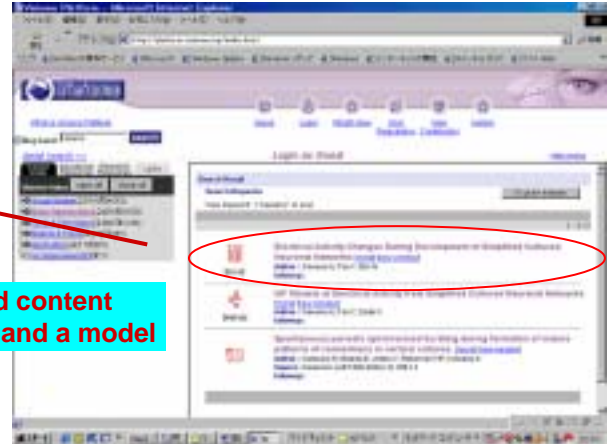


Electrical activity changes during development of simplified cultured neuronal network

A Kawana, Y Tan, N Itoh, K Saitou

Electrical activity changes during development of neuronal networks with a small number of neurons were observed using a multi electrode array. To explore their dynamics, we constructed a neuronal network model using integrated and fire model and parameters were optimized to reproduce the experimentally obtained spike train.

Submitted content
with data and a model!



Experiments

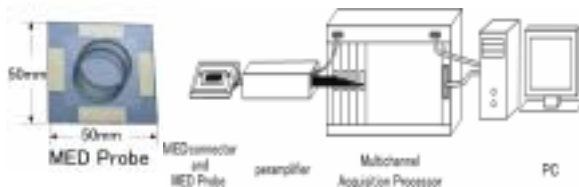


Fig.1 A small number of neurons from land water snail *Lymnaea* were cultured on a multi electrode array substrate. The electrical signals from neurons were amplified, digitized and stored in a computer.

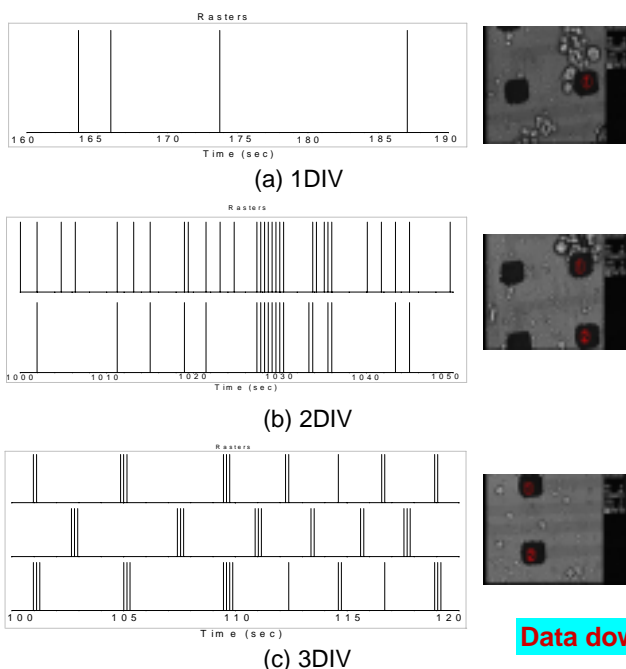
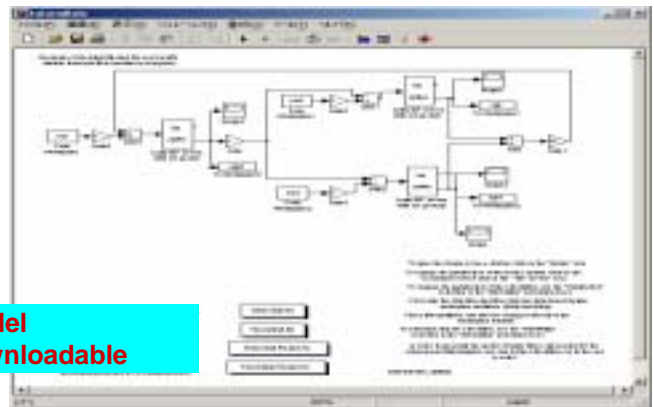
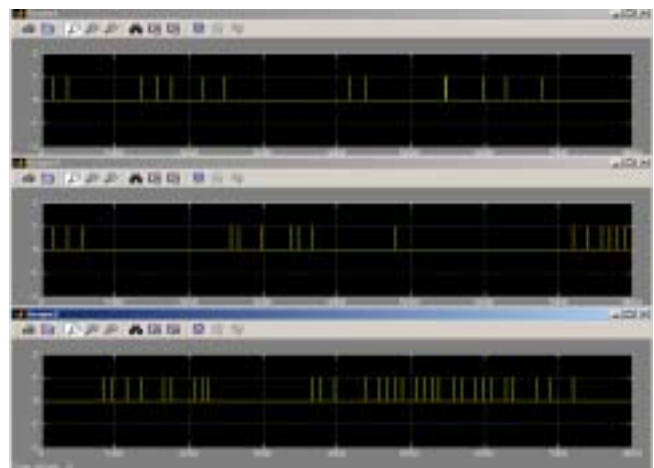


Fig.2 Spontaneous electrical signals from three neurons on the neighboring electrode were observed. They changed from spatiotemporally random state to synchronized and periodic state according to the days in culture.

Model simulations



Model
downloadable



Data downloadable

Fig.3 Spike trains from three neurons with synaptic connections were simulated using I & F model (programmed by Gabbiani).