# An *in vitro* and *in silico* neuronal network model to unravel genetic encephalopathies

Contact

*In vitro* article

## Introduction

**Neurological disorders are poorly understood**

**Limited experimental freedom and insight *in vivo***

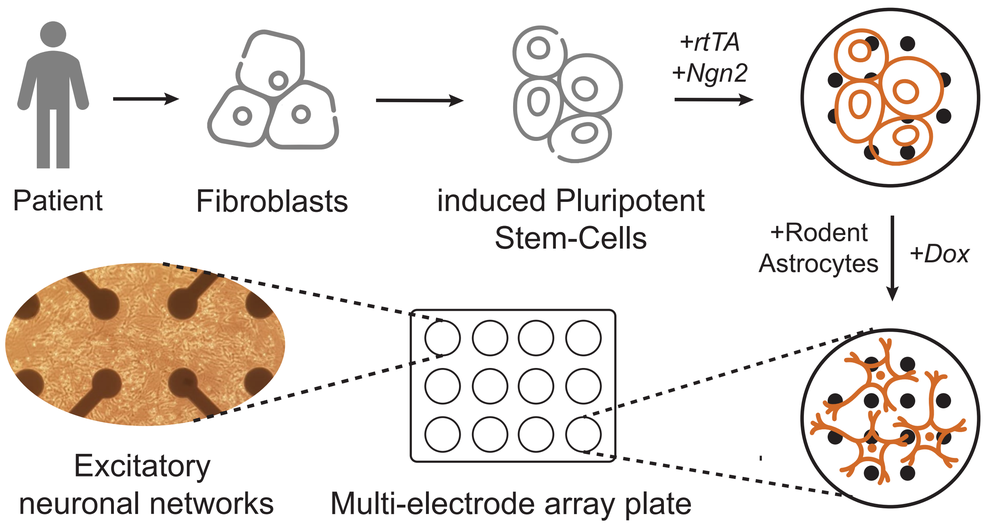
**Approach: stem-cell derived neuronal networks *in vitro***

**Difficult to deduce disease mechanisms from data**

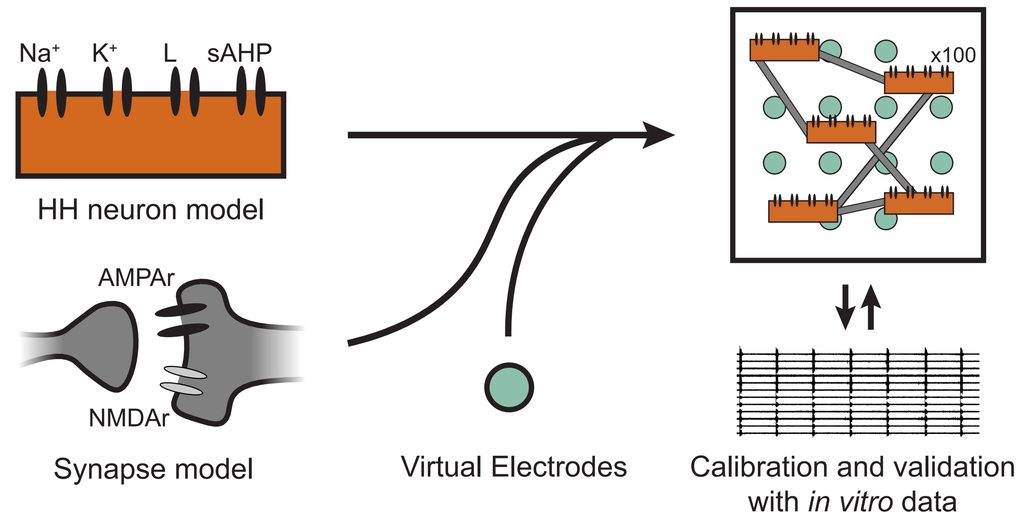
**Solution: *In silico* models to leverage the data**

## Methods

### *In vitro* model of mature neuronal networks

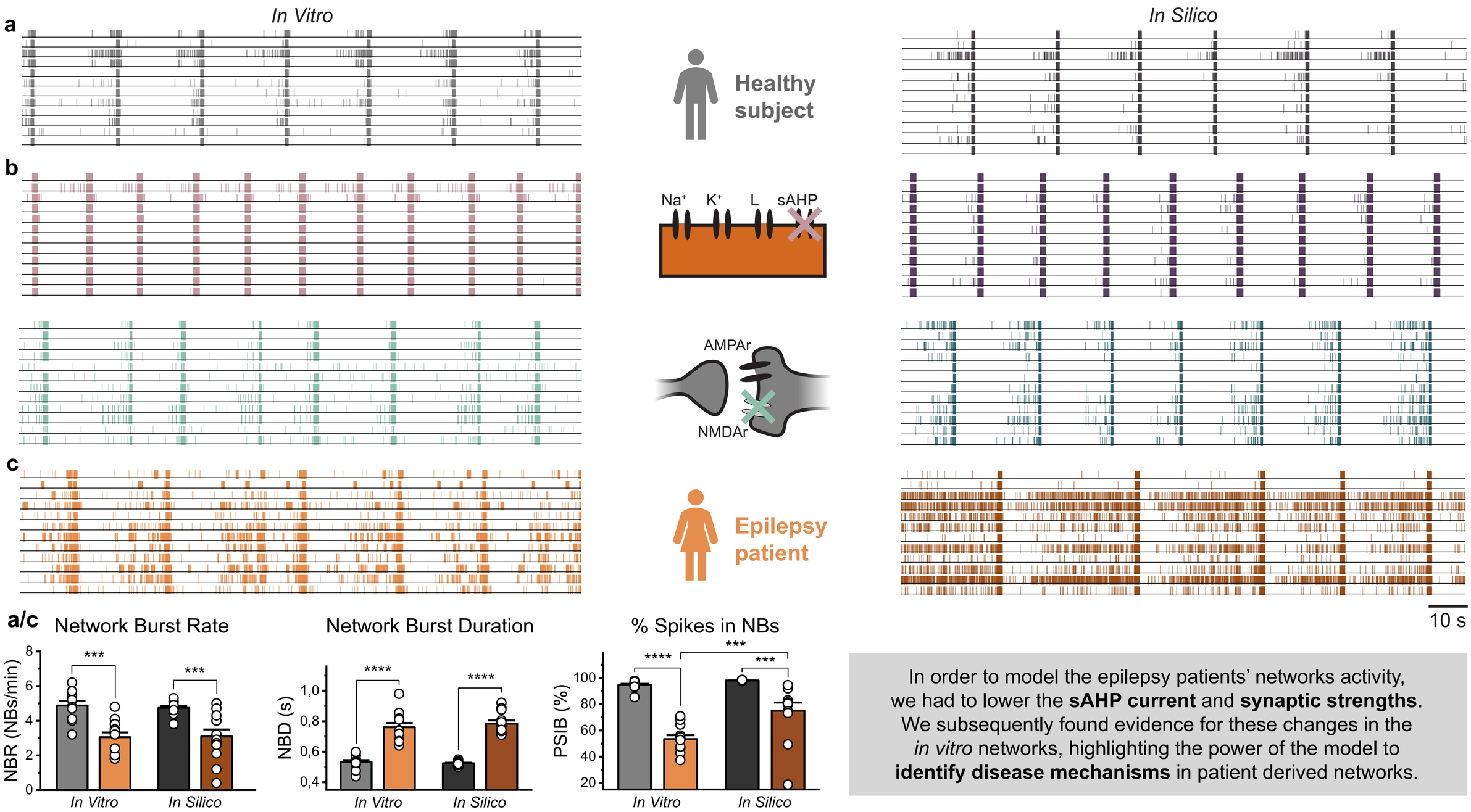



### Biophysical *in silico* neuronal network model




## Results

**Exemplary rasterplots of *in vitro* measurements & in *silico* simulations in a) physiological, b) pharmalogical and c) pathological conditions**







In order to model the epilepsy patients' networks activity, we had to lower the **sAHP current** and **synaptic strengths**. We subsequently found evidence for these changes in the *in vitro* networks, highlighting the power of the model to **identify disease mechanisms** in patient derived networks.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