A NOVEL TRANSCRIPTION FACTOR REGULATING OXIDATIVE STRESS RESPONSE IN NEUROSPORA CRESSA

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When live organisms are exposed to agents that induce oxidative stress they increase the expression of specific genes that encode proteins involved in the elimination of reactive oxygen species (ROS) in order to maintain the physiological balance of the cell. If this mechanism is not enough, events related to programmed cell death can be triggered. The objective of this work was to characterize the ORF NCU01629 product, a transcription factor annotated as a hypothetical protein and termed here as Δore-1 (for oxidative stress regulator), in the stress response in the fungus Neurospora crassa. The DNA binding preference for the transcription factor was previously determined by protein microarray analysis (PBM) and the putative genes regulated by this transcription factor were identified. FunCat was used for gene categorization. The influence of stress conditions (osmotic, heat and oxidative stress) on the growth of the wild-type and Δore-1 strains was analyzed by radial growth. The expression of ROS-associated genes (cat-1-cat-2, cat-3, gst-1, gst-2, sod and nox) and apoptotic genes (bax, metascaspases-1A, and p53-like) was analyzed by qPCR. Fluorescent microscopy analysis was performed to evaluate the ROS production within the hyphae. The FunCat results revealed a high involvement of the transcription factor in cellular events related to oxidative stress and cell death. The mutant strain growth was strongly influenced when cells were exposed to different ROS-inducers agents, such as paraquat, menadione, H₂O₂, and farnesol. In addition the qPCR results showed that the transcription factor regulates the expression of genes related to oxidative stress response. The microscopy analysis results showed differences between the wild-type and mutant strains mainly when the fungus was exposed to H₂O₂ and farnesol. Our results indicate that the ORF NCU01629 encodes a novel transcription regulating stress response in N. crassa.

Key words: Neurospora crassa, transcription factor, stress response

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