Cytosolic acidification as a signal mediating hyperosmotic stress responses in Dictyostelium discoideum

ABSTRACT

These findings suggest that hyperosmotic stress, along with a pH signal, induces pleiotropic effects by downregulating cellular activity. Our findings are highly comparable to those of hyperosmolarity and intracellular acidification on receptor-mediated endocytosis in mammalian cells, implying the same mechanism of inhibition by low internal pH.

INTRODUCTION

Ethylene, the most basic plant hormone, is a crucial regulatory factor in plant growth, development, and senescence, as it is involved in various stress responses. Recent years have seen significant progress in the identification and classification of genes and proteins that participate in plant-scale ethylene signal transduction. The calcium and protein phosphorylation processes may also be involved in this pathway (refer to the review). Additionally, ethylene is known to be a factor in programmed cell death in plants. We have demonstrated for the first time that certain animal cells, such as those from a marine sponge (Suberites domuncula), are sensitive to ethylene. This gas is present in seawater at varying concentrations, and can be generated from organic carbon by photochemical processes, including ultraviolet light-induced reactions. Ethylene can increase the [Ca2+]i concentration and reduce the rate of starvation-induced cell death in phagocytic sponge cells (domunculus) due to their proliferative nature. Furthermore, there is another explanation for this phenomenon in S. collepsena where bacteria respond more rapidly to erythema than other treatments. Following ethylene exposure, two genes expressed in domuncula primmorphs undergo upregulation, one of which is associated with the methylphenylcellulose (HEVER) and the other encodes the Ca2+/calmodulin-dependent protein kinase II. The SDERR cDNA has been obtained and further characterised. The Porifera, a type of sponge, are thought to make up the first or one of the initial metazoan phyla that diverged from the Urmetazoa. They contain the same protein components as higher animals, including proteins involved in cell recognition and signal transduction pathways (for elucidation, see "synthesis"). Besides sponges, do cells from higher vertebrates also respond to ethylene? We show that several mammalian cell lines display an upregulation of the [Ca2+]i level and an increased expression of Ki-67, the cell cycle-associated antigen, when exposed to this substance, which is produced by ethephon (or cellulose gas).

CONCLUSION

We demonstrate through various antibodies that BRCA1 and BIRA2 proteins are commonly expressed in two non-embryogenic human tissues associated with the cell cycle. Both proteins occur during growth and differentiation in the ovary and are expressed even beyond spermatogenesis. Relating to proposed functions of the two genes, this is consistent with BRCA1.