

2020



# WHITE-NOSE SYNDROME

## NATIONAL WEBINAR

## White-Nose Syndrome National Webinar

June 10 & 11, 2020, 11:00am – 5:00pm



### ABSTRACT

#### **Phase-2 Development of the Portable C-320 Electronic-Nose for Noninvasive Early Detection of White-Nose Syndrome in Susceptible Bat Species**

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Further investigations of new, noninvasive electronic methods for early White-Nose Syndrome (WNS)-disease diagnosis, based on e-nose VOC-detection of the disease itself, have provided new chemical evidence of metabolic differences in WNS-susceptible bat species. Development of improved methods for pre-symptomatic detection of WNS in bats using the portable C-320 electronic-nose (e-nose) has required multi-phase efficacy studies of instrument capabilities to discriminate between major sources of volatile organic compounds (VOCs) derived from clinical samples. In this phase-2 study, we further tested this e-nose for capabilities to discriminate between bat species based on differences in whole-body VOC emissions. Physiologically active (non-torpid) healthy individuals of nine bat species were temporarily captured outside of caves in Arkansas and Louisiana. VOC emissions from bats were collected using newly developed portable air-collection and sampling-chamber devices in tandem. Sensor-array output responses to bat VOC emissions were compared to those of 22 pure VOC analytical standards from five chemical classes. Distinct smellprint signatures were produced from e-nose analyses of VOC metabolites derived from individual bat species. Smellprint patterns were analyzed using 2-dimensional and 3-dimensional Principal Component Analysis (PCA) to produce aroma map plots showing effective discrimination between bat species with high statistical significance. These results demonstrate potential instrument efficacy for distinguishing between species-specific, bat-derived VOC metabolite emissions as major components of clinical samples collected in caves for disease detection prior to symptom development. This study provided additional information required to fully test the efficacy of a portable e-nose instrument for diagnostic applications in subsequent phase-3 testing of noninvasive, early WNS disease detection in intra-cave hibernating bats. These results suggest a new, possibly more reliable means and improved approach for early WNS-disease detection, based on e-nose VOC-detection capabilities, compared to the more tenuous early-detection capabilities of qPCR based on quantification of Pd-pathogen DNA in swabs from external skin surfaces.

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