



12th CDE international seminar (online)

Sep 24th (Fri), 10:00-11:00 am (Japan time) [Lang: English]

Dr. Matthew Harris

(Associate professor; Department of Genetics, Harvard Medical School)

<https://genetics.hms.harvard.edu/faculty-staff/matthew-harris>

Inherent capacity for change:

latent developmental potential and the evolution of limbs

Click this URL for registration (free event)

<https://forms.gle/8Cow5RfXAXPiWhNu9>

(Zoom URL will be sent to you based on the registered information)

- Abstract -

The source and causes of morphological complexity in Nature remains a broad unanswered question. Development plays a unappreciated role in shaping change -the properties of development can greatly alter evolutionary trajectories and the path of evolution. Developmental networks are dynamically integrated, capitalizing on modules that are used reiteratively in different temporal and spatial contexts. This integration presents a constraint in the types of genetic changes that will lead to viable, fertile, and thus heritable variation. However, this same constraint may bolster the generation of new forms, as scenarios having a functional phenotypic output can be attained with higher probability of functionality, and thus, potential positive effect on fitness. The developmental rules, or "playbooks", for such coordinated change in development and its role in evolution, are not well understood. I will discuss work from my lab to uncover these properties in developmental systems through use of forward genetic and genomic approaches. I will detail recent work in which we identify mutants in the zebrafish that do not simply disrupt development, but cause dominant shifts in programs, leading to qualitative, and viable changes in morphology. Our work identified simple genetic changes that activate a core signaling pathway that is sufficient to drive formation of new skeletal patterning of zebrafish pectoral fins, breaking an ancient constraint on morphology among teleost fishes. Such developmental perturbations reveal the capacity of teleost fishes to form structures once thought to be the purview of limbs and land dwelling animals. These changes are not driven through altered cis-regulatory wiring of gene function, rather tuning of signaling factors and shift in dynamics of signaling during development. Our work is starting to define hidden capacity of developmental systems that is founded on integrated, and ingrained developmental networks shaped by contingencies of evolutionary history.

進化にご興味のある全ての皆様へ

新学術領域「進化制約方向性 (倉谷代表)」公開オンラインセミナーのお知らせです。表現型進化の方向性、拘束、進化可能性といった概念や問題について、考え、議論したり新たな考えや人の相互作用をもたらすための不定期で行う国際オンラインセミナーです(公開。参加費無料)。フランクなオンラインミーティングです。大学院生の方々も広くご参加いただけましたら幸いです。近くに興味を持たれそうな方がおられましたらお声がけいただけると幸いです。

For all of you who are interested in Evolutionary Biology

We are happy to announce open, online international seminar provided by the research project "Constrained and Directional Evolution" (led by Dr. Shigeru Kuratani).

The aim of this open seminar is to share and discuss over the challenging topics in evolutionary biology, such as Evolvability, Constraints, Directionality in phenotypic evolution etc., and to boost interactions between scientists interested in these topics. It's an open seminar with participation free of charge, and we welcome your participation (Students, Postdocs, PIs etc.)

[Greeting from the chair of this project]

How much has our understanding of biological evolution improved in the past half century? Not even the shape of the tiny insect in front of us now can be satisfactorily explained. My understanding of evolution has not changed much since then. I do not think it's the way it should be. it's good enough. At last, it's time we start doing something to solve the mystery.

Why should the shapes of plants and animals be the way they are? How does purposefulness explain the process of these refinement of shapes? This project aims to construct a new theoretical system of evolutionary biology by not only encompassing natural selection and neutral theories but also integrating essential elements that previous theories failed to address. We hope that this attempt will provide a place for gathering bold challengers, and further leads to a new trend in the field of evolutionary biology.

<http://constrained-evo.org/greeting.html>

[領域代表より、挨拶] (原文はHPをご覧ください)

過去半世紀の間、生物の進化についての私たちの理解はどれほど深まっただろうか。いま目の前にいるちっぽけな虫のかたちすら満足に説明してくれない。進化に関する私の理解はあの頃とあまり変わってはいない。さりとして、このままでよいとも思わない。いよいよ謎を解くべく、何かを始めなければならない。動植物のかたちがなぜこのようなものでなければならないのか、そしてそれが洗練されて行く過程にどのように目的性が入り込むのか、自然選択説や中立説を包含するのみならず、それらが扱うことのできなかった本質的要素を統合することを通じ、本領域は進化生物学の新たな理論体系の構築を目標とする。この試み自体、進化生物学領域における梁山泊であり、自ら新たな潮流となり、進化研究を変える第一歩ならんと欲するものである。

<http://constrained-evo.org/greeting.html>