



## CDE international seminar (online)

5th: May 11th (Tue), 9:00-10:00 am (Japan time) [Lang: English]

**Dr. D. Allan Drummond**

(Assoc. Prof., Biochemistry & Molecular Biology and Genetic Medicine, the University of Chicago)

Lab HP >>> <http://drummondlab.org>

## Rethinking the cellular response to heat shock, from biophysics to evolution

Click this URL for registration (free event)

<https://forms.gle/EWqmQXoJjQVvYPqn7>

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

### - Abstract -

Cells across the tree of life respond to a sudden, nonlethal rise in temperature--heat shock--in similar ways. Following heat shock, proteins and mRNAs form clumps, certain genes turn on, and protein synthesis and cell growth sharply decline. The standard interpretation of these long-studied phenomena has held that thermal energy causes proteins to misfold, forming toxic aggregates that require cleanup by the induced chaperone proteins. Substantial challenges to this misfolding-catastrophe interpretation have remained. A fundamentally different picture emerges from recent work: aggregation instead reflects evolved, adaptive biomolecular condensation processes integral to the sensation of and adaptation to temperature, and chaperones regulate these condensed states. I will discuss our ongoing molecular and cell-biological studies which have led to this alternative perspective in which temperature acts as a signal, rather than a proteotoxic stress. Along the way, I will discuss ways in which molecular evolution and organismal evolution have provided crucial lenses through to see these phenomena.

### [ 領域代表より、抜粋 ] (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合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論む。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>

### 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, Pls 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.

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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。