Abstract

The translation represents one of the most crucial processes in the cell. That is why it is often targeted by various regulations. Its initiation phase has a particularly important role in regulatory processes. Initiation of translation usually starts by recognition and binding of canonical eukaryotic initiation factor 4E1 (eIF4E1) to the methylguanosine cap present on the 5' end of the majority of eukaryotic mRNA. The family of 4E translation initiation factors contains two more members – eIF4E2 and eIF4E3. Those two proteins can bind cap structure as well which predetermines it to function in the regulation of translation. Protein eIF4E2 is well known for being a translational repressor in development processes and it takes part in specific miRNA-dependent silencing. It was proven to be able to initiate translation in hypoxia which is consistent with its proposed role in hypoxic tumor cells. The biological roles of the protein eIF4E3 are much less understood. This thesis propounds the picture of the overall functions of all discussed translation initiation factors using cell lines with their overexpression or deletion. Experimental data confirmed the role of the eIF4E2 in the regulation of developmental processes. Cell lines with deleted eIF4E2 and eIF4E3 were characterized based on the influence of various cultivation conditions on their growth.

Key words:

translation initiation; eIF4E1; eIF4E2; 4E-HP; eIF4E3, translational silencing, hypoxic translation, translation repression