

Explanation of the data

This directory contains current-voltage data acquired from HEK-Nav1.5 cells using the Nanion Patchliner. The purpose of this study was to explore the effects of series resistance compensation on the interpretability of sodium voltage clamp data.

I have saved the data on Box in two different formats.

Format 1 (for cells: 220314_001_ch1 and 220210_003_ch3)

As an example: `./220210_003_ch3_csv/NaIVCP20/step_10.csv`

- `./220210_003_ch3_csv` – folder containing all info about a cell
 - `./220210_003_ch3_csv/NaIVCP20` – folder containing current-voltage traces at a specific compensation setting. The CP20 in this example indicates that the traces in this folder had 20% comp and 20% prediction compensation.
 - `./220210_003_ch3_csv/NaIVCP20/step_10.csv` – a file containing the current responses, which were sampled at 25 kHz. Each trace consists of a 10 ms holding step at -100 mV, followed by a 20 ms step to the specified voltage, and then a 10 ms step back to -100 mV.

For each cell, we acquired data at multiple compensation settings (e.g. NaIVCP10, NaIVCP20, etc). You may see three different constructions of these labels:

- NaIV**CP**XX – indicates that we compensated XX amount using both compensation and prediction (e.g. NaIVCP80 would be 80% comp + 80% pred)
- NaIV**C**XX – indicates that we compensated XX amount of *only* the compensation setting, while prediction was held at 0 (e.g. NaIVC80 would be 80% comp + 0% pred)
- NaIV**P**XX – indicates that we compensated XX amount of *only* the prediction setting, while compensation was held at 0 (e.g. NaIVP80 would be 0% comp + 80% pred)

We were not able to acquire data for all cells at every setting. The cells would often experience rundown after a few minutes (see 220210_003_ch3_csv comp+pred traces versus prediction only traces).

Format 2 (for cell: 220314_001_ch1_csv)

- Data was acquired at 25 kHz, so each point is 0.4 ms apart.
- Each cell was held at -100 mV for 1980 ms. Then, the voltage was stepped to a voltage between -80 and 35 mV for 20 ms before returning to -100 mV. Steps were incremented by 5 mV (e.g., -80 mV, -75 mV, -70 mV, ..., 35 mV) for a total of 35 mV.
- Each file labeled NaIV_XXC_YYCP.csv contains traces at each step for a given temperature and compensation setting:
 - The **XX** is a placeholder for the temperature at which the experiment was conducted. Experiments were conducted at 25C and 35C.
 - The **YY** is a placeholder for the compensation setting. Compensation was set to 0, 20, 40, 60, and 80%.
 - Each column in a file contains 40 ms of current response data from a given voltage step. Each column is labeled with the trace's corresponding voltage step (between -80 and 35 mV). The first 10 ms of the trace in each column is at -100 mV, the next 20 ms is at the specified voltage, and the final 10 ms is back to -100 mV.
 - **Leak subtraction has already been done for these traces**
- Each file labeled NaIV_XXC_YYCP_meta.csv contains information about the experiment conducted at the given temperature and compensation.
 - This file contains the estimated cell capacitance, series resistance, and seal resistance for the cell at every voltage step. The seal resistance and cell capacitance are measured before the protocol begins, so we assume they are the same for all voltage steps. The seal resistance is measured between each sweep (i.e., voltage step), so you will notice that it is a different value throughout a given trial