

Translational factors are modified after sea urchin egg artificial activation, leading to protein synthesis increase and Cyclin B synthesis.

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Fertilization of sea urchin eggs triggers metabolism activation and the beginning of embryonic development. Most of the fertilization events are induced by a transient increase of cytoplasmic free calcium released from internal stores and an intracellular pH elevation. One of these events is the global increase in protein synthesis, required for the first mitotic division. Artificial elevation of intracellular calcium by ionophore or alkalinization in presence of NH₄Cl were both reported to activate unfertilized eggs and to induce an increase in protein synthesis. However, no cell division was observed in these conditions. Analysis of translational factors showed that 4E-BP (4E-Binding Protein) is degraded and eIF2 (eukaryotic Initiation Factor 2) is dephosphorylated after fertilization. We report here that eEF2 (eukaryotic Elongation Factor 2) is also dephosphorylated after fertilization. We show that the rapid modifications of these three factors are also observed after artificial activation by calcium ionophore or NH₄Cl treatment. We are now analysing the pathways involved in these modifications: we demonstrate that MAPK is dephosphorylated after NH₄Cl treatment as it was already reported for fertilization and calcium ionophore activation. Interestingly, while fertilization and calcium ionophore activation induce permanent changes, translational factors and MAPK modifications triggered by NH₄Cl treatment are transients although protein synthesis activity is maintained. We show that Cyclin B is synthesized and accumulates after artificial egg activation but no CDK1/Cyclin B activation is observed. These data indicate that in addition to Cyclin B synthesis, another crucial event triggered by fertilization should occur for CDK1/Cyclin B activation required for the onset of the first mitotic division of the embryos. Identification of this event is currently under analysis in our group.