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A binning and sampling approach to molecular vaccine candidate discovery for ASFV

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Members of the African Swine Fever Virus (ASFV) superfamily carry the largest known viral genomes, display the most complex viral life cycles, and use a diversity of mechanisms for host immune evasion. ASFV is highly contagious, causing an acute hemorrhagic fever in domestic pigs, but persistent infections its natural hosts: warthogs, bushpigs and soft ticks. The virus is endemic in Africa but outbreaks occur worldwide such as in the Caucuses and Eurasia presently. Mortality rates are near 100%; no treatment, vaccine, or animal disease model is available. ASFV incurs severe economic and social impacts from loss of domestic pig populations and export bans on animals and pork products. Furthermore, its short incubation period, high mortality rate, and particle stability contribute to making ASFV a potential agent of agricultural bioterrorism.

An approach will be presented for vaccine discovery based on forcing a pathogen to unnaturally expose its immunome by vaccinating with expression libraries encoding the proteome. This far broader repertoire of host activities can then be examined to identify protective ones. Immunogens are identified in a first round of analyses and then more informative assays are performed in a second round. Immunogens are sorted into categories based on their characteristics. Finally, representatives from each of these "bins" are functionally tested in challenge-protection studies to identify categories that correlate with protection. Our immediate objective is to obtain a safe and broadly effective vaccine against ASFV. However, we intend that this approach be applicable to many other emerging or re-emerging diseases.

Biography

Sykes received her doctorate from Duke University and then moved to University of Texas, Southwestern Medical Center for two postdoctoral fellowships. She was Director of Vaccine Research at MacroGenics for several years before arriving at Arizona State University in 2005 as an Assistant Professor. She is interested in using innovative molecular approaches to manipulate the immune system toward better health.