Reviewer's report

Title: Gene expression profiling supports the hypothesis that human ovarian surface epithelia are pluripotent and capable of serving as ovarian cancer initiating cells

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Reviewer: Philippe Van Trappen

Reviewer's report:

This is a well written paper of a descriptive study assessing genes differentially expressed between ovarian cancer epithelial cells (CEPI) and ovarian surface epithelia (OSE). Methods and statistical analyses are appropriate. However, the study is lacking: 1/essential comparison of paired samples, such as CEPI from FIGO-stage I ovarian cancer and adjacent normal OSE or anaplasia and 2/functional in vitro experiments. The authors used 12 OSE samples and 12 laser capture microdissected CEPI from different serous papillary ovarian adenocarcinomas. Gene expressions were analysed using Affymetrix Human Genome U133 Plus 2.0 Arrays, and methods such as Gene Set Enrichment Analysis (GSEA). The description of analyses in the Methods section is confusing and could be shorter. There were 2320 genes differentially expressed between CEPI and OSE of which 1210 highly expressed in CEPI and 1110 highly expressed in OSE. The Results section is too long with description of findings in other studies. This could be significantly shortened and mentioning findings from other studies in the Discussion section. A variety of genes involved in cell cycle -, TGFB -, WNT -, Notch -, Hedgehog -, or Retinoid Pathway have been described to be either overexpressed in CEPI or OSE. This section should summarize/highlight more the most important differences between CEPI and OSE. Although similarities have been found between OSE and ovarian cancer (initiating) stem cells, such as expression for CD44 and KIT (although only in 5 of 12 OSE samples for KIT) + ligand - with low or no expression in CEPI, these findings do not provide evidence of a functional linkage between OSE and the rise to OCSC. It would have been interesting to also add a functional assay in the study for the gene expressions LHX2 and LHX9, involved in asymmetric cellular division possibly occurring in OSE.

Minor Essential Revisions:
- clarifying methods section (analyses) and shortening results section (see above)
- data on paired samples (?) and functional in vitro assays could strengthen the paper (see above).

Level of interest: An article whose findings are important to those with closely related research interests
Quality of written English: Acceptable

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.