



Channelrhodopsin-2 is a cation channel derived from algae that will open with millisecond precision upon illumination with blue light (excitation maximum around 470 nm) and depolarize neuronal membranes. This can be used to selectively activate neurons and neuronal fibers expressing this protein, replacing the need for unspecific extracellular electric stimulation. In a pilot study, we used this channel in combination with the Rapp OptoElectronic UGA-40 system to map inputs to pyramidal cells in the hippocampus.



Figure 1: Panel A shows 23 illumination locations set using the sequence stimulation function of the UGA-40 and an extracellular recording electrode placed in the stratus radiatum. Panel B shows an overlay of extracellular field potentials in response to 5 ms illumination at each point.

### **Setup:**

- Upright microscope for electrophysiology

### **Rapp OptoElectronic Components:**

- UGA-40 - point scanning device
- DL-473 - 473nm diode laser

### **Data provided by:**

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