

Supporting Information

Title: Development and clinical validation of RT-LAMP based lateral-flow devices and electrochemical sensor for detecting multi-gene targets in SARS-CoV-2

Apoorva Saxena¹, Pawankumar Rai¹, Srishti Mehrotra^{1,2}, Samiya Baby³, Suman Singh^{2,4}, Vikas Srivastava^{2,3}, Smriti Priya^{2,3} and Sandeep K. Sharma^{1,2*}

Supplementary Tables

Table S1: Sequences of LAMP primers used in this study

| Table S1a: Target Name- N-gene | | | |
|--------------------------------|---------|---|-----------------------|
| Primer ID | Primers | Sequence (5' – 3') | PMID No. |
| N-1 | F3 | TGGCTACTACCGAAGAGCT | 32719001, 32635743 |
| | B3 | TGCAGCATTGTTAGCAGGAT | |
| | FIP | TCTGGCCCAGTTCCTAGGTAGTCCAGACGAATTCGTGGTGG | |
| | BIP | AGACGGCATCATATGGGTTGCACGGGTGCCAATGTGATCT | |
| | LF | GGACTGAGATCTTTCATTTTACCGT | |
| | LB | ACTGAGGGAGCCTTGAATACA | |
| N-2 | F3 | ACCAGGAACTAATCAGACAAG | 32635743 |
| | B3 | GACTTGATCTTTGAAATTTGGATCT | |
| | FIP | TTCCGAAGAACGCTGAAGCGGAACCTGATTACAAACATTGG CC | |
| | BIP | CGCATTGGCATGGAAGTCACAATTTGATGGCACCTGTGTA | |
| | LF | GGGGGCAAATTGTGCAATTTG | |
| | LB | CTTCGGGAACGTGGTTGACC | |
| N-3 | F3 | GCCAAAAGGCTTCTACGCA | 32276051 |
| | B3 | TTGCTCTCAAGCTGGTTCAA | |
| | FIP | TCCCCTACTGCTGCCTGGAGGCAGTCAAGCCTCTTCTCG | |
| | BIP | TCTCCTGCTAGAATGGCTGGCATCTGTCAAGCAGCAGCAAA G | |
| | LF | TGGTGGACCCTCAGATTCAA | |
| | LB | ATGGCGGTGATGCTGCTCT | |
| N-4 | F3 | GTTGTTCGTTCTATGAAGACT | 32547882 |
| | B3 | GACGTTGTTTTGATCGCG | |
| | FIP | CGAACGTCATGATACTCTAAAATGTCTGATAATGGACCCCA | |
| | BIP | CGAAATGCACCCCGCATTACCCACTGCGTTCTCCATTC | |
| | LF | TGTTTCGTTTAGATGAAATC | |
| | LB | TGGTGGACCCTCAGATTCAA | |
| N-5 | F3 | CCAGAATGGAGAACGCAGTG | 32626666 |
| | B3 | CCGTCACCACCACGAATT | |
| | FIP | AGCGGTGAACCAAGACGCAGGGCGCGATCAAAACAACG | |
| | BIP | AATTCCCTCGAGGACAAGGCGAGCTCTTCGGTAGTAGCCAA | |
| | LF | TTATTGGGTAAACCTTGGGGC | |
| | LB | TTCCAATTAACACCAATAGCAGTCC | |

| | | | |
|------|-----|---|---------------|
| N-6 | F3 | CACAAGCTTTCGGCAGAC | 32588005 |
| | B3 | CATCCAATTTGATGGCACC | |
| | FIP | CGGCCAATGTTTGTAATCAGTTCCTGGTCCAGAACAAACCCAA | |
| | BIP | CGTTCTTCGGAATGTCGCGCGTAGGTCAACCACGTTCC | |
| | LF | TTCCTGGTCCCCAAAATTTCC | |
| | LB | ATTGGCATGGAAGTCACACC | |
| N-7 | F3 | TGGACCCCAAAATCAGCG | 32333644 |
| | B3 | GCCTTGTCTCGAGGGAAT | |
| | FIP | CCACTGCGTTCTCCATTCTGGTAAATGCACCCCGCATTACG | |
| | BIP | CGCGATCAAAACAACGTCGGCCCTTGCCATGTTGAGTGAGA | |
| | LF | TGAATCTGAGGGTCCACCAA | |
| | LB | GGTTTACCCAATAATACTGCGTCTT | |
| N-8 | F3 | AGATCACATTGGCACCCG | 32333644 |
| | B3 | CCATTGCCAGCCATTCTAGC | |
| | FIP | TGCTCCCTTCTGCGTAGAAGCCAATGCTGCAATCGTGCTAC | |
| | BIP | GGCGGCAGTCAAGCCTCTTCCCTACTGCTGCCTGGAGTT | |
| | LF | GCAATGTTGTTCTTGAGGAAGTT | |
| | LB | GTTCTCATCACGTAGTCGCAACA | |
| N-9 | F3 | CTACCTAGGAACTGGGCC | 32692666 |
| | B3 | AGAAGAGGCTTGACTGCC | |
| | FIP | GGTGTATTCAAGGCTCCCTCACCTATGGTGCTAACAAGAC | |
| | BIP | AATCCTGCTAACAATGCTGCAATCCTGCTCCCTTCTGCGTAG | |
| | L F | GTTGCAACCCATATGATGC | |
| | L B | CTTCCTCAAGGAACAACAT | |
| N-10 | F3 | GCTGCAATCGTGCTACAACT | Self-designed |
| | B3 | TTGCTCTCAAGCTGGTTCAA | |
| | FIP | TGCGACTACGTGATGAGGAACGTTGCCAAAAGGCTTCTACGC | |
| | BIP | AATCCAGGCAGCAGTAGGGGAGCAGCAGCAAAGCAAGAG | |
| | L F | AGGCTTGACTGCCGCCTCT | |
| | L B | CTCCTGCTAGAAATGGCTGGC | |

| Table S1b: Target Name- ORF-1ab-gene | | | |
|--------------------------------------|--------|--|---------------|
| Primer ID | Primer | Sequence (5' – 3') | Reference |
| ORF-1AB-1 | F3 | TGCTTCAGTCAGCTGATG | 32361529 |
| | B3 | TTAAATTGTCATCTTCGTCCTT | |
| | FIP | TCAGTACTAGTGCCTGTGCCCACAATCGTTTTTAAACGGGT | |
| | BIP | TCGTATACAGGGCTTTTGACATCTATCTTGGAAGCGACAACAA | |
| | LF | CTGCACTTACACCGCAA | |
| | LB | GTAGCTGGTTTTGCTAAATTCC | |
| ORF-1AB-2 | F3 | GGTATGATTTTGTAGAAAACCCA | 32276116 |
| | B3 | CAACAGGAACTCCACTACC | |
| | FIP | GGCATCACAGAATTGTACTGTTTTTGCGTATACGCCAACTTAGG | |
| | BIP | AATGCTGGTATTGTTGGTGTACTGAGGTTTGTATGAAATCACCGAA | |
| | LF | AACAAAGCTTGGCGTACACGTTCA | |
| ORF-1AB-3 | F3 | GGATTTTGTGACTTAAAAGGTAAG | 32692666 |
| | B3 | GCACTTACACCGCAAACC | |
| | FIP | CGGTACAGACTGTGTTTTTAAGTGTGTACAAATACCTACAACTTGTG | |
| | BIP | TCTGCGGTATGTGGAAAGGTTATAAACGATTGTGCATCAGC | |
| | LF | AAACCCACAGGGTCATTAG | |
| | LB | GAACCCATGCTTCAGTC | |
| ORF-1AB-4 | F3 | TTGTGCTAATGACCCTGT | Self-designed |
| | B3 | TCAAAAGCCCTGTATACGA | |
| | FIP | GATCACAACCTACAGCCATAACCTTTTACACTTAAAAACACAGTCTGT | |
| | BIP | GCTGATGCACAATCGTTTTTAAACGCATCAGTACTAGTGCCTGT | |
| | LF | CCACATACCGCAGACGGT | |
| | LB | GGTGTAAGTGCAGCCCGT | |

| Table S1c: Target Name- E-gene | | | |
|--------------------------------|---------|--|----------|
| Primer ID | Primers | Sequence (5' – 3') | PMID no. |
| E-1 | F3 | TGAGTACGAACTTATGTACTCAT | 32635743 |
| | B3 | TTCAGATTTTTTAACACGAGAGT | |
| | FIP | ACCACGAAAGCAAGAAAAAGAAGTTCGTTTCGGAAGAGACAG | |
| | BIP | TTGCTAGTTACACTAGCCATCCTTAGGTTTTACAAGACTCACGT | |
| | LF | CGCTATTAACCTATTAACG | |
| | LB | GCGCTTCGATTGTGTGCGT | |

| Table S1d: Target Name- S-gene | | | |
|--------------------------------|---------|--|---------------|
| Primer ID | Primers | Sequence (5' – 3') | PMID No. |
| S-1 | F3 | TCTATTGCCATACCCACAA | 32276116 |
| | B3 | GGTGTTTTGTAAATTTGTTTGAC | |
| | FIP | CATTCAGTTGAATCACCACAAATGTGTGTTACCACAGAAATTCTACC | |
| | BIP | GTTGCAATATGGCAGTTTTTTGTACATTGGGTGTTTTTGTCTGTT | |
| | LF | ACTGATGTCTTGGTCATAGACACT | |
| | LB | TAAACCGTGCTTTAACTGGAATAGC | |
| S-2 | F3 | CTGACAAAGTTTTTCAGATCCTCAG | 32276051 |
| | B3 | AGTACCAAAAATCCAGCCTCTT | |
| | FIP | TCCCAGAGACATGTATAGCATGGAATCAACTCAGGACTTGTTCTTACC | |
| | BIP | TGGTACTAAGAGGTTTTGATAACCCTGTTAGACTTCTCAGTGGAAGCA | |
| | LF | CCAAGTAACATTGGAAAAGAAA | |
| | LB | GTCCTACCATTTAATGATGGTGTTT | |
| S-3 | F3 | TCTTTCACACGTGGTGTT | 32333644 |
| | B3 | GTACCAAAAATCCAGCCTC | |
| | FIP | CATGGAACCAAGTAACATTGGAAAACCTGACAAAGTTTTTCAGATCC | |
| | BIP | CTCTGGGACCAATGGTACTAAGAGGACTTCTCAGTGGAAGCA | |
| | LF | GAAAGGTAAGAACAAGTCCTGAGT | |
| | LB | CTGTCCTACCATTTAATGATGGTGTT | |
| S-4 | F3 | GTGTTACCACAGAAATTCTACC | Self-designed |
| | B3 | GTGCAAAAACCTCTTGGGT | |
| | FIP | GCATTCAGTTGAATCACCACAAATAGTGTCTATGACCAAGACATC | |
| | BIP | AGCAATCTTTTGTGCAATATGGCTTTTTGTCTTGTTCAACAGCTAT | |
| | Loop B | CACAATTAAACCGTGCTTTAACTGG | |

Table S1e: RT-LAMP primers selected for labelling

| Primer ID | Primers | Sequence (5' – 3') | PMID No. |
|-----------|---------|--|----------|
| N-5 | F3 | CCAGAATGGAGAACGCAGTG | 32626666 |
| | B3 | CCGTCACCACCACGAATT | |
| | FIP | AGCGGTGAACCAAGACGCAGGGCGCGATCAAAACAACG | |
| | BIP | AATTCCCTCGAGGACAAGGCGAGCTCTTCGGTAGTAGCCAA | |
| | LF | TTATTGGGTAAACCTTGGGGC | |
| | LB | TTCCAATTAACACCAATAGCAGTCC | |
| | FIP* | Biotin AGCGGTGAACCAAGACGCAGGGCGCGATCAAAACAACG | |
| | BIP* | FAM AATTCCCTCGAGGACAAGGCGAGCTCTTCGGTAGTAGCCAA | |
| N-9 | F3 | CTACCTAGGAAGTGGGCC | 32692666 |
| | B3 | AGAAGAGGCTTGACTGCC | |
| | FIP | GGTGTATTCAAGGCTCCCTCACCTATGGTGCTAACAAAGAC | |
| | BIP | AATCCTGCTAACAATGCTGCAATCCTGCTCCCTTCTGCGTAG | |
| | LF | GTTGCAACCCATATGATGC | |
| | LB | CTTCCTCAAGGAACAACAT | |
| | LF* | Biotin GTTGCAACCCATATGATGC | |
| | LB* | FAM CTTCCTCAAGGAACAACAT | |
| ORF-1AB-1 | F3 | TGCTTCAGTCAGCTGATG | 32361529 |
| | B3 | TTAAATTGTCATCTTCGTCTT | |
| | FIP | TCAGTACTAGTGCTGTGCCACAATCGTTTTTAAACGGGT | |
| | BIP | TCGTATACAGGGCTTTTGACATCTATCTTGGAAGCGACAACAA | |
| | LF | CTGCACTTACACCGCAA | |
| | LB | GTAGCTGGTTTTGCTAAATTCC | |
| | LF* | Biotin CTGCACTTACACCGCAA | |
| | LB* | FAM GTAGCTGGTTTTGCTAAATTCC | |
| ORF-1AB-2 | F3 | GGTATGATTTTGTAGAAAACCCA | 32276116 |
| | B3 | CAACAGGAACTCCACTACC | |
| | FIP | GGCATCACAGAATTGTACTGTTTTTGCGTATACGCCAACTTAGG | |
| | BIP | AATGCTGGTATTGTTGGTGTACTGAGGTTTGTATGAAATCACCGAA | |
| | LF | AACAAAGCTTGGCGTACACGTTCA | |
| | FIP* | Biotin GGCATCACAGAATTGTACTGTTTTTGCGTATACGCCAACTTAGG | |
| | BIP* | FAM AATGCTGGTATTGTTGGTGTACTGAGGTTTGTATGAAATCACCGAA | |
| E-1 | F3 | TGAGTACGAACTTATGTACTCAT | 32635743 |
| | B3 | TTCAGATTTTAAACACGAGAGT | |
| | FIP | ACCACGAAAGCAAGAAAAAGAAGTTCGTTTCGGAAGAGACAG | |

| | | | |
|-----|------|---|-------------------|
| | BIP | TTGCTAGTTACACTAGCCATCCTTAGGTTTTACAAGACTCACGT | |
| | LF | CGCTATTAAGTATTAACG | |
| | LB | GCGCTTCGATTGTGTGCGT | |
| | LF* | Biotin CGCTATTAAGTATTAACG | |
| | LB* | FAM GCGCTTCGATTGTGTGCGT | |
| S-1 | F3 | TCTATTGCCATACCCACAA | 32276116 |
| | B3 | GGTGTTTTGTAATTTGTTTGAC | |
| | FIP | CATTGAGTTGAATCACCACAAATGTGTGTTACCACAGAAATCTAC C | |
| | BIP | GTTGCAATATGGCAGTTTTTGATACATTGGGTGTTTTGTCTTGTT | |
| | LF | ACTGATGTCTTGGTCATAGACACT | |
| | LB | TAAACCGTGCTTTAACTGGAATAGC | |
| | LF* | Biotin ACTGATGTCTTGGTCATAGACACT | |
| | LB* | FAM TAAACCGTGCTTTAACTGGAATAGC | |
| S-4 | F3 | GTGTTACCACAGAAATTCTACC | Self- designed |
| | B3 | GTGCAAAAACCTTCTTGGGT | |
| | FIP | GCATTGAGTTGAATCACCACAAATAGTGTCTATGACCAAGACATC | |
| | BIP | AGCAATCTTTTGTTGCAATATGGCTTTTTGTCTTGTTCAACAGCTAT | |
| | LF | CACAATTAAACCGTGCTTTAACTGG | |
| | FIP* | Biotin GCATTGAGTTGAATCACCACAAATAGTGTCTATGACCAAGACATC | |
| | BIP* | FAM AGCAATCTTTTGTTGCAATATGGCTTTTTGTCTTGTTCAACAGCTAT | |

Table S2: Primers for invitro transcription of viral mRNA used in this study

| Target | Forward primer (5'-3') | Reverse primer (5'-3') |
|-----------------|--|-------------------------------|
| N-gene | TAATACGACTCACTATAGGGGTTGTTTCGTTCTATGAA GACT | GACTTGATCTTTGAAATTTGGA TCT |
| ORF lab-gene | TAATACGACTCACTATAGGGGGATTTTGTGACTTAAA AGGTAAG | CAACAGGAACTCCACTACC |
| E-gene | TAATACGACTCACTATAGGGTGAGTACGAACTTATGT ACTCAT | TTCAGATTTTAAACACGAGAGT |
| S-gene | TAATACGACTCACTATAGGGTCTATTGCCATACCCAC AA | GGTGTTTTGTAAATTTGTTTGA C |

*RNA polymerase Promoter-(T7 TAATACGACTCACTATAGGG)

Table S3: Yield and purity ratio of invitro transcribed viral mRNA used in the study

| Target | Concentration (ng/μl) | A260/280 | A260/230 |
|-------------|-----------------------|----------|----------|
| N-gene | 998.8 | 2.20 | 2.34 |
| ORF1ab-gene | 1246.6 | 2.27 | 2.43 |
| E-gene | 3022.9 | 2.14 | 2.40 |
| S-gene | 3398.5 | 2.15 | 2.29 |

Table S4: Primers selected for the establishment of RT-LAMP based LFD assay

| Primer ID | Primers | Sequence (5' – 3') | PMID No. |
|------------------------------------|---------|---|-------------------|
| N-gene (N-9) | F3 | CTACCTAGGAACTGGGCC | 32692666 |
| | B3 | AGAAGAGGCTTGACTGCC | |
| | FIP | GGTGTATTCAAGGCTCCCTCACCTATGGTGCTAACAAAGAC | |
| | BIP | AATCCTGCTAACAAATGCTGCAATCCTGCTCCCTTCTGCGTAG | |
| | LF | GTTGCAACCCATATGATGC | |
| | LB | CTTCCTCAAGGAACAACAT | |
| | LF* | Biotin GTTGCAACCCATATGATGC | |
| | LB* | FAM CTTCCTCAAGGAACAACAT | |
| ORF1ab-gene (ORF-1AB-2) | F3 | GGTATGATTTTGTAGAAAACCCA | 32276116 |
| | B3 | CAACAGGAACTCCACTACC | |
| | FIP | GGCATCACAGAATTGTACTGTTTTTTCGTATACGCCAACTTAGG | |
| | BIP | AATGCTGGTATTGTTGGTGTACTGAGGTTTGTATGAAATCACCGAA | |
| | LF | AACAAAGCTTGGCGTACACGTTCA | |
| | FIP* | Biotin GGCATCACAGAATTGTACTGTTTTTTCGTATACGCCAACTTAGG | |
| | BIP* | FAM AATGCTGGTATTGTTGGTGTACTGAGGTTTGTATGAAATCACCGAA | |
| E-gene (E-1) | F3 | TGAGTACGAACTTATGTACTCAT | 32635743 |
| | B3 | TTCAGATTTTAAACACGAGAGT | |
| | FIP | ACCACGAAAGCAAGAAAAAGAAAGTTCGTTTCGGAAGAGACAG | |
| | BIP | TTGCTAGTTACACTAGCCATCCTTAGGTTTACAAGACTCACGT | |
| | LF | CGCTATTAACCTATTAACG | |
| | LB | GCGCTTCGATTGTGTGCGT | |
| | LF* | Biotin CGCTATTAACCTATTAACG | |
| | LB* | FAM GCGCTTCGATTGTGTGCGT | |
| S-gene (S-4) | F3 | GTGTTACCACAGAAATTCTACC | Self- designed |
| | B3 | GTGCAAAAACTTCTTGGGT | |
| | FIP | GCATTCAGTTGAATCACCCACAAATAGTGTCTATGACCAAGACATC | |
| | BIP | AGCAATCTTTTGTGCAATATGGCTTTTGTCTTGTTCACAGCTAT | |
| | LB | CACAATTAAACCGTGCTTAACTGG | |
| | FIP* | Biotin GCATTCAGTTGAATCACCCACAAATAGTGTCTATGACCAAGACATC | |
| | BIP* | FAM AGCAATCTTTTGTGCAATATGGCTTTTGTCTTGTTCACAGCTAT | |

Supplementary Figures

Figure S1: Sequences for customized DNA synthesis

1. E GENE (26232-26441)

TGAGTACGAACTTATGTACTCATTCGTTTCGGAAGAGACAGGTACGTTAATAGTTAA
TAGCGTACTTCTTTTTCTTGCTTTCGTGGTATTCTTGCTAGTTACACTAGCCATCCTTA
CTGCGCTTCGATTGTGTGCGTACTGCTGCAATATTGTTAACGTGAGTCTTGTA AAAACC
TTCTTTTTACGTTTACTCTCGTGTTAAAAATCTGAA

2. N-GENE (28195-29323)

GTTGTTTCGTTCTATGAAGACTTTTTAGAGTATCATGACGTTTCGTGTTGTTTTAGATTT
CATCTAAACGAACAACTAAAATGTCTGATAATGGACCCCAAAATCAGCGAAATGC
ACCCCGCATTACGTTTGGTGGACCCTCAGATTCAACTGGCAGTAACCAGAATGGAGA
ACGCAGTGGGGCGCGATCAAAACAACGTCGGCCCCAAGGTTTACCCAATAATACTG
CGTCTTGGTTCACCGCTCTCACTCAACATGGCAAGGAAGACCTTAAATTCCCTCGAG
GACAAGGCGTTCCAATTAACACCAATAGCAGTCCAGATGACCAAATTGGCTACTAC
CGAAGAGCTACCAGACGAATTCGTGGTGGTGACGGTAAAATGAAAGATCTCAGTCC
AAGATGGTATTTCTACTACCTAGGAACTGGGCCAGAAGCTGGACTTCCCTATGGTG
TAACAAAGACGGCATCATATGGGTTGCAACTGAGGGAGCCTTGAATACACCAAAAG
ATCACATTGGCACCCGCAATCCTGCTAACAATGCTGCAATCGTGCTACA ACTTCCTC
AAGGAACAACATTGCCAAAAGGCTTCTACGCAGAAGGGAGCAGAGGGCGGCAGTCA
AGCCTCTTCTCGTTCCTCATCACGTAGTCGCAACAGTTCAAGAAATTCAACTCCAGG
CAGCAGTAGGGGAACTTCTCCTGCTAGAATGGCTGGCAATGGCGGTGATGCTGCTCT
TGCTTTGCTGCTGCTTGACAGATTGAACCAGCTTGAGAGCAAAATGTCTGGTAAAGG
CCAACAACAACAAGGCCAACTGTCTACTAAGAAATCTGCTGCTGAGGCTTCTAAGA
AGCCTCGGCAAAAACGTACTGCCACTAAAGCATACAATGTAACACAAGCTTTCGGC
AGACGTGGTCCAGAACAACCCAAGGAAATTTTGGGGACCAGGAACTAATCAGACA
AGGAACTGATTACAAACATTGGCCGCAAAATTGCACAATTTGCCCCCAGCGCTTCAGC
GTTCTTCGGAATGTCGCGCATTGGCATGGAAGTCACACCTTCGGGAACGTGGTTGAC
CTACACAGGTGCCATCAAATTGGATGACAAAGATCCAAATTTCAAAGATCAAGTC

3. S-GENE (23693-23937)

TCTATTGCCATACCCACAAATTTTACTATTAGTGTTACCACAGAAATTCTACCAAGTGT
CTATGACCAAGACATCAGTAGATTGTACAATGTACATTTGTGGTGATTCAACTGAAT
GCAGCAATCTTTTGTTGCAATATGGCAGTTTTTGTACACAATTAAACCGTGCTTTAAC
TGGAATAGCTGTTGAACAAGACAAAAACACCCAAGAAGTTTTTGCACAAGTCAAAC
AAATTTACAAAACACC

4. ORF1ab-GENE (13286-14140)

GGATTTTGTGACTTAAAAGGTAAGTATGTACAAATACCTACAACCTTGTGCTAATGAC
CCTGTGGGTTTTACACTTAAAAACACAGTCTGTACCGTCTGCGGTATGTGGAAAGGT
TATGGCTGTAGTTGTGATCAACTCCGCGAACCCATGCTTCAGTCAGCTGATGCACAA
TCGTTTTTAAACGGGTTTGCGGTGTAAGTGCAGCCCGTCTTACACCGTGCGGCACAG
GCACTAGTACTGATGTCGTATACAGGGCTTTTGACATCTACAATGATAAAGTAGCTG
GTTTTGCTAAATTCCTAAAACTAATTGTTGTCGCTTCCAAGAAAAGGACGAAGATG
ACAATTTAATTGATTCTTACTTTGTAGTTAAGAGACACACTTTCTCTAACTACCAACA
TGAAGAAACAATTTATAATTTACTTAAGGATTGTCCAGCTGTTGCTAAACATGACTT
CTTTAAGTTTAGAATAGACGGTGACATGGTACCACATATATCACGTCAACGTCTTAC
TAAATACACAATGGCAGACCTCGTCTATGCTTTAAGGCATTTTGATGAAGGTAATTG
TGACACATTAAAAGAAATACTTGTCACATACAATTGTTGTGATGATGATTATTTCAA
TAAAAAGGACTGGTATGATTTTGTAGAAAACCCAGATATATTACGCGTATACGCCAA
CTTAGGTGAACGTGTACGCCAAGCTTTGTTAAAAACAGTACAATTCTGTGATGCCAT
GCGAAATGCTGGTATTGTTGGTGTACTGACATTAGATAATCAAGATCTCAATGGTAA
CTGGTATGATTTTCGGTGATTTTCATACAAACCACGCCAGGTAGTGGAGTTCCTGTTG

***Reference genome:** Severe acute respiratory syndrome coronavirus 2 isolate Wuhan-Hu-1, complete genome NCBI Reference Sequence: NC_045512.2

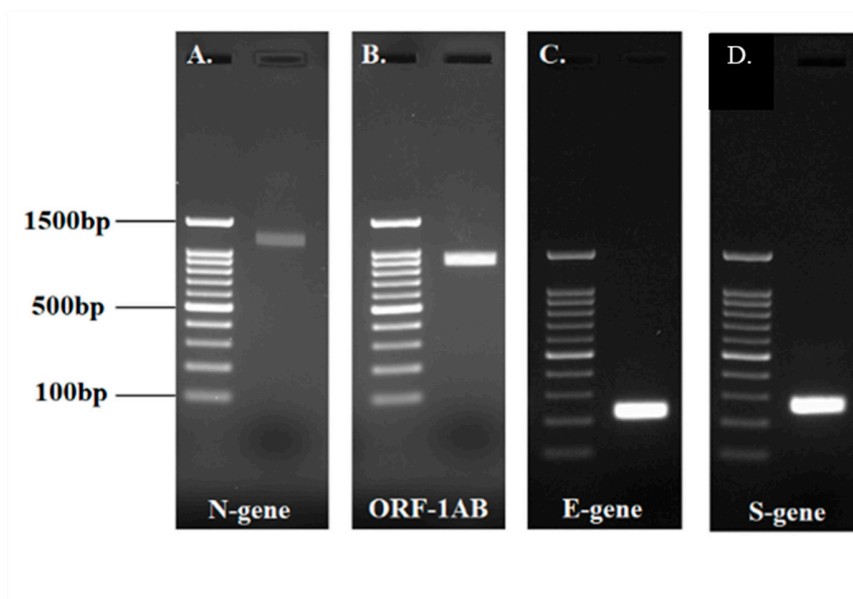


Figure S2: PCR amplification and purification of customized DNA sequence of SARS-CoV-2. PCR amplified and purified product visualised on agarose gel of **A)** N-gene (1129bp), **B)** ORF1ab-gene (855bp), **C)** E-gene (210bp), and, **D)** S-gene (245bp). L- DNA ladder (#MAGSPIN-21, APSLABS). All the experiments were replicated 3 times.

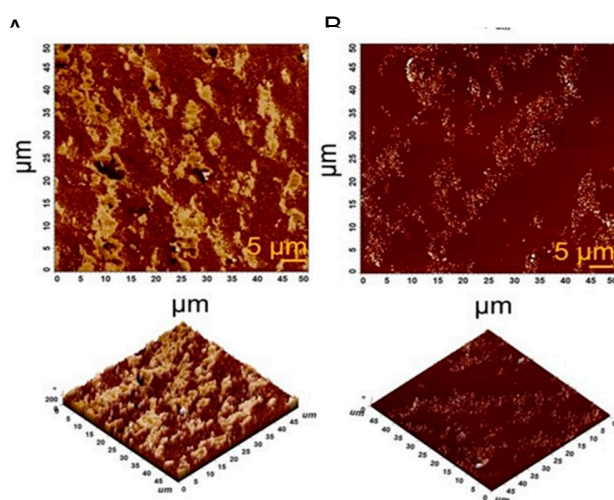


Figure S3: Surface characterization of screen-printed gold electrode through AFM. Topographical scan showing variation in the current magnitude at a scale of 5μm; **A.** screen-printed Au electrode (unmodified) and **B.** modified screen printed Au electrode/ β -ME/ssDNA probe.

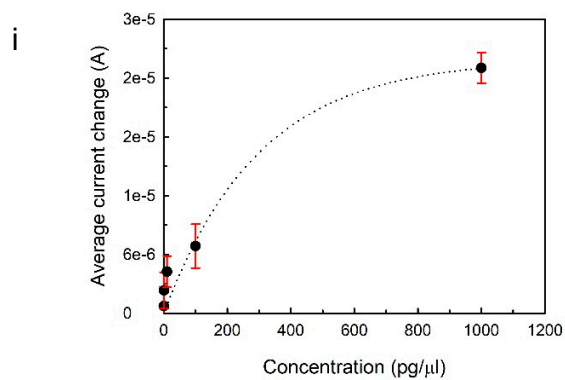
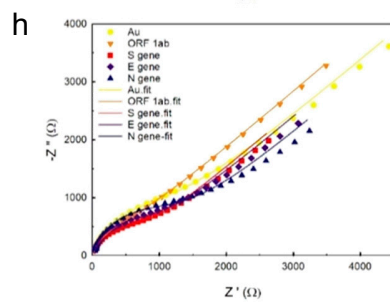
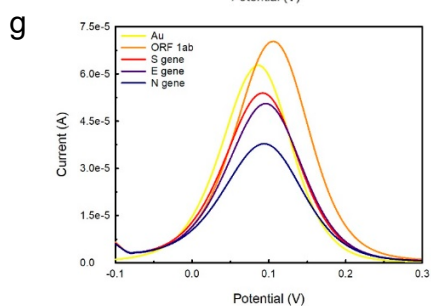
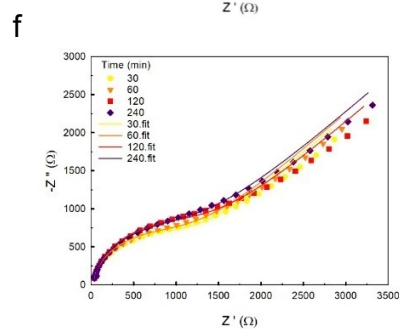
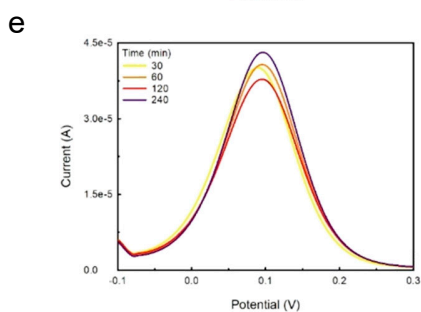
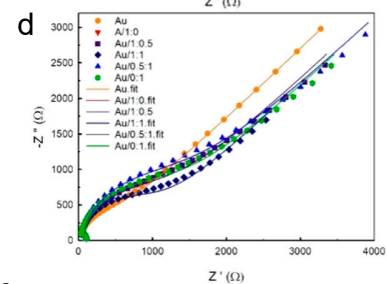
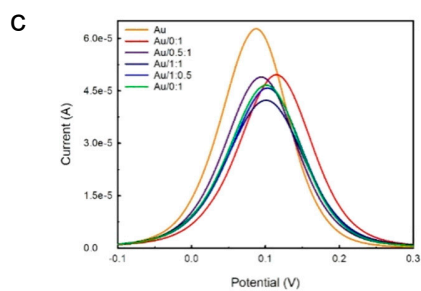
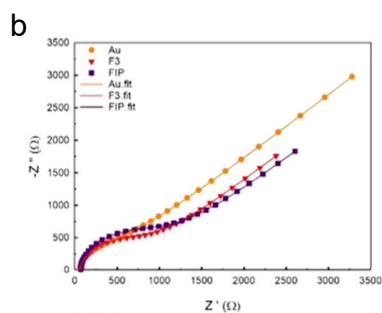
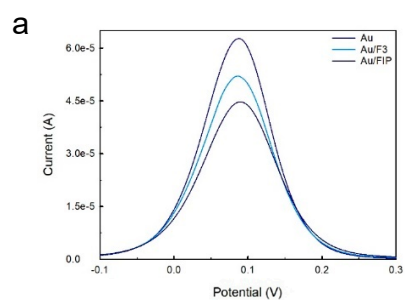


Figure S4: Differential pulse voltammogram and nyquist plot to determine the (a,b) primer type between F3 and FIP, (c,d) assembly of the spacer and primer, (e,f) effect of hybridisation time and (g,h) the response of non-complementary DNA (NcDNA) namely, ORF 1ab, S gene and E gene, (i) Standard plot between the average current change and concentration of customized RNA standards of N-gene