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BAG3 mRNA is present in synaptosomal polysomes of rat brain

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BAG3 is a 75-kDa protein of the family of co-chaperones that interacts with the ATPase domain of heat shock protein Hsp70 through the BAG domain. The bag3 gene is constitutively expressed in several tumor types and a few normal cell types, including skeletal muscle and heart. In normal cell types, BAG3 expression is induced by oxidants, high temperature, serum deprivation, and other stressors, mainly through the activity of heat shock factor 1 on bag3 gene promoter. In addition to the BAG domain, BAG3 contains also a WW domain and a proline-rich (PXXP) repeat that mediates binding to partners different from Hsp70. These multifaceted interactions underlie BAG3 ability to modulate major biological processes, including apoptosis, cytoskeleton organization, and autophagy.[1]

In the central nervous system, BAG3 has been detected both in neurons and glial cells, and its expression was found to increase by cell exposure to various forms of cell stress, including hypoxia-ischemia, kainic acid-induced seizure, and viral infection.[1,2] In addition, to sustain brain cell survival, BAG3 plays an essential role in protein quality control and autophagic removal of misfolded proteins.[3] We have previously shown that synaptosomes selectively contain a small size BAG3 of about 40 kDa,[4] possibly reflecting a specialized activity modulating synaptic response to stressful stimuli. Now we report that bag3 mRNA is associated with synaptosomal polysomes.

To verify whether bag3 mRNA is present in synaptosomes, we extracted RNA from purified synaptosomal polysomes and subjected it to PCR analyses using primers specific for bag3 mRNA. As shown in **Figure 1**, PCR data indicate that synaptosomal polysomes contain bag3 mRNA, thus disclosing a new example of mRNA translated by brain synaptosome.

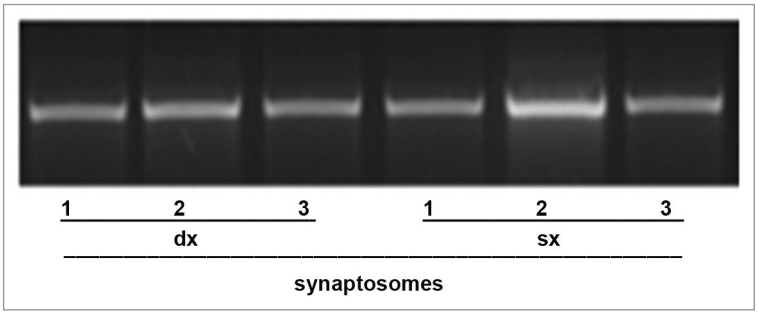

Figure 1. PCR data indicate that synaptosomal polysomes contain bag3 mRNA.

It is worth noting that synaptosomal protein synthesis is actively involved in brain plastic events. Indeed, in rats recovering from permanent brain ischemia, its rate undergoes a massive and prolonged increase,[5] and in learning adult and old rats, the local synthesis of 2 synaptic proteins is selectively enhanced.[6,7] In addition, in learning rats, the ability to learn correlates with the content of synaptosomal GAT-1 and GFAP mRNAs.[8] In this respect, BAG3 represents an example of a synaptosomal protein possibly involved in brain plastic responses. Its 40-kDa form might exert such a role. Further studies are needed to understand the process by which this small form of BAG3 is derived from the corresponding full-length mRNA. The goal will be likely facilitated by the identification of the synaptic element(s) hosting BAG3.

Disclosure of Potential Conflicts of Interest

No potential conflicts of interest were disclosed.

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