



MosaicMPI: A New Approach to Integrating Complex Data for Targeted Cancer Therapies

PROJECT SUMMARY

Understanding how diseases like cancer progress and identifying effective treatment targets requires analyzing data from various biological sources. Researchers at the University of Calgary have developed a new tool called mosaicMPI to combine and interpret complex data generated by various profiling technologies. These technologies include single cell profiling, which examines the unique characteristics of individual cells, and proteomics, which explores the structure and function of proteins, among other profiling technologies. MosaicMPI can harmonize data from different patient groups, providing a comprehensive view of disease mechanisms and potential treatment targets.

Using mosaicMPI, the team has made strides in research on glioblastoma, a highly aggressive brain cancer. By integrating data from multiple datasets,

the team has begun to understand how tumour cells spread and resist treatment, particularly at disease recurrence. This work could lead to better-targeted treatments for glioblastoma patients, who currently have poor survival rates.

In sarcoma, a rare type of cancer that affects the bones and soft tissues, the team is using mosaicMPI to study how tumours differ across patients. In a pilot study, they analyzed data from nearly 650 sarcoma cases and identified patterns that could predict whether a patient might respond to a specific type of immunotherapy, known as immune checkpoint inhibitors. These findings could help doctors personalize treatment plans for future sarcoma patients, while also helping scientists refine and focus their research efforts on those patients less likely to benefit from current standard therapies.

PUBLICATIONS

<https://academic.oup.com/nar/article/52/12/e53/7685157>

mosaicMPI is available at <https://github.com/MorrissyLab/mosaicMPI>

OVERALL IMPACT

By enabling researchers to identify biological patterns in complex cancers such as glioblastoma and sarcoma, this project supports the development of more personalized and effective treatment options from patients.