Distinct mechanisms of signal processing by lamina I spino-parabrachial neurons

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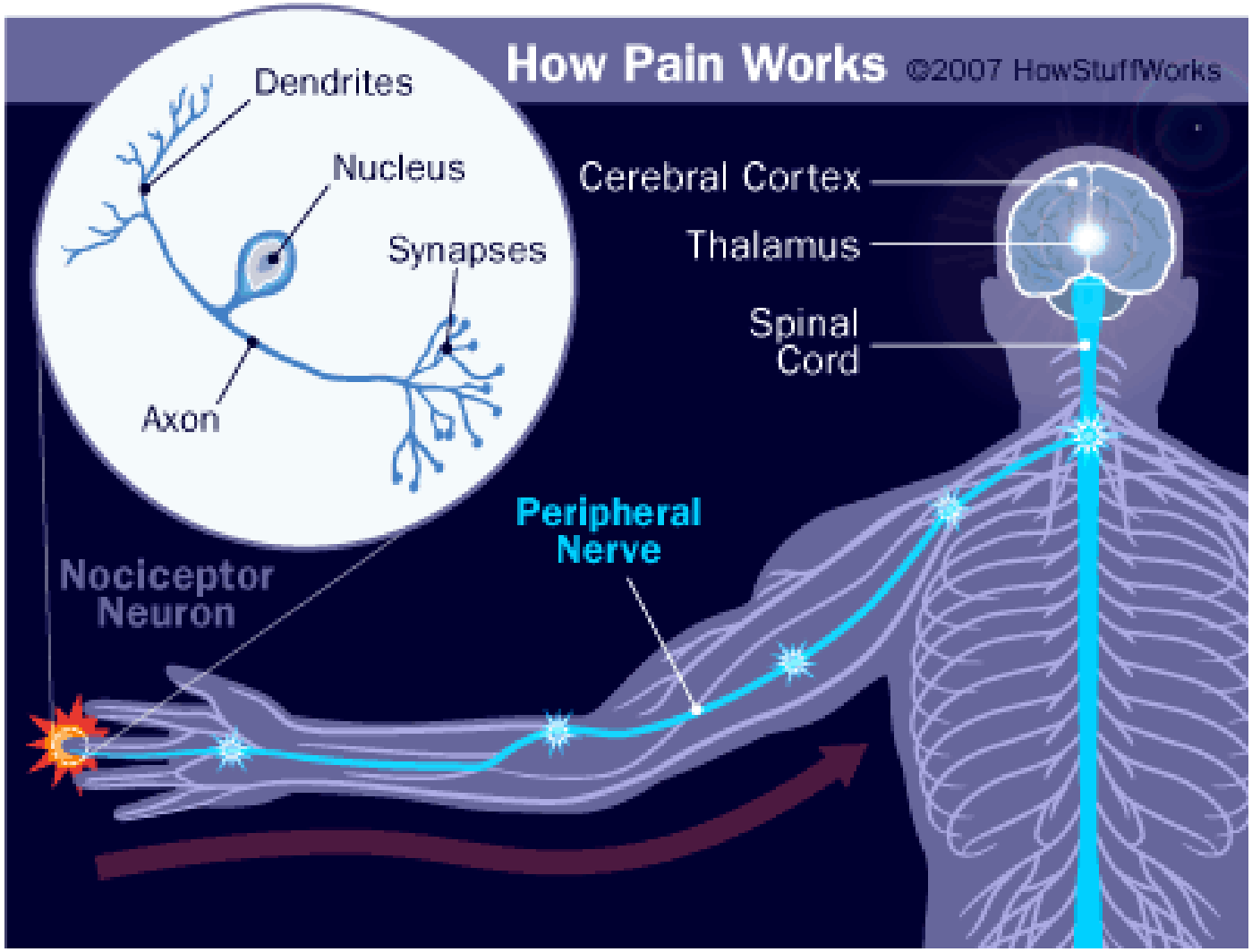
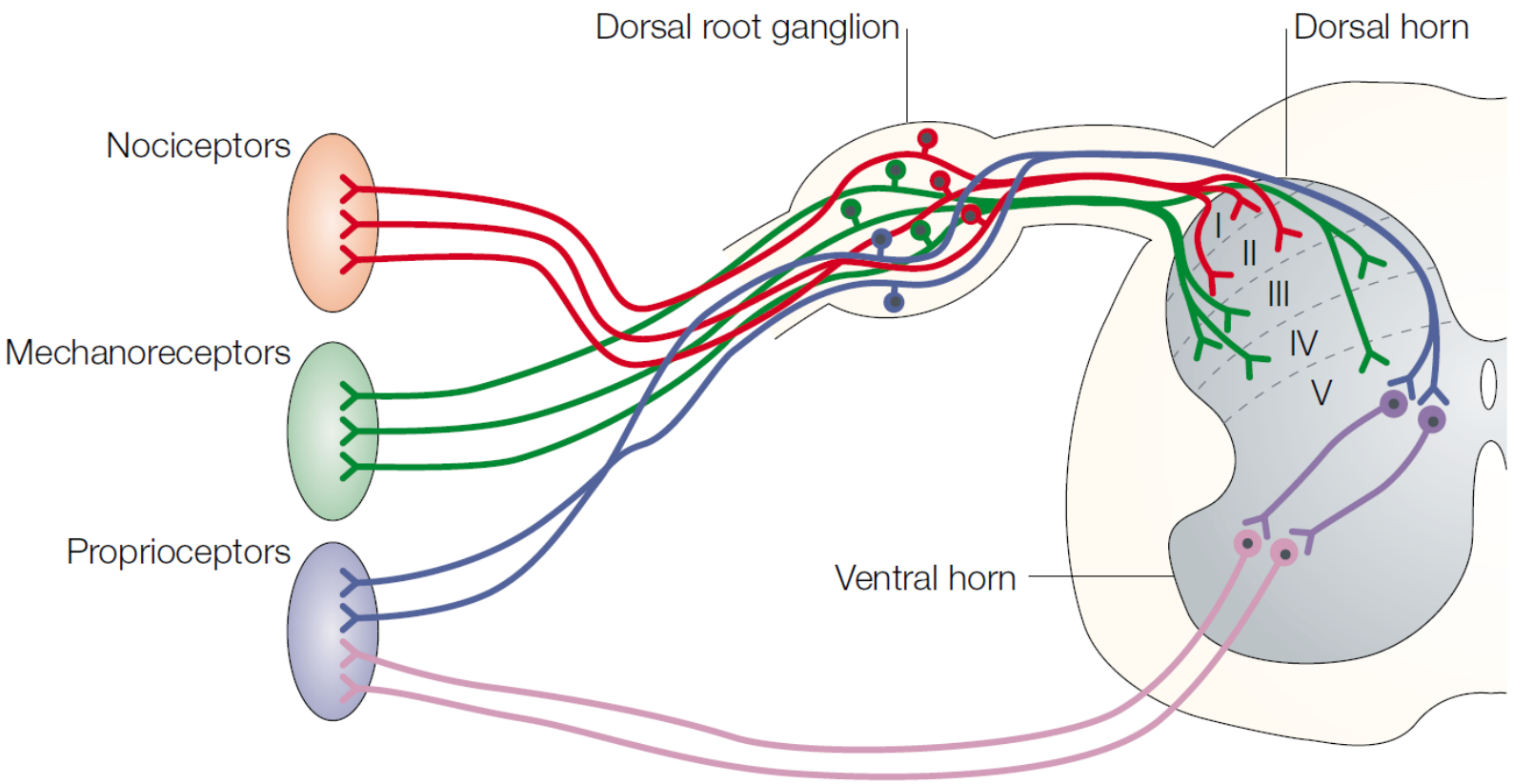
HORIZON 2020 PROJECT

Pain processing pathways



Organization of the PNS and spinal cord



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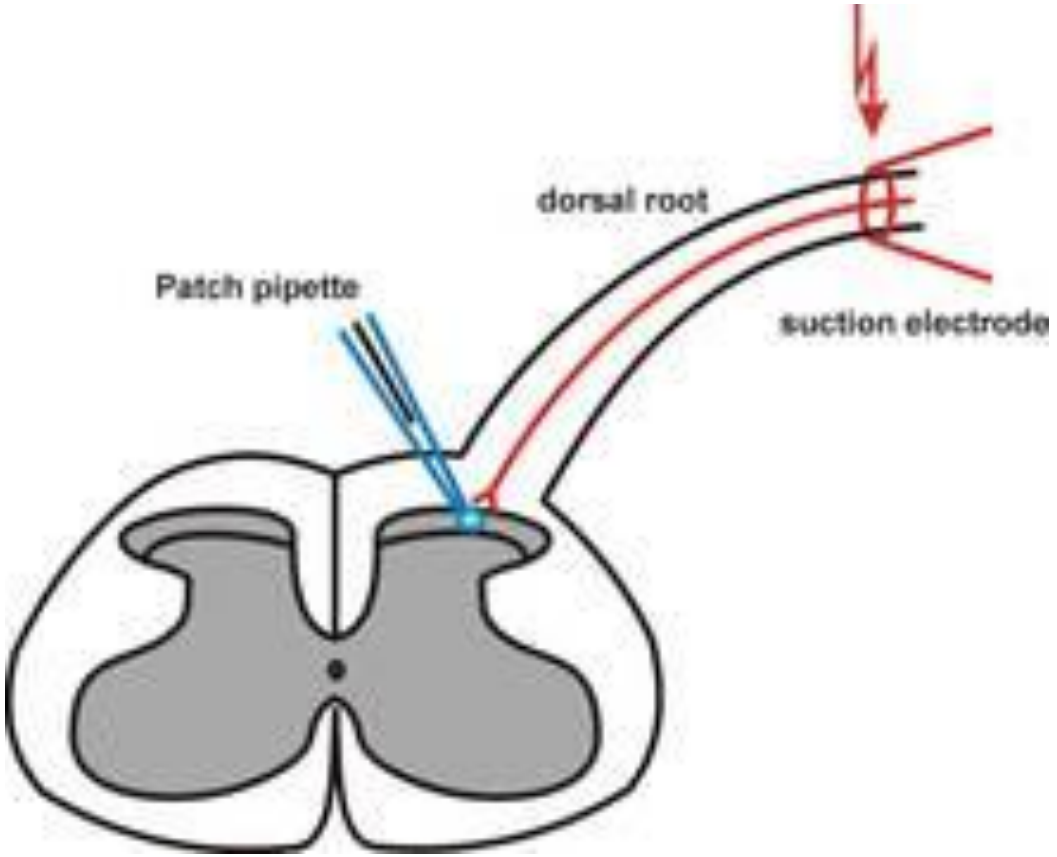
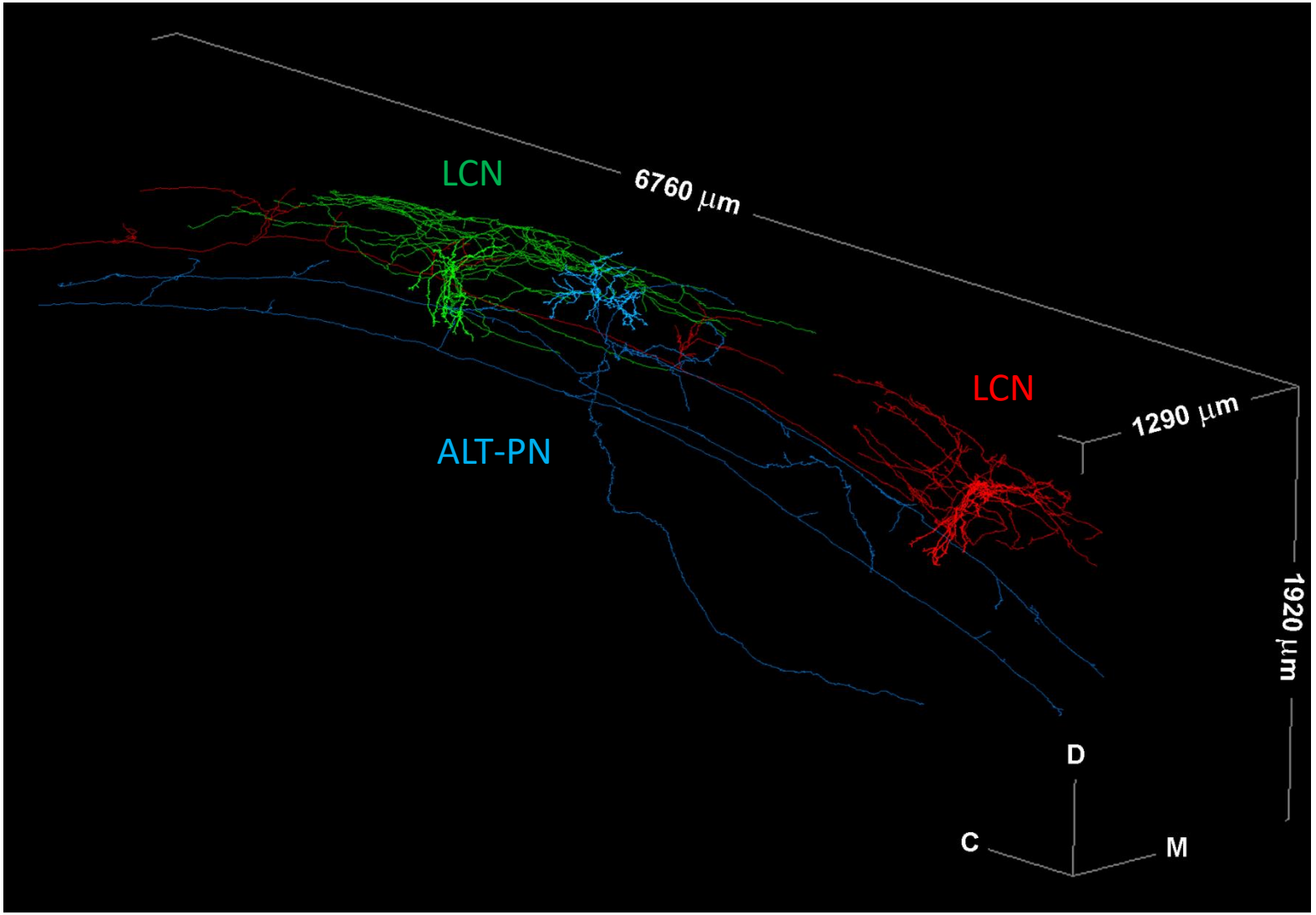
Electrophysiological recordings from Dorsal Horn

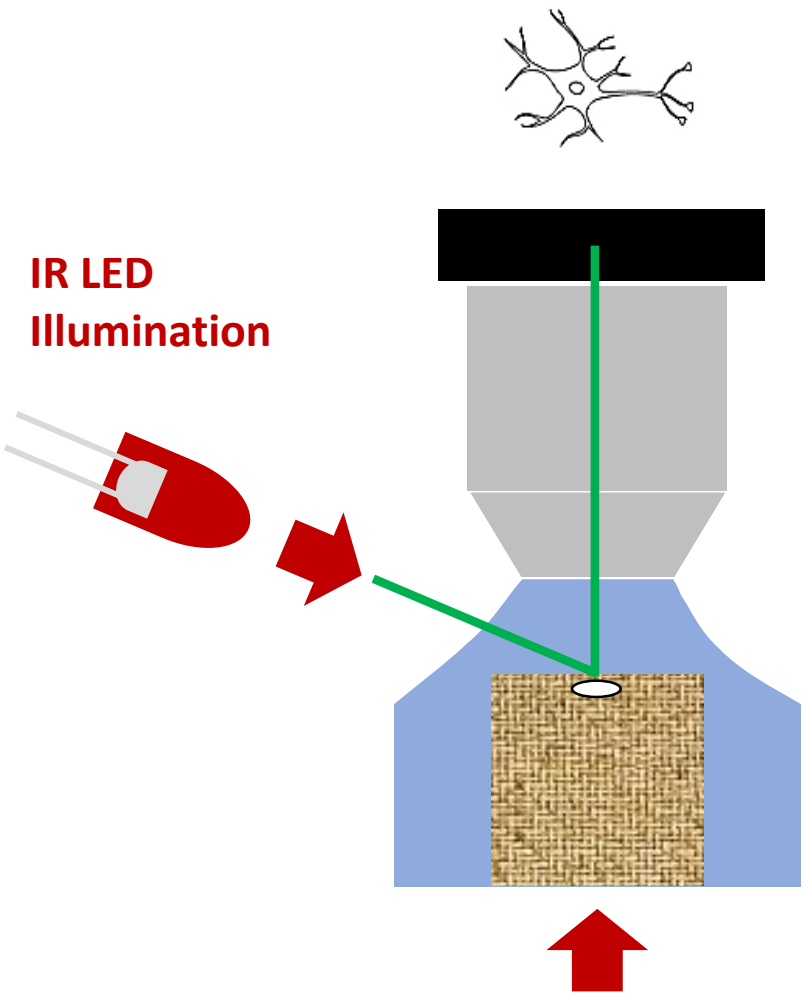


Axons of lamina I local-circuit neurons (LCNs) & projection neurons (ALT-PN)

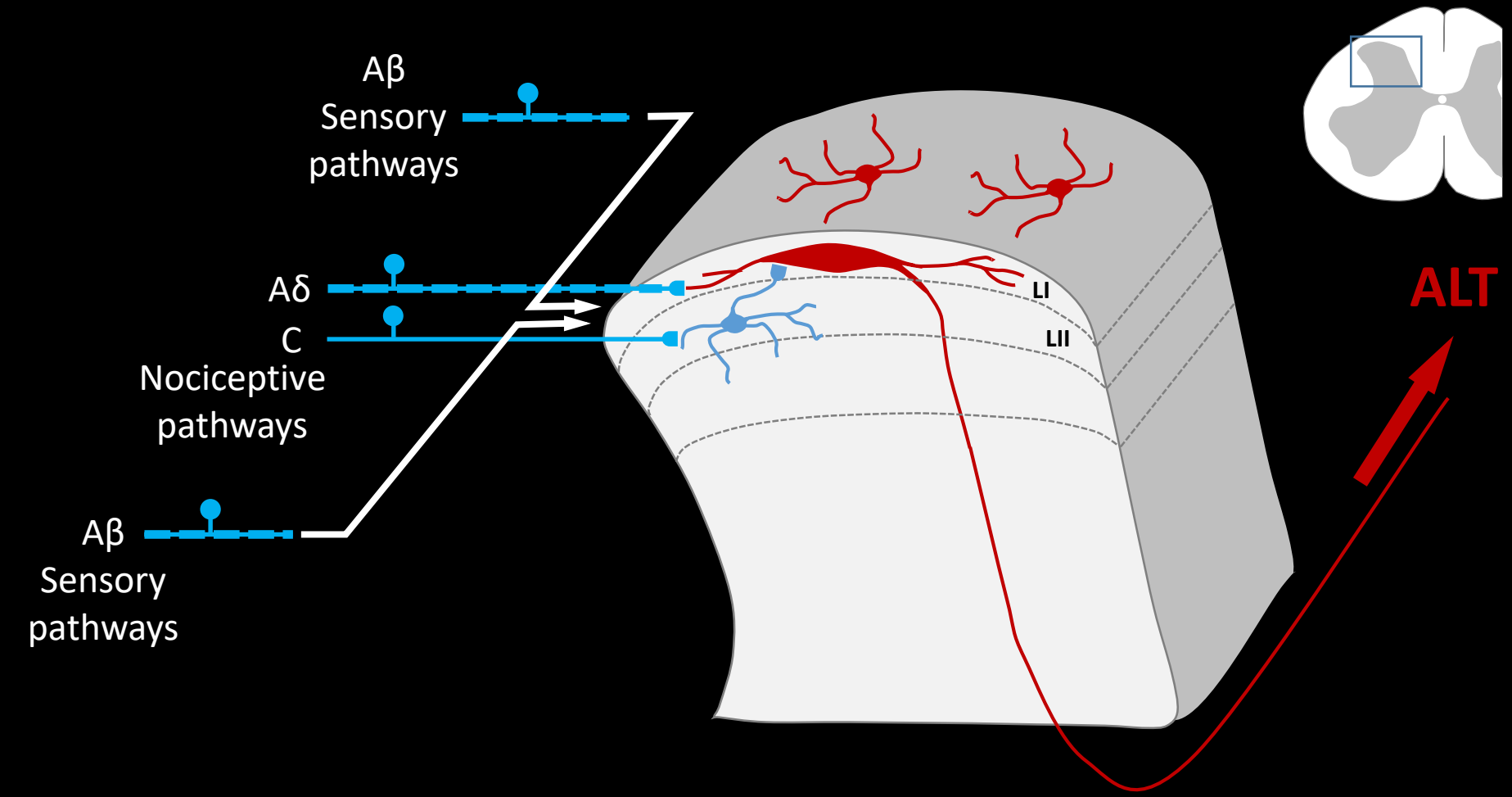


Safronov lab results

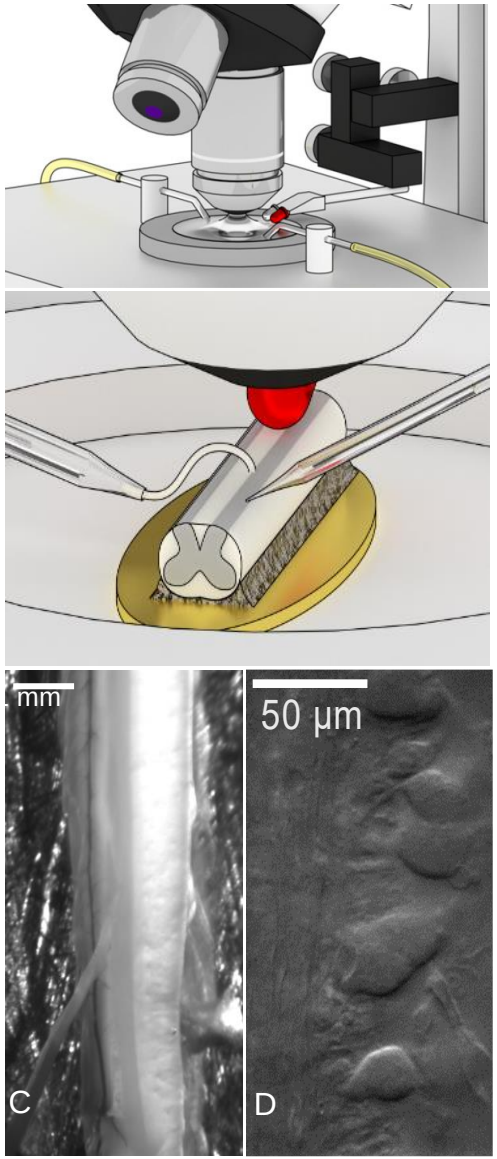
Cell imaging in the spinal cord



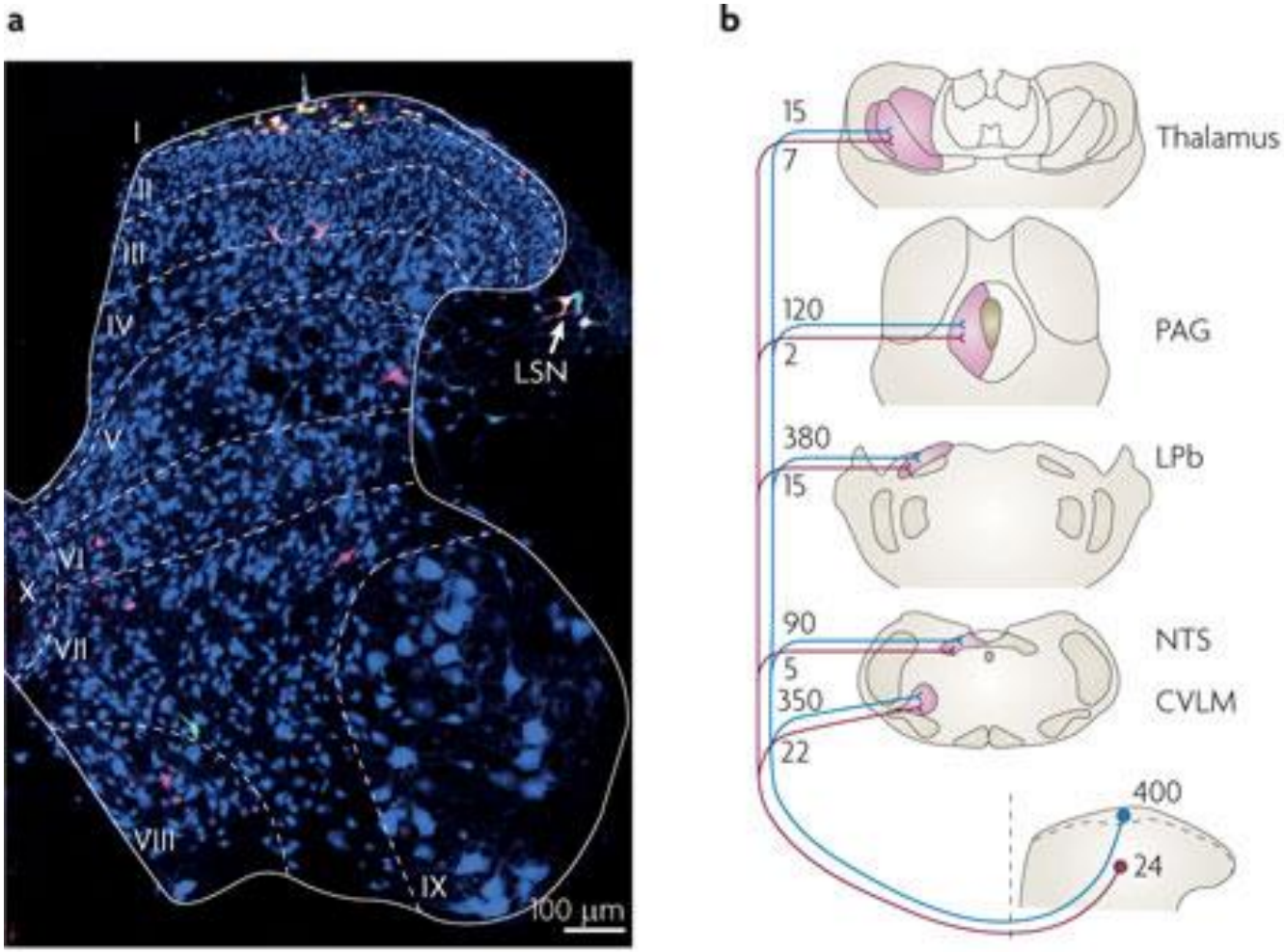
The superficial dorsal horn (laminae I-II)



Visualization of lamina I neurons using infrared light-emitting diode (IR LED) illumination in the ex-vivo spinal cord preparation



Projection neurons of spinal cord



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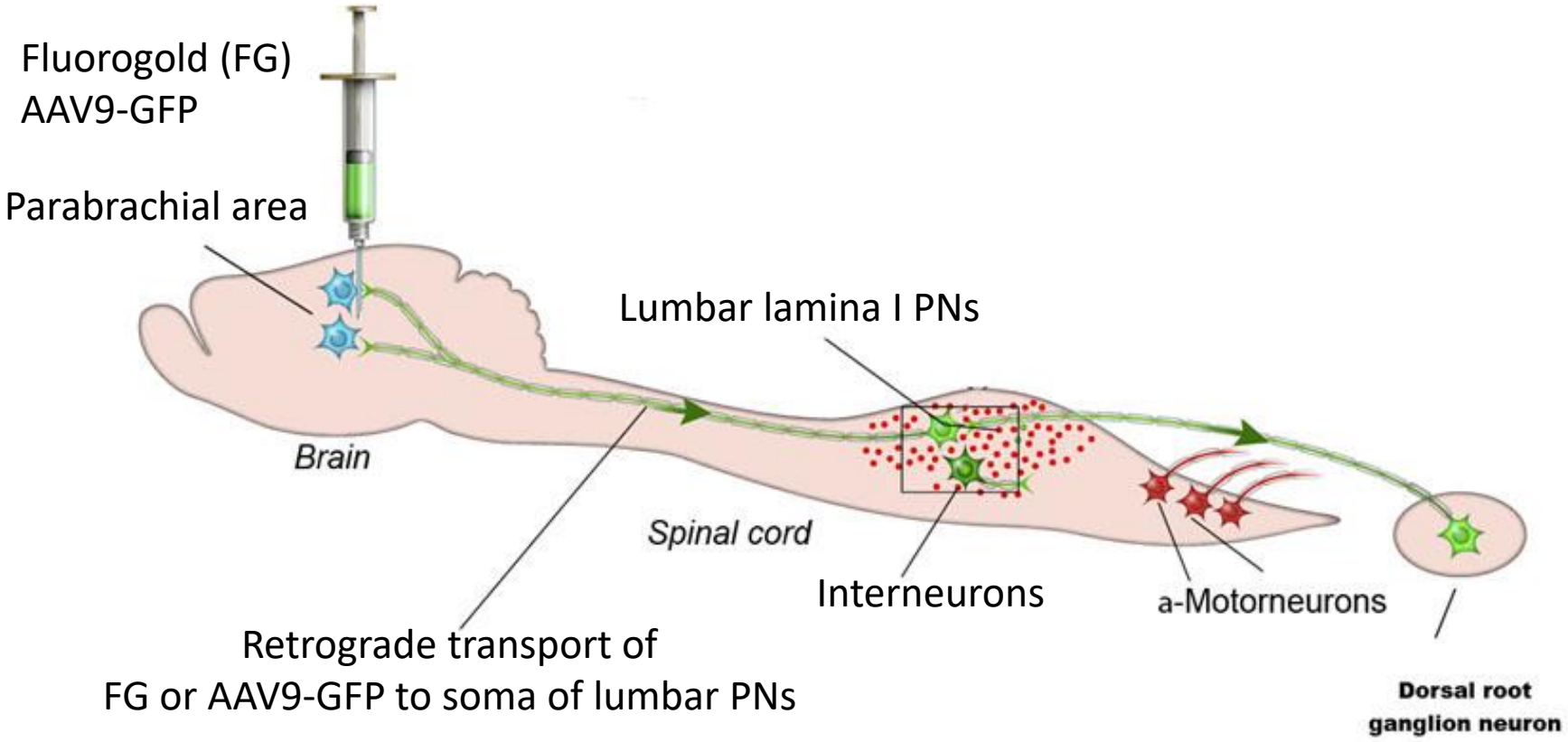
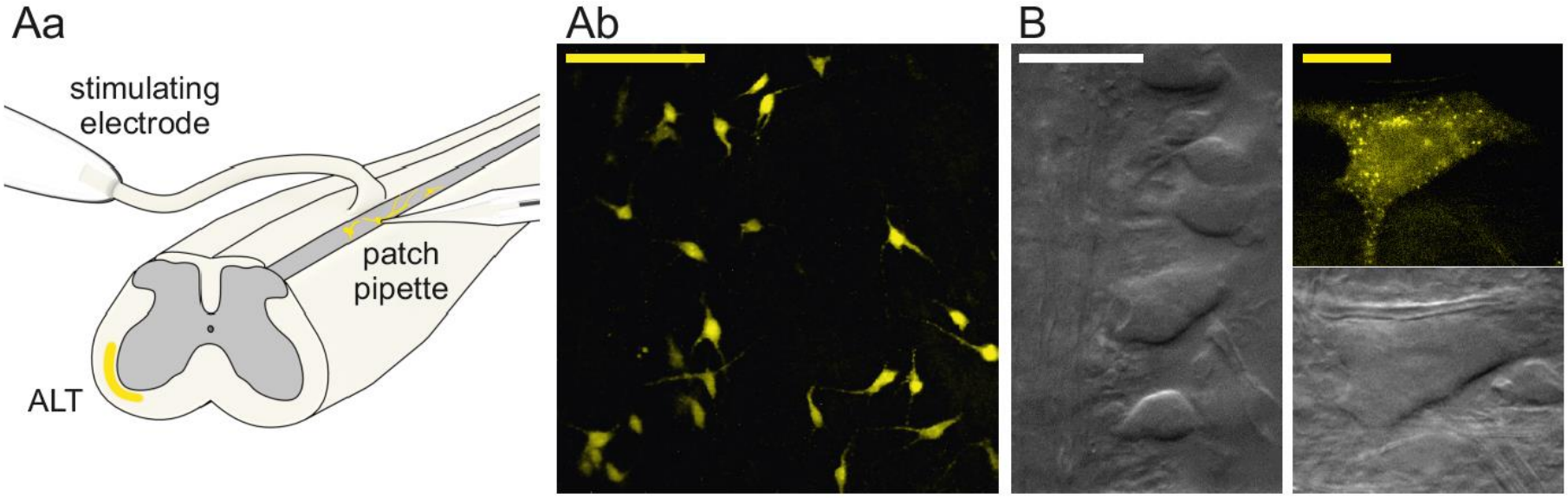
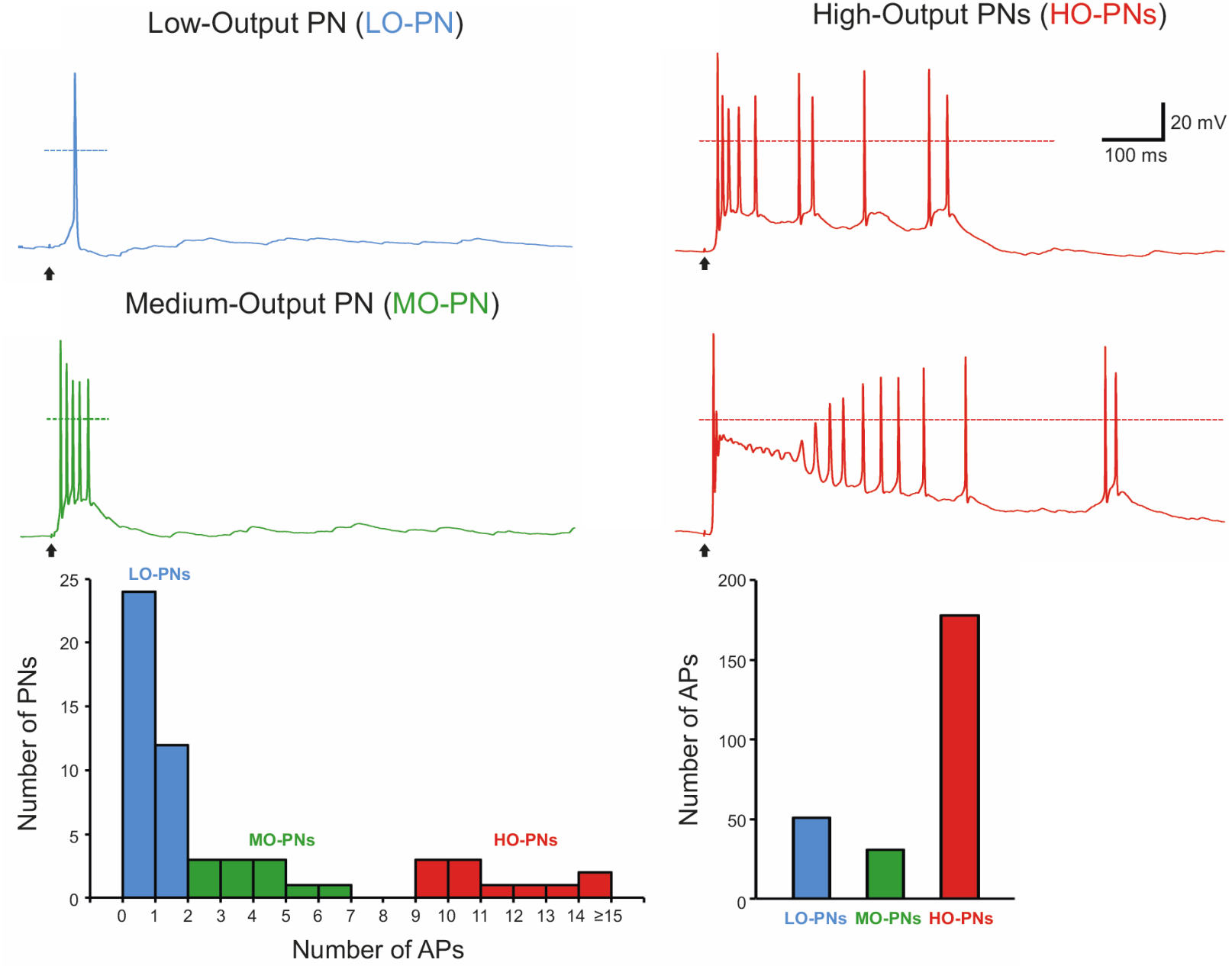
Retrograde labeling of nociceptive projection spinal cord neurons by injection in parabrachial area



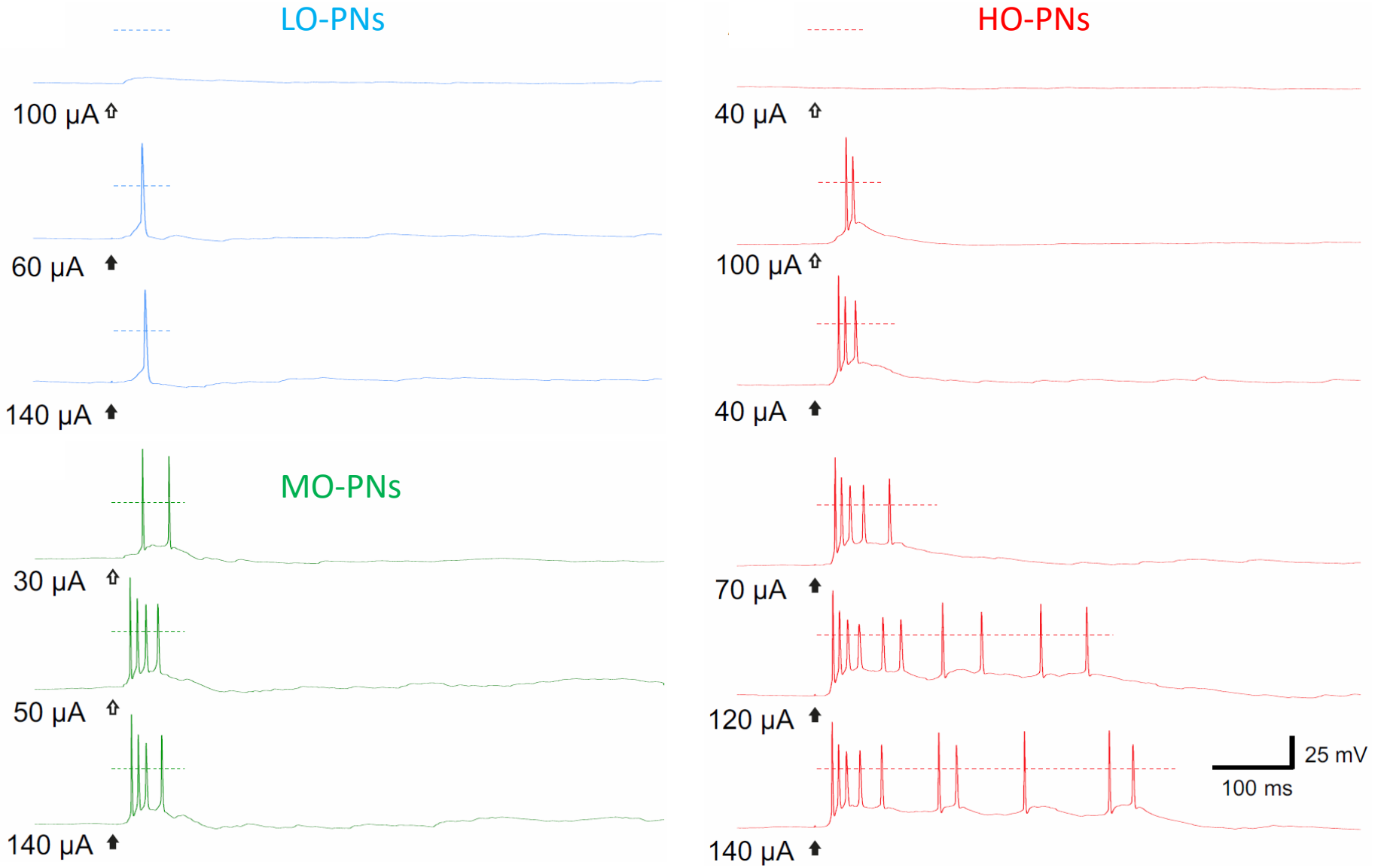
Schematic illustration of experimental design and projection neuron labeling



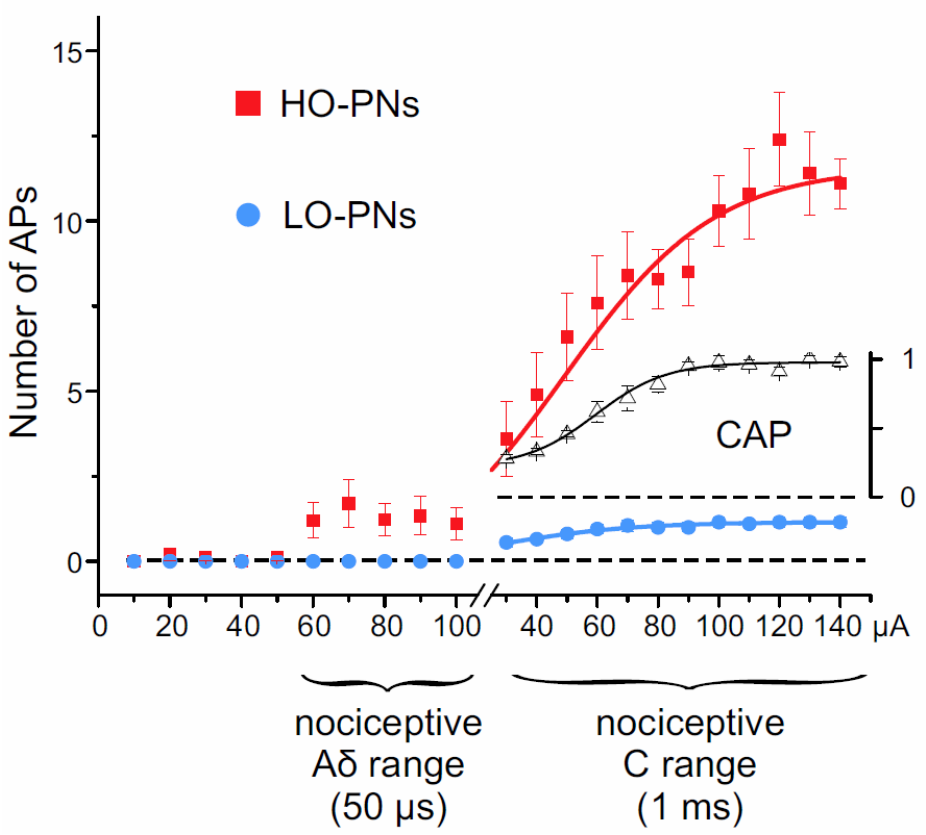
High output projection neurons as main output of spinal cord

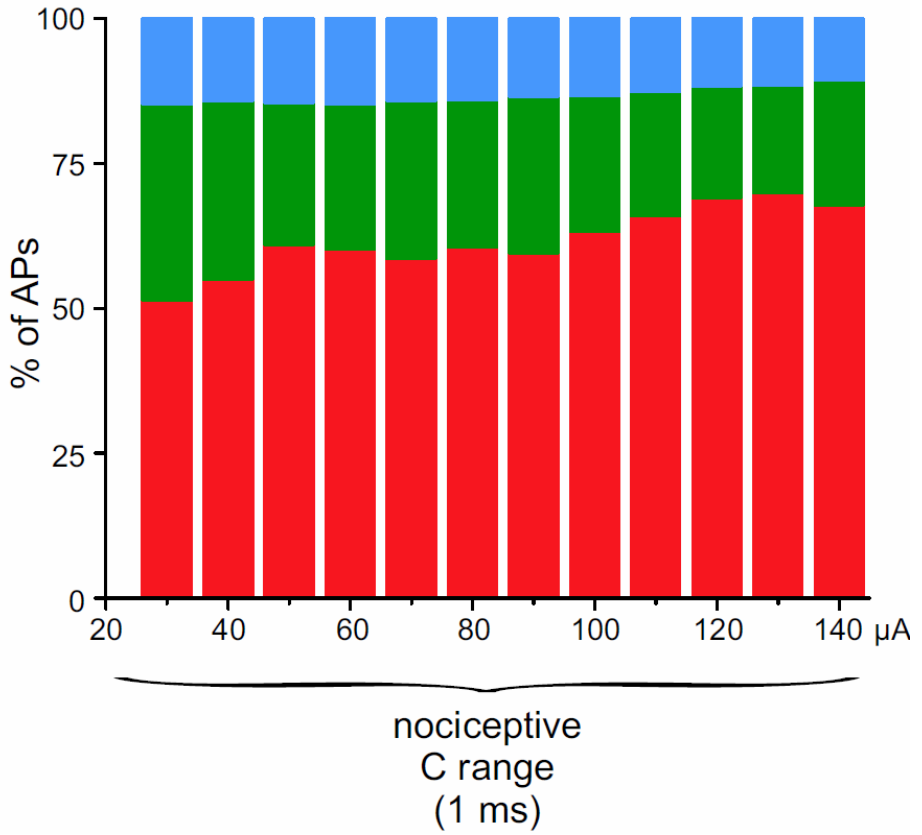


LO-PNs and HO-PNs are different pain encoders

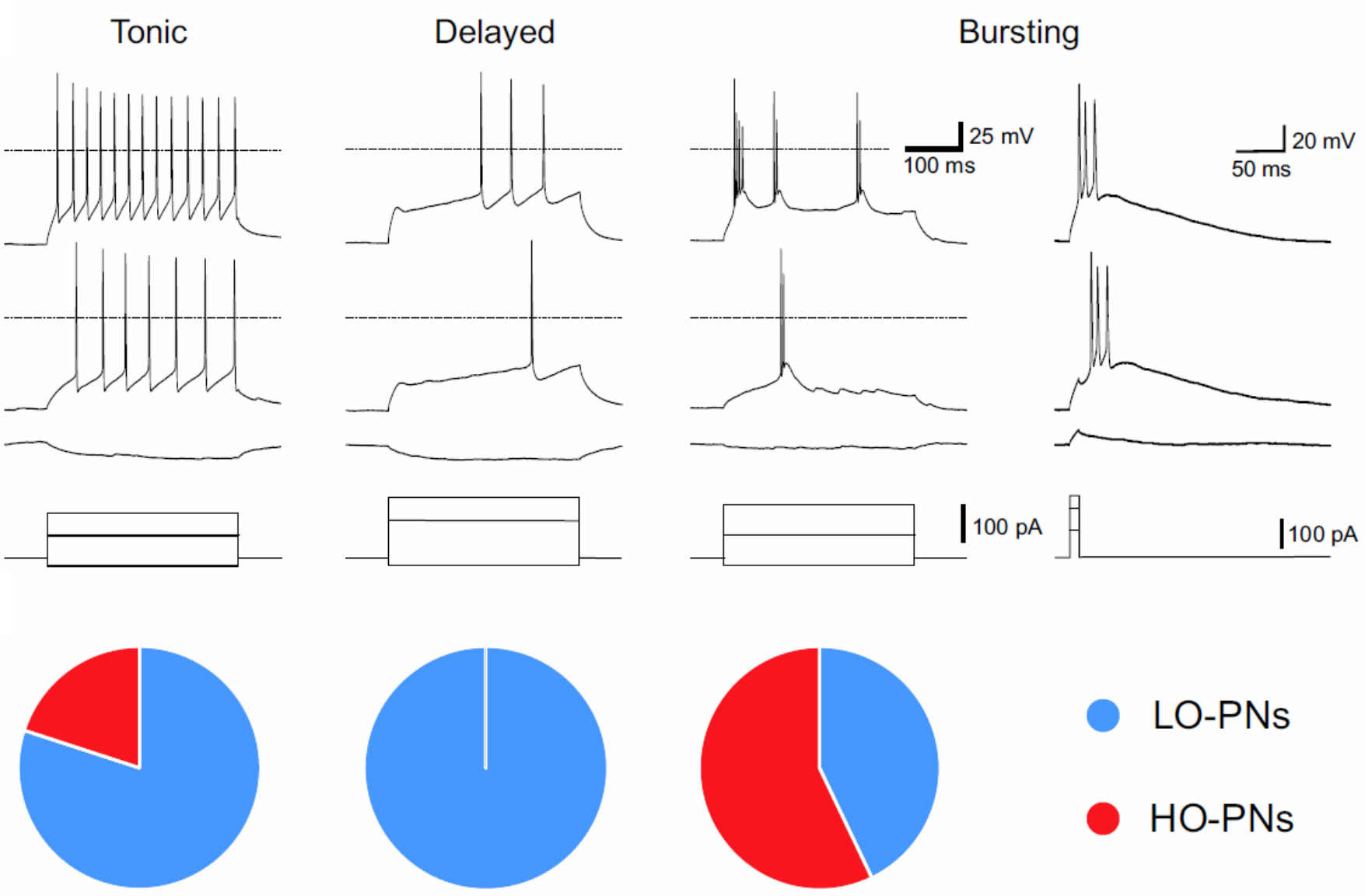


LO-PNs and HO-PNs are different pain encoders

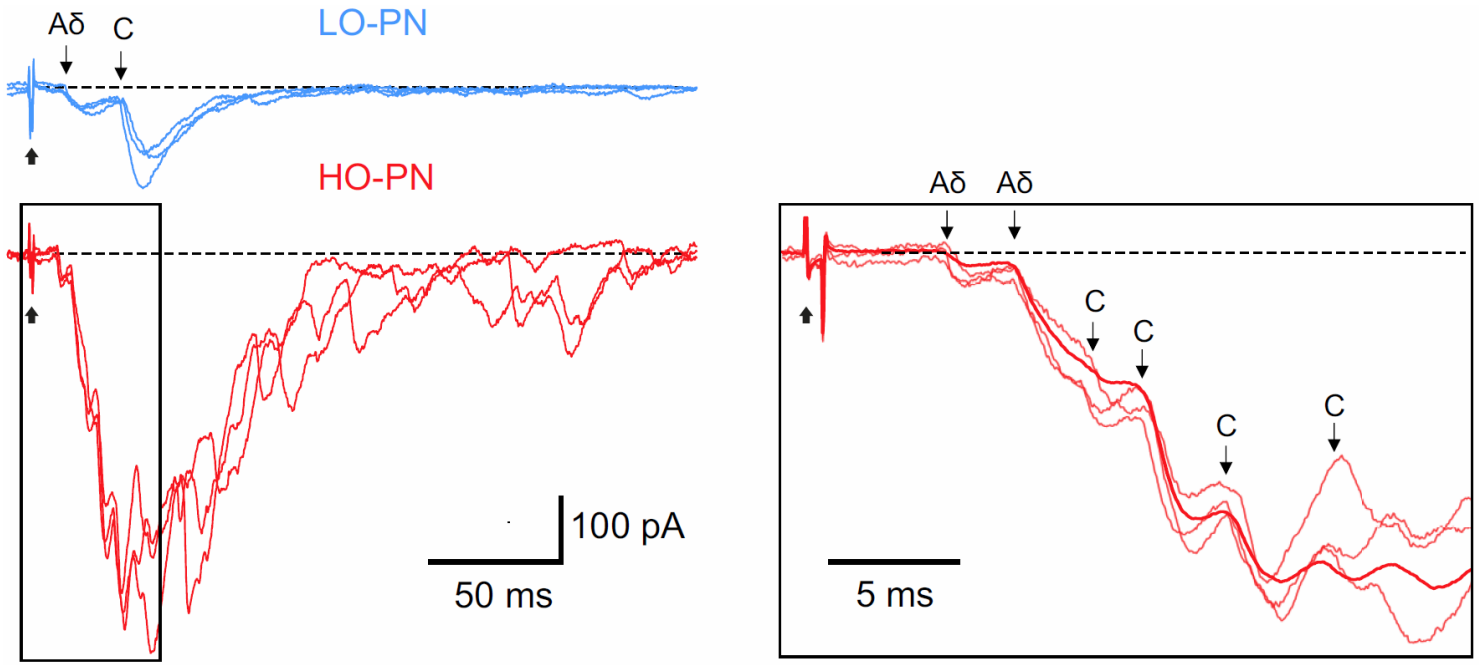


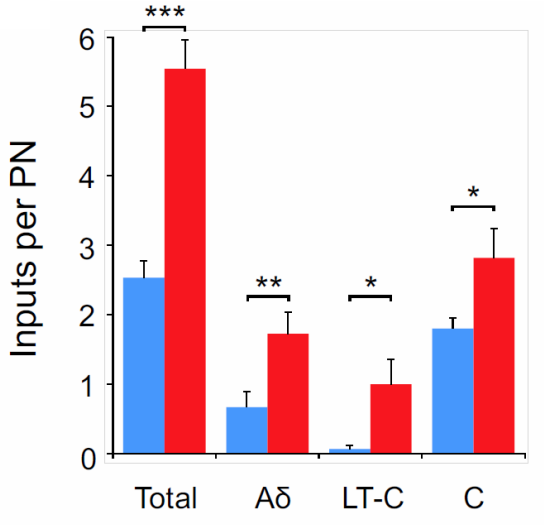


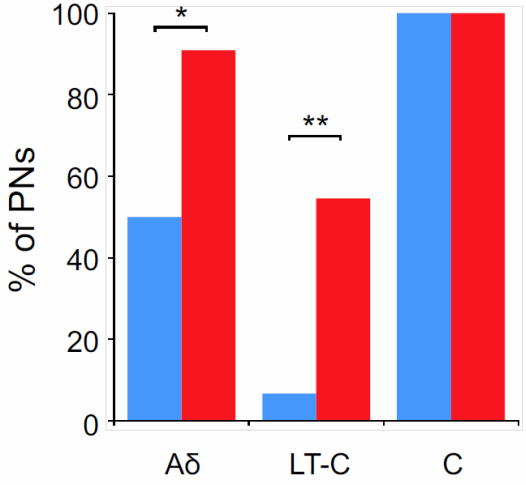
LO-PNs and HO-PNs differ in their intrinsic properties

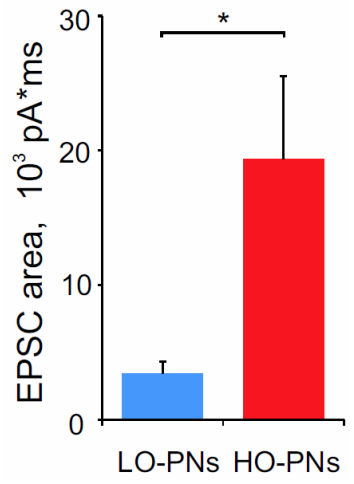


LO-PNs and HO-PNs differ in their afferent supply

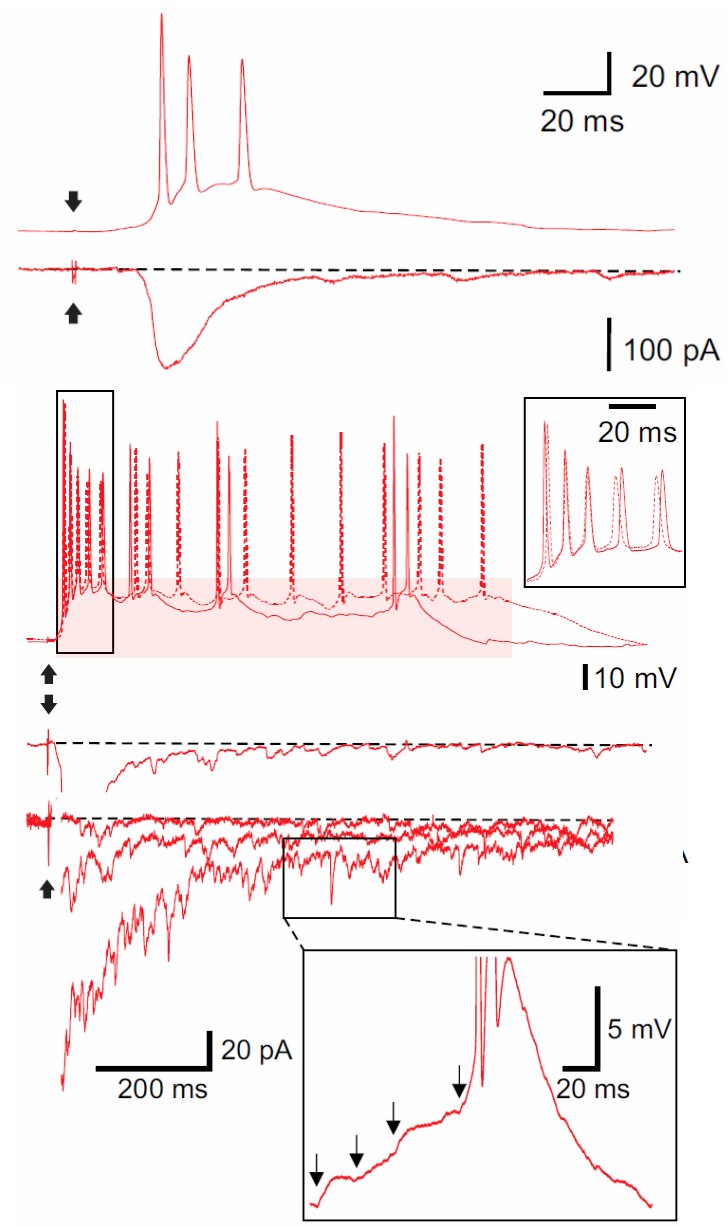




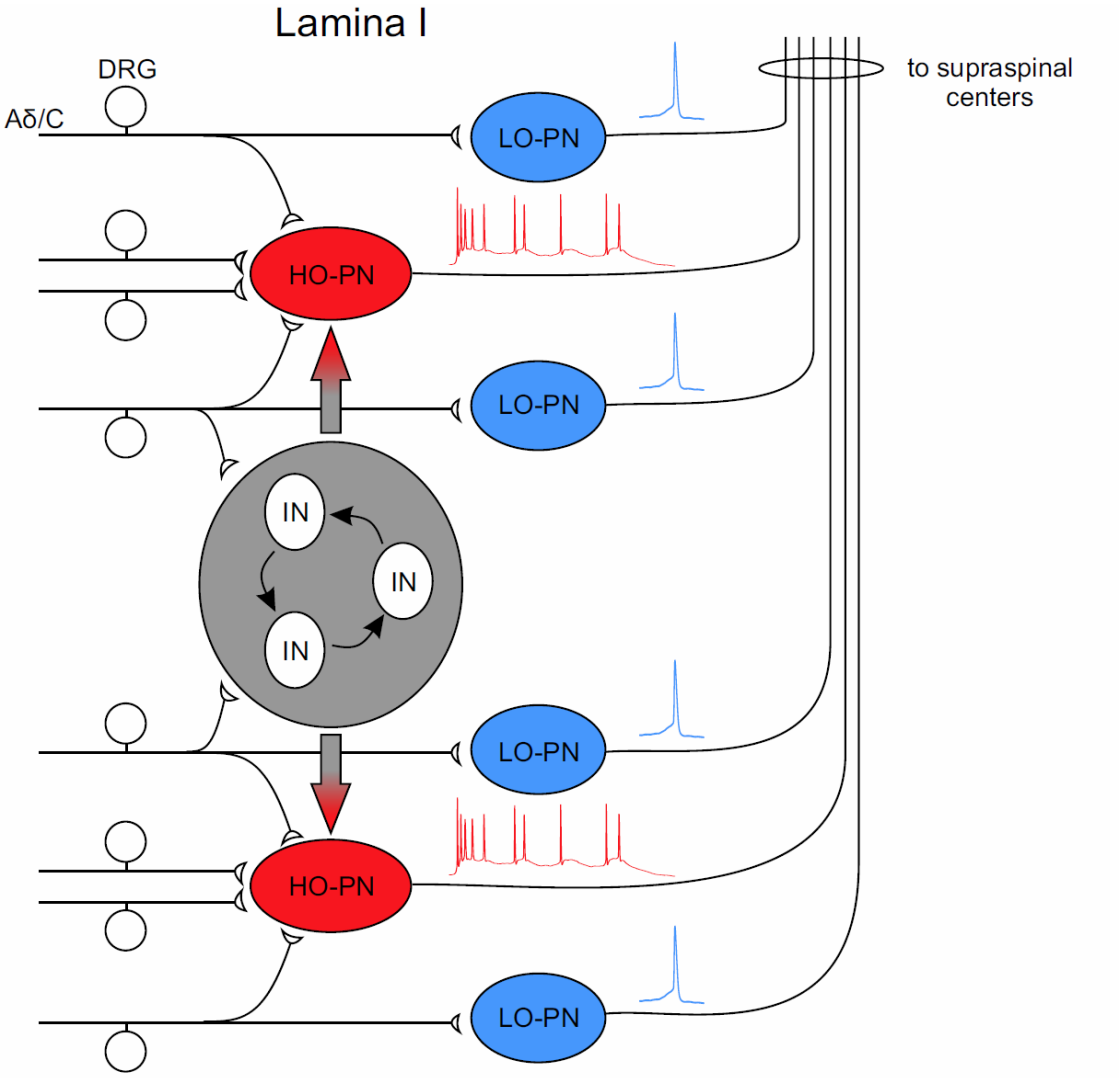




HO-PNs but not LO-PNs integrate network activity



Painful stimuli encoding by projection neurons of the spinal cord

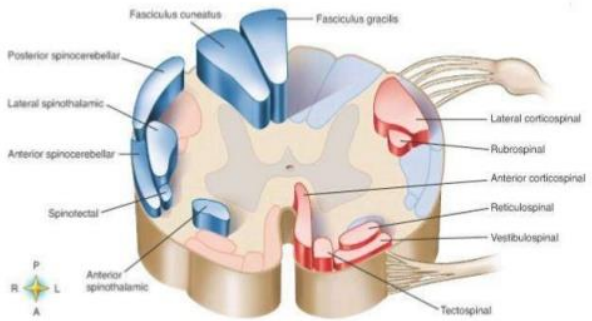


Conclusion

Two groups of PNs are likely to play principally different roles in nociception, functioning either as transducers or as intensity encoders of painful stimuli

How to treat pain based on our results

Ascending tracts



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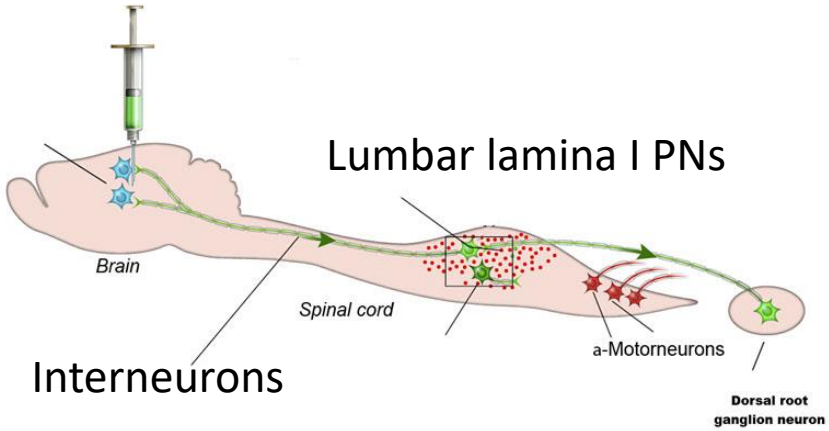
Parabrachial area



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