

Analysis of G-quadruplex Binding Protein of EWS for Transcriptional Regulation of TERRA

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Telomeric repeat-containing RNA (TERRA) contains a tandem array of r(UUAGGG) repeats as G-quadruplex (G4) noncoding RNA.¹ TERRA is an inherent component of telomere and involve in heterochromatin formation. The telomere and TERRA can form the G4 in K⁺ ion-containing solution¹, so the G4-binding protein might be important to know the mechanism of histone modification in the telomere region. We have reported that TLS/FUS as G4-binding protein represses TERRA transcription and promotes heterochromatin.² In the telomere, the changing heterochromatin to euchromatin is distinguished by an increased density of histone marks characteristic of active chromatin domains.³ The euchromatin is open chromatin that participates in the active's transcription of TERRA. However, the relationship between G4-binding protein associated with euchromatin is still unaccounted for in the telomere.

We previously reported that Ewing Sarcoma (EWS), include in TET-Family (like TLS/FUS), binds to G4 through the RGG3 domain.⁴ The EWS as a G4-binding protein binds and stabilizes the G4 formation. Here we show that the TERRA level was decreased when the EWS was knockdown by siRNA. In addition, overexpression of EWS increased the TERRA transcript. Our findings suggest that EWS as a G4-binding protein promotes TERRA transcription (Figure 1).

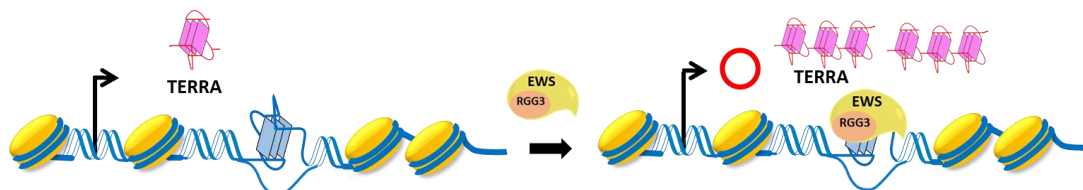


Figure 1. Model of the mechanism EWS as promoter TERRA transcription.

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