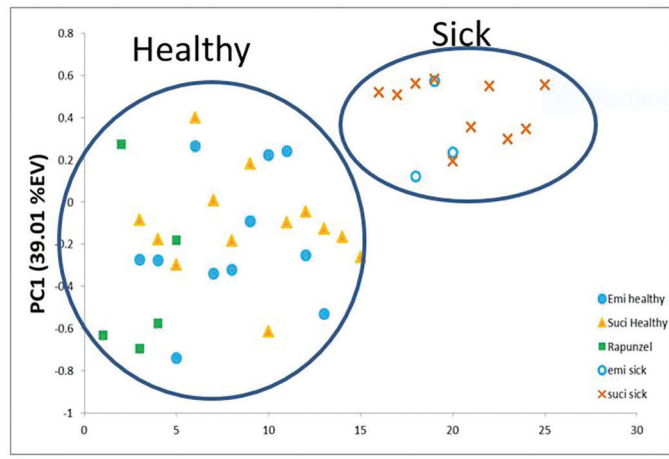


NON-TRADITIONAL PROJECT UPDATES

Going Fishing with Metabolomics

Sumatran Rhinos

Because serum ferritin concentrations are not diagnostic of iron storage disease (hemochromatosis) in Sumatran rhinos, it is important to investigate alternative tests. One area of research that is gaining momentum in human medicine is metabolomics - the study of untargeted, comprehensive small molecule profiles derived from body fluids or tissue extracts. This area of research is beyond CREW's expertise, but we have a strong partnership with our neighbors at Cincinnati Children's Hospital Medical Center (CCHMC), and they do have these specialized skills and the necessary, high-tech equipment required for such work. A case study in which serum metabolomes were analyzed in two Sumatran rhinos that died of hemochromatosis revealed some very promising results. Metabolomes from serum collected during healthy times were compared to those from serum collected when rhinos were exhibiting symptoms of hemochromatosis in the months leading up to their deaths. A total of 18 metabolites including several amino acids and carbohydrates were altered in samples from healthy versus from unhealthy rhinos. These findings demonstrate that metabolomics could prove to be a valuable tool for monitoring the health of wildlife and may reveal biomarkers that could be used to monitor the progression of this and other insidious diseases that are difficult to diagnose. (Funded, in part, by CCHMC).



Principal components analysis of Sumatran rhino serum metabolomes

Fishing Cats

Metabolomics is being increasingly applied to wildlife, extrapolating findings from humans and laboratory animals to provide insights into the health status and disease issues of nondomestic species. The fishing cat, an endangered aquatic felid native to Southeast Asia, has been one beneficiary of this new science. Fishing cats in zoos experience a very high prevalence of bladder cancer, with one-third of older cats (>5 years of age) dying of this disease. Early diagnosis is one key to effective treatment, but most diagnostic methods require the cancer to be well-advanced for detection. Metabolomics, using nuclear magnetic resonance (NMR) with urine and/or blood samples, has proven useful in other species to identify potential biomarkers for bladder cancer early in the disease course. In collaboration with Dr. Miki Watanabe from NMR - Based Metabolomics Core Facility at CCHMC, CREW has been evaluating the urinary and serum metabolome of fishing cats with and without evidence of bladder cancer. Findings to date, based on ~50 urine and serum samples provided by 12 zoos, have shown that several metabolites differ significantly between fishing cats with bladder cancer compared to cats without known cancer. Analysis of additional samples will be necessary to validate these biomarkers, but our initial results are encouraging for the prospect of establishing an early diagnostic method for bladder cancer in this imperiled felid species. (Funded, in part, by CCHMC.)

