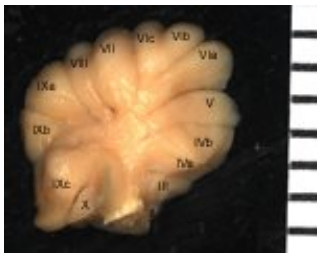
Fall '12
BISC 491 Opportunity with Dr. Lainy Day
Avian Brain Plasticity, Evolution, and Stress Control



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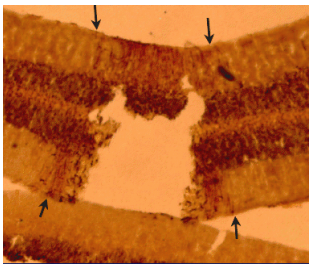
Project suggestion below; other projects within this general scope are possible. Students must sign up for 3 credit hours.

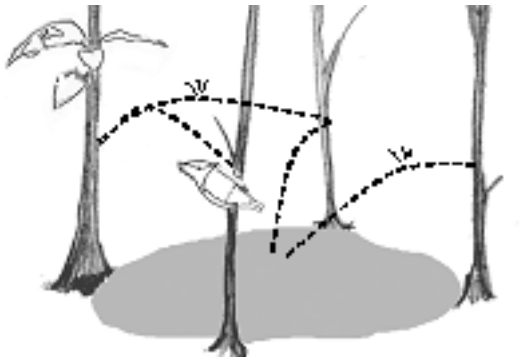
1) Hormones, recovery of function, and neurogenesis after cerebellar lesions in zebra finch



The female hormone estrogen has a variety of roles in brain and behavior. One of the most recently discovered is a role in protecting the brain from damage and in influencing the brains ability to repair itself. Because there is abundant estrogen in cells of the cerebellum, we are testing whether estrogen plays a role in how birds with lesions of the cerebellum recover from damage to this brain region.

Project Responsibilities
-Read supplied literature on this topic and discuss with professor.
-Assist with care and feeding of birds
-Help devise and develop tests of bird motor and cognitive behaviors
-Assist with surgeries and histology

2) Cerebellar Adaptations Related To Complex Mating Displays



Just as the beak of the finch is shaped by evolution, so to is the brain. For example, a part of the brain known to be involved in memory for locations is particularly large in bird species that hide their food in caches and later must remember these locations in order to retrieve it. We are currently investigating whether a motor region of the brain is larger in species that perform complex physical displays in order to attract their mates compared to closely related species that perform simple or no displays.

Project Responsibilities
Read supplied literature on this topic and discuss with professor.
Assist with preparation of brain tissue and perform measurements on brain tissue.
-Depending on individual interests, commitment, and skill, possibilities also exist to learn immunocytochemistry, and insitu hybridization.

3) A Neurophysiological Examination of Stress Control in Martial Artists

When an individual is experiencing stress the central nervous system responds by increasing heart rate and the level of activity in sweat glands. The central nervous system is also active when the stressful experience is no longer present and the body needs to return to homeostasis. Using physiological measures, we are seeking to determine if martial artists have a greater ability to remain calm in the face of stressors and/or can efficiently return to homeostasis after the stress has been experienced.

Project Responsibilities

Read supplied literature on this topic and discuss with professor.
Assist with data collection and the use of neurophysiological equipment (we will be measuring galvanic skin response, heart rate, and respiratory sinus arrhythmia).