Is Manganese Involved in Helping Haloarchaea Resist UV Damage?

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The purpose of this project is to investigate whether or not Haloarchaea can survive exposure to UV light by an intracellular mechanism involving manganese (Mn) or Mn complexes. The hypothesis states that if Haloarchaea are protected from the effects of ionizing radiation (IR) by intracellular Mn complexes, then survival after UV exposure will be higher with increasing levels of Mn in the growth medium. The null hypothesis argues that if Haloarchaea do not use Mn complexes to help in the resistance of UV damage, then there will be no difference in survival if more Mn is added to the growth medium. To test these hypotheses, two species of Haloarchaea, Halobacterium salinarum, and Haloferax mediterranei were exposed on agar plates to UV light for different times after growth in culture media that contained increasing levels of Mn, and survival was measured after a standard growth period. The results were compared to a UV control with no exposure and a Mn control with the standard low Mn growth medium. For both species, at low Mn, survival after UV exposure decreased dramatically from 1 to 2 minutes, and after 4 minutes, only a few colonies grew. At 4 and 8 minutes of exposure, Hb. salinarum displayed a higher number of surviving colonies than Hfx. mediterranei. When grown in media with higher Mn, UV survival of Hfx. mediterranei was higher than in low Mn, supporting the hypothesis. To confirm this result, experiments using more samples will need to be done for statistical measurements.

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