Breast Cancer

Stage-Specific Biomarker Detection for Different Stages

Meet the team

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Results interpretation and Communication

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Data Collection and Preprocessing

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Data Analysis

Introduction to the problem

Breast cancer is a heterogeneous disease, with clinical behavior varying across stages. Stage-specific biomarkers are critical for improving diagnosis and guiding personalized treatment strategies.

We aim to identify and validate biomarkers that can distinguish different stages of breast cancer by analyzing transcriptomics data. This will enable better diagnostic tools and potentially novel therapeutic targets.

Lopez-Gonzalez L, Sanchez Cendra A, Sanchez Cendra C, Roberts Cervantes ED, Espinosa JC, Pekarek T, Fraile-Martinez O, García-Montero C, Rodriguez-Slocker AM, Jiménez-Álvarez L, Guijarro LG, Aguado-Henche S, Monserrat J, Alvarez-Mon M, Pekarek L, Ortega MA, Diaz-Pedrero R. Exploring Biomarkers in Breast Cancer: Hallmarks of Diagnosis, Treatment, and Follow-Up in Clinical Practice. Medicina (Kaunas). 2024 Jan 17;60(1):168. doi: 10.3390/medicina60010168. PMID: 38256428; PMCID: PMC10819101.

Flowchart of the methods

Data Collection

Ensure datasets contain a variety of stages (I-IV)

Preprocessing

Normalize RNA-Seq data, filter low-expressed genes

Differential Gene Expression Analysis

Identify stage-specific gene expression changes

Functional Enrichment Analysis

Identify signaling pathways that are associated with the identified biomarkers

Validation of Biomarkers

Validate the identified biomarkers using independent datasets

Expected results

Stage-Specific Gene Expression Profiles

Identification of distinct gene expression patterns for different stages of breast cancer

Functional Annotation of Discovered Biomarkers

Mapping biomarkers to biological pathways involved in cancer progression

Validation of Biomarkers

Validation of identified biomarkers using independent transcriptomic datasets

Q/A