Reviewer's report

Title: PARP inhibitors in the management of breast cancer: current data and future prospects

Version: 1 Date: 10 June 2015

Reviewer: Christina Annunziata

Reviewer's report:

Summary:
This is a comprehensive description of research to date on the use of poly (ADP-ribose) polymperase inhibitors in treatment strategies for breast cancer. The authors discuss DNA damage repair pathways, synthetic lethality, and BRCAAness in order to introduce the rationale for PARP inhibitors in sporadic and BRCA-mutation associated breast cancer. Informative tables are included to describe ongoing clinical trials utilizing PARP inhibitors as monotherapy and combination therapy. Furthermore, they discuss reported toxicities, with an emphasis on additional primary hematologic malignancies. Potential mechanisms of resistance to PARP inhibition, and further investigations of predictors of response to PARP inhibitors are also reported. Overall, the authors have given comprehensive coverage to a topic of interest to broad audience of readers.

Major Compulsory Revisions:
1. The topic of PARP trapping is introduced, without clear explanation or context. This could be confusing to general readers who are unfamiliar with this term. Please expand the definition of this term, and include some discussion of why this may be particularly relevant to certain combinations of cytotoxic agents but less important or unwanted in others.

2. In comparison to other areas covered in the paper, novel work in potential resistance mechanisms received less in-depth discussion. Consider an expanded discussion of the mechanisms of resistance, with an expanded supporting Table 6. It would also be informative to include the authors' views on therapeutic strategies to overcome or avoid resistance to these agents.

3. The topics of predicting response and applying these agents to sporadic breast cancer are closely related, and could be combined into one section. Please also expand on assays currently under development for predicting response, for example HRD-LOH, NtAl, and LST, as markers of “genomic scars.” Consider including published literature and recent presentations at ASCO 2015.

Minor Essential Revisions
4. Please review for minor edits of consistent grammar and punctuation.

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 declare that I have no competing interests