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## Presentation Abstract

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Presentation Title: [Systemic lidocaine transiently restores disruption of functional connectivity between dorsal horn neuronal ensembles produced by capsaicin-induced skin inflammation](#)

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Abstract: During skin injury there is a long lasting increase of the spontaneous and evoked activity of dorsal horn neurons responding to noxious and non-noxious stimuli. This effect is temporarily reduced by systemic injection of lidocaine (Pain 2006 122: 68), an effect that may contribute to the well known reduction of postoperative and neuropathic pain in humans. Previous work (J Physiol 2012, 590: 1563) has shown that the acute section of a cutaneous nerve disrupts the connectivity patterns of the intersegmental ensembles of dorsal horn neurons involved in the generation of spontaneous negative and negative-positive cord dorsum potentials (nCDPs and npCDPs). This affects the processing of the sensory information arriving to the spinal cord and may contribute to the generation of hyperalgesia observed after nerve injury. The question is raised on whether a similar disruption of the patterns of neuronal connectivity is seen during the capsaicin-induced inflammation and hyperalgesia and whether this effect can be reversed by systemic lidocaine. We have now investigated in anesthetized, paralyzed and artificially ventilated cats, the effects of inflammation produced by capsaicin injected into the left foot pad and of systemic lidocaine on the correlation patterns between spontaneous nCDPs or npCDPs simultaneously generated in different lumbosacral segments. These potentials were recorded with a multielectrode array placed over the spinal cord (segments L4 to

L7). Simultaneous recordings were also made of spontaneous and evoked intraspinal field potentials (IFPs), the latter produced by low threshold mechanical stimuli (air-puffs) applied to the left foot pad and adjacent regions. We found that capsaicin-induced inflammation disrupted the patterns of segmental connectivity between dorsal horn neurons without significantly affecting the CDPs and IFPs evoked by mechanical stimulation. Systemic lidocaine transiently reseted the interconnectivity patterns to those observed before capsaicin. This could underlie its analgesic action. Current studies are aimed to investigate the contribution of supraspinal structures in the setting and resetting of the connectivity patterns of dorsal horn neurones in response to inflammation.

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