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Autores	Kyana Y. Garza, Alex Ap. Rosini Silva, Jonas R. Rosa, Michael F. Keating, Sydney C. Povilaitis, Meredith Spradlin, Pedro H. Godoy Sanches, Alexandre Varão Moura, Junier Marrero Gutierrez, John Q. Lin, Jialing Zhang, Rachel J. DeHoog, Alena Bensussan, Sunil Badal, Danilo Cardoso de Oliveira, Pedro Henrique Dias Garcia, Lisamara Dias de Oliveira Negrini, Marcia Ap. Antonio, Thiago C. Canevari, Marcos N. Eberlin, Robert Tibshirani, Livia S. Eberlin e Andreia M. Porcari
Autor (es) USF	Alex Ap. Rosini Silva, Jonas R. Rosa, Pedro H. Godoy Sanches, Alexandre Varão Moura, Junier Marrero Gutierrez, Danilo Cardoso de Oliveira, Pedro Henrique Dias Garcia, Lisamara Dias de Oliveira Negrini, Marcia Ap. Antonio e Andreia M. Porcari
Autores Internacionais	Kyana Y. Garza, Michael F. Keating, Sydney C. Povilaitis, Meredith Spradlin, John Q. Lin, Jialing Zhang, Rachel J. DeHoog, Alena Bensussan, Sunil Badal, Robert Tibshirani e Livia S. Eberlin
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Resumo	The outbreak of COVID-19 has created an unprecedent global crisis. While the polymerase chain reaction (PCR) is the gold standard method for detecting active SARS-CoV-2 infection, alternative high-throughput diagnostic tests are of a significant value to meet universal testing demands. Here, we describe a new design of the MasSpec Pen technology integrated to electrospray ionization (ESI) for direct analysis of clinical swabs and investigate its use for COVID-19 screening. The redesigned MasSpec Pen system incorporates a disposable sampling device refined for uniform and efficient analysis of

	swab tips via liquid extraction directly coupled to an ESI source. Using this system, we analyzed nasopharyngeal swabs from 244 individuals including symptomatic COVID-19 positive, symptomatic negative, and asymptomatic negative individuals, enabling rapid detection of rich lipid profiles. Two statistical classifiers were generated based on the lipid information acquired. Classifier 1 was built to distinguish symptomatic PCR-positive from asymptomatic PCR-negative individuals, yielding a cross-validation accuracy of 83.5%, sensitivity of 76.6%, and specificity of 86.6%, and validation set accuracy of 89.6%, sensitivity of 100%, and specificity of 85.3%. Classifier 2 was built to distinguish symptomatic PCR-positive patients from negative individuals including symptomatic PCR-negative patients with moderate to severe symptoms and asymptomatic individuals, yielding a cross-validation accuracy of 78.4%, specificity of 77.21%, and sensitivity of 81.8%. Collectively, this study suggests that the lipid profiles detected directly from nasopharyngeal swabs using MasSpec Pen-ESI mass spectrometry (MS) allow fast (under a minute) screening of the COVID-19 disease using minimal operating steps and no specialized reagents, thus representing a promising alternative high-throughput method for screening of COVID-19.
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