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Role of heterotrimeric G-protein in plant signaling during stress

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Heterotrimeric G-proteins, comprising α-, β-and γ-subunits, perceive the extracellular environment through receptors on the plasma membrane and transmit signals to signaling molecules inside the cells known as effectors. In plants, these effectors comprise some transcription regulatory proteins, metabolic enzymes, phospholipases and scaffold proteins. However, the participation of these proteins in intracellular defense signaling pathway remains poorly understood. Moreover, according to our knowledge, no studies have analyzed the overall changes in global gene expression in bell pepper leaves exposed to UV-B. Molecular biological analyses have allowed us to draw a picture of UV stress responses in plants, and determination of the transcriptome has had a significant impact on this research field. Therefore, in the present study, transcriptional responses were investigated in bell pepper stem before and after exposure to UV-B irradiation using RNA-seq analysis to perform gene-expression profiling of the transcripts. Differentially expressed genes revealed that the radiation promoted the acclimation of bell pepper to UV by regulating the expression of genes with functions in UV protection and by inducing the accumulation of phenolic compounds. The major number of genes expressed in response to UVB are main related to regulation of transcription, kinase activity and oxidative stress response. Furthermore, most representative transcripts related to biological pathways, including antioxidant enzymes, G proteins, primary and secondary metabolism, and transcription factors. Interestingly, some of the genes involved in secondary metabolism. Transcriptome profiling highlights possible signaling pathways and molecules for future research. These results opened up ways of exploring the molecular mechanisms underlying the effects of UV-B irradiation on bell pepper and have great implications for further studies.

Publications

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Biography

Dr. Luis Lightbourn has a bachelor´s degree Doctor of Science in Chemistry and PhD in Molecular Biology graduated Summa Cum Laude. Lightbourn is an expert in the interface of chemistry and biology pertaining to nanomaterial. The research interest of Luis Lightbourn is focused broadly on science and technology at the nanoscale and for material science to push scientific boundaries in diverse areas of chemistry, biochemistry and bio-nanotechnology. He has also been actively involved in enhancing the societal awareness of food biotechnology issues around the world.

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