



18th CDE international seminar (online)

Dec 15th (Wed), 9:00-10:00 am (Japan time) [Lang: English]

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<https://www.nicholslab.org/>

Buffering craniofacial variability

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Click this URL for registration (free event)

<https://forms.gle/PucsNxT4Z1yKM4CfA>

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

- Abstract -

Human faces are variable, we all look different from one another. Human craniofacial diseases are also variable. Some people inherit a deleterious mutation and suffer devastating birth defects, while others inherit the same disease allele and live normal unaffected lives. We use the zebrafish system to understand craniofacial development and variability. This study began with a particularly variable craniofacial mutant phenotype produced by a mutation in the transcription factor encoding gene *mef2ca*. Three new approaches have uncovered some of the mechanisms behind the phenotypic variability. First, we generated several new *mef2ca* alleles and find that allele severity is positively correlated with phenotypic variation. Second, many years of selective breeding in our laboratory has produced two strains of zebrafish that are either highly resilient to the effects of the mutant allele, or very sensitive to the mutation. Comparing these two strains reveals that many members of the *mef2* gene family, paralogs, have decreased expression in the high-penetrance strain. These results suggest that variation in paralog expression underlies variation in mutant phenotype severity, and that our selective breeding changed the expression of the buffering paralogs through generations of selection. Finally, we mutagenized all the *mef2* paralogs and find evidence of modular, piecemeal buffering by paralogs. Specifically, the different paralogs each buffer a different aspect of the *mef2ca* mutant phenotype. These studies advance our understanding of the mechanisms buffering facial variation, including how some genetically resilient individuals can overcome a deleterious mutant allele.

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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。

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