Exposing a complex metabolic system: glycolysis in Saccharomyces cerevisiae

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Exposing a complex metabolic system: glycolysis in *Saccharomyces cerevisiae*

**ACADEMISCH PROEFSCHRIFT**

ter verkrijging van de graad van doctor
aan de Universiteit van Amsterdam,
on gezag van de Rector Magnificus
Prof. dr. J.J.M. Franse
ten overstaan van een door het college voor promoties ingestelde commissie, in het openbaar te verdedigen in de Aula der Universiteit
op dinsdag 20 april 1999 te 15.00 uur
door

**BASTIAAN TEUSINK**

Geboren te Enschede
The research described in this thesis was conducted at the E.C. Slater Institute, BioCentrum Amsterdam, University of Amsterdam, The Netherlands, and at the Department of Microbiology, BioCentrum Amsterdam, Vrije Universiteit Amsterdam, The Netherlands, at the Department of General and Marine Microbiology, University of Gothenburg, Gothenburg, Sweden, and at the Department of Biomolecular Sciences, UMIST, Manchester, United Kingdom. The work was supported by the Netherlands Organization for Scientific Research (NWO), the Netherlands Association of Biotechnology Research Schools (ABON) and the European Union. The publication of this thesis was supported by a generous gift from DSM Bakery Ingredients, Delft, The Netherlands.
Anteater: Exactly. The other thing that can happen is that a critical mass of ants is present, and the thing will snowball, bringing more and more ants into the picture. In the latter case, a whole “team” is brought into being which works on a single project. That project might be trail-making, or food-gathering, or it might involve nest-keeping. Despite the extreme simplicity of this scheme on a small scale, it can give rise to very complex consequences on a larger scale.

Achilles: I can grasp the general idea of order emerging from chaos, as you sketch it, but that still is a long way from the ability to converse. After all, order also emerges from chaos when molecules of a gas bounce against each other randomly – yet all that results there is an amorphous mass with but three parameters to characterize it: volume, pressure, and temperature. Now that’s a far cry from the ability to understand the world, or to talk about it!

Anteater: That highlights a very interesting difference between the explanation of the behavior of an ant colony and the explanation of the behavior of gas inside a container. One can explain the behavior of the gas simply by calculating the statistical properties of the motions of its molecules. There is no need to discuss any higher elements of structure than molecules, except the full gas itself. On the other hand, in an ant colony, you can’t even begin to understand the activities of the colony unless you go through several layers of structure.


voor Femke en Siem