This spring, IU was awarded a one million dollar NIH training grant in which CISAB will participate, entitled “Common Themes in Reproductive Diversity” thanks to CISAB faculty members Ellen Kettersson, Dale Sengelaub, Troy Smith and Greg Demas and grant writer Eva Allen.

Early this summer, four pre-doctoral training grant recipients were announced:

**Britt Heidinger**

Britt is a fifth year graduate student working with Ellen Kettersson. She has been extremely active in research, attending multiple professional conferences and producing 1 published paper, 3 submitted manuscripts, and another 1 in preparation. Britt has received multiple grants to fund her research, including an NSF Doctoral Dissertation Improvement Grant. Britt’s CTRD predoctoral fellowship will help her conduct her research examining age-related changes in interactions between stress response and

Cont. page 4

**CBN SPRING SYMPOSIUM**

This spring graduate student Shawn Hurst traveled to Atlanta Georgia to participate in the Center for Behavioral Neuroscience’s 2005 Spring Symposium. CBN is a consortium of eight Atlanta colleges and universities with an integrative approach to neuroscience and behavior. CISAB previously invited CBN members to our Spring Symposium along with members of North Carolina State University’s W.M. Keck Center for Behavioral Biology, and CBN invited CISAB and Keck Center graduate students to their symposium in return. This year’s Spring Symposium was held on the beautiful wooded campus of Emory University.

Despite rough weather on the eastern seaboard that delayed flights, storms cleared for a beautiful weekend in Atlanta. CBN graduate students went above and beyond the call of duty as hosts, ferrying late arriving grad students, taking them to the Natural History Museum, Centennial Olympic Park, and showing them around Atlanta. CBN had a dinner before the conference where Shawn and the Keck Center visitors had the opportunity to get to know each other and CBN faculty and graduate students as well. All were made to feel very welcome.

Cont. page 5
CISAB 2004
ANNUAL REPORT

Current Participants:
Faculty: 19 core and 20 adjunct faculty, representing 11 departments/programs. In 2004, we added one core faculty member and 5 new adjunct faculty.
Students and Affiliated Scientists: 19 postdoc and affiliated scientists, 44 graduate and 55 undergraduate students. In 2004, we added 3 graduate and 15 undergraduate students.

CISAB Core Facilities:
Our Animal Behavior Lab (136 Jordan Hall, managed by Amy Eklund) continues to be popular, providing sample analysis, training, space and equipment to CISAB members wishing to apply genetic, neuroendocrine, and immunological techniques. In 2004, the AB Lab participated in 25 separate projects involving 10 labs in Biology, Psychology, Medical Sciences and Chemistry. In addition, the faculty were used for a new introductory program for undergraduate summer researchers participating in the CISAB REU program.

Proposals for growth and extended use of our Behavioral Information Technology Center were further developed, including an IGERT pre-proposal for graduate training and software development projects done in collaboration with EthoSource (an international initiative to make behavioral data more easily available over the internet).

Training Program:
Ellen Ketterson, Dale Sengelaub, Troy Smith and Greg Demas spearheaded an effort to obtain funding for graduate students and postdocs through an NIH training grant on “Common Themes in Reproductive Diversity.” The proposal was successful and funding began in May 2005.

Eleven students participated in our NFS-supported Summer Undergraduate Research Experience, including 7 African-America or Latino students, 5 first-generation, low income and disabled students. A renewal was submitted and we have been funded for four more summers (2006-2010).

Seven new undergraduates and 5 new graduate animal behavior minors and area certificates were awarded. Six new graduates and 22 undergraduates declared their intent to pursue the minor. The undergraduate minor was updated in September and we are working on updating the graduate minor to reflect new courses.

Nine graduate students received stipend support for the 2004/2005 academic year. Eight students received travel awards to present their research at major conferences.

Both A500 and A501 graduate courses were offered in Spring and Fall 2004. A501 topics were: Evolution and Learning (Spring 2004/met with courses P717 and P416) organized by Bill Timberlake and Greg Lucas. The Adapted Primate Mind (Fall 2004/met with courses B400 and B600) organized by Kevin Hunt.

Seminars and other Events:
We organized and hosted a Faculty Retreat in Fall 2004 to discuss possible research and teaching collaborations. We plan to host these once or twice each year.

Our annual Animal Behavior Conference was organized by graduate students Hanna Kolodziejski (presented with Well’s Award in Spring 2004), Thalia Brine, Sue Anne Zollinger and Jen Cianciolo. Three of the 11 presentations were guest speakers from the Keck Center for Behavioral Biology at North Carolina State University, including the plenary speaker, Dr. John Godwin. The CISAB Exemplar Award went to Dale R. Sengelaub for a career of integrative, interdisciplinary research and teaching.
Our Behavior Brown Bag Seminar Series (A500) met throughout the 2004 year, including 10 talks by local and visiting researchers. We also hosted the annual Fall Reception and Open House to welcome new CISAB members to our community.

CISAB contributed to the hosting of 14 distinguished speakers as part of our Behavior Colloquium Series: Colin Allen (Texas A&M/IU); John C. Mitani (U Michigan); Erik Greene (U Montana); Steven M. Phelps (U Florida); Irene Pepperberg (MIT); Thomas J. Park (U Illinois, Chicago); William C. McGrew and Linda F. Marchant (Miami U); Sally T. Boysen (Ohio State); Matthew Grober (Georgia State); Jon Seger (U Utah); Anne E. Russon (Glendon College, York U); Deborah Gordon (Stanford); James K. Rilling (Emory).

Outreach:
We launched a new Undergraduate Internship Program, soliciting student input through an internship design project assigned as part of a COAS E105 course offered by Emilia Martins in Fall of 2004. The project included tours of internship sites and the development of internship ideas. Our first interns began in Spring 2005 with a project at the Indianapolis Zoo.

The CISAB Web site continues to increase in popularity, receiving hits from approximately 240,000 unique IP addresses in 2004. For comparison, this is about 25% higher than in 2003, slightly more than the Dept of Biology web site and about twice as many as those received by the Dept of Psychology web site.

Four issue of the Animal Behavior Bulletin were published this year, including a special Bill Rowland Memorial Issue. Copies are available at http://www.indiana.edu/~animal/forms/subscribe.html

CISAB sent out approximately 900 brochures, mostly in coordination with departmental student recruitment efforts. CISAB also joined a Biology presence at SACNAS and ABCRMS meetings to enhance minority recruitment, and led presentations and tours at the Biology Dept Graduate Recruitment Weekend.

We participated in several student outreach programs including the Freshman Expo and Jim Holland Summer Experience.

A new student-exchange program has been created with the Center for Behavioral Neuroscience at Emory University, based on our existing alliance with the Keck Center for Behavioral Biology at North Carolina State. Three of our graduate students (Sue Anne Zollinger, Erin Kelso, and Hanna Kołodziejska) presented their research at the Keck Center’s annual symposium in January 2004, and three Keck Center students presented research at our Animal Behavior Conference.

CISAB
INTERNSHIP PROGRAM

Faculty are encouraged to announce CISAB’s new internship program to undergraduate and graduate students and refer them to CISAB for more information. The program is created to expose the student to hands-on experience in the application of animal behavior knowledge. Internship sites may include private and public research facilities, zoos, conservation groups, museums, animal rescue organizations, pet adoption centers, pet training centers, and veterinary hospitals.

The basic undergraduate internship program will be offered as a 3 credit course. Students will be required to invest 9-12 hours per week at the internship site, including a minimum of 3 hours volunteer time and 6-9 hours collecting ethogram data. Students will be required to submit a report to their faculty/grad student mentor at the end of the semester. An advanced internship will be offered to students interested in completing a research project.

Organizations currently participating in the program are:

- Bloomington Animal Shelter
- WonderLab Museum
- Indianapolis Zoo
- The Exotic Feline Rescue Center

Students interested in participating may contact: Susan U. Linville, PhD
CISAB
402 N. Park Ave
Phone: 812-855-5895
E-mail: sulinvil@indiana.edu
reproduction in common terns.

Elizabeth Lehman
Elizabeth is a fifth year graduate student working with Butch Brodie. She has been extremely active in research, attending professional conferences and producing 2 published papers and another 1 in preparation. Elizabeth has received multiple grants to fund her research, including awards from Sigma Xi and the Theodore Roosevelt fund. Elizabeth’s CTRD predoctoral fellowship will help her conduct her dissertation work examining how maternal effects (female–egg interactions in rough-skinned newts) might be involved in predator-prey coevolution.

Joel McGlothin
Joel is a fourth year graduate student working with Ellen Ketterson. He has been extremely active in research, attending multiple professional conferences and producing 4 published papers and another 2 in preparation. Joel has received multiple grants to fund his research, including an NSF Doctoral Dissertation Improvement Grant. Joel’s CTRD predoctoral fellowship will help him conduct his research examining signaling in dark-eyed juncos, studying how selection acts to integrate sexually selected signals with other aspects of the phenotype.

Devin Zysling
Devin is a third year graduate student working with Greg Demas. She has been extremely active in research, attending multiple professional conferences and producing 1 published paper and another 2 in preparation. Devin has received multiple grants to fund her research, including an Indiana University Graduate School Summer Incentive Grant. Devin’s CTRD predoctoral fellowship will help her conduct her research examining the neuroendocrine mechanisms underlying energetic trade-offs between reproduction and immune function in the seasonally breeding Siberian hamster.

This grant will support broadly integrative training in areas of sexual reproduction and development, including:

Parental Effects on Development
Maternal or more generally parental effects refer to variation among offspring attributable to non-genetic aspects of the parental generation. The range of maternal and paternal effects on phenotypic development is enormous, and some are long lasting, even into subsequent generations. Fascinating in their own right, parental effects produce variation that at first appears to be ‘genetic’ because parents resemble offspring, but upon closer inspection parental effects reveal how parents transduce their own environments into the developmental environments of their young.

Roles of Hormones in the Development and Maintenance of Sex-specific Reproductive Physiology and Behavior
Across species, including humans, many of the behaviors, morphologies, and physiological processes that are essential for reproduction are sexually dimorphic. Sex differences in physiology and behavior are often regulated by hormones, particularly gonadal steroid hormones, and investigation of the role of hormones and other biological and environmental factors in sexual differentiation is essential for understanding the normal development and adult expression of sex-specific traits in humans, as well as the effects of perturbations of the hormonal milieu on typical sexual development (e.g. intersex syndromes).

Disease, Immunity, and Reproductive Function
Sexual physiology and behavior are linked in a wide variety of intriguing ways with the transmission of diseases and parasites and an organism's ability to cope with disease and illness. Not only is sexual behavior a major mode of disease transmission in humans as well as other animals, but organisms make critical physiological trade-offs in allocating resources to the immune vs. the reproductive systems.

In sum, the Training Program is built around questions that are rich and timely. Further, the approach we offer is a unique and sophisticated interdisciplinary blend of mechanism and ecological relevance.

FOR MORE INFORMATION and POSTDOCTORAL POSITIONS SEE: http://www.indiana.edu/~reprodiv/
International talks focused on early life stressors and their effects on adult behavior. Rick Richardson (Univ. New South Wales, Australia) presented rodent research in which he stated: “memory expression, in at least some cases, is appropriate to the animal’s age at time of training, not at their age at time of test...” This finding has implications not only for the developmental analysis of memory, but also for our understanding of the neural bases of learned fear. It is possible, at least in some circumstances, to ‘activate’, or update, an earlier acquired memory.”

Michael Meaney (Douglas Hospital Research Center, Montreal) presented DNA and cross-fostering research suggesting DNA methylation/demethylation serves to imprint social factors, such as maternal behavior, upon an offspring's genome. This is a mechanism for epigenetic effects of parental care on the phenotype of the offspring. Charles Nemeroff, (Chairman of the Department of Psychiatry and Behavioral Sciences at the Emory University School of Medicine) also discussed how behavior and social factors can modify the expression of genes- and the function of nerve cells. He suggests that learning can produce alterations in gene expression. He stated: “Alterations in gene expression induced by learning give rise to changes in patterns of neuronal connections.... Insofar as psychotherapy or counseling is effective and produces long-term changes in behavior, it presumably does so through learning, by producing changes in gene expression that alter the strength of synaptic connections and structural changes that alter the anatomical pattern of interconnections between nerve cells of the brain.” He suggested that psychotherapy, brain stimulation, and drugs all alter gene expression.

Jaap Koolhaas (University of Groningen) in what seemed the best received and perhaps most interesting talk of the conference discussed the function and origin of individual variation in coping styles in rats and mice- and discussed related research with birds and pigs as well. He stated, “In the early phases of a population cycle, aggressive behavior increases reproduction. In the course of the generations, the average level of aggression seems to increase. In the later phases, the increased level of aggressive behavior disrupts the social structure and reproduction in the colony. Individuals are differentially optimized for different environmental conditions.” He found that aggressive animals, while well adapted to stable environments, didn’t cope well with new ones; less aggressive more exploratory animals handled unpredictable environments much better. His research suggests: “Individual variation in coping style has a function in the evolutionary ecology of the species...The variation in coping style is related to a differential neuroendocrine reactivity and brain organization and predicts individual stress vulnerability. Animal models for stress related disease should study the full spectrum of biologically functional variation in nature.... Studies aimed at the neurobiological and perinatal origin of stress vulnerability should consider anxiety and coping style as independent dimensions.” These dimensions would be a reactive vs. proactive dimension and a high vs. low anxiety dimension. He stated low anxiety reactive behavior is exploratory while low anxiety proactive behavior is aggressive. Freezing is high anxiety, reactive behavior, while fleeing is high anxiety proactive behavior. He suggested that the sometimes-unpredictable effect of anti-depressive medication on individuals is a result of this, with benzodiazepines changing anxiety levels, and selective serotonin reuptake inhibitors changing reactive vs. proactive behavior instead.

The CBN symposium had the “feel” of a CISAB event, with people from various departments excited to hear about research in other labs and discussing the ways they could integrate their work. CISAB, CBN, and the Keck Center have made it a point to build ties because they compliment each other well, and this was evident during the lunch/poster session when many graduate students from different labs and universities discussed possible collaborative research. At least one of these projects is now underway. Elizabeth Hammock and Larry Young of Emory University recently published research (Science 308, 1630-1634) showing that “junk” DNA may have a function- and that the length of a particular microsatellite region (avpr1a) in different vole species is associated with their degree of sociality, effecting where in the brain vasopressin is expressed and thus how strongly social behavior is rewarded in the brain. Comparing the region in the published human and common chimpanzee...
Effects of social environment on boldness behavior in laboratory and wild zebrafish

Awilda Acarón, University of Massachusetts, Amherst
Mentors: Jason A. Moretz / Emilia P. Martins

Many studies have demonstrated that behavior has both a heritable and environmental basis. Traits may be inherited or innate, socially influenced by watching others behave or affected by external factors, like stress. Studies have also shown that younger animals are more likely to acquire behaviors from older individuals, consequently making the stage of development at which they are exposed to social stimuli another important factor that can affect behavior. In this experiment I determined whether the social environment of individuals can have an effect on boldness in laboratory and wild zebrafish (Danio rerio). I created mixed strain groups and varied the stages of development at which laboratory and wild zebrafish were housed together. These groups included: mixed as eggs, mixed three weeks after hatching and mixed at 5 months of age. A pure tank of each strain was used as a control. Each group was assayed for shoaling tendency, activity level in an unfamiliar environment, predator avoidance and feeding latency after stress. The results from these tests demonstrate that there is a significant difference in boldness between wild and domesticated strains, with the domesticated strain being bolder. The domesticated strains displayed higher activity level, less predator avoidance, and lower feeding latency. It was also demonstrated that the social environment and stage of development in which that individual was exposed to a particular behavior does not have an effect on the acquirement of behaviors. An explanation for this could be that boldness is innate and resistant to social learning. Future experiments could be done to see if other behaviors, for example reproductive behavior, are more influenced genetically or by their social environment.

Serotonin projections to the inferior colliculus: A retrograde tracing analysis of raphe nuclei in Mice

Aitalohi Amaize, Princeton University
Mentor: Dr. Laura Hurley

The purpose of this study was to further understand the modulatory effects of the neuromodulator serotonin (5-HT) in the inferior colliculus (IC), an important midbrain structure involved in auditory processing. This was accomplished in mice via quantification of cell distributions in different raphe nuclei, which are known to send serotonergic projections to the IC. We examined the distribution of serotonin cells in the raphe nuclei in mice by using the retrograde transport of green fluorescent retrobeads, pressure injected (0.1-1 µl) unilaterally or bilaterally into the inferior colliculus. This was combined with fluorescent immunostaining for serotonin after a 2-7-day survival period. Fifty-micron-thick brain sections were collected, immunostained for serotonin, and visualized with fluorescence microscopy. An abundance of retrogradely-labeled cells were present proximal to the IC injection site(s). Comparatively across different raphe nuclei, more retrogradely-labeled cells were found in the dorsal raphe nuclei (DRN) compared to fewer in the median raphe nuclei (MnR), with a few also appearing in the raphe magnus. Within just the DRN, further quantification of labeled cells revealed that labeled cells were mostly located in the medial wing, while there were fewer cells in the lateral wings. These results show that 1) mice are similar to other animals in the sources of serotonergic projections to the IC and 2) projections to the IC mostly come from a specific region of the DRN.
Thermal environment influences morphology of developing Norway rats

Jackeline Anderson, Baylor University
Mentors: Dr. Henry D. Prange / Jill Villarreal

Previously, Villarreal, Schlegel, and Prange (2005) reported that cool (17°C) housed rats develop shorter ears and tails than moderate (25°C) housed rats. In addition, they found cool-housed rats develop a preference for warmer air temperatures than moderate-housed rats. In order to elucidate possible biological mechanisms for the development of this seemingly counterintuitive thermal preference, we further assessed how the thermal environment influences morphological development of rats. Terminal morphology measures (body mass, body mass without coat, coat mass as a percent of body mass, and adrenal gland mass as a percent of body mass) of 32 22-day-old, 32 43-day-old, and 28 85-day-old rats were recorded. Results indicated that 22 and 43-day-old cool-housed rats had lower body mass with and without their coat than moderate-housed rats, p < 0.05. And 22 and 43-day-old cool-housed rats had higher coat mass as a percent of body mass than moderate-housed rats, p < 0.05. These results suggest the thermal environment substantially shapes the body morphology of juvenile rats. No differences were found on these measures in 85-day-old rats. In addition, no differences in adrenal gland mass as a percent of body mass were found at all 3 ages assessed. These results indicate that the morphological differences between cool and moderate housed-rats are not likely due to the cool temperature inducing a stress response. The results from this study have lead us to posit that the development of the previously observed thermal preference of cool-housed rats for warmer air temperatures than moderate-housed rats may be in part due to the lower body mass of juvenile cool-housed rats.

Effects of chronic stress on water maze performance in rats

Stefanie M. Baur, University of Evansville
Mentor: Dr. Preston E. Garraghty

Chronic stress has been shown to have the ability to impair learning in humans and in rats. These effects appear to be mediated by damage to the hippocampus that results from stress hormone release during exposure to chronic stress. Research on humans and rats has found stress to be related to hippocampal damage as well as memory and learning impairment.

This study examines the effects of chronic stress on spatial learning in rats. Spatial learning was assessed by performance in the delayed matching-to-place paradigm in a water maze. Previous research with this paradigm has validated impaired spatial learning resulting from hippocampal lesions, stress hormone treatment, and stress. For this study, chronic stress was induced through long-term, inescapable restraint. Stressed animals were found to have deficits in Trial 1 performance for the nine Training Days and deficits in Trial 2 performance for 10-minute inter-trial intervals. Ongoing research will seek to statistically verify these results.
Energy allocation and sickness behavior in Siberian hamsters
Andrew Garst, New Mexico Highlands University
Mentors: Dr. Gregory E. Demas / Devin Zysling

Many non-tropical mammals have evolved in fluctuating environments where resource availability can be vastly different across the seasons of the year. In response to these environmental changes, animals have evolved seasonal physiological and behavioral responses that allow them to anticipate and prepare for oncoming challenges in order to increase overall fitness. For example, during times of low resource availability (e.g. winter) animals will reallocate energy reserves into immediate survival challenges such as thermogenesis and reduce allocations to less critical responses (e.g. reproduction and immunity. In addition, many behavioral adaptations have co-evolved with energetic investment strategies to increase survival. Day length (photoperiod) is the primary cue mediating seasonal changes, and photoperiodic changes in the pineal hormone melatonin act as the biochemical signal mediating photoperiod responses. The purpose of the present study was to examine the physiological and behavioral costs of mounting an immune response and the role of melatonin in mediating these responses. Specifically we hypothesized that overall immune response and sickness behavior will be attenuated in melatonin (mel) implanted Siberian hamsters (Phodopus sungorus) as compared with control animals. Two experiments were conducted to test this hypothesis. Experiment 1 was tested the effects of food restriction on immune response in mel and control implanted animals. This was done by measuring antibody production response to an injection of the antigen keyhole limpet hemocyanin (KLH). Experiment 2 was conducted to determine the effects of lipopolysaccharide (LPS), an antigen that produces a robust sickness response, on a battery of sickness behaviors various in mel and control implanted animals. The results of these studies will be presented.

Does 1 + 1 really equal 2? Genotypic and phenotypic interactions in expressed social behavior of Poecilia reticulata
Derrick Parker, Louisiana State University
Mentors: Dr. Edmund Brodie III / Bronwyn Heather Bleakley

The phenotype of a group of animals reflects both the behavior of individuals and potentially interactions among individuals. We examined whether the phenotype of the group reflects additive, non-additive or a combination of additive and non-additive effects on the behavior of individuals within the group. We also sought to investigate whether the group phenotype as a whole could be described as additive, or whether it is different than the sum of its parts. We utilized an inbred strain of common guppies, Poecilia reticulata, which provides virtually homozygous subjects, eliminating variation in behavior resulting from genetic variation and allowing us to isolate interactions at the phenotypic level. All guppies were exposed to a predator stimulus and subjected to two test trials, once alone and once in a group, in random order. They were scored for time spent in close proximity to and oriented on the model, time spent foraging and agitated, and number of inspections. We found no net change in the mean phenotype displayed by individuals tested alone and individuals tested in a group. However, we did find evidence of non-additive effects within groups, with individuals differentially altering their behavior in response to the phenotype of other individuals within the group. Despite low repeatability an individual’s behavior alone is the best predictor of its behavior in a group. Our study therefore suggests that group phenotype is additive and therefore predicted, at least in part, by the mean individual phenotype.
Mobile versus stationary viewpoints affect blocking and facilitation between beacon and landmark learning in the floor maze

Natasha Pettifor, New College of Florida
Mentors: Dr. William D Timberlake / Eddie Fernandez

Blocking, when preexistent learning about one cue inhibits learning about a new, redundant cue, is known to occur readily in the temporal domain. In the spatial domain, its presence is not as clear. It is generally accepted that spatial learning is more complicated than can be described by the basic theories of associative learning, and spatial information may be encoded and integrated in multiple system. This experiment sought to examine the effects of moving versus stationary release and beacon positions on the interactions between beacon and landmark learning in rats. A square floor maze with four symmetrical quadrants was used, each quadrant containing a reward cup. A release basket was positioned in the center of each maze wall. Four treatment groups of Sprague-Dawley rats were studied: Moving Release/Static Beacon, Moving Release/ Moving Beacon, Static Release/Static Beacon, and Static Release/Moving Beacon. Each group received two trials per day for twelve days of training under these conditions, followed by the addition of landmarks and eight subsequent days of training in which all release and beacon positions were made static. A series of tests followed the training days. Overall, groups receiving a moving beacon in the first stage showed significantly higher latencies; this corresponds with an overall higher number of reward cups checked on the path to the goal. Groups receiving a moving release position in the first stage appear to learn more about the relevance of the beacon to the goal, while those receiving a static release position showed favor towards landmark cues. In the absence of a beacon, however, moving release groups demonstrated knowledge of landmark cues. Overall, this indicates that rats may encode knowledge of both beacon and landmark position simultaneously while demonstrating preference for one cue set, and this encoding is facilitated by receiving varied perspectives on the spatial area to be learned.

Effects of 5-alpha dihydrotestosterone on the frequency modulation and duration of chirping behavior in Apteronotus albifrons

Sara Sanford, Ripon College
Mentor: Dr. G. Troy Smith

Males and females of the species Apteronotus albifrons communicate through the sexually dimorphic EOD (electric organ discharge) frequency modulations they emit. Some of the short-term modulations are known as chirps, and males and females do seem to vary on the structure of these chirps. Androgens are thought to be at least partly responsible for the fact that males have a lower EOD frequency and that their chirps have a different structure than those of females. Androgen treatment has been found to lower the EOD frequency of females but has no effect on the rate or propensity of chirping in this species. The purpose of this study was to investigate whether the androgen 5-alpha dihydrotestosterone (DHT) has an effect on the structure of the chirps when implanted in both male and female A. albifrons. The DHT implants did not have the predicted effect on the EOD frequencies of the females, which would have served as an index of the effectiveness of the hormone treatment. This study did find, however, that females tended to increase the frequency modulation of the categorized low frequency modulations over time whereas the opposite was true of males. DHT implants tended to increase the frequency modulation of these low frequency chirps while control implants tended to decrease the frequency modulation of low frequency chirps over time. Even though the DHT implants did not have an effect on EOD frequency, these results suggest that it may have subtler effects on the structure of at least low frequency modulations. No effects were seen for the duration of chirps. This study should be repeated for conclusive findings about the effects of androgens on the structure of chirps in A. albifrons and analysis of the structure of chirp responses to specific stimulus frequencies should be pursued.
Electrophysiological evaluation of mice knocked-in with 140 CAG repeats

Anand Shah, Indiana University
Mentor: Dr. George V. Rebec

Huntington disease (HD) is a progressive, neurological disorder that is genetically inherited. It is autosomal dominant, where onset of the disease occurs with inheritance of one HD allele. The knock-in HD mice have 140 CAG repeats and are characterized by onset as late as 1 year of age, a much slower progression of disease in comparison to other models like the R6/2 line, with little known about the affected striatal region of the brain. Assessing the striatal function in the slow progression model, striatal electrophysiological activity was recorded between knock-in mice with 140 CAG repeats and wildtype littermate controls and neuronal firing rate was evaluated. Results suggest that there are no significant differences between knock-in and wildtype mice but there is a trend of higher firing rate for wildtype, control mice. Gender was also analyzed resulting in a sex difference in firing rates in the knock-in mice and, independently, in the wildtype mice; knock-in males also show some difference in firing rates when compared with wildtype males.

The yielded results offer new insights that vary from the hypothesized mechanisms underlying HD previously found in the R6/2 strain and implicate some role of gender and testosterone-dopamine interaction as an explanation for the sex difference found in this relatively new HD model.

Song-sharing in lizards?: An exploration of display type-matching using a robotic lizard

C. Brian Smith, Pacific University
Mentor: Dr. Emilia P. Martins

Neighboring male Sagebrush lizards, Sceloporus graciosus, produce and exchange species-typical push-up displays which vary in both syntax and delivery. This study tests for 1) the possibility of display-type matching in this species, and 2) behavioral differences in response to repeated exposure to two signal types. Two signal types (typical, atypical) were delivered to subjects using a mechanized lizard both in short-term tests and in repeated exposures for ten days. In short-term tests, lizards paid more attention to the robotic lizard when it produced atypical displays than when it produced the species-typical headbob display. After repeated exposures to the robotic lizard, subjects gave similar responses regardless of the display it produced, including a general increase in activity in comparison to behavior during short-term tests. Repeated exposures to different signals revealed only slight suggestion of differences between the displays produced. These findings suggest that lizards change behavior after repeated exposure to push-up displays, but provide little evidence for display-type matching.
An assessment of classical eyeblink conditioning in rats using a tone and light CS and three interstimulus intervals

Elizabeth Wheat, Oberlin College
Mentor: Dr. Joseph E. Steinmetz

The modality of the conditioned stimulus (CS) and length of the interstimulus interval (ISI) used in classical eyeblink conditioning can affect an animal’s ability to produce a conditioned response (CR) which is correctly timed to coincide with the onset of the unconditioned stimulus (US). The current study explores this relationship between CS modality, ISI length and CR production. Rats were trained using one of two CS modalities, either a light or a tone, and one of three ISI lengths, either 280 ms, 580 ms or 880 ms, yielding six conditioning groups. Animals trained with the 280 ms or 580 ms ISIs show robust learning across all seven conditioning days regardless of CS modality. CRs in the 280 ms groups were the most accurately timed, with timing accuracy sharply decreasing at longer ISIs. Furthermore, the acquisition curve for animals trained with the tone and the 880 ms ISI was unusually high and almost flat, suggesting that there may be a confounding effect of the tone which is artificially heightening the CR count.

Continued from page 5

(Pan troglodytes) genomes and testing DNA from a bonobo or “pygmy” chimpanzee (Pan paniscus) - which are known for their much stronger social bonds than those of common chimpanzees - shows that common chimpanzees do not have this microsatellite, while humans and the tested bonobo do. Hammock and Young are now working with Shawn on a project to test the DNA of a larger number of bonobos.

Another tie between CISAB and CBN is Geary “Chip” Smith, who received an area certificate in Animal Behavior here at Indiana University while an undergraduate in Preston Garraghty’s lab. He is now a graduate student at Georgia State University and a CBN member. He was more than happy to escort Shawn around Atlanta during the Symposium weekend, telling the organizers “I’ll volunteer to show someone around. Make sure they’re from I.U.!!”

By Shawn Hurst

CISAB ANIMAL BEHAVIOR LAB

The CISAB Animal Behavior Lab (Jordan Hall 136) is a wet lab set up for molecular genetic, endocrine, immune and biochemical assays. Services offered by the facility include genetic techniques such as: DNA and RNA extraction, PCR; Microsatellite genotyping; RFLP/SNP genotyping; cloning and sequencing; software for primer design and genotyping analysis. In addition, neuroendocrine techniques can be completed such as RIA and EIA.

For more information on the CISAB Animal Behavior Lab, stop by 136 JH or contact:

Amy Eklund, PhD
CISAB Animal Behavior Lab Manager
Jordan Hall 136
Phone: (812) 856-1139
E-mail: aeklund@bio.indiana.edu
SUPPORT ANIMAL BEHAVIOR RESEARCH

Private contributions are an important way in which we can expand our efforts. Even a small amount can go a long way. For example, $500 can send a student to a major scientific meeting to present their research, $200 can buy supplies for a museum exhibit, $25 can purchase chemicals to do DNA fingerprinting or other genetic tests, $10 can cover the cost of distributing our Kid’s Page to an elementary school class.

Charitable gifts are tax-deductible and can be mailed to: CISAB, 402 N. Park Ave, Bloomington, IN 47405
(payable to IU Foundation).

Yes, I would like to support Animal Behavior Research at Indiana University. I have included a contribution of __________

Name:_________________________________________
Address: _______________________________________
City: ____________________________ Zip: __________

Those contributing over $25 are entitled to receive paper copies of the Animal Behavior Bulletin for one year (also available as PDF copy on our web page). If you wish to receive the Bulletin please check here._____