The present dataset contains original data and metadata published in:

Abbas F, Blömer LA, Millet H, Montnach J, De Waard M, Canepari M. Analysis of the effect of the scorpion toxin AaH-II on action potential generation in the axon initial segment. bioRxiv, 2023. https://www.biorxiv.org/content/10.1101/2023.10.06.561226v1

“Metadata.pdf” contains values of the analysis for the experiments.

Data are contained in matlab files (.mat) named with the corresponding Figure (with panel or blocker when different experiments are presented in the same figure).

**Figure1, variables nav12 and nav16 are for data shown in the figure**

**Column1**: time in ms.

**Column2,4**: currents funder control.

**Column3,5**: associated currents with 0.3 or 10 nM AaH-II.

**Figure2, somatic action potential (AP) acquired at 20 kHz – each variable is a different cell**

**Column1**: AP in under control.

**Column2** : AP with 5 nM AaH-II.

**Column3** : AP with 10 nM AaH-II.

**Column4** : AP with 20 nM AaH-II.

**Figure3, AP in the soma and in the axon initial segment (AIS) acquired at 20 kHz – each variable is a different cell**

**Column1**: AP in under control.

**Column2** : AP with 7 nM AaH-II.

**Figure4AC, Na+ transient associated with the AP in the AIS acquired at 10 kHz – each variable is a different cell**

**Column1**: under control.

**Column2** : with 7 nM AaH-II.

**Figure4BC, Ca2+ transient associated with the AP in the AIS acquired at 10 kHz – each variable is a different cell**

**Column1**: under control.

**Column2** : with 7 nM AaH-II.

**Figure5, Ca2+ transient associated with the AP in the AIS acquired at 10 kHz – each variable is a different cell**

**Column1**: under control distal.

**Column2** : with 7 nM AaH-II distal.

**Column3**: under control proximal.

**Column4** : with 7 nM AaH-II proximal.

For all details regarding this work, refer to the pre-print version of the report freely available at: https://www.biorxiv.org/content/10.1101/2023.10.06.561226v1