

CovidArray: A Microarray-Based Assay with High Sensitivity for the Detection of Sars-Cov-2 in Nasopharyngeal Swabs

Francesco Damin ^{1,*}, Silvia Galbiati ^{2,†}, Stella Gagliardi ³, Cristina Cereda ³, Francesca Dragoni ^{3,4}, Claudio Fenizia ⁵, Valeria Savasi ^{6,7}, Laura Sola ¹ and Marcella Chiari ¹

- ¹ Istituto di Scienze e Tecnologie Chimiche “Giulio Natta” SCITEC CNR, 20131 Milan, Italy; laura.sola@scitec.cnr.it (L.S.); marcella.chiari@scitec.cnr.it (M.C.)
- ² Complications of Diabetes Units, Diabetes Research Institute, IRCCS San Raffaele Scientific Institute, 20132 Milan, Italy; galbiati.silvia@hsr.it
- ³ Genomic and Post Genomic Unit, IRCCS Mondino Foundation, 27100 Pavia, Italy; stella.gagliardi@mondino.it (S.G.); cristina.cereda@mondino.it (C.C.); francesca.dragoni@mondino.it (F.D.)
- ⁴ Department of Biology and Biotechnology “L. Spallanzani”, University of Pavia, 27100 Pavia, Italy
- ⁵ Department of Pathophysiology and Transplantation, University of Milan, 20122 Milan, Italy; claudio.fenizia@unimi.it
- ⁶ Unit of Obstetrics and Gynecology, L. Sacco Hospital ASST Fatebenefratelli Sacco, 20157 Milan, Italy; valeria.savasi@unimi.it
- ⁷ Department of Biomedical and Clinical Sciences, University of Milan, 20122 Milan, Italy
- * Correspondence: francesco.damin@scitec.cnr.it
- † These authors contribute equally to this work.

Table S1. Assay primer/probe sequences.

Assay	Description	Oligonucleotide Sequence		Amplicon Size (bp)
N1	Nucleocapside gene	For	5'-GACCCCAAATCAGCGAAAT-3'	73
		Rev ¹	5'-TCTGGTACTGCCAGTTGAATCTG-3'	
		Probe ²	5'-ACCCCGCATTACGTTGGTGGACC-3'	
N2	Nucleocapside gene	For	5'-TTACAAACATTGGCCGCAAA-3'	67
		Rev ¹	5'-GCGCGACATTCCGAAGAA-3'	
		Probe ²	5'-ACAATTGCCCCAGCGCTTCAG-3'	
RPP30	Ribonuclease P gene	For	5'-AGATTGGACCTGCGAGCG-3'	65
		Rev ¹	5'-GAGCGGCTGTCTCCACAAGT-3'	
		Probe ²	5'-TTCTGACCTGAAGGCTCTGCGCG-3'	
Negative control	Hybridization control	Probe ²	5'-AGGGCTCTATTCAGCGTATT-3'	

All the sequences are from the US CDC 2019–Novel Coronavirus (2019-nCoV) Real-Time RT-QPCR Diagnostic Panel. ¹The Reverse primers are labeled with Cyanine 3 in 5'-end. ²The spotted capture probes are amino modified in 5'-end.

Citation: Damin, F.; Galbiati, S.; Gagliardi, S.; Cereda, C.; Dragoni, F.; Fenizia, C.; Savasi, V.; Sola, L.; Chiari, M. CovidArray: A Microarray-Based Assay with High Sensitivity for the Detection of Sars-Cov-2 in Nasopharyngeal Swabs. *Sensors* **2021**, *21*, 2490. <https://doi.org/10.3390/s21072490>

Received: 1 March 2021

Accepted: 31 March 2021

Published: 3 April 2021

Publisher's Note: MDPI stays neutral with regard to jurisdictional claims in published maps and institutional affiliations.



Copyright: © 2021 by the authors. Licensee MDPI, Basel, Switzerland. This article is an open access article distributed under the terms and conditions of the Creative Commons Attribution (CC BY) license (<http://creativecommons.org/licenses/by/4.0/>).

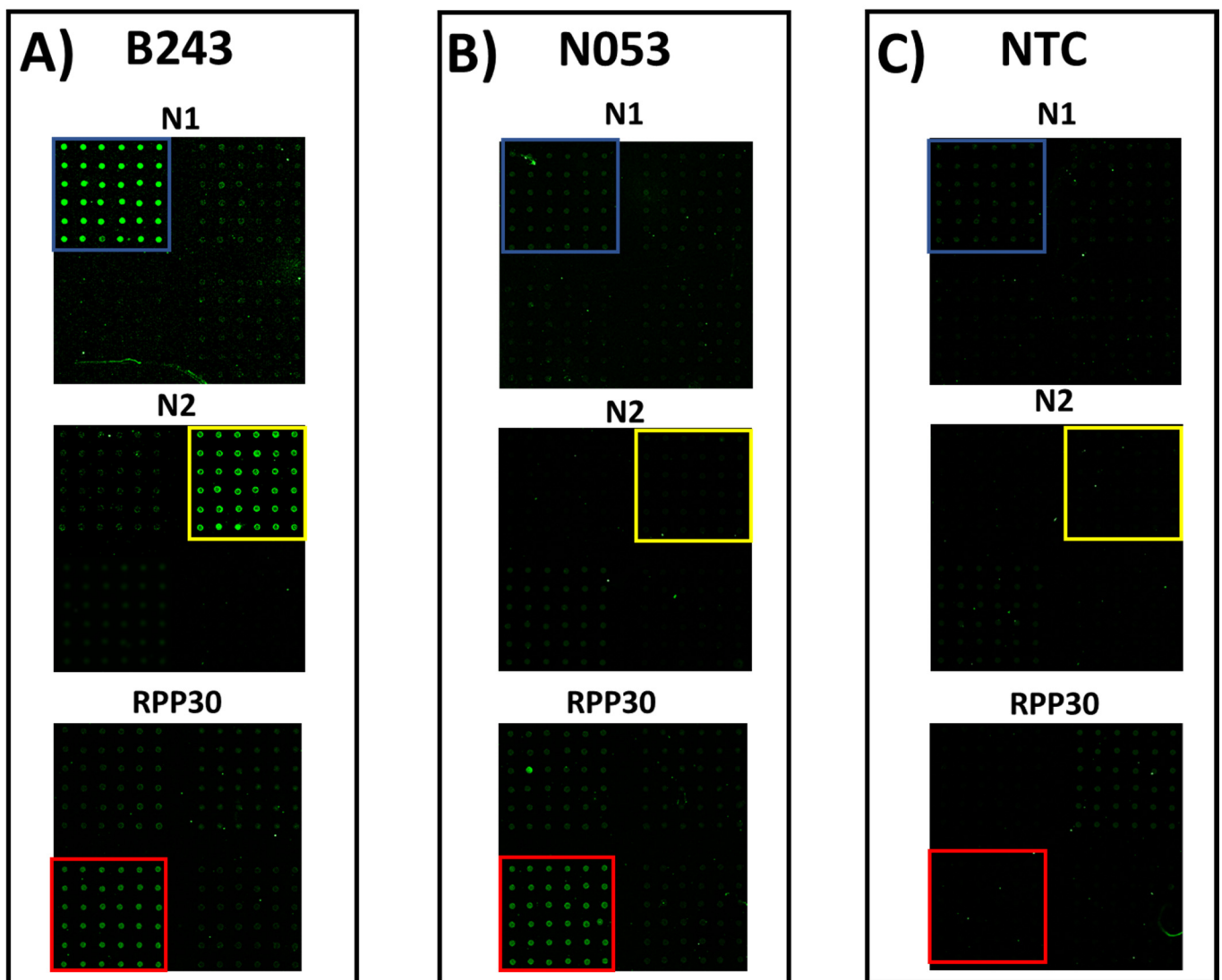


Figure S1. CovidArray analysis of two nasopharyngeal swabs. (A) Cy3 fluorescence image of the CovidArray analysis of sample B243. N1, N2 and RPP30 subarrays are highlighted in blue, yellow, and red, respectively. (B) Cy3 fluorescence images of the CovidArray analysis of sample N053. N1, N2 and RPP30 subarrays are highlighted in blue, yellow, and red, respectively. (C) Cy3 fluorescence image of the CovidArray analysis of the No Template Control (NTC). N1, N2 and RPP30 subarrays are highlighted in blue, yellow, and red, respectively. Laser Power: Low; PMT: 5%.