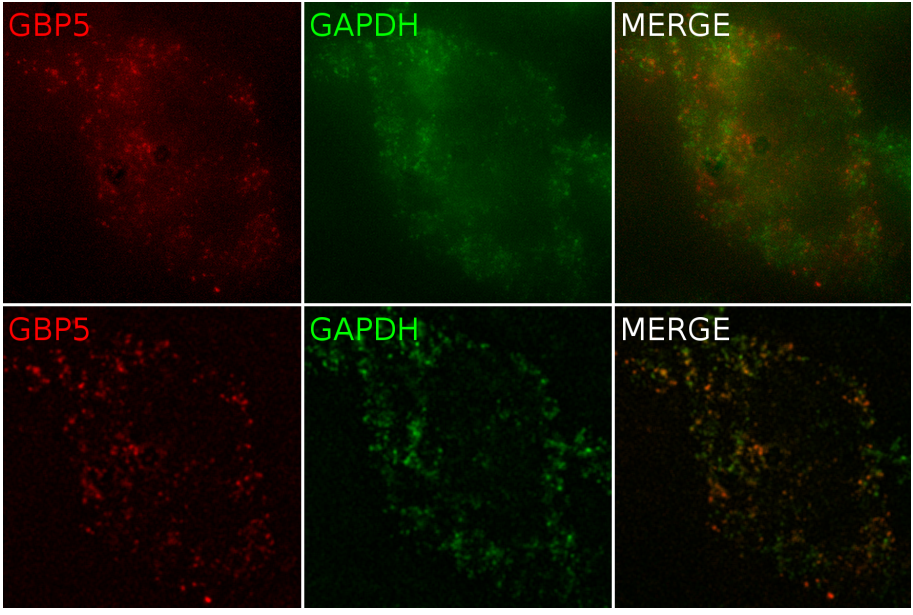
$r(t)$ is determined by many factors:

* 3D Chromatin structure e.g., looping, TADS, ...
* Epigenetic modifications (methylation, acetylation)
* Chromatin Dynamics (subdiffusion, viscoelasticity)
* Formation of transcriptional condensates
* Thermodynamic fluctuations - stochasticity

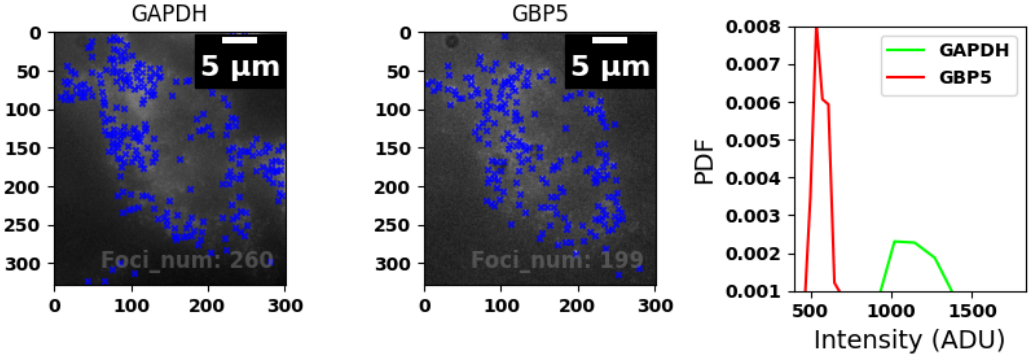
...

not necessarily independent

Rare HeLa cell GBP5 expression @ 24h after reinduction with IFN-γ



Intensity histogram for rare GBP5 expression



- Very few ($\sim 1\%$) reinduced cells express GBP5, but those that do express at high levels
- Waiting on the control to determine if this effect is coupled to IFN-γ
- Also going to try in U2OS