

Abstract

During unfavourable conditions eukaryotic cells inhibit translation of certain mRNAs and preferably synthesize proteins that are involved in the stress response. The saved energy is used for repair of cellular damages. The untranslated mRNAs are accumulated in the form of ribonucleoprotein complexes. This accumulation results in the formation of the cytoplasmic stress granules. These granules are sites of structure remodeling and triage of the ribonucleoprotein complexes - they can be stored, degraded or sent back to the cytoplasm for translation reinitiation. The mRNA molecules carry their associated proteins, which include also proteins implicated in the cell signaling. Stress granules can thus indirectly regulate some processes, such as apoptosis, and play role in the survival of the cell. This thesis focuses on protein content of stress granules in human cell lines, briefly characterizes stress factors that induce their formation and discusses differences between the content of stress granules induced by different stress stimuli. An important part of this thesis is a table summarizing proteins found in the stress granules. The second part of this work is dedicated to the characterization of the proteins of the fragile X mental retardation protein family. It outlines the possible link between the fragile X syndrome and stress granules.

Keywords: cellular stress, stress granules, protein composition of stress granules, translation inhibition, FMRP, FXR1, FXR2, human cell lines