Reviewer's report

Title: Using graph theory to analyze biological networks

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Reviewer: William Bush

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This article provides an excellent review of graph theory concepts and terminology, and provides references to several online resources for biological data. With a bit more information, this article will be of extraordinary utility for computational biologists.

Major Compulsory Revisions

1. There are numerous small language issues that should be addressed to improve readability; for example within the Metabolic and Biochemical Networks section:
   "occurring within a cell in different time points" should be "at different time points"
   "the main role in metabolic network is played... " should be "the main role within a metabolic network"
   "Often, enzymes are dependend on other cofactors" should be "Often, enzymes are dependant on other cofactors"

2. Much of the article explains graph theory and concepts, many of which could be found in text books on graph and network theory. I believe the utility of this article could be dramatically improved by adding one or both of the following aspects:
   A. Expand each section with literature references to specific examples of the graph theory concepts as they apply to biological data. For example, cliques have been used to identify new functional groups from gene expression data. Citing examples where the concept is used to ask a specific question would help readers relate these concepts to their own work.
   B. Expand each section with software tools or techniques that would allow the type of analysis mentioned. It would be extremely useful to know how to conduct a specific type of analysis on a particular graph.
   These additions would provide a sense of the current state of biological network analysis.

Essentially, as a reader, I'm excited to hear about all the possible ways to approach graph-based datasets, but I have no idea how to conduct this type of analysis (beyond writing my own code), or what has been tried for specific types of data before.

I strongly encourage resubmission of this article.
Level of interest: An article of importance in its field

Quality of written English: Needs some language corrections before being published

Statistical review: No, the manuscript does not need to be seen by a statistician.

Declaration of competing interests:

I have no financial interests to declare.