

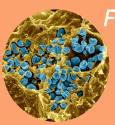


Investigating the Regulation of bs21 Homologs in *Francisella tularensis*

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Introduction



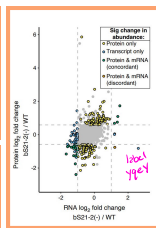
Francisella tularensis

- Gram-negative
- Intracellular pathogen
- Causes tularemia
- Potential bioweapon

bs21: small subunit ribosomal protein involved in translation

initiation

- Leads to ribosome heterogeneity
- Loss of bs21-2
- Influences virulence factors and intramacrophage growth



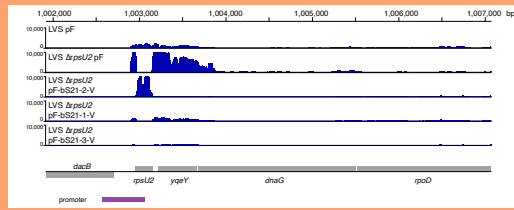
Disconnect between transcript and protein abundance in cells lacking bs21-2

Study Goals

Understand the regulation of the bs21 homologs

- Transcript Abundance
 - How do bs21-1, bs21-2, and bs21-3 affect their own production?
- Protein Abundance
 - How does bs21-2 affect its own production?

bs21 homologs repress bs21-2 transcript, *rpsU2*



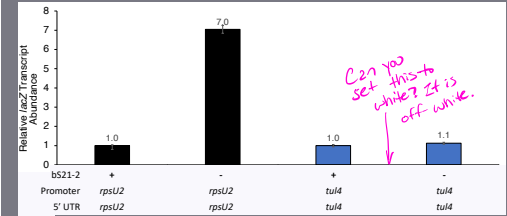
Translational Fusion Constructs and Predictions

		Transcript Abundance		Protein Abundance	
		Cells with bs21-2 (WT)	Cells without bs21-2 (Δ rpsU2)	Cells with bs21-2 (WT)	Cells without bs21-2 (Δ rpsU2)
tul4 promoter	tul4 5' UTR	+++	++	+++	++
rpsU2 promoter	rpsU2 5' UTR	+	++++	+	+
rpsU2 promoter	tul4 5' UTR	?	?	?	?
tul4 promoter	rpsU2 5' UTR	?	?	?	?

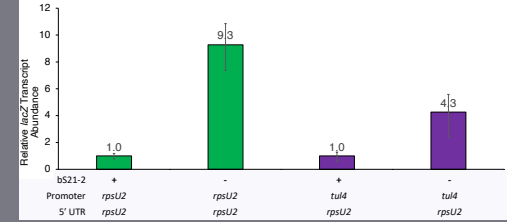
bs21-2

affected

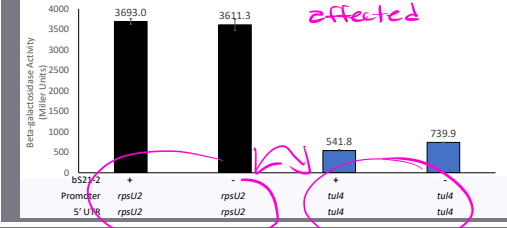
tul4 transcript abundance not regulated by bs21-2



rpsU2 5'UTR is sufficient for regulation by bs21

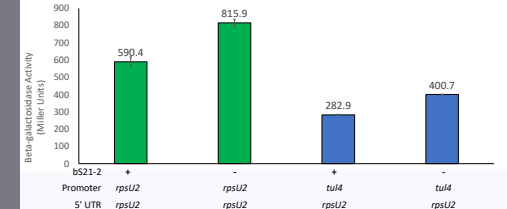


tul4 protein abundance not regulated by bs21-2



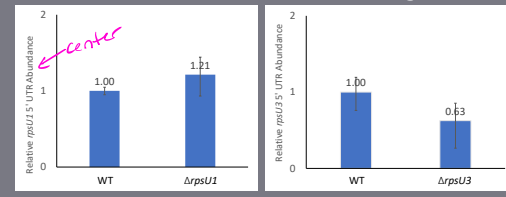
affected

rpsU2 5'UTR is sufficient for regulation by bs21



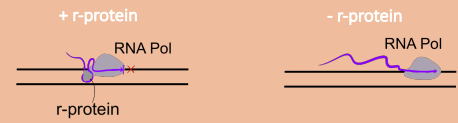
bs21-1 and bs21-3

bs21-1 and bs21-3 do not auto-regulate



Models for R-Protein Regulation

MODEL 1: Attenuation



MODEL 2:

Post-Transcriptional Control



Conclusions

- The 5' UTR of the *rpsU2* gene is sufficient to permit regulation by bs21
- bs21-2 transcript is uniquely repressed by all three homologs
- Regulation of transcript is not equivalent to the regulation at the protein level

Future Directions

- Determine if transcript abundance is due to changes in stability or termination during transcription
- Assess how the 5' UTR structure of the *rpsU2* transcript impacts translation

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