Tipo	Periódico
Título	Tumor-Promoted Changes in Pediatric Brain Histology Can Be Distinguished from Normal Parenchyma by Desorption Electrospray Ionization Mass Spectrometry Imaging
Autores	Seidinger AL, Silva FLT, Euzébio MF, Krieger AC, Meidanis J, Gutierrez JM, Bezerra TMS, Queiroz L, Silva AAR, Hoffmann IL, Daiggi CMM, Tedeschi H, Eberlin MN, Eberlin LS, Yunes JA, c, Cardinalli IA.
Autor (es) USF	Silva AAR, Gutierrez JM , Porcari AM
Autores Internacionais	Krieger AC, Eberlin LS
Programa/Curso (s)	Programa de Pós-Graduação Stricto Sensu em Ciências da Saúde
DOI	10.3390/biomedicines12112593
Assunto (palavras chaves)	pediatric oncology; brain tumor; intraoperative tool; mass spectrometry imaging; DESI
Idioma	Inglês
Fonte	Título do periódico: Biomedicines ISSN: 2227-9059 Volume/Número/Paginação/Ano: 2024, 12(11), 2593
Data da publicação	Published: 13 November 2024
Formato da produção	digital
Resumo	Background: Central nervous system (CNS) tumors are the second most frequent type of neoplasm in childhood and adolescence, after leukemia. Despite the incorporation of molecular classification and improvement of protocols combining chemotherapy, surgery, and radiotherapy, CNS tumors are still the most lethal neoplasm in this age group. Mass spectrometry imaging (MSI) is a powerful tool to map the distribution of molecular species in tissue sections. Among MSI techniques, desorption electrospray ionization (DESI-MSI) has been demonstrated to enable reliable agreement with the pathological evaluation of different adult cancer types, along with an acceptable time scale for intraoperative use. Methods: In the present work, we aimed to investigate the chemical profile obtained by DESI-MSI as an intraoperative surgical management tool by profiling 162 pediatric brain biopsies and reporting the results according to the histopathology and molecular profile of the tumors. Results: The 2D chemical images obtained by DESI-MSI allowed us to distinguish tumor-transformed tissue from non-tumor tissue with an accuracy of 96.8% in the training set and 94.3% in the validation set after statistical modeling of our data using Lasso. In addition, high-grade and low-grade tumors also displayed a distinct chemical profile when analyzed by DESI-MSI. We also provided evidence that the chemical profile of brain tumors obtained by DESI-MSI correlates with methylation-based molecular classes and specific immunophenotypes found in brain biopsies. Conclusions: The results presented herein support the incorporation of DESI-MSI analysis as an intraoperative assistive tool in prospective clinical trials for pediatric brain tumors management in the near future.
Fomento	This research was funded by Brazilian Health Ministry—PRONON grant number 25.000.069610/2015-43; São Paulo Research Foundation (FAPESP), grant numbers 2019/04314-6; Coordination of Improvement of Higher Education Personnel (CAPES)—Brazil, grant number 88887.504805/2020-00, 88887.511153/2020-00 and

	88887.636093/2021-00; NIH/NCI grant number R33CA229068; Welch Foundation, grant number Q-1895-20220331; Eli Lilly Research Award.