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- Author:** Queiroz, Joao, Emmeche, Claus & El-Hani, Charbel
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- Abstract:** During the 1950s and 1960s, genetics and cell and molecular biology have been swamped by terms borrowed from information theory. This “information talk” still pervades these fields, including widely used terms such as “genetic code”, “messenger RNA”, “transcription”, “translation”, “transduction”, “genetic information”, “chemical signals”, “cell signaling” etc. As the concept of information and its plethora of associated notions were introduced in biology, several problems emerged, with which the tradition of biology was unprepared to cope. Instead of deepening the discussion about “information talk”, the trend in the biological sciences was one of treating “information” as merely sequence information in DNA or proteins. Today, a number of researchers consider information talk as inadequate and “just metaphorical”, expressing a skepticism about the use of the term “information” and its derivatives in biology as a natural science. We disagree with this position, claiming instead that the notion of information and other related ideas grasp some fundamental features of biological systems and processes that might be otherwise neglected. Our problem is not to get rid of information talk, but rather to clarify it by using a proper theoretical framework. We intend to show that the use of semiotic concepts and theories to interpret information talk can contribute to the construction of a precise and coherent account of information in biology. For this purpose, we introduce here a model of information as semiosis, grounded on Peircean semiotics. Peirce’s formal science of signs provides an analytic framework in which information can be modeled as a pragmatic triadic dependent process that irreducibly connects signs, objects, and interpretants (effects on interpreters). According to the model developed in this paper, information is treated as semiosis, i.e., the communication of a form or habit

from an object to an interpretant through a sign, so as to constrain (in general) the interpretant as a sign or (in biological systems) the interpreter's behavior. We employ this treatment of information for building an account of genes as signs and genetic information as semiosis.

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