

## Binding of eEF1A with the 5'UTR of HIV-1 genomic RNA is important for reverse transcription

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## Eukaryotic elongation factor 1 complex subunits are critical HIV-1 reverse transcription cofactors

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### eEF1A review

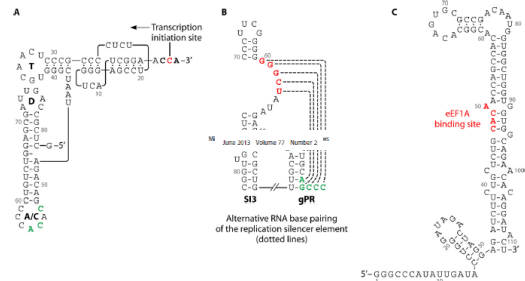
Microbiology and Molecular Biology Reviews

### The Unexpected Roles of Eukaryotic Translation Elongation Factors in RNA Virus Replication and Pathogenesis

Dongsheng Li, Ting Wei, Catherine M. Abbott and David Harrich

Microbiol. Mol. Biol. Rev. 2013, 77(2): 253

### eEF1A review



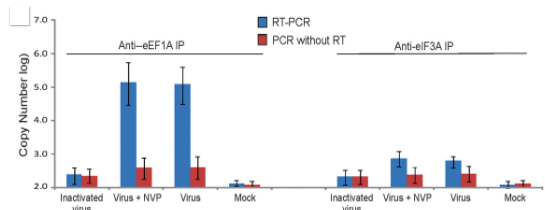
Li et al. Microbiology and Molecular Biology Reviews, June 2013 Vol 77

### Aims

Investigated whether eEF1A can affect HIV-1 replication via binding with HIV-1 genomic RNA

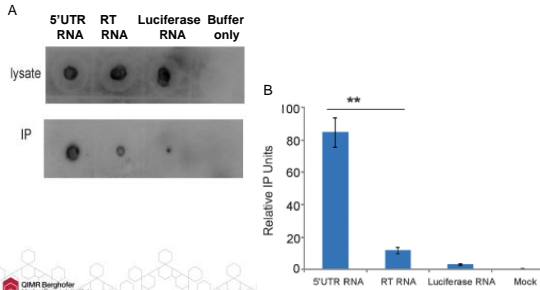
### eEF1A binds to HIV-1 genomic RNA

#### Reversible crosslink co-immunoprecipitation (RC-co-IP)



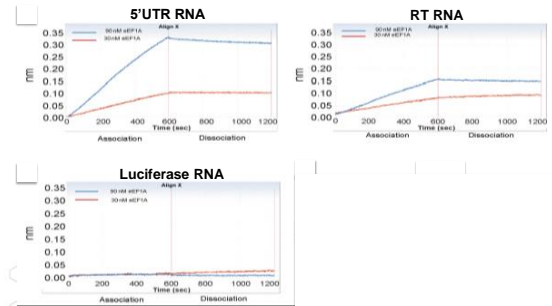
## eEF1A binds directly to 5' UTR of HIV-1 RNA

### RNA transfection + RC-co-IP

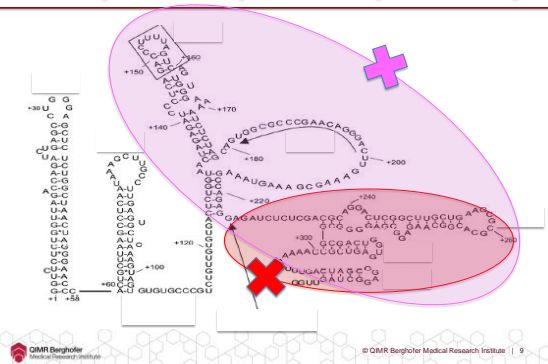


## eEF1A binds to 5' UTR of HIV-1 RNA

### Biolayer Interferometry (BLI) assay

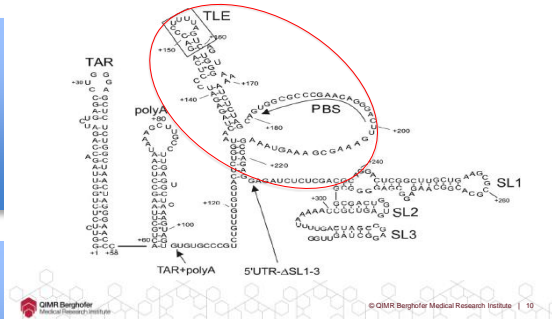


## Predicted secondary structure of 5' UTR



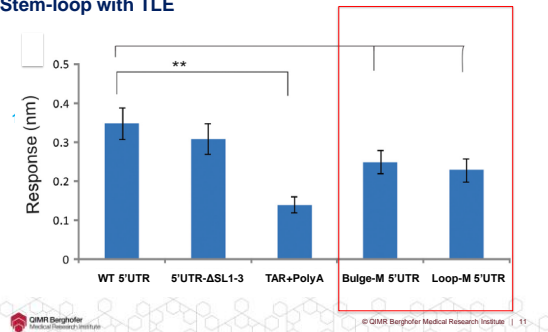
## Important site for eEF1A binding

### 106-224 of 5'UTR



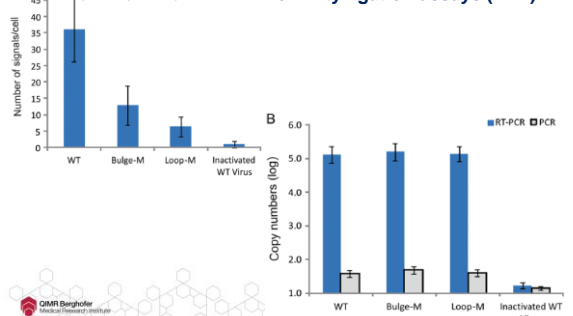
## Important site for eEF1A binding

### Stem-loop with TLE

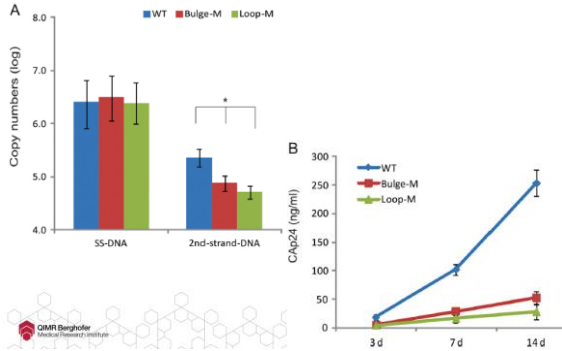


## 5'UTR mutations reduce eEF1A-RT association

### Proximity ligation assays (PLA)



## 5'UTR mutations affect HIV-1 RTn



## Summary

- ❖ eEF1A binds directly to 5' UTR of HIV-1 genomic RNA
- ❖ 142-170 stem-loop at 5'UTR RNA is important for eEF1A-RT binding
- ❖ Stem-loop mutations affect HIV-1 reverse transcription and replication

## Conclusion

eEF1A interacts with 5'UTR of HIV-1 genomic RNA so that affect reverse transcription efficiency

## Paper just published

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**RESEARCH** Open Access

**Binding of the eukaryotic translation elongation factor 1A with the 5'UTR of HIV-1 genomic RNA is important for reverse transcription**

Dongsheng Li, Ting Wei, Hongping Jin, Amanda Rose, Rui Wang<sup>1\*</sup>, Min-Hsuan Lin, Kraem Spann<sup>2</sup> and David Harrich<sup>1\*</sup>

**Binding of eEF1A with the 5'UTR of HIV-1 genomic RNA is important for reverse transcription**

**Abstract**  
HIV-1 reverse transcription (RTn) is a critical step in the HIV-1 life cycle. The 5'UTR of HIV-1 genomic RNA is essential for RTn. In this study, we investigated the role of the eukaryotic translation elongation factor 1A (eEF1A) in RTn. We found that eEF1A binds directly to the 5'UTR of HIV-1 genomic RNA, specifically to the 142-170 stem-loop. Mutations in this stem-loop region significantly reduced RTn efficiency. Our results suggest that the 142-170 stem-loop is important for eEF1A-RT binding, and stem-loop mutations affect HIV-1 reverse transcription and replication.

**Background**  
HIV-1 reverse transcription (RTn) is a critical step in the HIV-1 life cycle. The 5'UTR of HIV-1 genomic RNA is essential for RTn. In this study, we investigated the role of the eukaryotic translation elongation factor 1A (eEF1A) in RTn. We found that eEF1A binds directly to the 5'UTR of HIV-1 genomic RNA, specifically to the 142-170 stem-loop. Mutations in this stem-loop region significantly reduced RTn efficiency. Our results suggest that the 142-170 stem-loop is important for eEF1A-RT binding, and stem-loop mutations affect HIV-1 reverse transcription and replication.

**Conclusions**  
eEF1A binds directly to the 5'UTR of HIV-1 genomic RNA, specifically to the 142-170 stem-loop. Mutations in this stem-loop region significantly reduced RTn efficiency. Our results suggest that the 142-170 stem-loop is important for eEF1A-RT binding, and stem-loop mutations affect HIV-1 reverse transcription and replication.

Poster  
Theme A  
No.10

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