

## SUPPLEMENTAL INFORMATION

**Figure S1. Structures of nucleobases inserted at N(-4) of pre-tRNA.** For A(-4)  $R_1 = \text{NH}_2$ ,  $R_2 = \text{H}$ ; G(-4)  $R_1 = \text{O}$ ,  $R_2 = \text{NH}_2$ ; P(-4)  $R_1 = \text{H}$ ,  $R_2 = \text{H}$ ; DAP(-4)  $R_1 = \text{NH}_2$ ,  $R_2 = \text{NH}_2$ ; 2AP(-4)  $R_1 = \text{H}$ ,  $R_2 = \text{NH}_2$ .



