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XPRIZE SHINE - Paper-based SARS-CoV-2 NP Test

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1 Works for me dx.doi.org/10.17504/protocols.io.bk3qkymw

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ABSTRACT

This protocol describes how to perform a SHINE paper-based assay to detect SARS-CoV-2 RNA from a self-collected nasopharyngeal sample. This protocol is intended for in-home use. All enzymatic components are provided as a single-test freeze-dried pellet for shelf-stable storage, and all steps of the protocol are performed at ambient temperature. The protocol presented here is an improved version of the method presented in Arizti-Sanz J*, Freije CA*, *et al.* Integrated sample inactivation, amplification, and Cas13-based detection of SARS-CoV-2. *bioRxiv* (2020).

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KEYWORDS

CRISPR, SARS-CoV-2, nucleic acid diagnostic

LICENSE

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IMAGE ATTRIBUTION

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MATERIALS

NAME	CATALOG #	VENDOR
Nalgene® Dropper Bottles with Control Dispensing Tip, 4mL, white	2750-9125	Thermo Fisher
FastAmp® Viral and Cell Solution for Covid-19 Testing Solution B	4633	
Reagent Mix A (Paper-based SARS-CoV-2 resuspension mix)		
Lyophilized Reagent Mix B (Paper-based SARS-CoV-2 detection mix)		
HybriDetect – Universal Lateral Flow Assay Kit	MGHD 1	
Inoculating Loops and Needles Sterile 10 uL	12000-810	VWR International
Custom nasopharyngeal swab and collection tube		

STEPS MATERIALS

NAME	CATALOG #	VENDOR
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Lyophilized Reagent Mix B (Paper-based SARS-CoV-2 detection mix)		
Inoculating Loops and Needles Sterile 10 uL	12000-810	VWR International
HybriDetect – Universal Lateral Flow Assay Kit	MGHD 1	
FastAmp® Viral and Cell Solution for Covid-19 Testing Solution B	4633	
Custom nasopharyngeal swab and collection tube		

SAFETY WARNINGS

Please take care with potentially infectious sample material that does not come into contact with the provided viral lysis solution contained within the NP sample collection tube.

DISCLAIMER:

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BEFORE STARTING

Download the HandLens application on the user-provided smart device (smartphone, tablet, etc.). Wash hands prior to starting the protocol.

Sample Collection and Viral Lysis

- 1 Open the nasopharyngeal (NP) collection tube and rotate the nasal swab (attached to the NP collection tube cap) 4 times around the inside of each nostril. Return the swab to the collection tube and cap the tube.
Nasopharyngeal collection tube contains necessary volume of FastAmp® Viral and Cell Solution.



FastAmp® Viral and Cell Solution for
Covid-19 Testing Solution B
Catalog #: 4633



Custom nasopharyngeal swab and
collection tube

- 2 Mix NP sample and FastAmp® Viral and Cell Solution by shaking the closed sample collection tube for ⌚ 00:00:10
- 3 Wait ⌚ 00:05:00 , incubating sample at 🌡 Room temperature , before proceeding to Step 4.

SARS-CoV-2 Detection

- 4 Add the entire volume in the dropper bottle containing Reagent Mix A to the tube containing lyophilized Reagent Mix B. Cap the tube.



Nalgene™ Dropper Bottles with Control
Dispensing Tip, 4mL, white
by Thermo Fisher
Catalog #: 2750-9125



Reagent Mix A (Paper-based SARS-
CoV-2 resuspension mix)



Lyophilized Reagent Mix B (Paper-
based SARS-CoV-2 detection mix)

- 5 Mix Reagent Mix A and B by shaking for approximately ⌚ 00:00:10 .
- 6 Dip the inoculation loop into the sample collection tube (a small layer of liquid should be contained within the loop).



Inoculating Loops and Needles Sterile

10 uL

by VWR International

Catalog #: 12000-810

- 7 Transfer liquid in inoculation loop to the Reagent Mix A and B tube by dipping the loop into tube and stirring for 00:00:05 . Remove and discard the inoculation loop and cap the tube.
- 8 Mix the sample combined with Reagent Mix A and B by shaking for approximately 00:00:10 .
- 9 Wait 01:30:00 , incubating sample at Room temperature , before proceeding to Step 10.

Paper-based Readout and Automated Analysis

- 10 Open the Sample-Reagent Mix A and B tube and place the test strip into the liquid with the arrows on the test strip pointing upward and towards you.



HybriDetect – Universal Lateral Flow

Assay Kit

Catalog #: MGH1 1

- 11 Wait 00:05:00 with sample at Room temperature for visible horizontal bands to appear on the test strip.
- 12 With the user-provided smart device such as a smartphone, open the HandLens application and select paper-based as the test type.
- 13 Take a photo of the test strip, and select upload. The result of the test will appear on the smart device screen.