SFB 1315
Mechanisms and Disturbances in Memory Consolidation:
From Synapses to Systems

Tuesday

FEB 15, 2022
4:00 pm CET

ZOOM ID: 7754910236
Register at:
SFB1315.ifb@hu-berlin.de

SFB 1315 LECTURE SERIES 2019-2022

EVOLUTION AND NEURAL MECHANISMS OF VOCAL LEARNING

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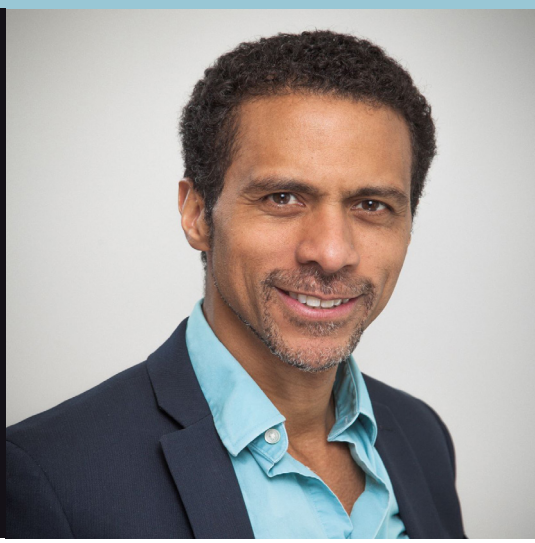

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EVOLUTION AND NEURAL MECHANISMS OF VOCAL LEARNING

Vocal learning is one of the most critical components of spoken language. It has evolved several independent times among mammals and birds. Although all vocal learning species are distantly related and have closer relatives that are non-vocal learners, humans and the vocal learning birds have evolved convergent forebrain pathways that control song and speech imitation and production.

Here I present an overview of the various biological hypotheses of what makes vocal learning and spoken language special, how it evolved, and what differs compared to other behavioral traits.

We used comparative genomics and transcriptomics to discover convergent changes in genes in song learning pathways in birds and speech pathways in humans that control brain connectivity, neural activity, and synaptic plasticity. The specialized regulation is associated with convergent accelerated regions in these gene's regulatory regions, that have binding sites for a set of transcriptive factors with differential regulation specific to vocal learning circuits.

To explain these findings, I propose a motor theory of vocal learning origin, in which brain pathways for vocal learning evolved by brain pathway duplication of an ancestral motor learning pathway, using mostly the same genes, but with some divergences in gene regulation via sequence and epigenetic changes. These changes control divergent connectivity and other specialized functions to rapidly integrate auditory input with vocal motor output.

Erich Jarvis, PhD is the head of the Laboratory of Neurogenetics of Language and professor at The Rockefeller University, and scientific investigator with Howard Hughes Medical Institute (HHMI). Dr. Jarvis uses song-learning birds and other species as models to study the molecular and genetic mechanisms that underlie vocal learning, including how humans learn spoken language. He is interested in how their brains, and ours, have evolved to produce this complex behavior. Dr. Jarvis also leads the Vertebrate Genomes project, is a co-PI of the Human Pangenome Reference Consortium and part of the Earth Biogenome Project.

Dr. Jarvis is the recipient of key awards and honors for his achievements, including one of the highest awards given by the National Institutes of Health (NIH) -- the NIH Director's Pioneer Award, and one of the highest given by the National Science Foundation (NSF) -- the NSF Alan T. Waterman Award.

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