Electronic Supplementary Material (ESI) for Journal of Materials Chemistry B.

Supporting Information for:

Translocation of Soft Phytoglycogen Nanoparticles through Solid-State Nanochannels

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1. i-V Curve of the Channel

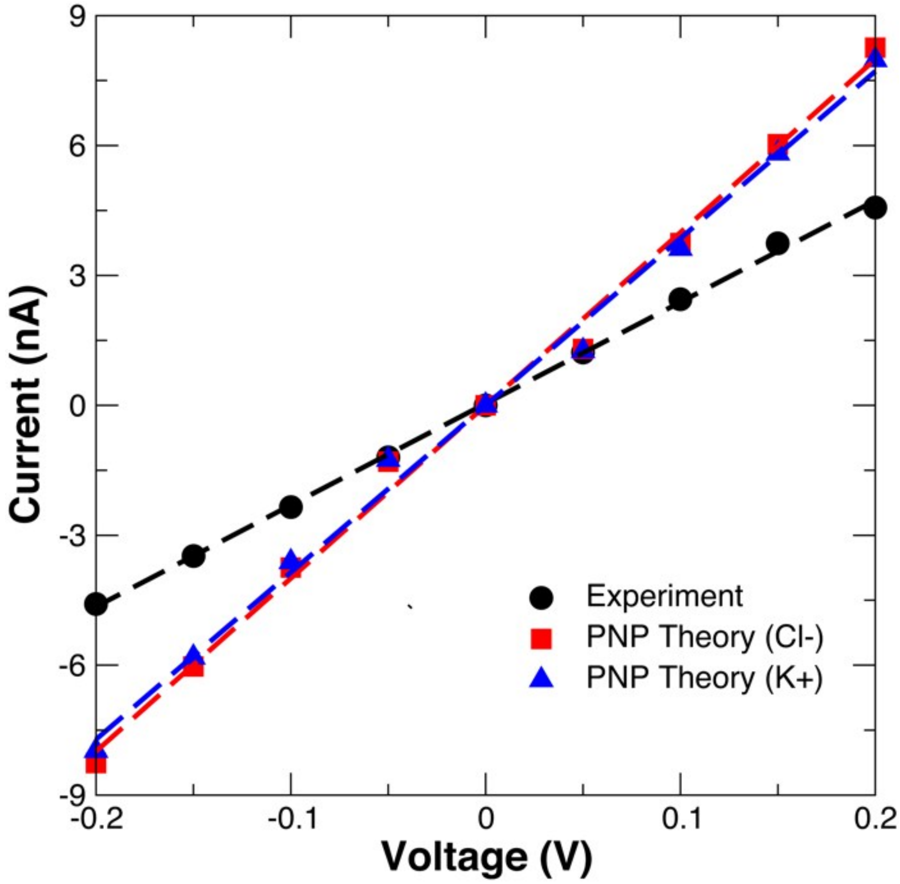

Figure S1. I-V characteristics of a d_P = 80 nm nanochannel. The points correspond to experimental measurements (circles), calculations using the PNP framework (squares) for the anion (red) and cation (blue).

The theoretical results shown above are in reasonable, though not quantitative, agreement with the experimental measurements. Notably, the experimental current matches closely to the anion current which is detected by the Ag/AgCl electrodes. PNP calculations from van Oeffelen *et al.* (DOI:10.1371/journal.pone.0124171) showed that their experimental currents most closely matched the anion currents. For this reason, blockade currents in the main text are calculated from the blockage of the Cl^- ions only.

2. Effects of Particle Hardness (h_{NP}) from PNP Calculations

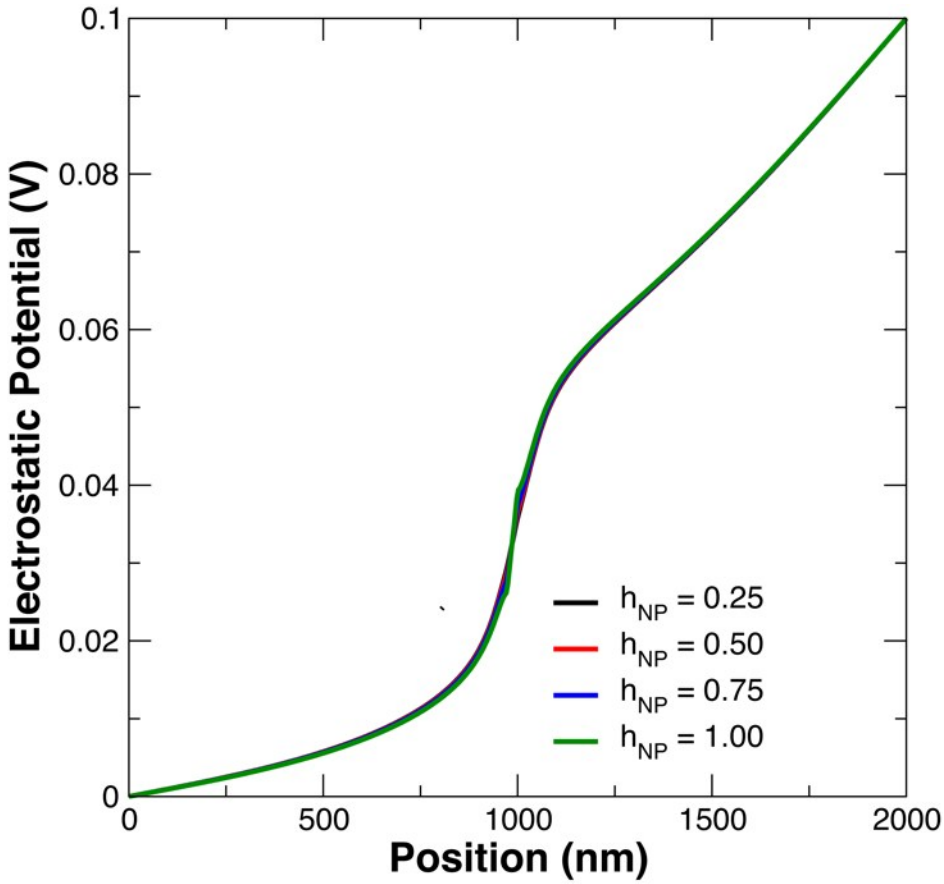

Figure S2. Variation of the electrostatic potential with particle hardness, calculated from PNP. Slight variation is observed near 1000 nm, where the particle is located, but the changes are subtle with h_{NP}.

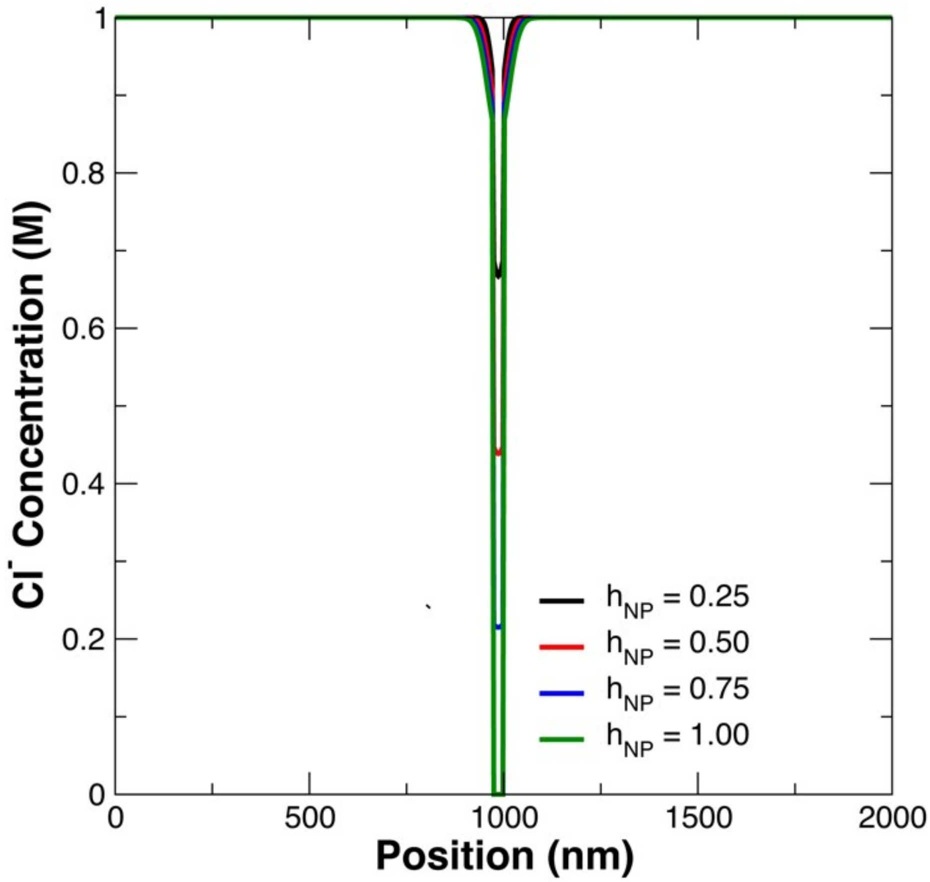

Figure S3. Concentration of chloride ions in the channel as a function of vertical position. The nanoparticle is located in the center of the system at 1000 nm. As the hardness of the nanoparticle decreases, the concentration of ions in the channel increases, resulting in a lower value for the blockade current.

3. Bounce-Off Events

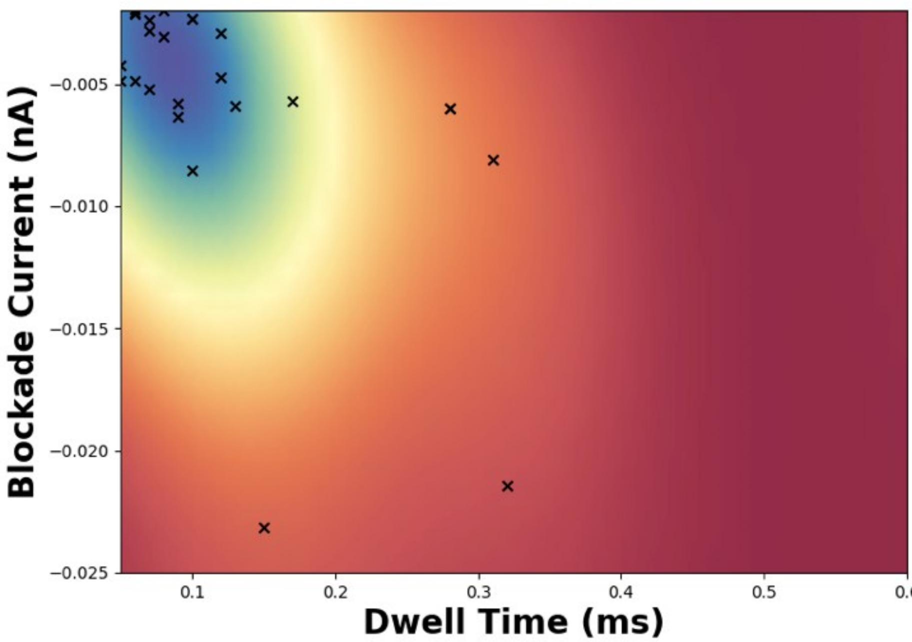

Figure S4. Translocation characteristics of 35 nm phytoglycogen nanoparticles through a 40 nm diameter nanochannel. The 2D histogram for *n* = 29 events shows an average dwell time of 0.15 ms and an average blockade current of 0.010 nA.

The histogram above summarizes events for a 40 nm nanochannel. The average dwell time is similar to the 60 nm channel (Figure 4, main text), and the current is greater. Note that PNP calculations predict that the blockade current should *increase* as the nanochannel diameter decreases. The similarity in shape of the histogram (*cf.* Figure 4, main text) implies that the majority of events in the 40 nm and 60 nm nanochannel systems are “bounce-off” events in which the particle does not completely traverse the length of the channel. Both the 40 nm and 60 nm histograms are markedly different from the 80 nm and 100 nm histograms (*cf.,* Figure 5, main text).