Institute for Advanced Studies Seminar

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"Ear-formatics: Probing Disorders of Hearing and Balance with a Systems Approach"

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11:00 a.m.
TA-3, Bldg. 1420, Room 2101 (Wijiji Conference Room)

Abstract: The emerging emphasis on integration of information gathered at the cellular level into a system level understanding of health and disease has heightened interest in the molecular underpinnings of organ function. Research in our laboratory seeks to uncover the genetic, anatomical, and physiological events that define the emergence of the adult inner ear with its auditory and vestibular sensory organs from its origin as an otic vesicle in embryonic specimens. The biomedical urgency of our research is underscored by the increasing number of persons afflicted with disorders of hearing and balance due to heredity, noise pollution, aging, developmental anomalies, and exposure to chemical agents such as antineoplastic drugs and antibiotics. Our approach implements a multidisciplinary experimental strategy and capitalizes on encouraging results from our laboratory using the NIH model organism, Xenopus. This genus offers unique research opportunities for addressing auditory and vestibular disorders due to Xenopus' neuroregenerative potential, a sequenced genome (8X coverage), and the availability of Xenopus gene chips. In this presentation I will highlight essential elements of the tridimensional organization of the Xenopus inner ear and its resident icon, the mechanosensory hair cell that is tasked with reception and transduction of mechanical forces. These findings have provided a foundation for new research directions that rely on computational strategies to analyze genetic (microarray) and imaging datasets gathered from inner ear organs. Our preliminary results afford the hope that a systems level understanding of the genes involved in auditory and vestibular function, and of the potential phenotypes associated with their genetic profiles, can be achieved. I will conclude by summarizing outcomes from our initial efforts to scrutinize the effects of chemical agents, such as antibiotics and antineoplastic medications, on inner ear sensory organs. We acknowledge the support of NIH (GM008136; DC03292; P50GM068762). Research presented here was done in collaboration with graduate and undergraduate student participants in NIH (RISE R25GM061222) and NSF (CREST HRD0420407; IGERT DGE0504304; AMP HRD0803171, HRD0832947) training programs that aim to diversify STEM research communities.

Biography: For more information on Professor please go to the following web sites.
http://www.cdpcenter.org/people/directory/elba-serrano/
http://biology-web.nmsu.edu/serrano/neurolab/neurolab.html

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