Abstract - What do “gapers”, “tail chasers” and “flank and blanket suckers” all have in common? The inheritance of the wide open mouth coyote gape threat in coyote x beagle hybrids, tail chasing in bull terriers and flank/blanket sucking in Doberman pinschers all illustrate the importance of the interactive relationship of genes, hormones, and environmental stress on behavioral development. The latter two studies have been proposed as animal models for human obsessive compulsive disorder and possibly human autism spectrum disorder, which adds an additional consideration when developing training and behavior modification programs for an affected dog.

Having a general understanding of gene-environment interaction is relevant to animal professionals of various persuasions. Why? How many times have you heard: “pit bulls” are genetically predisposed to be aggressive vs. “pit bulls” are no different from other dogs and any aggressive behavior is the result of their “environment”? Thinking rationally, it is clear neither viewpoint is valid on its own merit. In this day and age when we are inundated with “popular science” via the Internet, books and television, it is tempting to turn urban myth into “fact”. By exploring these specific studies, I hope to generate an interest in animal behavior genetics and illustrate the importance of the gene environment relationship and why it is important not to jump to “genetic-only” or “environmental-only” conclusions. An intelligent vs. emotional approach to animal behavior genetics has positive implications for animal models for genetic disease, breed bans, rescue and other topics of concern to many animal professionals.

The following are three published abstracts for the research to be discussed and used as models to illustrate key concepts. Be assured the information will be presented in a friendly format for the non-scientist, complete with videos and slides to illustrate the behaviors, but with enough detail to interest academics in the audience.

The Ontogeny of Expression of Communicative Genes in Coyote–Beagle Hybrids

Alice Moon-Fanelli, PhD, CAAB

Abstract: Although there are minimal genetic differences between the coyote (Canis latrans), the gray wolf (Canis lupus), and the domestic dog (Canis familiaris), these three species are extremely different in numerous aspects of their physiology, morphology, and behavior. In particular, the
threat display of coyotes differs markedly from dogs and wolves. Coyotes display a wide open mouth gape-threat with attendant arched back defensive posture, and hiss vocalization. In our experience, this threat display is absent from the repertoire of the domestic dog and the gray wolf. We hypothesized that the foundation of these differences in species-typical threat displays is genetic. The threat displays of coyote–beagle crosses (F1’s, F2’s, F3’s, F1F2’s and beagle backcrosses), included the following phenotypes: that of each parental species, that of the domestic dog during pre-pubertal development switching spontaneously to the coyote gape-threat following sexual maturation; and a comparable phenotype requiring exposure to post-pubertal social stress-priming to bring the encoded genetic potential for the gape-threat to expression. The changeover from the dog snarl-threat to the coyote gape-threat was accompanied by a precipitous rise in endogenous cortisol levels over baseline. We hypothesized that where alternative genetic systems are physically available, their selective expression in development may depend on environmental events, such as social stress, to affect internal mechanisms that ultimately control the phenotype. Exogenously elevated cortisol levels, in the absence of the subjective experience of social stress, were associated with the onset of the expression of the coyote threat pattern in an F1 hybrid possessing a full haploid complement of coyote genes and his backcross offspring resulting from a breeding to his F2 daughter. With oral doses of hydrocortisone, the cortisol levels were substantially elevated over basal levels. With endogenous cortisol priming, an increase up to five-fold over those levels obtained with social stress was associated with the expression of the coyote phenotype.

(Behav Genet 2011; 41:858-875)

Blanket and flank sucking in Doberman Pinschers

Alice A. Moon-Fanelli, PhD, CAAB; Nicholas H. Dodman, BVMD, DACVB; Nicole Cottam, MS

Objective—To evaluate blanket and flank sucking and any association with pica in Doberman Pinschers.

Design—Survey and case-control study.

Animals—153 Doberman Pinschers (77 dogs with blanket or flank sucking and 76 unaffected dogs).

Procedures—Owners of Doberman Pinschers with blanket sucking, flank sucking, or both were surveyed regarding the age of onset, triggers, frequency, duration, interruptability, and associated medical and behavioral consequences. A putative association of blanket sucking
and flank sucking with pica was examined by comparison of affected dogs with unaffected dogs.  

Results—Apart from the difference in the object of oral activity between blanket and flank suckers, age of onset was the only variable that differed between dogs with the 2 conditions. Dogs with blanket or flank sucking had a higher prevalence of pica than the unaffected population.  

Conclusions and Clinical Relevance—Blanket and flank sucking are apparently related conditions that can occur with sufficient intensity to cause medical sequelae. These nonnutritive suckling behaviors share similarities with other canine compulsive disorders and are associated with pica. Veterinarians should advise owners that flank and blanket sucking are abnormal, potentially harmful behaviors in dogs. Treatment should be considered for severely affected dogs or when flank or blanket sucking is associated with medical problems.  


Characteristics of compulsive tail chasing and associated risk factors in Bull Terriers

Alice A. Moon-Fanelli, PhD, CAAB; Nicholas H. Dodman, BVMS, DACVB; Thomas R. Famula, PhD; Nicole Cottam, MS

Objective—To evaluate and define the characteristics of tail chasing in Bull Terriers and explore the association between tail chasing and other behavioral and physical characteristics.

Design—Survey and case-control study.

Animals—333 Bull Terriers (145 dogs with tail-chasing behavior and 188 unaffected dogs).

Procedures—Owners of Bull Terriers with tail-chasing behavior were surveyed regarding the age of onset, triggers, frequency, duration, interruptability, degree of disruption to the dogs’ normal functioning and the owners’ relationship with the dog, and associated medical and physical consequences. Associations of tail chasing with various behavioral and physical characteristics were examined by comparison of dogs with tail-chasing behavior with unaffected dogs.

Results—Phenotypic and developmental descriptions of tail chasing in Bull Terriers were defined. Associations of tail chasing with sex, trance-like behavior, and episodic aggression were found. Males were at an 8% greater risk for the diagnosis of tail chasing than females. Phobias and owner-directed aggression did not significantly associate with tail chasing in the final log-linear model, but did have significant associations in earlier analyses that did not include the behaviors of episodic aggression and trance-like behavior.

Conclusions and Clinical Relevance—In Bull Terriers with tail-chasing behavior, there was a slight increase in the susceptibility of males to develop tail-chasing behavior, compared with females. A close association of tail chasing with trance-like behavior and episodic aggression was identified.