THE SYMBIONT MICROALGAE *Trebouxia* sp. TR9 AND *Trebouxia jamesii* SHOW DISSIMILAR GENE EXPRESSION AND PHENOTYPES UNDER UV-C LIGHT

Eva Barreno[1]; Javier Alcodori[2]; Marta Pérez-Rodrigo[2]; Francisco Marco[2]; César D. Bordenave[1]; Pedro Carrasco Sorli[2]

[1] Instituto "Cavanilles" de Biodiversidad y Biología Evolutiva (ICBIBE), Botánica, Fac. CC. Biológicas, Universitat de València, 46100 Burjassot, Valencia, Spain; [2] Universitat de València, Institut Universitari de Biotecnologia i Biomedicina (BIOTECMED), 46100 Burjassot, Valencia Spain.

Tolerance and adaptation to ultraviolet light has been extensively studied in plants. Nevertheless, information concerning responses to ultraviolet stress in free-living microalgae is scarce, or even non-existent in lichen symbiotic microalgae. In this study, mechanisms of response to UV-C light were evaluated in the phycobionts and *Trebouxia* sp. TR9 and *Trebouxia jamesii* isolated from the lichen *Ramalina farinacea*. These microalgae were cultivated in 3N-BBMGC medium for 21 days and then irradiated with ultraviolet C light for 5, 15, 30 and 45 minutes. The morphology of both colonies showed changes in colour at different exposure times. UV-C radiation on these algae produced alterations in thylakoid structure, which became more scattered and loosely stacked. These two microalgae were also analyzed by flow cytometry revealing significant changes in cell populations. Analysis of gene expression could be a way to understand the different tolerance ranges to ultraviolet stress in these and other strains. Abscisic acid is a hormone involved in the response of plants to abiotic stress, and a key gene for its biosynthesis is NCED3. The expression of this gene increased after exposure to UV-C in *Trebouxia* sp. TR9, but not in *Trebouxia jamesii*. Expression of a set of genes involved in DNA and protein repair increased in *Trebouxia* sp. TR9. The dissimilar gene expression and phenotypes amongst these microalgae could suggest that compared to *T. jamesii*, *Trebouxia* sp. TR9 thrives on high irradiances . Some of our results contrast with those reported for vascular plants and free-living microalgae, suggesting that symbiont microalgae may have developed alternative adaptation mechanisms to cope with extremely bright environments.

Funding: PROMETEO/2017/039 (GVA).