Data- and knowledge-based modeling of gene regulatory networks: An update

Linde J, Schulze S, Henkel SG, Guthke R (2015) Data- and knowledge-based modeling of gene regulatory networks: An update *EXCLI Journal - Experimental and Clinical Sciences* 14, 346-378.

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Abstract

Gene regulatory network inference is a systems biology approach which predicts interactions between genes with the help of high-throughput data. In this review, we present current and updated network inference methods focusing on novel techniques for data acquisition, network inference assessment and network inference for interacting species and the integration of prior knowledge. After the advance of Next-Generation-Sequencing of cDNAs derived from RNA samples (RNA-Seq) we discuss in detail its application to network inference. Furthermore, we present progress for large-scale or even full-genomic network inference as well as for small-scale condensed network inference and review advances in the evaluation of network inference methods by crowdsourcing. Finally, we reflect the current availability of data and prior knowledge sources and give an outlook for the inference of gene regulatory networks that reflect interacting species, in particular pathogen-host interactions.

Involved units

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Topics

Networks of host- fungal pathogen interaction

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doi: http://dx.doi.org/10.17179/excli2015-168