

Autopoiesis 40 years Later. A Review and a Reformulation

Pablo Razeto-Barry

Received: 31 May 2012 / Accepted: 9 September 2012 /
Published online: 4 October 2012
© Springer Science+Business Media Dordrecht 2012

Abstract The concept of autopoiesis was proposed 40 years ago as a definition of a living being, with the aim of providing a unifying concept for biology. The concept has also been extended to the theory of knowledge and to different areas of the social and behavioral sciences. Given some ambiguities of the original definitions of autopoiesis, the concept has been criticized and has been interpreted in diverse and even contradictory ways, which has prevented its integration into the biological sciences where it originated. Here I present a critical review and conceptual analysis of the definition of autopoiesis, and propose a new definition that is more precise, clear, and concise than the original ones. I argue that the difficulty in understanding the term lies in its refined conceptual subtlety and not, as has been claimed by some authors, because it is a vacuous, trivial or very complex concept. I also relate the concept of autopoiesis to the concepts of closed systems, boundaries, homeostasis, self-reproduction, causal circularity, organization and multicellularity. I show that under my proposed definition the concept of a molecular autopoietic system is a good demarcation criterion of a living being, allowing its general integration into the biological sciences and enhancing its interdisciplinary use.

Keywords Autopoiesis · Definition of life · Individual identity · Physical proximity · Self-reproduction · Circular causality

Introduction

The search for a definition of life or of a living being has been recurrent in biological thinking, and has acquired a renovated interest due to the appearance of research programs related to artificial life, the origin of life and astrobiology (reviewed in Popa 2004). The

P. Razeto-Barry (✉)
Instituto de Filosofía y Ciencias de la Complejidad, IFICC, Los Alerces 3024, Santiago, Chile
e-mail: prazeto@ificc.cl

P. Razeto-Barry
Universidad Diego Portales, Vicerrectoría Académica, Manuel Rodríguez Sur 415, Santiago, Chile