

6th International Conference on

Bioinformatics & Systems Biology

August 22-23, 2016 Philadelphia, USA

Exploring tumor biology via integrated analysis of tumor transcriptome datasets with MiSTIC

Mader Sylvie, Lemieux S and Sauvageau G
Université de Montréal, Canada

MiSTIC is a unique software package designed to visualize and annotate gene-gene correlations at different resolution levels from global transcriptomes to gene correlation clusters to individual genes. MiSTIC compares correlation structures of large transcriptome datasets, revealing similitudes between datasets from different solid tumor types in keeping with common gene reprogramming events in these cancers. Within datasets, MiSTIC performs systematic enrichment analysis on correlated gene clusters to explore their biological significance using gene sets from multiple databases and lists of genes containing transcription factor binding sites or ChIP-Seq regions in their flanking sequences. This enables the rapid identification of potential causes of gene clustering, including gene amplification/deletion or transcription networks. Enrichment analysis performed at the dataset level can also directly visualize the main aspects of tumor heterogeneity targeted by each gene signature in the database, illustrating for instance that all breast cancer prognostic signatures as well as subtype classifiers are enriched in a proliferation cluster highly conserved among different cancers. Finally, patient sets defined by expression of selected biomarker genes can be visualized, compared and annotated for enrichment in clinical features. Examples will be provided to illustrate how MiSTIC greatly facilitates both the mechanistic exploration of cancer biology and tumor classification using public or in-house transcriptome datasets. A version of MiSTIC pre-loaded with public tumor transcriptome datasets and relevant gene signatures will be made accessible via web interface and the software package will be distributed for analysis of custom datasets.

Biography

Mader Sylvie has completed her PhD from Université de Strasbourg in France and Post-doctoral studies from McGill University in Canada. She is the Professor at Université de Montréal and the Director of the Molecular Targeting Unit at the Institute for Research in Immunology and Cancer. She holds the CIBC Breast Cancer Research Chair at Université de Montréal. She has published more than 70 papers in reputed journals and she is currently serving as an Editorial Board Member of the *Journal of Molecular Endocrinology*. She has also developed and organized the Systems Biology Summer School in the Molecular Biology graduate program at Université de Montréal.

sylvie.mader@umontreal.ca

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