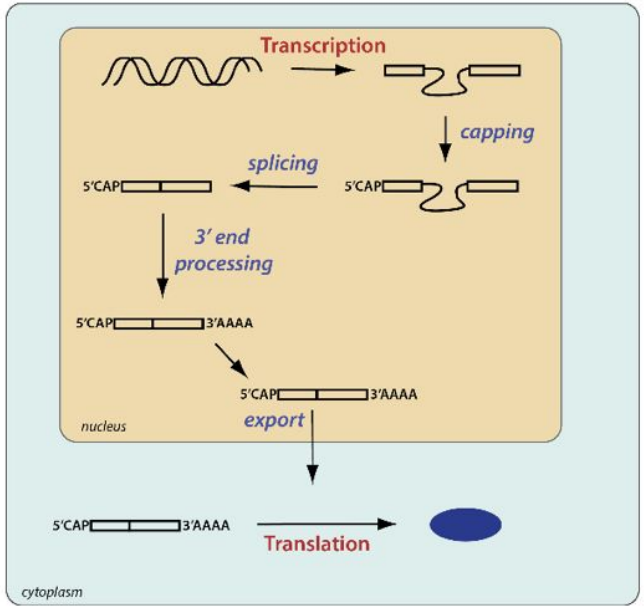
# Coordination Between Steps in Gene Expression

## Investigating the Role of *Rsc* in the Regulation of Splicing

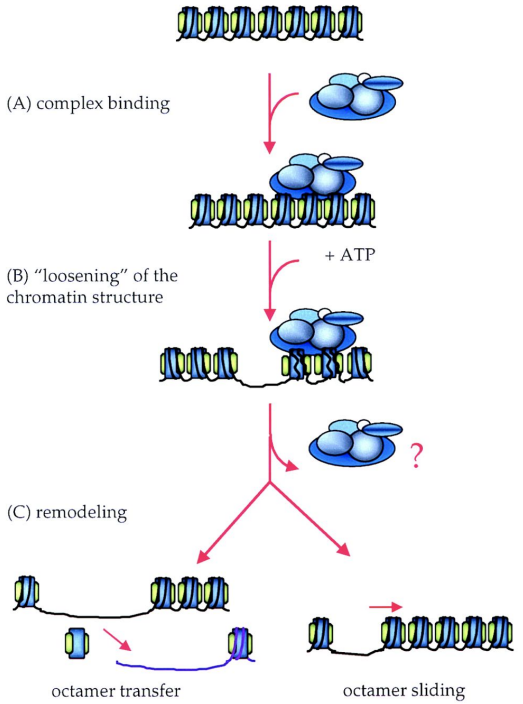
# Transcription

- DNA within cells are tightly wrapped around nucleosomes
- Transcription requires DNA to be accessible
  - Chromatin remodeling
- Pre-mRNA product must be modified
  - Spliceosome
- Splicing can occur as soon as transcription of RNA begins
  - Cotransriptional splicing



# Chromatin Remodeling: Rsc

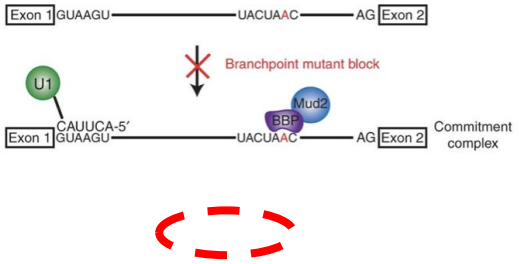
- Nucleosome repression
  - Removal
  - Sliding
- Rsc Complex
  - 18-subunit complex
  - Identified when studying the SWI/SNF complex
  - Rsc 1 vs. Rsc 2




Vignali et al. Molecular and Cellular Biology Mar 2000

# Splicing Machinery

- Spliceosome assembly happens in a stepwise manner
- Focus on the U2 snRNP
  - Contains the Ist3 subunit and interacts with Cus2

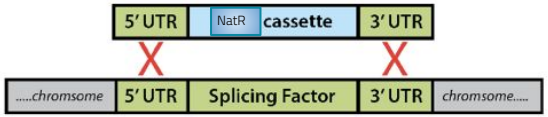



Abelson et al. Nature Structural and Molecular Biology 2010

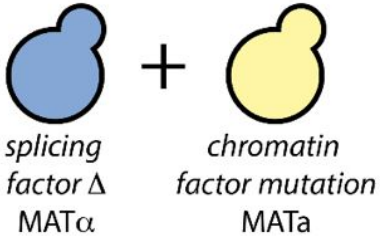
# Coordination between splicing and transcription?

My project focuses on the interactions between U2 snRNP components and Rsc2 chromatin remodeling complex.

# Methods

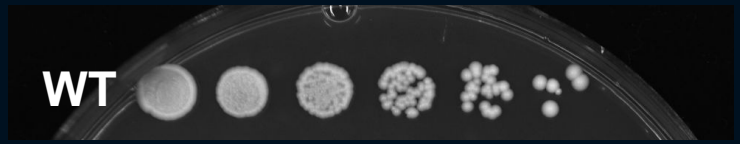

5′ UTR
NatR
cassette
3′ UTR
.....chromsome
5′ UTR
Splicing Factor
3′ UTR
chromsome.....

# Frogging



# Does Rsc influence splicing?

37℉

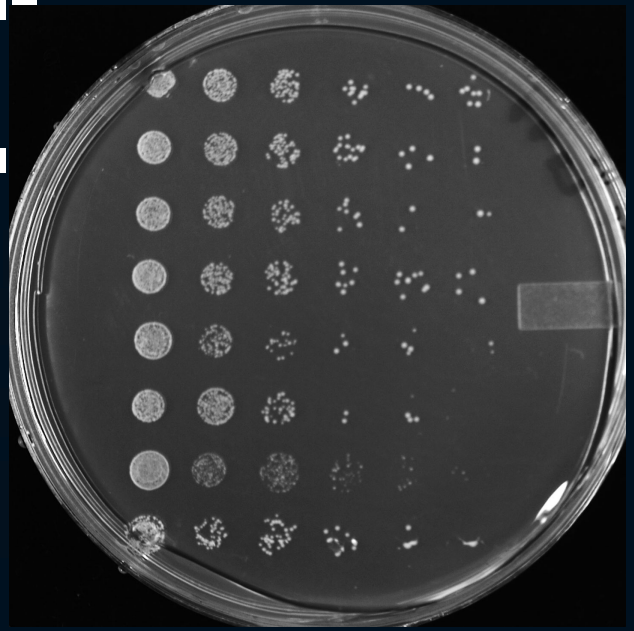



Positive interactions with *rsc*1 and *cus*2

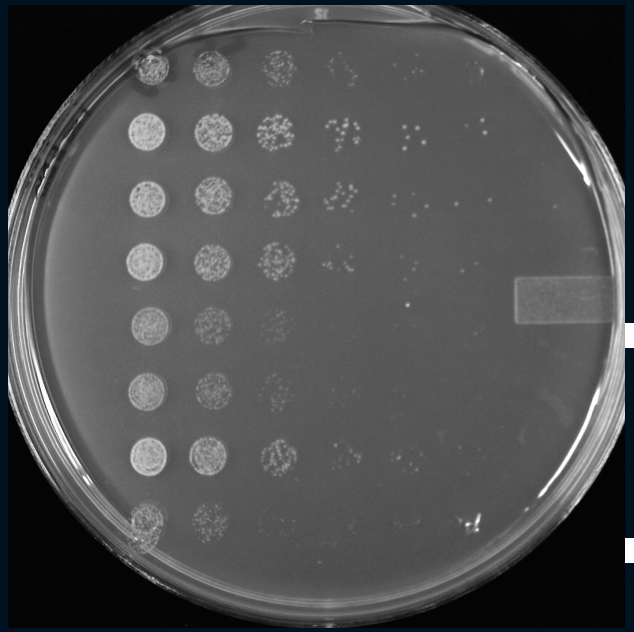
Positive interactions between *rsc*2 and *ist*3

YEPD Plates

# Does Rsc influence splicing?



WT
*cus2*
*rsc1*
*rsc1 x cus2*
*rsc 2*
*rsc2 x cus2*
*ist3*
*rsc2 x ist3*

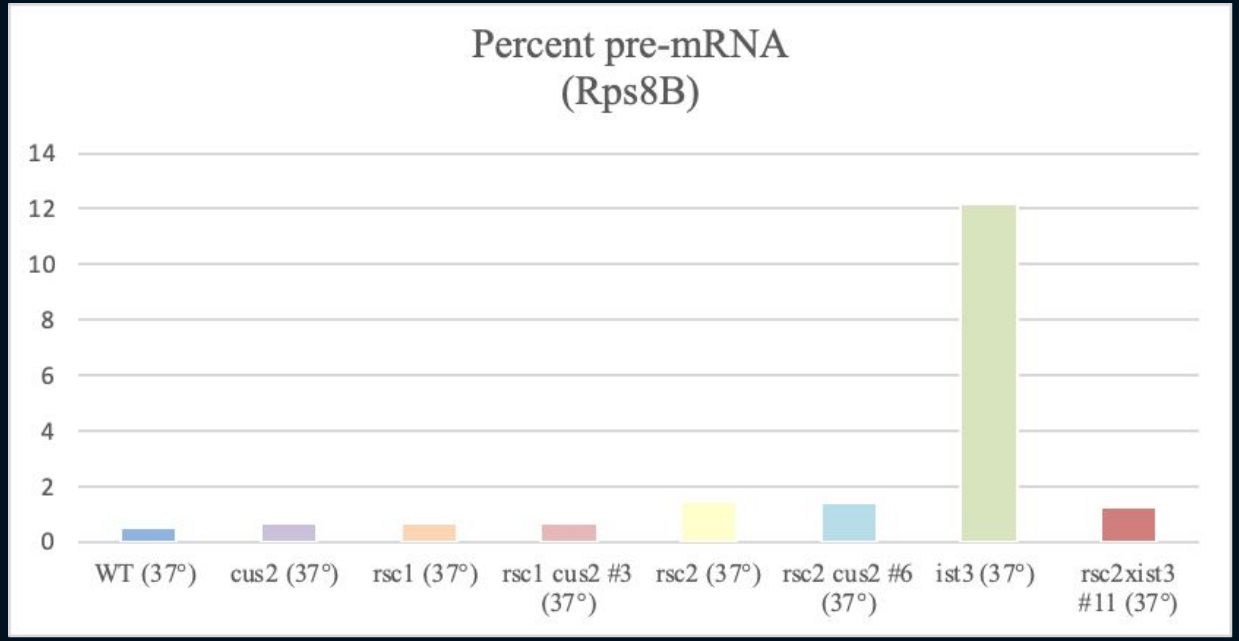


Complete

100

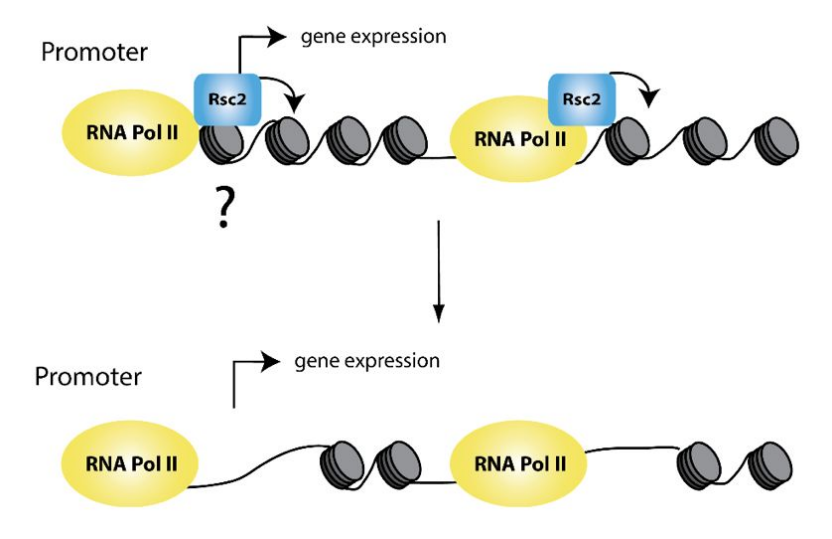
37℉ 6 AU drug plate

# Quantitative PCR



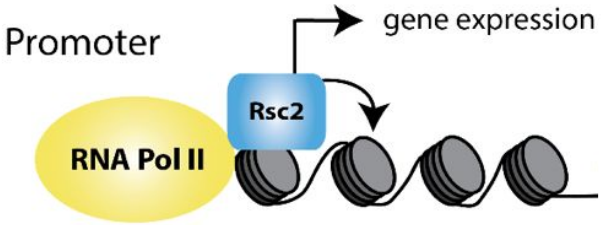

*ist*3 Δ induces splicing defects and *rsc*2Δ shows slight decrease in splicing
Splicing rescued in the double mutant

# Rsc2 Proposed Model

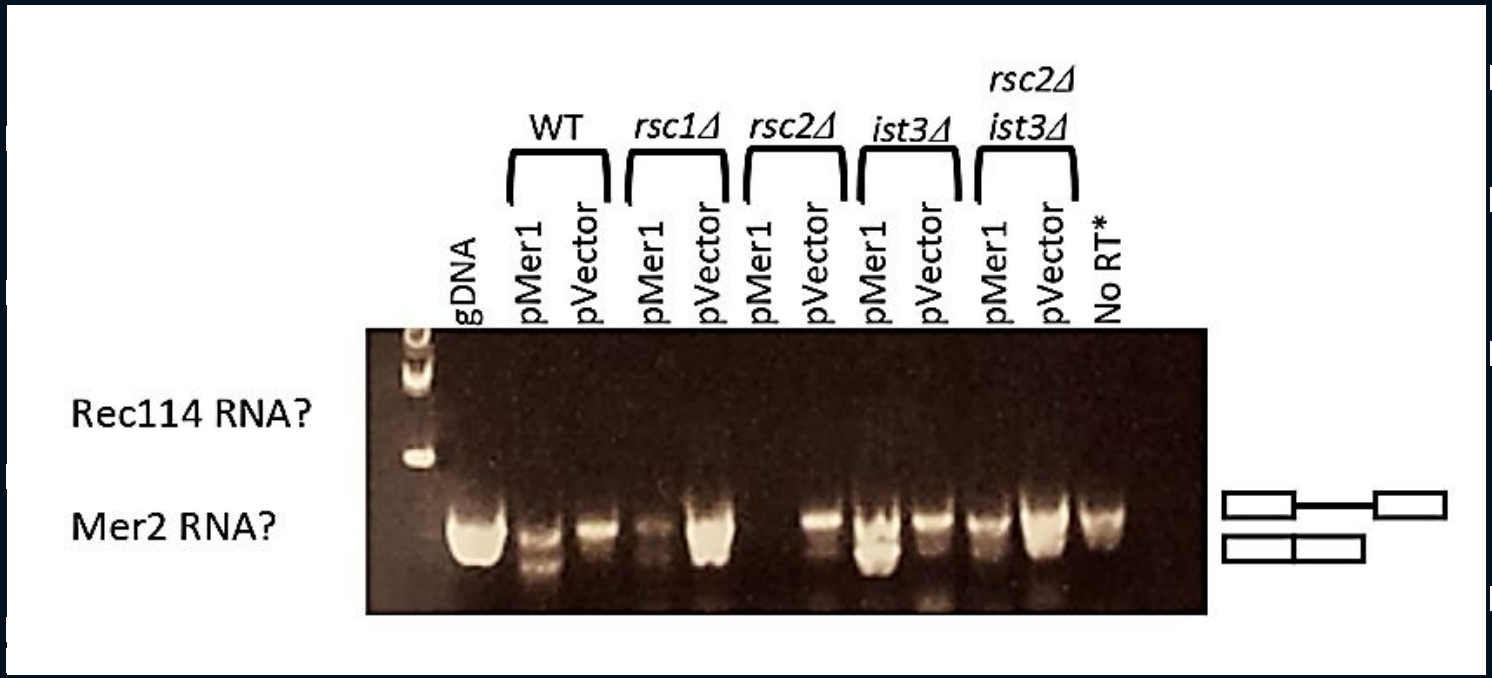



Possible mechanism:
→ Affects speed of transcription (KINETIC MODEL)
→ Recruits splicing factors
→ Usually hinders splicing

# Rsc2 Proposed Model



# Does splicing impact TXN?



# THANKS!

Any questions?