

Saluki genetics study

In my interactions with the researchers at the Van Andel Institute (who are including Salukis in their NIH supported cancer studies), I have been fortunate to meet Dr. Mark Neff. He is enthusiastic and fascinating to talk to. His interests lie in the genetic causes for adaptive traits ranging from coat texture to behavior (see his work on coat variation in the dog, which is governed mostly by variants in just three genes that are shared broadly across dogdom; Science, 2009). Dr. Neff has agreed to give the invited seminar at the SCOA National Specialty Show in Lexington, Kentucky in June. He is pursuing several projects involving the unique biology of Salukis. He will address these questions through a combination of gene mapping, molecular and cell biology, and comparative histology. Saluki samples are needed. I am interested in collaborating with Dr. Neff on a study of coat variations found in Salukis (from fine and sparse to double coating with profuse feathering) as well as abnormalities, such as bald thigh syndrome, flank alopecia and color dilution alopecia. Please contact me if you are willing to participate.

–MaryDee Sist, DVM, salukihealth@aol.com

2010 SCOA National seminar Genetics as a lens for viewing the unique biology of the Saluki

by Mark Neff, Ph.D., Director of the Center for Canine Health and Performance

Abstract

Genetics holds promise for elucidating the basis of inherited disease in the dog. Gene discoveries can be translated into DNA tests that inform breeding decisions to reduce or even eliminate certain diseases and defects. The same molecular approaches used to understand hereditary diseases can similarly be applied to illuminate the characteristics that define a breed's standard. While these traits are of obvious interest to breeders, they are more broadly biologically important because the profound diversity in size, shape, and behavior across breeds will inform on basic biological processes, which creates a foundation for interpreting the mechanistic missteps that give rise to disease. Understanding pointing or lure-coursing, for example, will help to establish the basic rules by which genes govern behavior. This in turn will lay the groundwork for deciphering how these rules are broken in human mental illness and psychiatric disease. In this talk, I will frame the unique biological attributes of the Saluki that are of particular interest to both breeders and biologists, and discuss

ongoing research into the basis of these traits. I will also report on our broad initiatives aimed at tackling complex diseases in the dog, such as the Canine Hereditary Cancer Consortium, which is exploring root causes of breed-based cancer susceptibilities.

Additional background

The Saluki reflects the incipient ancestral type of all sight hounds, with ancient origins in the Middle East and North Africa. The unique biology of the Saluki is largely unexplored - the dog's morphology, physiology, and behavioral repertoire can reveal the genes that have been prized for thousands of years. In my laboratory, we hope to explore this unique biology in several respects. The first study will be focused on a relatively simple characteristic, but one that is unique to some Salukis - the long hair on the ears and tails, with feathering between the toes. The gene(s) responsible for this trait of remarkable biological interest - what kind of change in what kind of gene alters the hair growth cycle in such a localized way? This genetic attribute will provide a window into the determinants of

intercellular signaling and developmental biology. We can also use this biology to deduce the natural history of the Saluki, and the more general diaspora of sight hound breeds. Lastly, the genetics of localized hair growth and feathering is likely relevant to some of the hair growth alopecias in the Saluki (e.g., bald thigh syndrome). By understanding the basic biology of desirable traits, we can gain a molecular foothold into the basis of several undesirable alopecias, with an ultimate goal of predictive DNA tests to reduce the incidence.

Biography and perspective

Dr. Mark Neff is the founding Director of the Center for Canine Health and Performance, a research initiative jointly supported by the Translational Genomics Research Institute (TGen) in Phoenix and the Van Andel Research Institute (VARI) of Grand Rapids, Michigan. Dr. Neff's doctoral studies were focused on cell cycle research in classical yeast genetics at the University of Virginia. After receiving his PhD, Dr. Neff accepted a Human Genome Distinguished Postdoctoral Fellowship from the U.S. Dept. of Energy to work on the original Dog Genome Project. This was in the laboratory of Dr. Jasper Rine, a member of the U.S. National Academies of Sciences, at UC Berkeley. Dr. Neff's current research interests marry dual aspects of canine biology. The first aims to tackle the basis of inherited disorders in the dog, as these serve as natural models of human disease. The second aims to leverage adaptive variation in the dog to shed light on the evolution of form and function. The laboratory has a particular emphasis on using selectively bred action patterns, such as pointing and herding, to probe the mechanics of the mammalian mind. Both research aspects, health and performance, are driven by the unique strengths of breed genetics, and the ability to gain molecular access to causative genes through effective and efficient genome analyses.