

Supporting Information

**On-Chip Surface Acoustic Wave Lysis and Ion-Exchange Nanomembrane Detection of Exosomal RNA for Pancreatic Cancer Study and Diagnosis**

Daniel Taller,<sup>a,b</sup> Katherine Richards,<sup>c</sup> Zdenek Slouka,<sup>b,d</sup> Satyajyoti Senapati,<sup>b,d</sup> Reginald Hill,<sup>c</sup> David B. Go,<sup>a,d\*</sup> and Hsueh-Chia Chang<sup>b,d\*</sup>

<sup>a</sup> Department of Aerospace and Mechanical Engineering, University of Notre Dame, Notre Dame, Indiana 46556, USA.

<sup>b</sup> Center for Microfluidics and Medical Diagnostics, University of Notre Dame, Notre Dame, Indiana 46556, USA.

<sup>c</sup> Department of Biological Sciences, University of Notre Dame, Notre Dame, Indiana 46556, USA..

<sup>d</sup> Department of Chemical and Biomolecular Engineering, University of Notre Dame, Notre Dame, Indiana 46556, USA.

\*Corresponding Authors: [dgo@nd.edu](mailto:dgo@nd.edu) (DBG) and [hchang@nd.edu](mailto:hchang@nd.edu) (HCC)

This Supporting Information contains the current-voltage characteristics (CVCs) for the seven nanomembrane sensors used to verify the sensor calibration model given by Eq. 3.

## Supporting Information

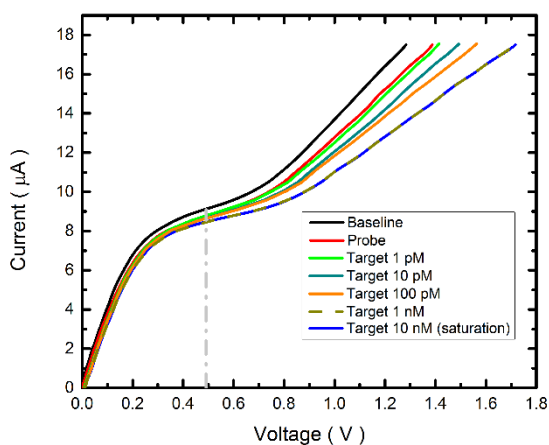


Fig. S1) Current voltage characteristic (CVC) for chip 1, corresponding to filled red markers in Figs. 5-6. The black, red, and blue curves indicate a CVC taken with the bare membrane, a CVC taken with the probe attached to the membrane, and a CVC taken with the probes on the membrane surface fully saturated with target RNA, respectively. Voltage measurements were taken at 17.5  $\mu\text{A}$ , while the limiting current  $I_o$  and current shift  $\Delta I$  were measured at 0.49 V (dotted grey line).

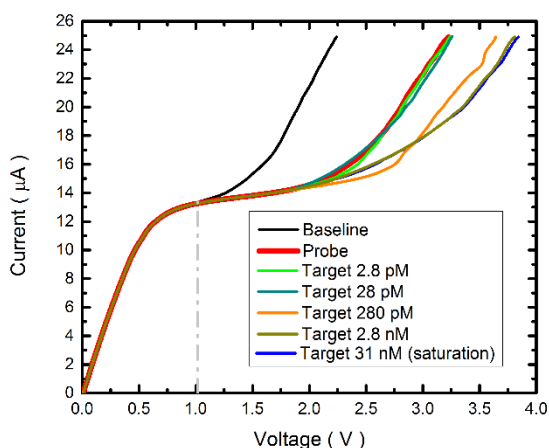


Fig. S2) Current voltage characteristic (CVC) for chip 2, corresponding to filled blue markers in Figs. 5-6. The black, red, and blue curves indicate a CVC taken with the bare membrane, a CVC taken with the probe attached to the membrane, and a CVC taken with the probes on the membrane surface fully saturated with target RNA, respectively. Voltage measurements were taken at 24.9  $\mu\text{A}$ ,

while the limiting current  $I_o$  and current shift  $\Delta I$  were measured at 1.015 V (dotted grey line).

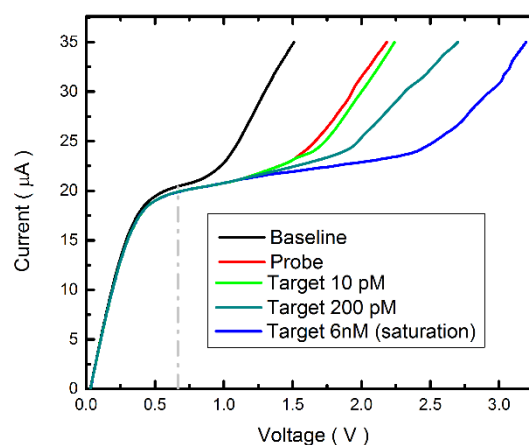


Fig. S3) Current voltage characteristic (CVC) for chip 3, corresponding to open magenta markers in Figs. 5-6. The black, red, and blue curves indicate a CVC taken with the bare membrane, a CVC taken with the probe attached to the membrane, and a CVC taken with the probes on the membrane surface fully saturated with target RNA, respectively. Voltage measurements were taken at 35  $\mu\text{A}$ , while the limiting current  $I_o$  and current shift  $\Delta I$  were measured at 0.667 V (dotted grey line).

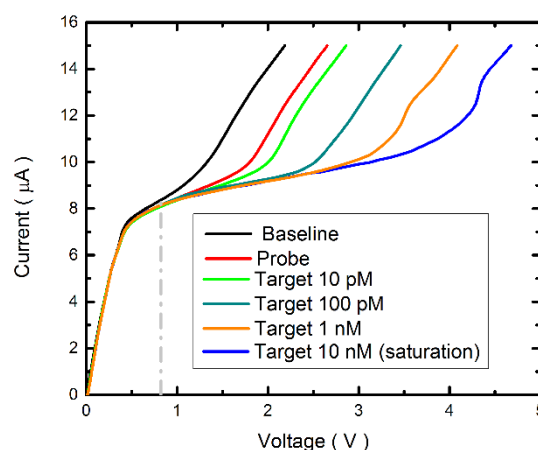


Fig. S4) Current voltage characteristic (CVC) for chip 4, corresponding to open green markers in Figs. 5-6. The black, red, and blue curves indicate a CVC taken with the bare membrane, a CVC taken with the probe attached to the membrane, and a CVC taken with the probes on the membrane surface fully saturated with

target RNA, respectively. Voltage measurements were taken at 15  $\mu\text{A}$ , while the limiting current  $I_o$  and current shift  $\Delta I$  were measured at 0.822 V (dotted grey line).

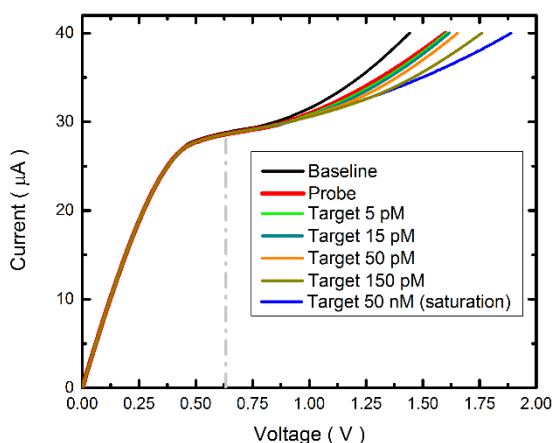


Fig. S5) Current voltage characteristic (CVC) for chip 5, corresponding to open orange markers in Figs. 5-6. The black, red, and blue curves indicate a CVC taken with the bare membrane, a CVC taken with the probe attached to the membrane, and a CVC taken with the probes on the membrane surface fully saturated with target RNA, respectively. Voltage measurements were taken at 40  $\mu\text{A}$ , while the limiting current  $I_o$  and current shift  $\Delta I$  were measured at 0.633 V (dotted grey line).

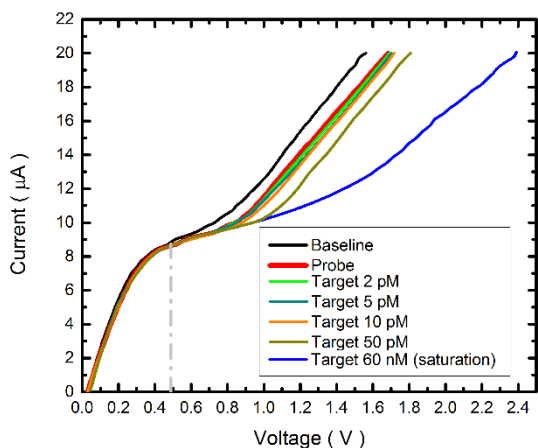


Fig. S6) Current voltage characteristic (CVC) for chip 6, corresponding to open orange markers in Figs. 5-6. The black, red, and blue curves indicate a CVC taken with the bare membrane, a CVC taken with the probe attached to the membrane, and a CVC taken with the probes on the membrane surface fully saturated with target RNA, respectively. Voltage measurements were taken at 20  $\mu\text{A}$ , while the limiting current  $I_o$  and current shift  $\Delta I$  were measured at 0.488 V (dotted grey line).

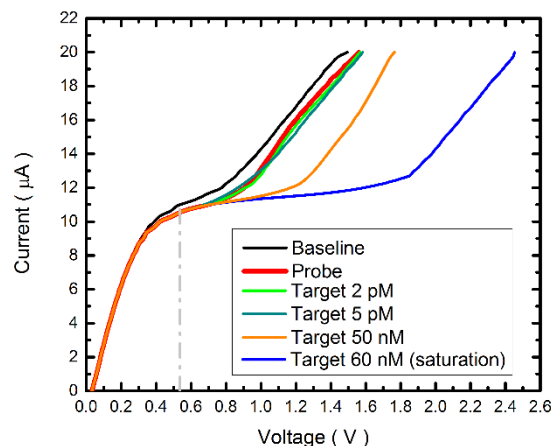


Fig. S7) Current voltage characteristic (CVC) for chip 7, corresponding to open orange markers in Figs. 5-6. The black, red, and blue curves indicate a CVC taken with the bare membrane, a CVC taken with the probe attached to the membrane, and a CVC taken with the probes on the membrane surface fully saturated with target RNA, respectively. Voltage measurements were taken at 20  $\mu\text{A}$ , while the limiting current  $I_o$  and current shift  $\Delta I$  were measured at 0.537 V (dotted grey line).