Unravelling the secret of the resistance of desert strains of *Chroococcidiopsis* to desiccation and radiation

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Chroococcidiopsis is a unicellular cyanobacterial genus that is growing in extreme dry conditions, either in low or high temperatures. At the lower end of the spectrum, they live as cryptoendoliths in rocks of the Mc Murdo Dry Valleys in Antarctica where they were discovered by Imre Friedmann, while at the higher end, they grow as hypoliths/endoliths in hot deserts, e.g. Negev, Gobi, Atacama (Friedman, 1980).

The capacity of desert strains of *Chroococcidiopsis* to stabilize their sub-cellular organization is so efficient that, when dried, they can cope with simulated space and Martian conditions (Billi et al 2011 ; Baquè et al. 2013a) as well as with high doses of ionizing and UV radiations (Verseux et al. 2017 ; Baqué et al. 2013b).

Since it is known for radiation/desiccation tolerant bacteria that the capability to avoid protein oxidation is critical to cope with such stressors (Frederickson et al. 2008; Daly et al. 2007), the present study investigates the protein oxidation after prolonged desiccation, irradiation with gamma-rays up to 25kGy and treatment with hydrogen peroxide in a selection of desert *Chroococcidiopsis* isolates, including 2 Antarctic strains: CCMEE134 and CMEE171 isolated from Beacon Valley and University Valley, respectively (Mc Murdo Dry Valleys).

A tight correlation was observed between the desiccation and radiation tolerance of the investigated desert strains and the absence of oxidative damage to proteins. The efficiency of the antioxidant systems of the desert strains of *Chroococcidiopsis* was highlighted also by the lack of protein carbonylation until treatment with 1M of oxygen peroxide. The phylogenetic analysis of the investigated 11 desert strains of *Chroococcidiopsis* is reported.

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