Ejaculation elicited by microstimulation of lumbar spinothalamic neurons

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LSt neurons connect to anatomical structures involved in ejaculation

The spinal area from which ejaculation-related events are evoked matches the LSt neuron area

LSt neuron activity not only triggers ejaculation, but is also required to maintain it

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Brief electrical microstimulation in the LST neuron area (green line) evokes rhythmic bursting in the BS muscle EMG that lasted for about 35 s (A: background activity in gray). BS muscle activity represents the expulsion phase of ejaculation.

Electrical microstimulation in the LST neuron area (green line) evokes rhythmic bursting in the BS muscle EMG that lasted for about 35 s (A: background activity in gray). BS muscle activity represents the expulsion phase of ejaculation.

Strong current injection after microstimulation marks the spinal location of the microstimulation electrode. (A: spinal cord section at segment L4). Ejaculation and ejaculation-related events were successfully triggered 210 ± 30 µm (n = 12) lateral from the central canal (cc) at L4 level.

Local muscimol injection in the LSt neuron area shortly after LSt neuron microstimulation (green line) blocks the evoked BS muscle activity in midstream. The response recovers after about 20 minutes.

**Conclusions**

- Electrical microstimulation in the LSt neuron area activates the entire sequence of ejaculation in rats in a coordinated fashion, i.e. the emission (SV pressure change) followed by the expulsion (rhythmic BS muscle activity) of living spermatozoa.
- Midcourse interruption of ejaculation following intraspinal muscimol injection demonstrates that LSt neurons not only trigger but also maintain ejaculation, establishing LSt neurons as a crucial component of the spinal generator for ejaculation.
- Given the comparable organization of ejaculation in rats and humans, these results could help to identify spinal pharmacological target for the treatment of ejaculatory disorders.

**Methods**

Adult male rats were kept under urethane anesthesia and maintained at 37 °C. Electrodes were implanted in the BS muscle and the SV was catheterized. After exposure of spinal segment L4, the stimulation electrode was lowered into the LSt neuron area. Electrical stimulation of the LSt neurons consisted of a 0.3-0.5 duration train of 0.5 ms pulses (200 Hz, 15-100 µA), while recording BS muscle EMG and SV pressure change. For intraspinal drug delivery, a glass micropipette was glued to the electrode, connected to a “Picospritzer”. Pressure injection duration was 400 ms, with 200-500 nl injected volume. For BS muscle activity quantification, the EMG signal was rectified, 200 Hz low-pass filtered and the mean value calculated between 1 and 25 s after stimulation. Full experimental details will be published in: A.J. Borgdorff et al. 2008. European Urology, in press.