Investigating events involved in the potentiation of SA-mediated Hsp/Hsc70 accumulation during heat stress in plants

Snyman M, Cronje MJ

Department of Biochemistry, University of Johannesburg, Auckland Park, South Africa

All organisms, including plants, are constantly under stress, whether pathological, environmental or physiological. These stressors are usually counteracted through the expression of heat shock (HS) proteins (HSP). The 70 kD member of the HSP family, Hsp70, provides protection against various stress conditions and work synergistically with ATP to balance the levels of ATP needed in cellular processes. In plants, salicylic acid (SA) is a natural signaling molecule and plays a role in the potentiation of heat-induced Hsp/Hsc70 accumulation. Reactive oxygen species (ROS) are involved in signal transduction and pathogen defense. The involvement of ROS and/or ATP in SA-mediated potentiation of Hsp/Hsc70 in plants is unknown. The effects of SA alone or in combination with HS on ROS levels, ATP and cell viability in tobacco cells as well as *hsp70* mRNA stability in tomato seedlings were investigated. Although high levels of ROS were not observed in cells treated with SA during a HS, the addition of an antioxidant abolished the potentiation of Hsp/Hsc70. ATP levels in cells treated with SA in combination with HS were significantly low, when compared to the relevant controls. Low ATP levels could have contributed to the potentiation of Hsp/Hsc70. However, potentiation of Hsp/Hsc70 in SA and HS treated cells was abrogated in the presence of ATP inhibitors. Therefore, we conclude that SA-mediated potentiation is not a mitochondrial-related event. Preliminary results indicate that potentiation may involve *hsp70* mRNA stabilization. Currently, the effect of SA on nuclear events are being investigated.