

Editorial

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Published online: 26 August 2009
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Theory in Biosciences has been designed as a discussion platform that will allow dealing with relevant problems in the formation of a theoretical framing for biosciences. Herein, the phenomenon of inheritance and especially the gene concept is of central relevance. The gene seems to represent the *attributum crucis* of life forms. Chemical systems may form out self organisational features, crystals will assimilate molecules to grow on according to a pre-configurated schedule, but only in organisms we find a specific substance that may act as a coding sequence to organise a bulk of chemical reactions within such an organism and to transfer that information to organise it via various entities in a continuous process throughout the different generations of species. So far, one could feel good about the gene, as it will allow us to separate organic and inorganic realms in a quite easy way.

One could think also, however, the other way around. As the gene allows us to separate life forms from non-life forms, we do not think about what the gene essentially is, not biochemically, but functionally. Thus, one has to ask, how far the idea to look on genes as a pathway of inheritance will actually cover what a gene—biochemically—is forming out.

One point here is that the gene-concept is much older than our ideas about the molecular base of inheritance

and the specific reaction pathways that constitute it. Even worse, the concept of inheritance and the ideas set along with it were not formed out within the biosciences, but within every day life, history and economy, thus, in German the same term may indicate inheritance and legacy: *Erbe*. Thus, *Theory in Biosciences* is interested to start a discussion on our gene concept and the way to deal with it. Here, recently, Klaus Scherrer and Jürgen Jost contributed a paper that presents a new proposal for a clarification of the concept of the gene and a definition of it in formal terms. It builds on the idea of a separation between the functional, the coding and the regulatory aspects (Scherrer and Jost 2007).

Given the central importance of this concept in molecular and evolutionary biology we thought it should be a good idea to send this paper around asking for comments to start a discussion on the gene concept in our journal. The editorial board had invited several leading authorities in the field to present their views, comments, and in particular their criticism of this paper. The authors were given the opportunity for a response.

The first results of this attempt to launch a discussion are published in the present issue. I feel that this debate is crucial for a theoretical clarification of the present state of molecular biological approaches to the gene concept—thus; I hope this presentation will give a relevant input into that discussion and may initiate further reactions. My co-editors and I hope that our journal will continue to be a forum for such a discussion within the next issues.

Therefore, this issue is not only a documentation, but also an invitation to join into that debate. We plan to continue with a special issue on the gene concept—in a broad sense, including historical and bio-philosophical

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remarks—in 2010. I feel that the present issue is not only a good starting point for that discussion but by the paper of Scherrer and Jost and the comments on it has already given a substantial contribution to it.

Jena, 06 June 2009 Olaf Breidbach.

Reference

- Scherrer K, Jost J (2007) Gene and genon concept: coding versus regulation. A conceptual and information-theoretic analysis of genetic storage and expression in the light of modern molecular biology. *Theory Biosci* 126:65–113