

# ALPHA LIPOIC ACID, A POWERFUL AND UNIQUE ANTIOXIDANT: PRELIMINARY RESULTS FOLLOWING ADMINISTRATION OF ALA TO PINNIPEDS

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## ABSTRACT

Ocular disease is well documented in captive pinnipeds.<sup>1</sup> Supplementation with antioxidants may protect against ocular, cardiac, renal, and hepatic diseases.<sup>2,3,4</sup> Disinfectants such as chlorine and ozone are dissociated by ultraviolet radiation to produce reactive free radicals which likely cause cellular damage if exposed.<sup>5</sup> Alpha lipoic (ALA) is a fatty acid that acts as a powerful water and fat-soluble antioxidant found in the body in trace amounts. ALA increases the body's production of glutathione, the body's most important endogenous antioxidant. ALA helps dissolve toxic substances in the liver.<sup>3</sup> Imbalance of the glutathione redox cycle contributes to cataractogenesis and ALA has been shown to protect lenses from oxidative stress that causes cataract.<sup>4</sup> The objective of this study was to determine if ALA, at a dose of 2-3mg/kg a day, is a safe antioxidant for California sea lions. CBC/chemistry panel was collected from seven animals pre and post ALA supplementation with no evidence of hepatic toxicity (6 out of the 7 animals decreased in GGT values). The mean length of time the animals were on the supplement was 35 days. Currently, there is no method known to quantify ALA in sea lion serum. Serum (100mls total) was collected and frozen at a -80°C freezer from 73 sea lions, followed by a novel LC-MS/MS analysis to quantify ALA levels in sea lion serum. Current research is in progress to determine if higher doses of ALA would still be safe and well-tolerated in California sea lions.

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## LITERATURE CITED

1. Colitz CM, Saville WJ, Renner MS, McBain JF, Reidarson TH, Schmitt TL, Nolan EC, Dugan SJ, Knightly F, Rodriguez MM, Mejia-Fava JC, Osborn SD, Clough PL, Collins SP, Osborn BA, Terrell K. 2010. Risk factors associated with cataracts and lens luxations in captive pinnipeds in the United States and the Bahamas. *J Am Vet Med Assoc* 237(4):429-436.

2. Adeghate E, Kalasz H, Veress G, Teke K. 2010. Medicinal chemistry of drugs used in diabetic cardiomyopathy. *Curr Med Chem* 17(6):517-551
3. Foo NP, Lin SH, Lee YH, Wu MJ, Wang YJ. 2011.  $\alpha$ -Lipoic acid inhibits liver fibrosis through the attenuation of ROS-triggered signaling in hepatic stellate cells activated by PDGF and TGF- $\beta$ . *Toxicology*.
4. Maitra I, Serbinova E, Tritschler H, Packer L. 1995. Alpha-lipoic acid prevents buthionine sulfoximine-induced cataract formation in newborn rats. *Free Rad Biol Med* 18:823-829.
5. Chiras DD. *Environmental Science*. Massachusetts: Jones and Barlett Publishers. 431 p.