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TRANSLATIONAL CONTROL

Cellular stress and translation factors.

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The 4E-binding proteins (4E-BPs) regulate the cap-dependent eukaryotic initiation factor 4E (eIF4E). The level of 4E-BP protein is regulated during early development of sea urchin embryos. Fertilization leads to the rapid disappearance of the protein that reappears later in development. We show that two important cellular stresses, hypoxia and bleomycin prolonged checkpoint mobilization provoked the overexpression of the protein 4E-BP in developing sea urchin embryos. Hypoxia resulted after 1 h in a reversible gradual increase in the protein 4E-BP level. At 20 h, the protein 4E-BP had reached the level existing in the unfertilized eggs. Bleomycin used as a DNA-damaging agent for checkpoint activation, provoked cell cycle inhibition and after prolonged exposure (20 h), induced the expression of the protein 4EBP. The effect of bleomycin on 4E-BP protein overexpression was dose-dependent between 0.4 and 1.2 mM. The role of the overexpression of the protein 4E-BP is discussed in relation with cellular stress responses.