



CALIFORNIA STATE SCIENCE FAIR 2015 PROJECT SUMMARY

Name(s) Rachna R. Deshpande	Project Number 35742
Project Title Comparative Epidemiology of Coccidioidomycosis	
Objectives/Goals The goal of the project was to assess epidemiologic factors for coccidioidomycosis in chimpanzees and humans. The primary objectives were (1) to identify factors associated with disease-incidence and treatment-response in each species, and (2) to identify inter-species differences. The central hypothesis was that the epidemiology of coccidioidomycosis will be highly similar between captive chimpanzees and humans. Abstract Methods/Materials The veterinary records (collected over 30 years) of 87 chimpanzees nurtured at the Primate Foundation of Arizona were studied, and the data were organized into the following categories: name, date of birth, sex, age when seroconversion was observed, clinical complications if any, and treatments administered. These were compared with the epidemiologic data collected between 2001 and 2014 on the occurrence of coccidioidomycosis in 19,817 humans (records were obtained from the Kern County (CA) Public Health Services Website). The data were analyzed using single or multiple category filters in Microsoft Excel to spot epidemiologic trends in each species, and to identify inter-species differences. Two-tailed Student's t-test and Chi-square test were used to determine the statistical significance. Results A statistically significant age bias was identified between (younger) chimpanzees and (older) humans showing seroconversion or disease symptoms (an inter-species difference). All ages combined, a trend for male gender bias for the same outcomes was observed in both species (an inter-species similarity). However, among older chimpanzees, females showed higher seroconversion rates, lower complement fixation titers, and lower treatment response rates than males. Conclusions/Discussion The results showed that, as hypothesized, a common epidemiologic factor (male gender) was identified for seroconversion in captive chimpanzees and incidence of coccidioidomycosis in humans. A contrasting epidemiologic factor (age) was also identified. Greater seroconversion was observed in older female chimpanzees; it may have been associated with weaker immunocompetence and may have led to weaker treatment response. Future studies will need to assess (1) any gender bias among older, infected humans, and (2) possible underlying mechanisms including poor immune status. More detailed epidemiologic comparisons may help us model susceptibility and improve treatments for this disease in both species.	
Summary Statement Gender, age, and immunocompetence may serve as important epidemiologic factors for coccidioidomycosis in chimpanzees and humans.	
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