An online tool to validate predictive biomarkers of therapy response using transcriptomic data of 3,651 ovarian cancer samples

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Background

➤ Systemic therapy of ovarian cancer can include chemotherapy and targeted therapy.

➤ Prognostic biomarkers are capable to predict survival and predictive biomarkers are capable to predict therapy response.

➤ To date, multiple online tools were established to identify prognostic biomarkers, but no platform is yet available for predictive biomarkers.

Objectives

Here, we describe the first release of an online available tool capable to validate gene expression based predictive biomarkers using transcriptomic data of a large set of ovarian cancer patients.

Methods

1. Published gene expression data of 35 publicly available datasets was integrated with treatment data into a unified database.

2. **The classification is based** on either author-reported pathological complete response (n=1,022) or relapse-free survival status at 6 (n=1,347) or 12 (n=1,282) months:

3. **Treatment data includes (at 6 months):**
   - Platin therapy (n=1,209)
   - Taxol therapy (n=694)
   - Docetaxel (n=97)
   - Gemcitabine (n=126)
   - Paclitaxel (n=208)
   - Topotecan (n=118)

4. **The transcriptomic database** includes 20,089 unique genes and 54,675 probe sets.

5. Gene expression and therapy **response are compared using receiver operating characteristics and Mann-Whitney tests:**

Results

Overview of the statistical analysis as run on the server:

Analysis interface:

ROC curves and box-plots of **top genes of platin resistance** – AKIP1 (A), MARVELD1 (B), SKI (C), AKIRIN2 (D), CFL (E) and SEBP1 (F):

Summary

❖ **The analysis pipeline enables to validate and rank predictive biomarker nominees.**

❖ **By analysing the candidate genes in a large set of independent patients, we can select the most reliable candidate and abolish those which are most likely to fail in a clinical setting.**

❖ **The registration-free interface of the online analysis platform is accessible at www.rocplot.org/ovar**