OPEN ACCESS Freely available online

Drug Designing: Open Access

Perspective

Induction of Molecular Chaperons during Stressors in Prokaryotic and Eukaryotic Cells

Alaa S. Kolkaila*

Department of Chemistry and Science, Damanhour University, Abadiyyat Damanhur, Egypt

ABOUT THE STUDY

Heat shock proteins (HSP) are a family of proteins that are produced by cells in response to exposure to stressful conditions. They were first described in relation to heat shock, but are now known to also be expressed during other stresses including exposure to cold, UV light and during wound healing or tissue remodeling. Many members of this group perform chaperone functions by stabilizing new proteins to ensure correct folding or by helping to refold proteins that were damaged by the cell stress. This increase in expression is transcriptionally regulated. The dramatic up regulation of the heat shock proteins is a key part of the heat shock response and is induced primarily by heat shock factor (HSF). HSPs are found in virtually all living organisms, from bacteria to humans.

Heat-shock proteins are named according to their molecular weight. For example, Hsp60, Hsp70 and Hsp90 (the most widely studied HSPs) refer to families of heat shock proteins on the order of 60, 70 and 90 kilodaltons in size, respectively. The small 8-kilodalton protein ubiquitin. Which marks proteins for degradation, also has features of a heat shock protein. A conserved protein binding domain of approximately 80 amino-acid alpha crystallins are known as small heat shock proteins (sHSP). Some HSPs have been found to play key roles in the immune response in animals, including antigen presentation, lymphocyte and macrophage activation, and dendritic cell activation and maturation. Plants have a two-branched innate immune system that includes PAMP Pattern-Triggered Immunity (PTI) and effector-triggered immunity in response to pathogen invasion. HSP90 is the most well-studied plant immunity enzyme till present. HSP90 physically interacts with a number of co-chaperones, including members of multiple HSP families, to recruit and interact with a variety of substrate proteins, causing cellular processes to change. HSPs are mostly found in the cytoplasm, although they play a role in transmitting cellular signals to the nucleus during moments of stress. Many cytosolic HSPs respond to biotic and abiotic challenges, including as pathogen infection and insect, as well as abiotic conditions like heat, dryness, and salinity. In both prokaryotic and eukaryotic cells, HSP90 is the most common member of the cytosolic heat shock protein family, and it is rapidly produced in response to various stress conditions. HSP90 interacts with a variety of intracellular proteins in physiological settings, including calmodulin, actin, tubulin, kinases, and receptor proteins. HSFs are the major regulators of HSP gene expression. HSF/HSP transcriptional module-based HSR has been identified as an evolutionarily conserved heat stress response mechanism. Hsp70, as the most important cytoprotective molecular chaperone, is involved in the protection against a wide range of stimuli as well as the recovery of cellular homeostasis. In HT environments, the plant's survival strategy is to modify the expression of genes all across the transcription/translation process at the molecular level. Heat shock proteins are obtained as a result (HSPs) of various stress and tension. Plants have evolved a more complex HSR than yeast and animals. For example, the HSF family of plants has 18-52 members, whereas yeast and Drosophila only have a single copy and mammals have four HSFs.The induction of transcription of these several types of heat shock proteins indicates a reaction to heat stress.

CONCLUSION

HSPs in plants have been characterized based on their estimated molecular weight and intracellular location. The term "heat shock protein" is ambiguous because hsp genes are activated by a variety of signals other than heat. HSPs in plants have recently received a lot of attention because of their new role in innate immunity. High Temperature (HT) is one of the most damaging abiotic challenges for plant tissues.

Correspondence to: Alaa S. Kolkaila, Department of Chemistry, Faculty of Science, Damanhour University, Abadiyyat Damanhur, Egypt, E-mail: allaskolkaela@yahoo.com

Received: 03- Feb-2021, Manuscript No. DDO-22-16024; **Editor assigned:** 07- Feb-2021, PreQC No. DDO-22-16024 (PQ); **Reviewed:** 22-Feb-2022, QC No. DDO-22-16024; **Revised:** 24-Feb-2022, Manuscript No. DDO-22-16024 (R); **Published:** 04- Mar-2022, DOI: 10.35248/2169-0138.22.11.205

Citation: Kolkaila AS (2022) Induction of Molecular Chaperons during Stressors in Prokaryotic and Eukaryotic Cells. Drug Des.11:205