Can Antarctic Marine Embryos and Larvae Repair UV-damaged DNA Fast Enough?

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Abstract. Previous research (Lesser et al. 2004)[†] showed that embryos of the Antarctic sea urchin *Sterechinus neumayeri* experienced abnormal development and elevated DNA damage when exposed to enhanced UV-B during spring-time atmospheric ozone depletion. The intensities of UV-R experienced were low (UV-B ≈ 0.0028 W m^{-2}, UV-A ≈ 0.1563 W m^{-2}), suggesting that these embryos may be particularly sensitive to UV-R. Increased sensitivity could be the result of a number of factors, including a lesser ability to repair UV-R induced damage.

We examined the ability of Antarctic embryos to repair UV-R induced DNA damage. The specific mechanism we investigated was the photoreactivation of DNA-dimers (CPDs) by the DNA repair enzyme, photolyase. We experimentally assessed the rate of DNA repair in larval stages of the Antarctic sea urchin, *Sterechinus neumayeri*, and for comparison, in the embryos and larvae of two New Zealand echinoderms *(Evechinus chloroticus* and *Petirella regularis).* Differences in DNA repair rates between Antarctic and temperate species are examined, and implications for UV-R sensitivity in Antarctic marine larvae are discussed.

Reference

Lesser MP, Lamare MD, Barker MF (2004) UV-B radiation caused DNA damage in Antarctic sea urchin embryos under the annual sea ice. Limnology and Oceanography 49: 1957-1963