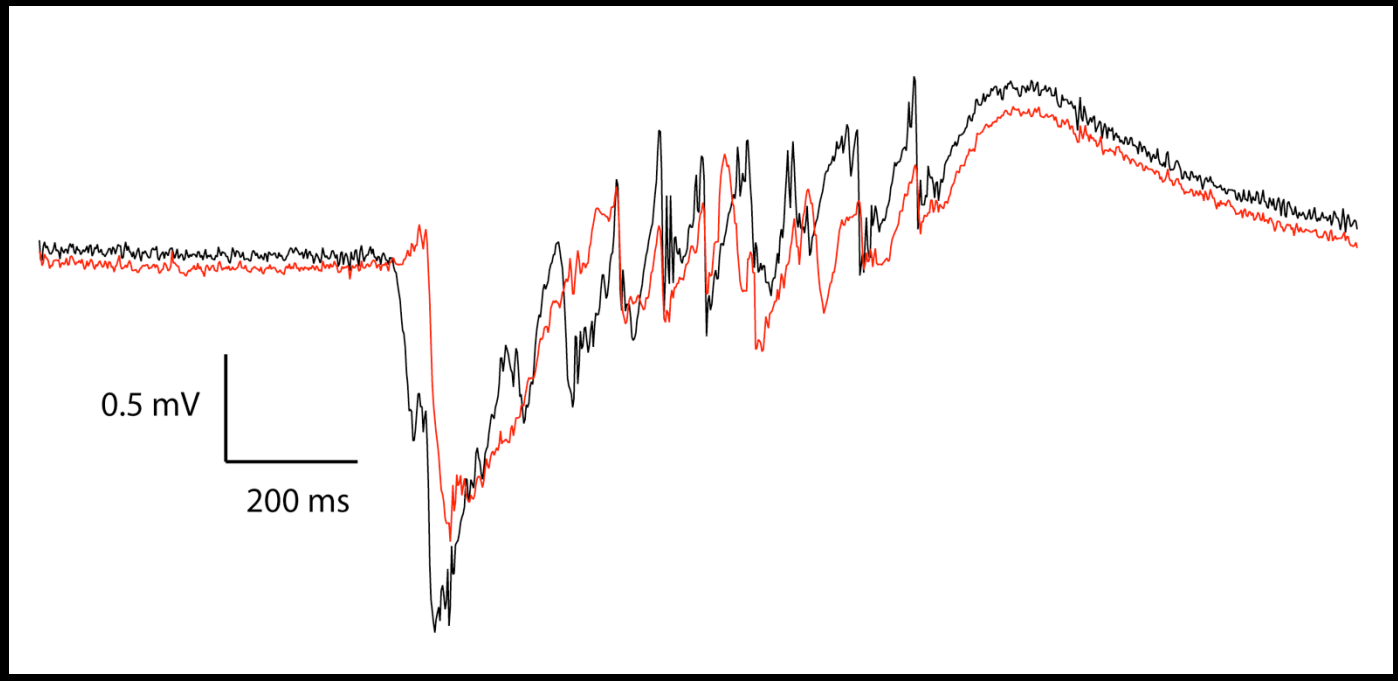
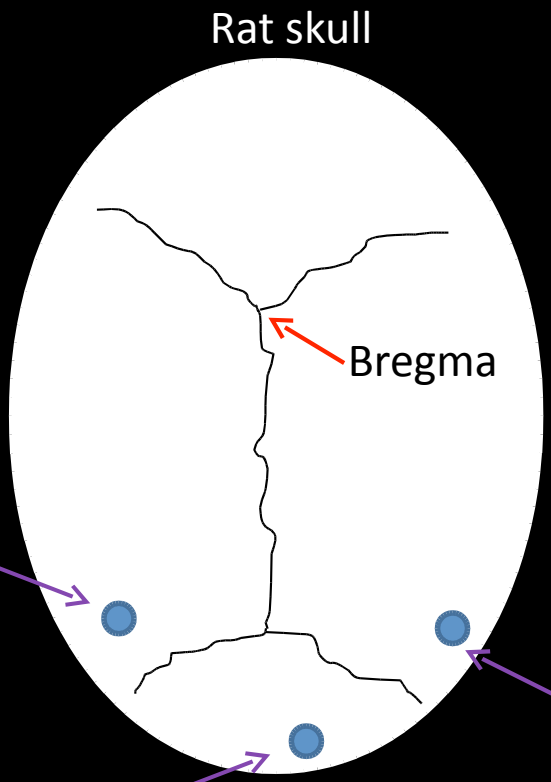
Recording seizures from 2 brain regions using the opensourceinstruments dual electrode wireless transmitter.



Rob Wykes

March 27th 2013

Position of electrodes.



Transmitter A3028D dual channel transmitter ID 9&10. Co-ordinates taken from bregma.

Visual cortex (V1B). -3.9 mm lateral, -7.0mm posterior, Acute injection of 5M pilocarpine into layer 5 (1mm below pia), via a pre-implanted cannula. (Black EEG traces)

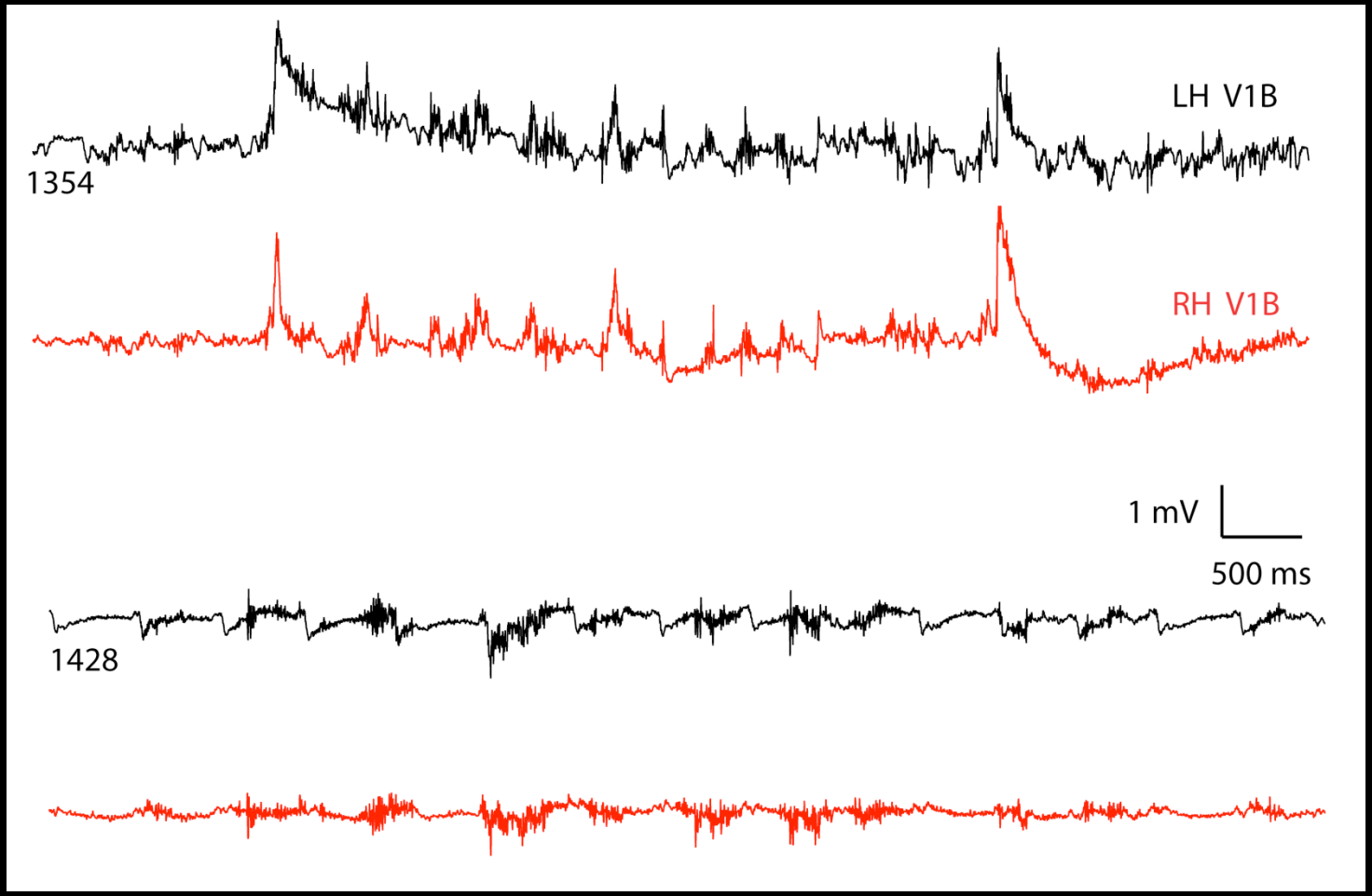
Visual cortex (V1B). +3.9 mm lateral, -7.0mm posterior, ffstChR2 injected into layer 5 (1mm below pia). Fibre optic cannula inserted above injection site. (Red EEG traces).

Reference electrode in cerebellum. +2.2mm, -12.0 mm.

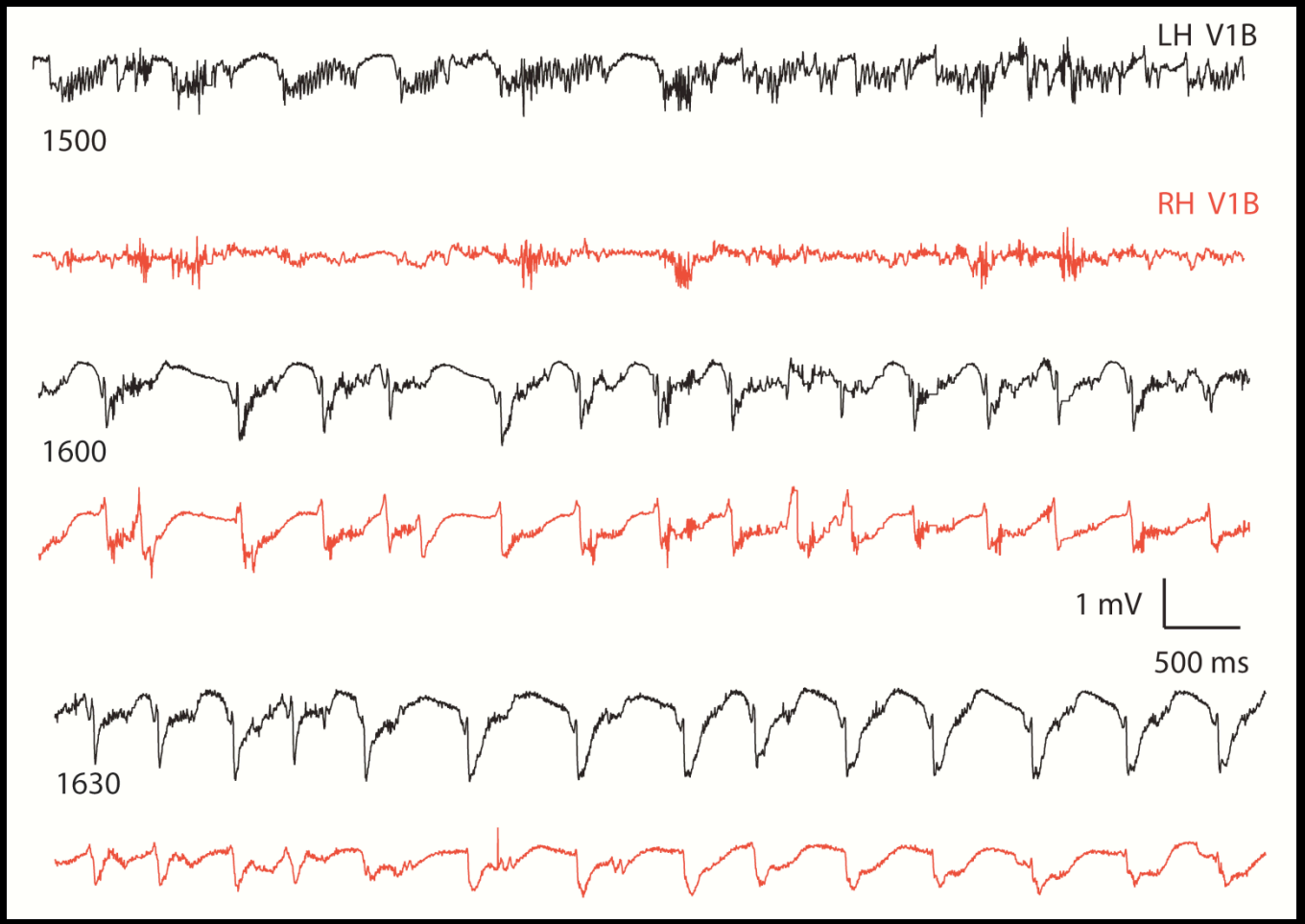
- Surgery (injection of virus, implantation of cannula for drug delivery and cannula for light delivery) Feb 24th 2014.
- Acute injection of ~1ul of 5M pilocarpine into the Left hemisphere V1B area (black EEG trace) March 27th. At the same time a fibre optic cable was connected to the fibre optic cannula on the contralateral hemisphere.
- Viral expression after 4 weeks should be very good.

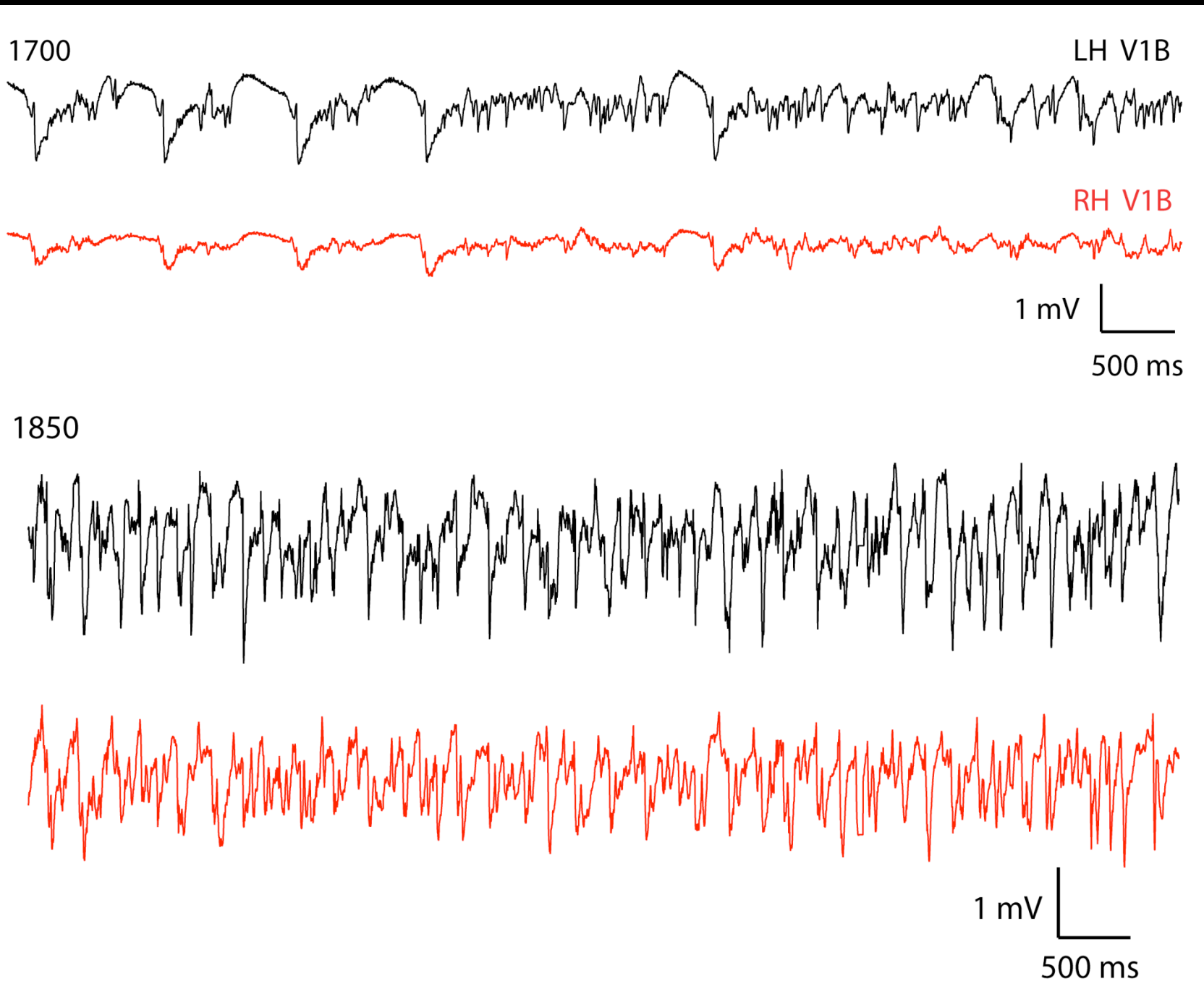
Pilocarpine injected (under light isoflurane anaesthesia at time 1000-1050s) – animal placed back into telemetry and appeared to ‘wake up’ around time 1100s – spiking in the injected visual cortex appeared soon after and evolved.

Suddenly ~300s after injection of pilocarpine the animal went into a seizure correlated with pronounced physical manifestations (note change in scale bar amplitude).

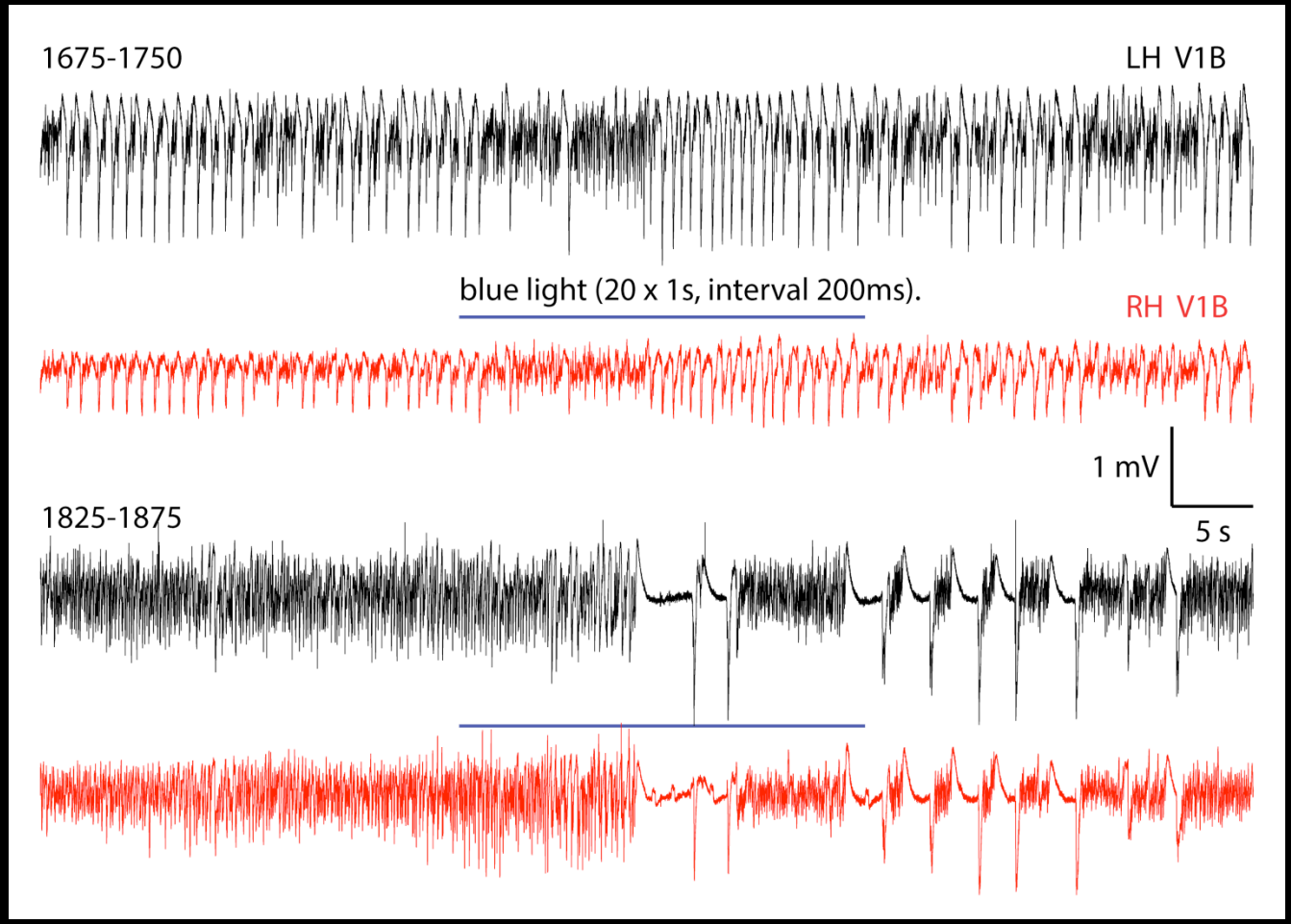


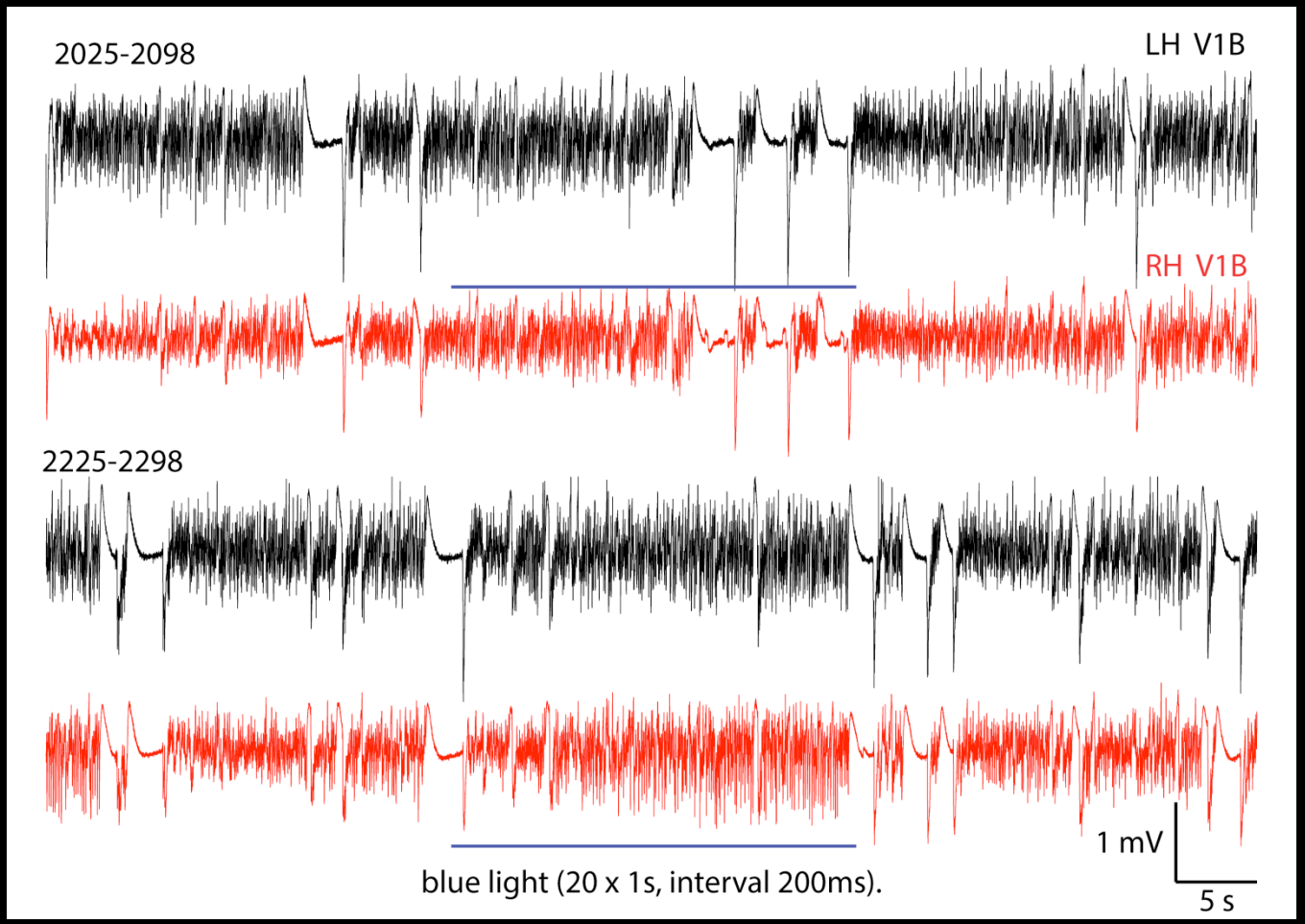
This activity evolved

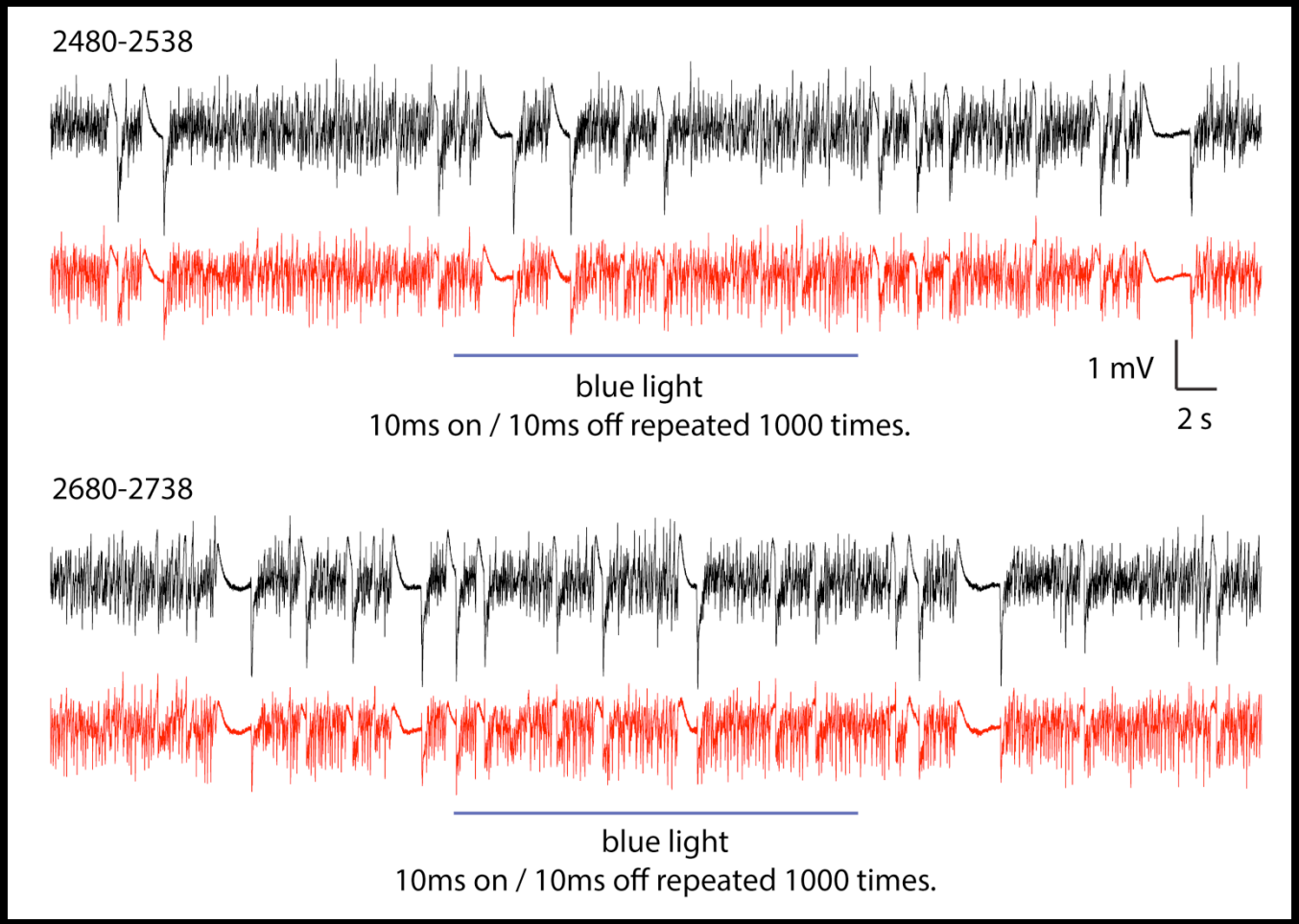


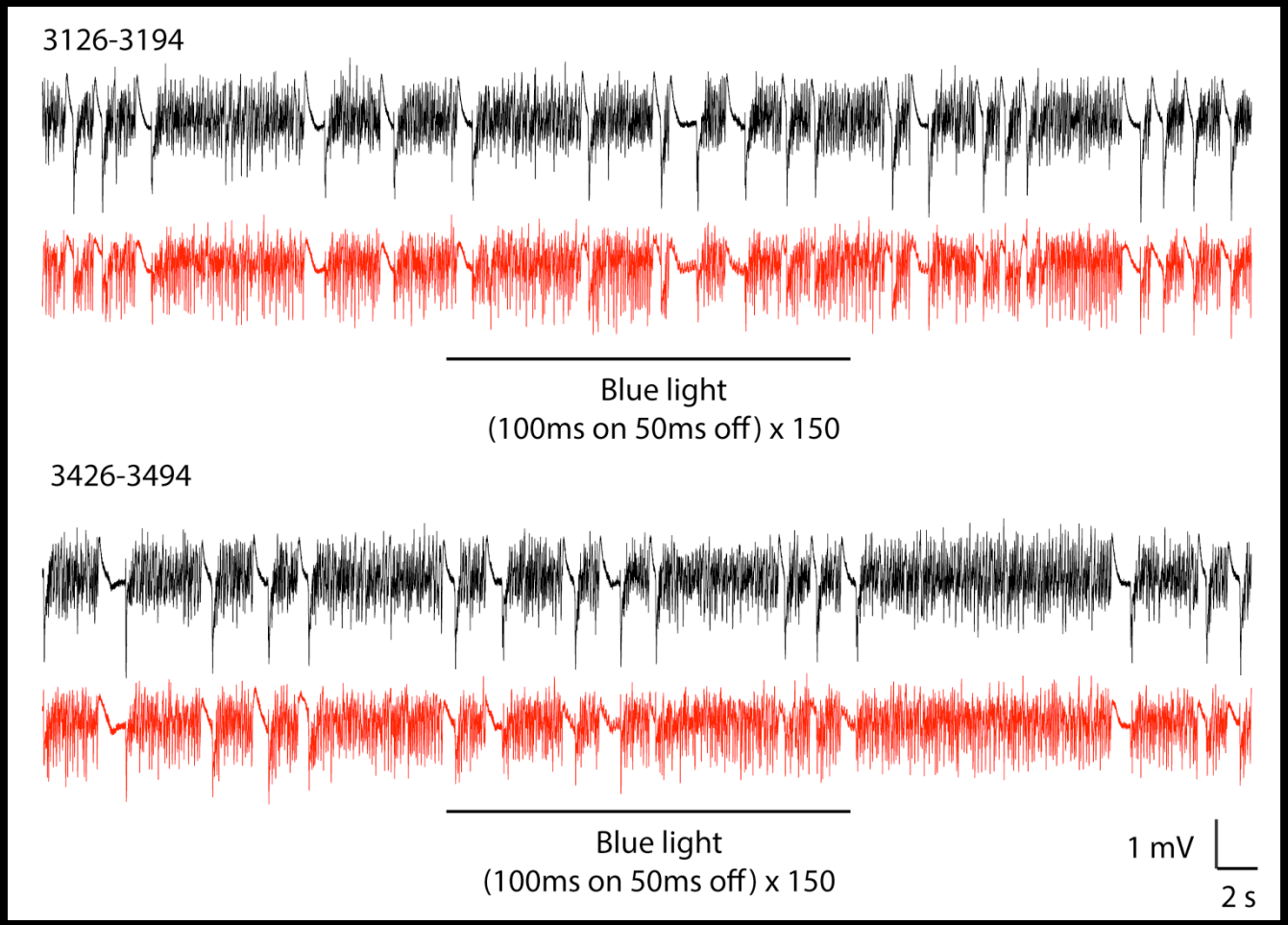

1700
LH V1B
RH V1B
1 mV
500 ms
1850
1 mV
500 ms

Stimulation of interneurons in the RH V1B area by shining blue light (19.1mW at fibre optic tip) on interneurons transduced with ChR2 using the ffst promoter.

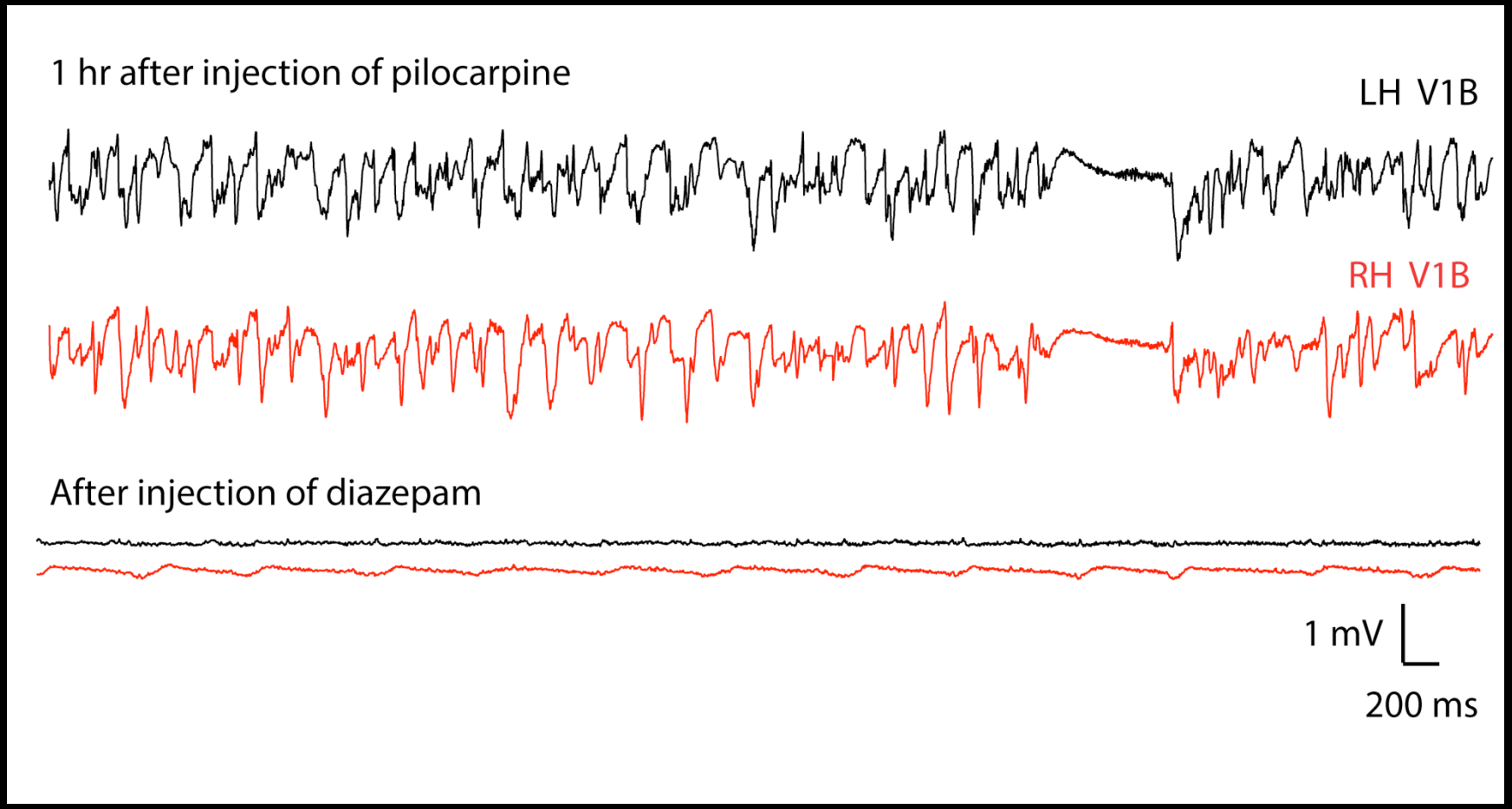



2025-2098
LH V1B
RH V1B
2225-2298
1 mV
5 s
blue light (20 x 1s, interval 200ms).

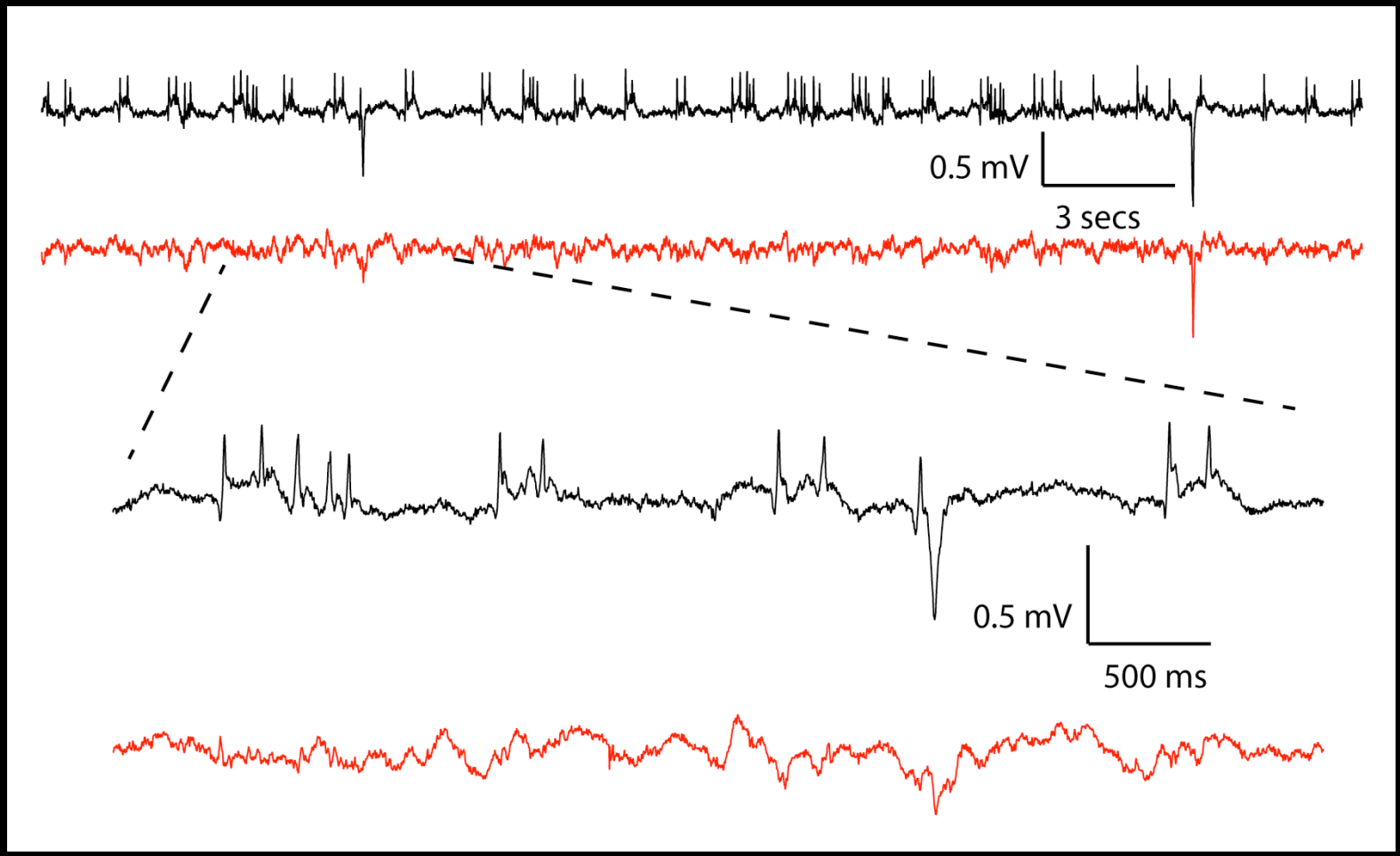

2480-2538
1 mV
2 s
blue light
10ms on / 10ms off repeated 1000 times.
2680-2738
blue light
10ms on / 10ms off repeated 1000 times.


3126-3194
Blue light
(100ms on 50ms off) x 150
3426-3494
Blue light
(100ms on 50ms off) x 150
1 mV
2 s

After 1 hr seizures were terminated by an ip injection of diazepam



24hrs later some spiking persists in injected hemisphere – no behavioural manifestation.



3 days later EEG normal