STRIP: Systematic Testing using Robotics and Innovation during Pandemics

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Peter Krijger

DISCLAIMER

ABSTRACT

STRIP is a start-to-end streamlined and automated procedure for COVID-19 testing, centering on a single Tecan Fluent liquid-handling robot that can process over 14,000 samples per day. The sensitivity, specificity, and practical implementation of STRIP have been validated in a clinical study on 1128 individuals, meeting the standards set by the Dutch National Institute for Public Health and the Environment (Dutch CDC). Automation throughout the testing procedure dramatically reduces the workload of diagnostic laboratory personnel and potentially allows the placement of multiple STRIP liquid-handling robots per testing facility, further increasing testing capacity. The entire test procedure also requires only 3 pipet tips per sample, as well as reduced testing reagents due to process miniaturization, which is important given scarcity of testing consumables during the COVID-19 pandemic. Furthermore, STRIP is compatible with reagents from any supplier, and thus less sensitive to supply chain bottlenecks. Finally, the system is open and modular, facilitating adaptation of future developments in diagnostics. Overall, the system enabled substantial savings in personnel and reagents requirements compared with conventional diagnostic testing; when STRIP runs at full capacity, it is possible to rapidly recoup the initial outlay in the liquid-handling system from savings in personnel costs, reagents and materials.

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J.V. is co-founder and CSO of InActiv Blue; S.M. is an employee of Tecan Trading AG; L.M.P.D., M.M.C.B., R.J.T.M.R., L.B.J.V. and J.H.B.B. are employees of Stichting PAMM Veldhoven; A.vW. is an employee of Sanquin;, E.D. is a founder and employee of Bodegro; and F.J.D. is CEO and co-founder HiFIBiO France.

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FILES

Step 1: Swab sample collection
Version 1
by Peter Krijger

Step 2: RNA extraction and RT-qPCR
Version 1
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Bead preparation protocol
Version 1
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Multiplex SARS-CoV-2 RT-qPCR protocol
Version 1
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