

# 3D Patch Clamp Electrophysiology on Novel Magnetic Substrate

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## Introduction:

Patch clamp electrophysiology allows the measurement of the excitability of a cell. It can also specifically measure the activity of individual ion channel protein that control the activity of a cell. The technique allows the investigator to hold the cell at selected voltages of an action potential, measuring the changes that occur in terms of ionic currents through ion channels. The patch clamp technique is useful for excitable cells such as neurons and cardiomyocytes. The figures shown represent the activity of a human  $Na_v1.2$  sodium channel expressed in a HEK293 background. This isoform is expressed throughout the central nervous system.

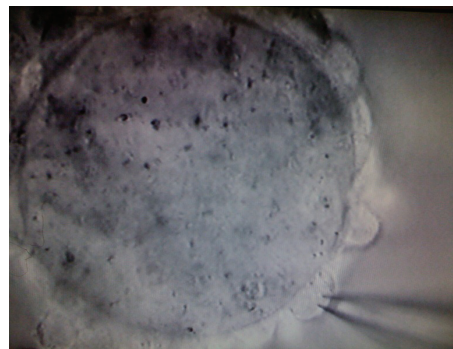


Figure 1. An electrode records from a cell on the GEM substrate.

## Method:

Sodium currents were recorded HEK293 cells stably expressing  $hNa_v1.2$  using the whole-cell configuration of the patch clamp recording technique. HEK 293 cells were cultured on the GEM™ substrate in the BioLevigator™ under standard conditions.

## Results:

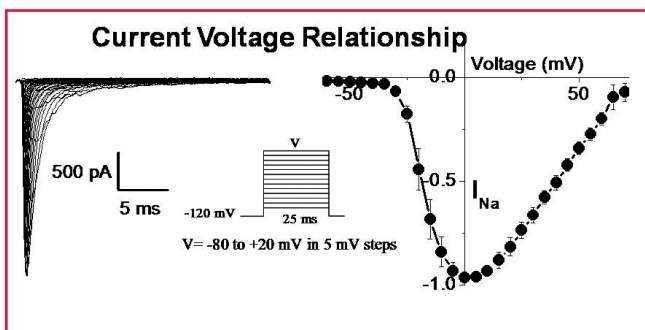


Figure 2. Current /voltage relationship. In this figure we measure the activity of the sodium channels expressed in HEK293.

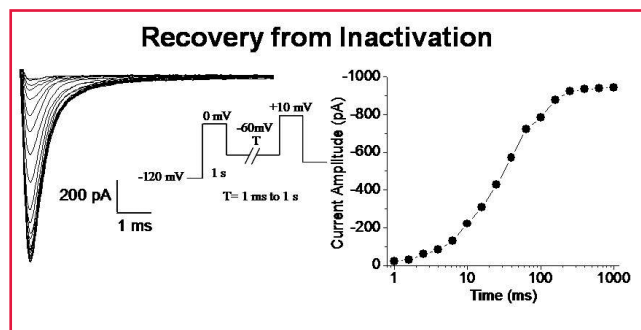


Figure 4. Recovery from inactivation. In this figure we measure how quickly the channels can become active again after they have inactivated.

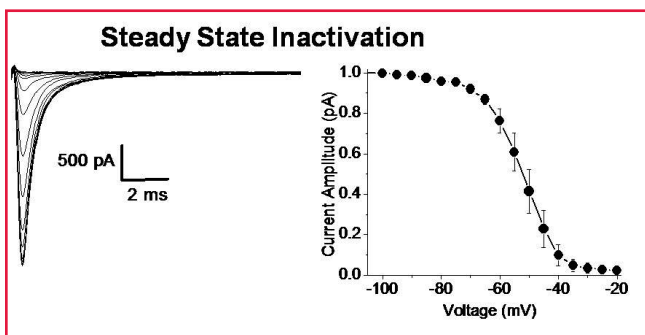


Figure 3. Steady state inactivation. In this figure we measure how the channel inactivates or becomes inactive.

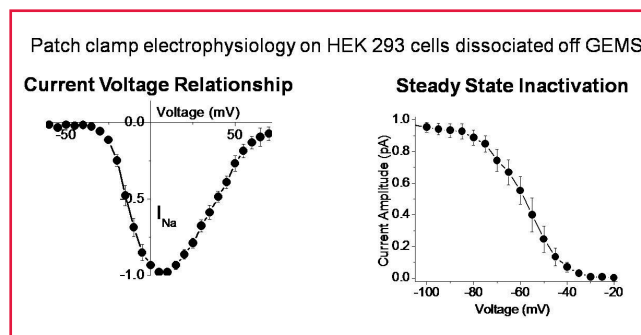


Figure 5. Recordings can be made from cells on GEMS and those dissociated off GEMS.

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