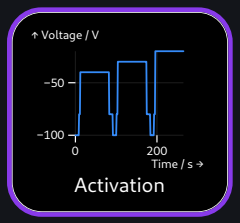
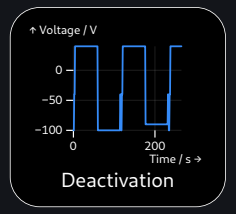
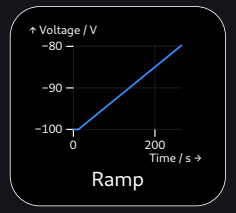
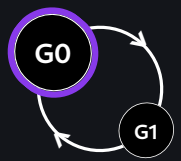




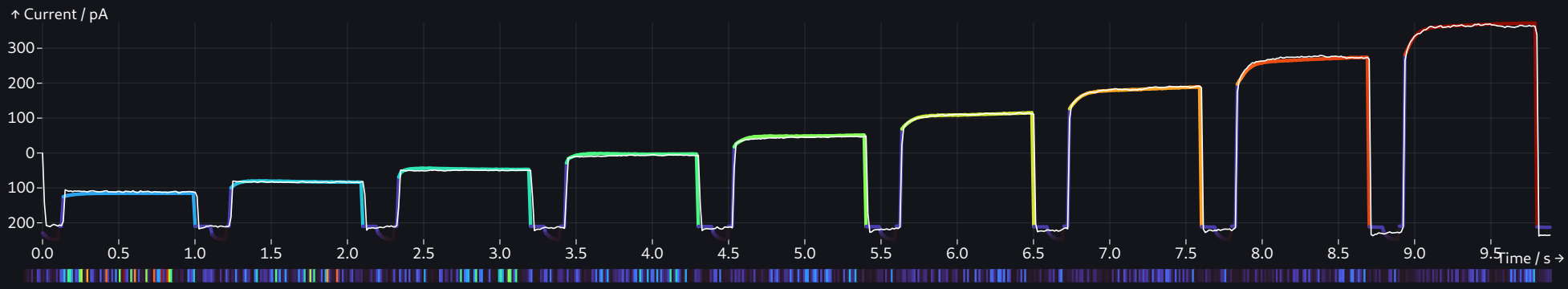




In-Silico Cancer Cell

Welcome! This is a full current measurement + simulation through an A549 cancer cell's membrane for a given voltage protocol (voltage accross the membrane).

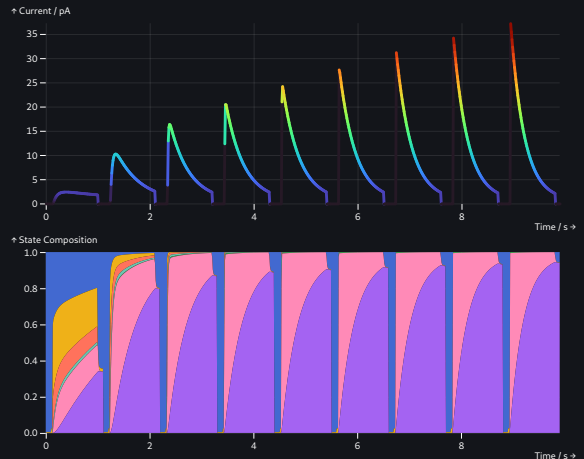
Full Simulation + Measurement Current



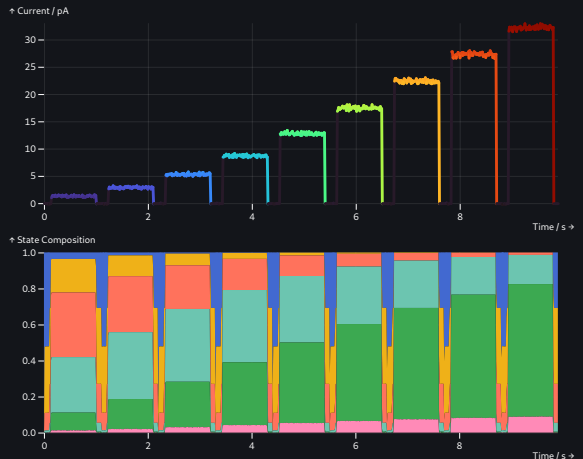
Individual Channel Contributions

The entire cell's membrane is composed of many individual ion channels, which we classify into 11 different types so far. The contributions per ion channel type are listed below:

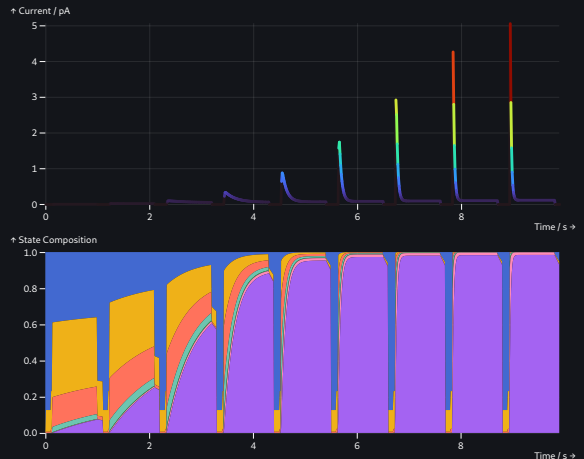
Kv13 Channel (7 states, 22 channels)

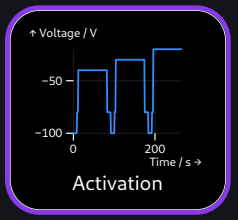


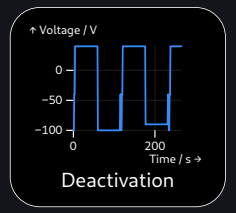
Kv31 Channel (6 states, 78 channels)

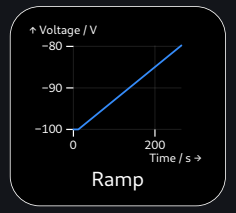


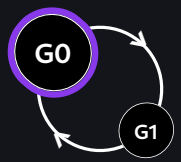
Kv34 Channel (7 states, 5 channels)



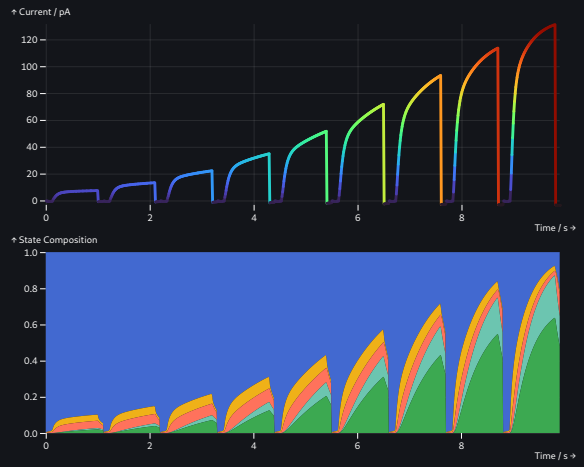




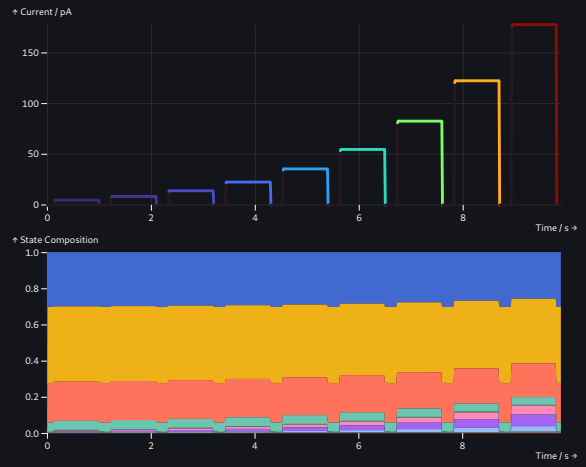




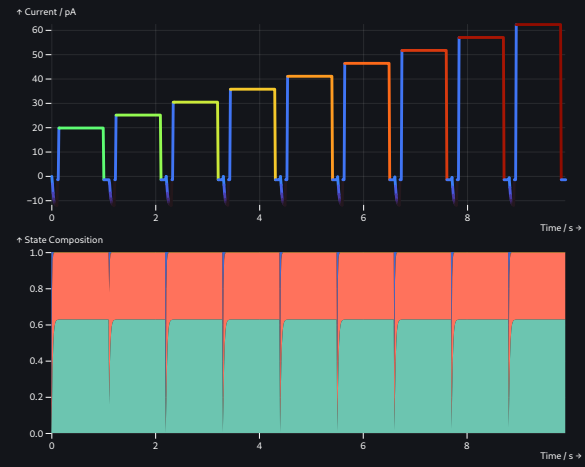
Kv71 Channel (5 states, 1350 channels)



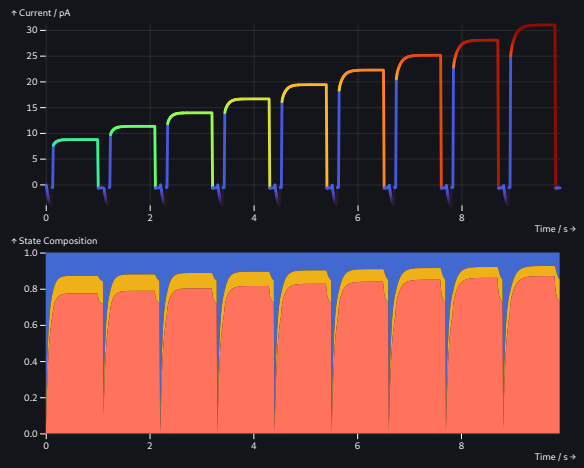
KCa11 Channel (10 states, 40 channels)



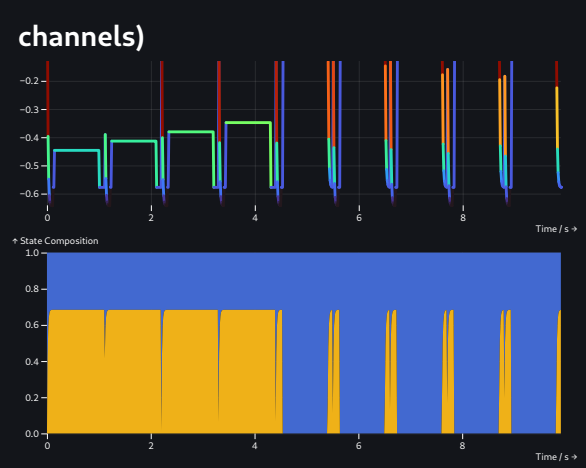
KCa31 Channel (4 states, 77 channels)



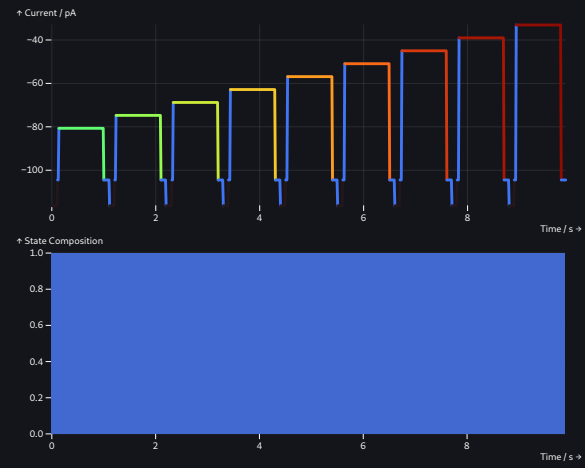
Task1 Channel (3 states, 19 channels)

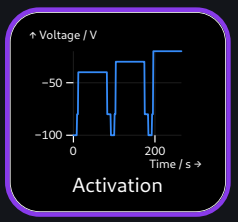


CRACM1 Channel (2 states, 200 channels)

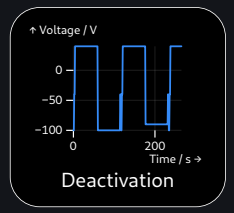


TRPC6 Channel (1 states, 17 channels)

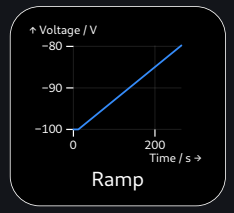




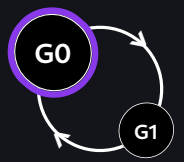
Activation



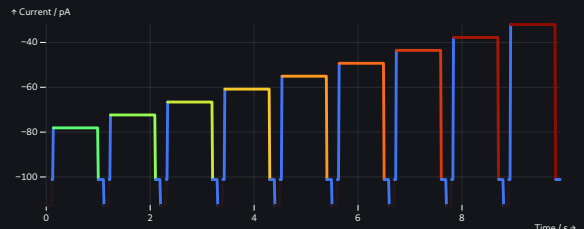
Deactivation

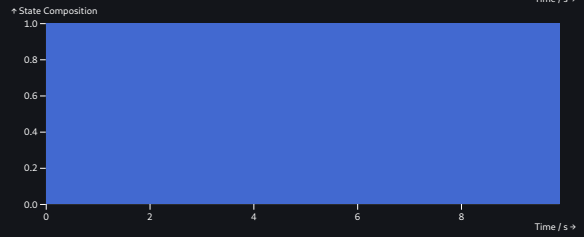


Ramp

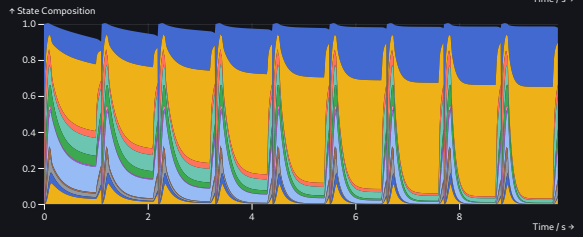


TRPV3 Channel (1 states, 12 channels)





CLC2 Channel (12 states, 13 channels)



Fundamental Research Background

The electrophysiological research and all individual models backing this simulation are documented in A549 in-silico 1.0: A first computational model to simulate cell cycle dependent ion current modulation in the human lung adenocarcinoma by Langthaler et al. The simulation was later ported to Rust, making it much more efficient.
Rust's WASM compilation is also what allows you to run it in a browser! The interface and visualisations are done with Astro and d3.

Simulation: Source Code →

Explore the source code of this simulation.

Institute: HCE →

Developed at the Institute of Health Care Engineering with European Testing Center of Medical Devices

Place: TU Graz →

Part of the Technical University of Graz.