

BLOOD CHEMISTRY VALUES OF CALIFORNIA CONDORS EXPOSED TO LEAD

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ABSTRACT.—Clinical pathology provides a noninvasive means to elucidate health status in wildlife species. The California Condor (*Gymnogyps californianus*) is an endangered species that has been reintroduced into the wild due to successful captive breeding. Condors are periodically recaptured from the wild in order to evaluate battery function on wing-tag radio transmitters and to collect blood samples to assess blood lead levels. It has been shown previously that blood lead levels in condors increase with time spent in the wild. Lead is a well-known neurotoxin and nephrotoxin; however, there are no specific blood chemistry markers for lead-induced nerve tissue damage or renal disease. The effect of lead on blood chemistry values in wild bird species is unknown. It is thought that lead interferes with second messenger receptors in neurons and induces Schwann cell degeneration. Lead also decreases renal glomerular filtration rates, which would then lead to an increase in serum concentrations of molecules normally filtered by the kidney. This project analyzed 12 plasma samples from condors collected between April and November of 2007. Four of the condors had not yet been released into the wild (prerelease), and eight had been released (released) for at least one month prior to the time of blood collection. Samples were run in duplicate on an Abaxis® VetScan VS2® instruments utilizing Avian/Reptilian Profile Plus (ALB, AST, BA, Ca, CK, GLOB, GLU, K⁺, Na⁺, PHOS, TP, UA) and Mammalian Liver Profile (ALB, ALP, ALT, BA, BUN, CHOL, GGT, TBIL) rotors. Increases in phosphorous and in uric acid are used as indicators of renal disease in birds, however, in this study, no correlation was found between phosphorus or uric acid and blood lead levels. In the two condors with the highest blood lead levels (64 and 20 µg/dL), CK, and K were at levels above the currently published reference ranges for these blood chemistry values. CK is an enzyme found in skeletal muscle, cardiac muscle and brain tissue, and increases in CK activity have been associated with lead toxicity, perhaps due to neuronal damage. K is an electrolyte that may be increased due to kidney dysfunction caused by lead-protein complex formation in renal tubular cells. This study served as an initial survey of blood chemistry values in condors with established blood lead levels, and will be expanded in the future.

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