New open-source bioinformatics tool identifies factors responsible for diseases

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Researchers from Boston University School of Medicine (BUSM) have developed and tested a new computational tool, Candidate Driver Analysis (CaDrA), which will search for combinations of factors that are likely to cause a specific disease. CaDrA recognizes that diseases are complex and likely induced by multiple causes. It is now available free to members of the research community.

To measure CaDrA's ability to select sets of genomic features that are responsible for certain oncogenic phenotypes in cancer, the researchers performed extensive evaluations based on simulated data, as well as real genomic data from cancer cell lines and primary human tumors. The results from their simulations showed CaDrA has high sensitivity for mid- to large-sized datasets, and high speci?city for all sample sizes considered.

"We have shown CaDrA's capacity to correctly identify well-characterized driver mutations in cancer cell lines and primary tumors spanning multiple cancer types, as well as its ability to discover novel features associated with invasive phenotypes in human breast cancer samples," explained corresponding author Stefano Monti, Ph.D., associate professor of medicine at BUSM.

According to the researchers, this tool can be used to search for genetic and epigenetic alterations likely to cause a malignancy of interest, and in so doing it can support the identification of novel therapeutic targets.

"As the size and quality of publicly available multi-omics resources continues to increase, CaDrA will allow biomedical practitioners the flexibility to query these resources as they search for genetic and epigenetic factors contributing to disease susceptibility, drug sensitivity and/or pathway activity," added first author Vinay Kartha, Ph.D., a graduate of the BU Bioinformatics program and currently a post-doctoral fellow at the Broad Institute

These findings appear in the journal *Frontiers in Genetics*.

Provided by Boston University School of Medicine