The role of poly(A) sequence length in eukaryotic termination of translation

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There are a lot of evidences of the ability of 3' area below the stop codon, in particular, poly(A) tract, to influence translation termination efficiency. It was also shown that an approxiamtion of poly(A) binding protein PABP and peptide release factor eRF3a leads to termination efficiency increase. Moreover, an amount of mRNA–connected PABP molecules is in direct dependency on the length of poly(A) tail. It was also demonstrated recently, that poly(A) tail length affected efficiency of translation, but the data about termination dependency on poly(A) length is still poor. At the same time, investigation of this dependency is important, as about 10% of genetic diseases are caused by nonsense mutations, and the effect of poly(A) tract can modulate the cure. An appearance of small closed-loop mRNA structure as a result of interconnection between PABP and eRF3a was proposed. However, experimental evidences of such a structure are controversial. To reveal the mechanism of its formation, we used reconstituted system of eukaryotic translation. We obtained purified pretermination complexes on mRNAs with CDSs and poly(A) tracts of different length, containing PABP. Than we estimated the efficiency of translation and peptide release, as well as the efficiency of stop codon recognition by the release factor. We revealed, that an increase of poly(A) length leads to stimulation of translation termination efficiency.