PHOTORECEPTOR DYSTROPHY IN BORON DEPLETED ZEBRAFISH

S. Dohs and C. D. Eckhert

Department of Environmental Health Sciences
University of California
Los Angeles, California, USA

Adult wildtype (WT) zebrafish (*Danio rerio*) were maintained in acrylic aquariums filled with ultrapure grade Milli-Q purified water containing $<0.2\mu\text{mol B/L}$. Brine shrimp, reared in a low boron environment, were provided as food. After six months WT fish were bred. About 5% of the zygotes (F₀) survived to adulthood. These boron depleted (B⁻) fish were reared to adulthood and used as stock to develop an F₁ (B⁻) generation. The F₁ fish were photophobic. Light sensitivity was not apparent in F₁ (B⁺) fish reared in ultrapure water that had been supplemented with boric acid to achieve a concentration of $50\mu\text{M B}$, the concentration of Los Angeles tap water. Retinas from both (B⁻) and (B⁺) adults were fixed and embedded for histological evaluation.

Retinas from (B⁻) zebrafish exhibited cone dystrophy. This manifested as poorly developed outer segments with small myoid regions of the inner segment. In contrast, the outer segments of (B⁺) retinas were well developed and their inner segments exhibited well developed myoid regions.

Boron depletion is manifested in embryonic fish as retarded growth (trout) and death resulting from a failure to complete the cleavage stage (zebrafish) of development. The present observation adds photoreceptor dystrophy in the adult as an additional symptom of boron deficiency.