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# SICB 2023 Annual Meeting Abstracts



**1511** Evelyn Abbott, Mikhail Matz

***Gene body methylation and gene expression plasticity do not correlate in a reef-building coral***

As coral reefs continue to decline, the relationship between epigenetics and response to environmental change warrants investigation. In invertebrates, epigenetic markers are almost entirely in the form of gene body methylation (GBM). Here, we tested whether environmentally-driven changes in GBM impact gene expression plasticity in a reef-building coral. In our experiment, coral fragments were subjected to either heat or control conditions over four weeks, in addition to daily temperature fluctuations due to the time of day. Near the end of the experiment, some heated corals were switched to the control condition to see if their expression would revert remain in the heated state, indicating reduced plasticity. When taking a transcriptome-wide approach, we found no significant correlation between treatment-driven GBM change and reduced plasticity. In regards to daily expression changes, we found evidence that some genes had reduced plasticity at the end of the experiment. However, this was unrelated to GBM change. Finally, to look for fine-scale signatures of reduced plasticity and GBM change we identified modules of co-regulated genes, one of which showed reduced plasticity following heat treatment. However, there was no significant correlation between gene membership in this module and plasticity in the heat and control groups, and only a negligible correlation in the switched group. We conclude from these results that although GBM can change over time, this has no bearing on gene.

**488** David Adams, Michael Deutsch, Lorin Neuman-Lee, Matthew Gifford

***Consequences of Anthropogenic Fire Suppression for Lizard Immunity***

Maintenance of innate immunity is energetically costly. When resources are limited, organisms might trade-off between immunity and other important functions like growth and reproduction. Climate change is expected to introduce novel or intensified immune challenges, which may exacerbate life history trade-offs and reduce individual fitness, especially in already vulnerable populations. Eastern Collared Lizards (Crotaphytus collaris) are especially vulnerable to the compounded effects of human disturbances, climate change, and life history trade-offs. Crotaphytus collaris is a Species of Greatest Conservation Need (SGCN) in the state of Arkansas where naturally occurring populations are concentrated on xeric glade outcroppings. Due to anthropogenic fire suppression, many glades have been overrun by red cedar trees (Juniperus virginiana), which dramatically altered the habitat. Crotaphytus collaris on cedar-encroached glades have smaller body sizes and lower fecundity than C. collaris on non-degraded glades, which current modeling suggests is caused by energy limitations on cedar-encroached glades. We investigated immune function and sex steroid concentrations of C. collaris between glades with varying tree densities across the reproductive season. We predicted that immune function would be suppressed during the height of reproductive investment and that the degree of immune suppression would be highest on cedar-encroached glades where energy is thought to be most limited. Results of these analyses and their implications for ecoimmunology and conservation efforts will be discussed.

**1292** Danielle Adams, Brad Boyce, Daniel Hooks, Benjamin Klitsner, Samantha Price, Richard Blob

***Material properties of Cetartiodactyla skull and jaw bones***

Reentering aquatic habitats involved drastic evolutionary changes in the physiology and morphology of whales and dolphins (Cetacea) compared to their terrestrial relatives (Artiodactyla). Bone material properties of the skull and lower jaw, including density and

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on their head called cephalic hair, which when stimulated rapidly elicit flight. During such rapid take-offs, diverse distributed flight-related reflexes are activated in a closely coordinated manner suggesting that they directly trigger diverse flight-related reflexes. We tested this hypothesis in the Oleander hawkmoth, Daphnis nerii by stimulating their cephalic hair with a sharp gust, and monitoring their flight response using high-speed videography, IR imaging and electrophysiology. Our experiments revealed diverse facets of cephalic hair-mediated flight initiation in the tethered moths. At the behavioral level, moths stimulated with an air puff directed at their head displayed robust and stereotypical flight initiation responses consisting of modular behaviors including leg extension, wing initiation, antennal positioning, head stabilization, and abdominal flexion. Cephalic hair-mediated flight initiation was rapid, and bypassed the need for warm-up behavior, typically required in larger moths including Daphnis nerii. Fluorescent dye fills of the cephalic hair revealed that the long primary afferents project into the meso and metathoracic ganglia. Electromyograms of the steering muscles innervated by flight motor neurons showed consistent activity elicited by cephalic hair stimulation. Together,these data show that the cephalic hair system is part of an escape-like response, which enables rapid flight initiation.

**726** Stephen Manning, Mark Nohomovich, Jennifer Olori, Eli Amson, Roy Ebel

***Are all caudates boneheads? Exploring lifestyle signals in the microanatomy of amphibian skull roofs***

Tetrapod hard tissue structure repeatedly has been shown to evolve in concert with specific lifestyles. Such microanatomical correlates allow reconstruction of past lifestyle transitions and can shed light on tetrapod evolutionary history. One example is the recent discovery of lifestyle signal in squamate skull roof structure. However, we currently lack information on how roof microanatomy might reflect the variation in ecology, bodyplan, and life-history encountered in amphibians. We examined μCT scans of 18 salamander species and quantified six skull roof traits based on a new computational method. These traits comprise skull roof compactness and thickness, bone overlap, frontoparietal length ratio, and cranial diameter and elongation. Skull roofs were segmented in 3D Slicer and resulting volumes analyzed for structural trends in FIJI. Compactness exceeded 97% in all species, and a correlation between lifestyle and microanatomy was not supported. Although average values for the skull roofs lacked significant differences across lifestyle, there were indications of differences in specific regions of the skull roof. Contrasting with trends across squamates, size may play a stronger role in shaping microanatomy, or the relationship with lifestyle is more complex in salamanders due to frequent biphasic habitat use and strong burrowing capabilities in aquatic taxa. The addition of more taxonomically diverse anurans and fully fossorial caecilians will help refine our understanding of the major influences on roof microanatomy in amphibian evolution.

**1828** Devanand Manoli, Ruchira Sharma, Kristen Berendzen, Amanda Everitt1, Kimberly Long, Nerissa Hoglen, Michael Sherman, Arthur Willsey

***Dissecting the neural basis of social attachment***

Social attachments play a central role in most, if not all, levels of human interaction. The analysis of social attachment has been resistant to genetic and neurobiological approaches, as traditional genetic lab model animals do not exhibit adult social attachment behaviors. Prairie voles display social attachment as adults such that mates form an enduring pair bond and display complex attachment behaviors including social monogamy and bi-parental care. Pioneering work in voles identified vasopressin (Avp) and oxytocin (Oxt) as critical mediators of pair bonding and social cognition and behaviors in humans. Nevertheless, how these and other genes function within these circuits to control specific aspects of complex social behaviors remains unknown. We generated prairie voles lacking mutant for the oxytocin receptor (OxtR) to understand how Oxt signaling controls attachment behaviors, and the associated changes in gene expression and neural activity in circuits that mediate attachment-related behaviors. Here we present our analysis of the behavioral, molecular, and physiologic consequences of loss of OxtR function on pair bonding and attachment behaviors. We find differences in the role of OxtR in the formation of pair bonds and promiscuity in males vs. females, and sex-specific effects of OxtR function on 1) reciprocal social behaviors mediating attachment formation, 2) the development of neurons that mediate pair bonding, and 3) patterns of neural activity in these populations during social and attachment behaviors.

**693** Lianna Marilao, Paula Tran, Daniel Barta

***The variable occurrence of Wormian (intrasutural) bones across Mammalia***

Wormian (intrasutural) bones develop from separate ossification centers between cranial sutures and within fontanelles. They are an anatomical variation, with a va-