

What is “information” in signal transduction?

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In the field of signal transduction, metaphorical words such as signal, message, transduction, communication and information are used almost on a daily basis probably without examining what they really mean. What is “information” that is processed, transferred or transmitted inside the cell upon binding of a ligand to its receptor? Although biology (or physics, for that matter) is flourishing without the exact knowledge of life (or energy/mass/time), I think the efforts to define life should give us a broader and deeper understanding of what life is or what distinguishes living from non-living. Given the claim that the information transfer is one of the key factors to differentiate between the biotic and the non-biotic worlds, rigorous examination of the meaning of information may give us a profound, if not a new, perspective not only on biochemical events in the cell but also on the nature of life. With this in mind, I would like to review the evolution of the concept of information in biology and give some thoughts on the information transfer.