Mutational signatures of cancer: Can passengers set a direction for prognosis?

January 22 2024

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An editorial paper was published in *Oncoscience* by researcher Peeter Karihtala from the University of Helsinki and University Hospital Comprehensive Cancer Center, titled, "The mutational signatures of cancer: can passengers set a direction for prognosis?"

In the early days of cancer genomics, the field concentrated mostly on finding actively cancer-progressing driver mutations. After the rapid development of modern sequencing technologies in the early 2010s, it was noted that passenger mutations could not be just random, irrelevant debris, but rather scars that have occurred during underlying biological processes of the tumor development and could therefore represent a historical record of carcinogenesis.

This paved the way for the mutational signatures, the concept which is nowadays defined as characteristic patterns of somatic mutations that occur in cancer genomes.

Despite multiple other ways to characterize mutational signatures, the COSMIC (Catalog of Somatic Mutations in Cancer) signatures are extensively studied and recognized as one of the most comprehensive and clinically relevant collections of mutational signatures to date. For example, specific COSMIC single-base substitution (SBS) mutational signatures may tell defects in specific DNA proofreading mechanisms (e.g., SBS10), exposure to specific chemotherapies (e.g., SBS17), or they may be secondary to smoking (e.g., SBS4). Still, the association of the mutational signatures with prognosis have not been elucidated until recently.

"In our two recent papers, we used publicly available data from the

Cancer Genome Atlas (TCGA) and Pan-Cancer Analysis of Whole Genomes (PCAWG) databases to evaluate if the presence of some COSMIC mutational signatures would be able to improve the prognostic value over the traditional prognostic factors in gastrointestinal or urological cancers, altogether in 13 histological types of cancers," says Karihtala

More information: Peeter Karihtala, The mutational signatures of cancer: can passengers set a direction for prognosis?, *Oncoscience* (2023). DOI: 10.18632/oncoscience.588

Provided by Impact Journals LLC