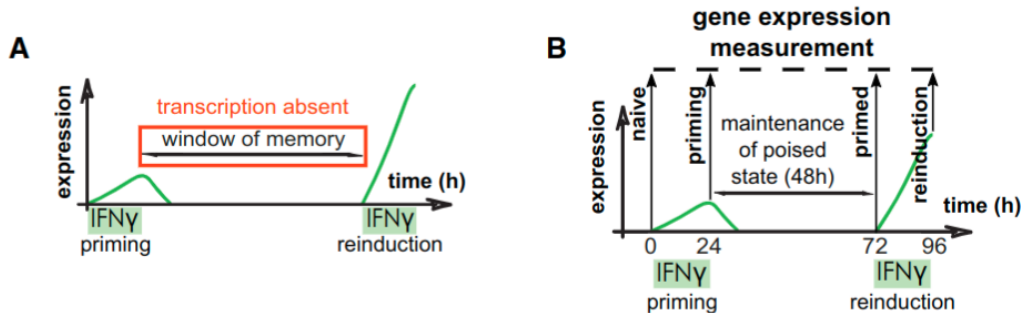


# Interferon- $\gamma$ induction of GBP5 in HeLa cells

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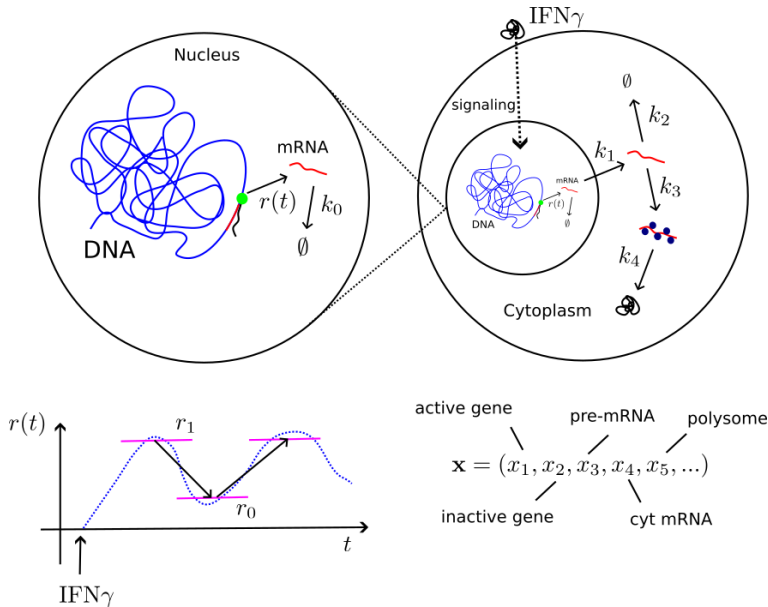
# The principle of Interferon- $\gamma$ induced transcriptional memory



**Figure 1**

Siwek et al. *Activation of Clustered IFN $\gamma$  Target Genes Drives Cohesin-Controlled Transcriptional Memory*. Molecular Cell 2020

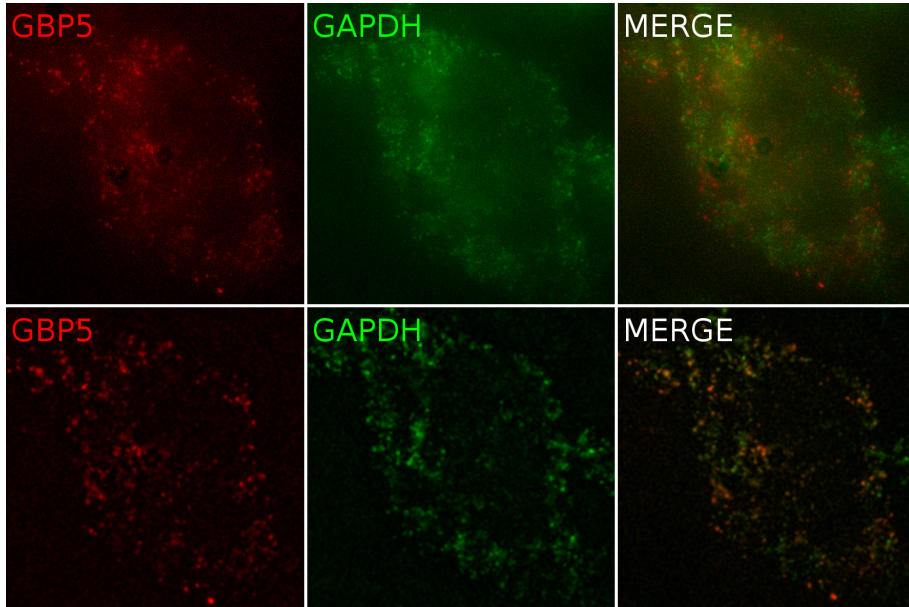
# RNA flow model for transcription dynamics and RNA transport



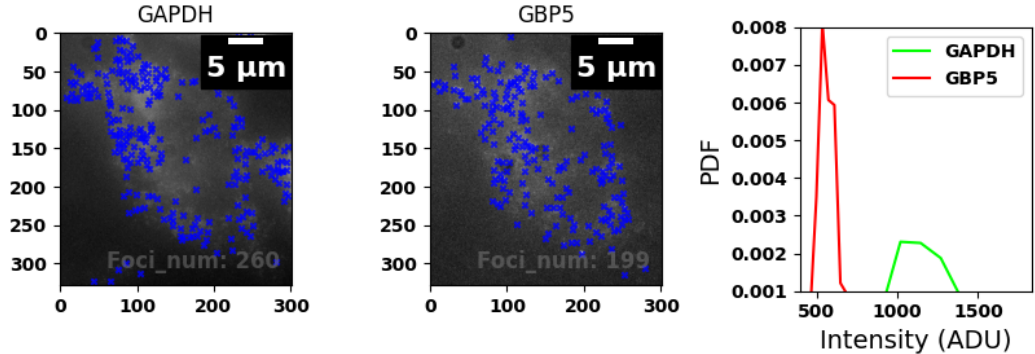
## Rare HeLa cell GBP5 expression @ 24h after reinduction with IFN- $\gamma$

Perhaps IFN- $\gamma$  is not mixed very well? Could also be the illumination issue

## Rare HeLa cell GBP5 expression @ 24h after reinduction with IFN- $\gamma$



## Intensity histogram for rare GBP5 expression



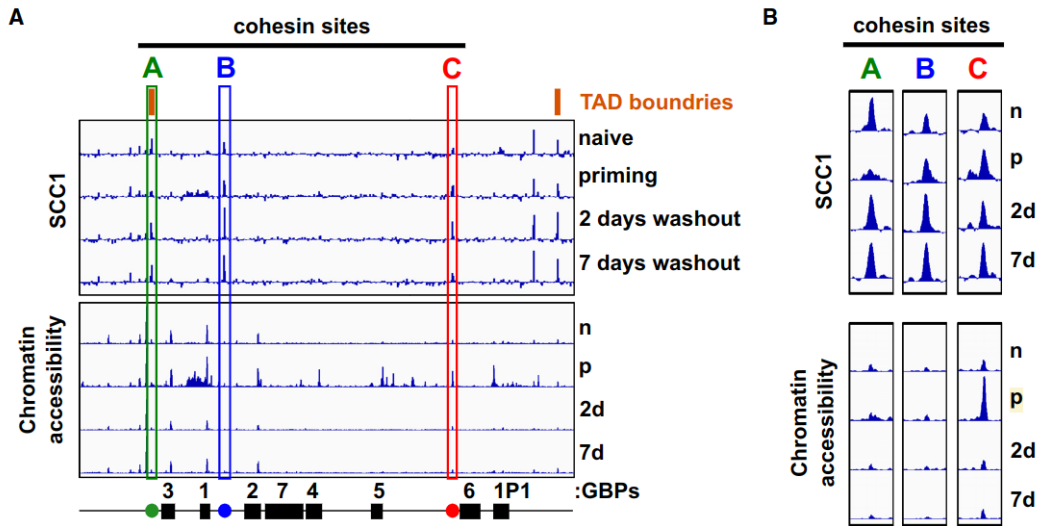
- ▶ Very few ( $\sim 1\%$ ) reinduced cells express GBP5, but those that do express at high levels (relative to GAPDH)
- ▶ Waiting on the control to determine if this effect is coupled to IFN- $\gamma$

# Comments on ergodicity of transcription

- ▶ If this result is reproducible, transcription is non-ergodic
- ▶ RNA flow cannot apply to non-ergodic systems (yet ergodicity is often assumed)
- ▶ Previous work suggests that IFN- $\gamma$  induces epigenetic changes at the GBP5 locus
- ▶ If only some cells get the epigenetic modification, the cells are distinguishable
- ▶ What is the epigenetic change? Is the epigenetic change all or nothing? If it is, then the modified subpopulation form an ergodic subsystem
- ▶ Perhaps more importantly, we can study the epigenetic change itself

But it is difficult to study epigenetic changes at a single gene, without additional methods e.g., DNA FISH + STORM microscopy. Let's talk about STORM

# Epigenetic changes at GBP genes after IFN- $\gamma$ treatment





# Details on STORM timing setup

# Using STORM to measure epigenetic changes