Interpretation of common diagnostic markers reported for Colorectal cancer and other indications for the development of multiplex biomarker panels; Analysis using GOBIOM Biomarker Database


Background
Colorectal cancer is one of the most common cancers worldwide. It accounts for over 9% of all cancer incidences and the third most common cancer worldwide. The five-year survival rate of people with localized stage colorectal cancer is 96% and 70% in patients with distant metastasis. Despite marked improvement in the new therapies, more than 40% of patients who present with stage I or II disease will have a disease recurrence following primary therapy. Thus, the early detection of colorectal cancer can be key to effectively treating the disease. Early detection process can become more sensitive and specific if we focus on a panel of biomarkers instead of a single biomarker (that may visualization of overlapping biomarkers between the indications will enable in understanding the complex biological system and cellular pathways involved in the disease. GOBIOM Database is a comprehensive database of validated and putative biomarkers providing insights into relationships between biomarker and disease. The user-friendly interface facilitates analyzing and visualizing the biomarker data, which can aid in better understanding of biological processes involved in specific pathologies, identification of new drug targets, development of personalized medicine strategies utilizing companion diagnostics, development/evaluation of diagnostic assays kits and monitoring the safety of experimental or marketed drugs. GOBIOM is a single platform provides clinical and preclinical information on biochemistry, genomics, imaging, metabolomics, clinical scoring scales and molecular markers spanning over 18 different therapeutic areas, covering 1372 therapeutic indications with its reported utilities like diagnosis, prognosis, progression of disease, survival, response to therapy, pharmacokinetics, efficacy, drug resistance and safety/ toxicity.

Objective
The aim of this study was
(a) To analyze the diagnostic biomarkers that are reported for colorectal cancer and explore for the possibility of developing a diagnostic panel that can increase the sensitivity of the disease detection.
(b) To see if any diagnostic markers which are common between colorectal cancer and other indications.

GOBIOM Database
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Data is manually curated from:
- Poor reviewed journals
- Clinical trials and their results
- Scientific meetings
- Patents
- Regulatory approved documents
- Approved Analyte from SIB and PMA database
- Other relevant web resources

Methodology
We extracted diagnostic biomarkers of colorectal cancer and other indications from GOBIOM database by using the new GOBIOM Heatmap Analysis feature. Following steps are carried out in the analysis:

1. Search Strategy

2. Data Analysis and generation of plots

3. Generation of the relevant heatmaps

Analysis
Biochemical Diagnostic biomarkers that are common between colorectal cancer and other indications

Genomic Diagnostic biomarkers that are common between colorectal cancer and other indications

Conclusions:

Biochemical Biomarkers:
1. There is a strong association between Breast cancer and Colorectal cancer as evident by overlap of ~60% of biochemical biomarkers between the two indications.
2. All the biochemical diagnostic biomarkers reported for colorectal cancer, evidence of inflammatory markers is high suggesting possible indication of chronic inflammation in the etiology of colorectal cancer.

Genomic Biomarkers:
1. Of all the genomic diagnostic biomarkers reported for colorectal cancer, incidence of microRNA markers is high suggesting a possible role of these markers in disease pathogenesis. Development of a microRNA panel can help in early detection of colorectal cancer and may prove improved risk stratification of patients.
2. The involvement of miR-21, miR-155, miR-146a, miR-210, miR-16-1, miR-31, and miR-29b in colorectal cancer has been reported. These microRNAs play a role in various cellular processes including cell proliferation, apoptosis, invasion, and metastasis.

Further focused studies should help us to identifying more robust panels for both screening and differential diagnosis of colorectal cancer thus decreasing unnecessary invasive procedures, and potentially avoiding unnecessary health care costs.

Focused biomarker databases like GOBIOM can be a very useful resource to perform such large scale studies and identify the hidden patterns in the published literature.

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