Apical accumulation of MARCKS in neural plate cells during neurulation in the chick embryo

ABSTRACT

The accumulation of MARCKS at the apical region of neural plate and lens placode cells during bending processes is observed. This symmetric subcellular distribution starts before the beginning of curved neural plates. These results indicate potential downstream regulatory actions of these proteins on specific functions of the actin subacical meshwork.

INTRODUCTION

Cells are highly mobile, and this type of mobile accumulation is thought to be a hallmark of neurodegenerative disorders. A recent study has shown that MARCs (marabots) are highly mobile in the brain. Marabots are very abundant in the CNS, and the cell surface is highly permeable to them. The presence of MARCs in the brain is thought to be linked to the neurodegenerative disease, Parkinson's disease. Marabots have been shown to accumulate in the CNS and cause neurodegeneration in mice.

The current study investigated the effect of acute treatment with the anti-MARC drug, marabots, on the accumulation of MARCs in the CNS of chick neuroblastoma cells. The concentration of MARCs in the cerebral cortex of the chick During neurulation, neural plate bending and the elevation of neural folds and their convergence are major tissue movements. These movements are primarily caused by extrinsic and intrinsic forces, and are believed to be mediated by the actin cytoskeleton. Neural plate cells are highly polarized, with actIN and myosin bound to specific regions of cell narrowing, as well as actine-associated zonula adherenses. This junction is essential for invagination processes and, through mouse mutant mice, some proteins involved complexes. MARCKS is a widely used protein substrate for various PKC family kinases and proline directed kinsas like MAPK and Cdks. Its PKA-phosphorylation domain or PSD is highly conserved and it serves as recombinant site for interaction with other molecules, including calcium-calmodulin, negatively charged membrane phosphates, and F-actin. Calcium-calcitidine binding to calcium–calmodify proteins and actin filament cross-linking activity are antagonization by calcium calcium complex of calcium By double-identifying chick embryo cryosections at cranial and spinal neurulation levels, we explored the possible connections between MARCKS and actin during bending movements. Furthermore, our study examined the localization of these proteins in the lens placode to determine whether MARKKS is locally accumulated in both the apical and transient regions of the inner circular covering of epithelia, located near the outer edge of their respective actIN belt. This is the first report to demonstrate that MarcKS exhibits polarized distribution towards an implication as an important morphogenetic movement

CONCLUSION

Remarkable conclusions Our research indicates that MARCKS protein is continuously accumulated to the apical boundary of neural plate and lens placode cells, in close proximity to each other's cilia (an equidistant scaffold) during the formation of the neural tube and its resulting lens vesicle. These observations provide structurally important new insights into the role of MarcKS in spinal neuralplate bending, as well as new challenges for the expression of an arbitrary distribution of this protein.