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The Levator Auris Longus (LAL) muscle as an accessible system to study the effects of Botulinum Toxins in vivo

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**Aim:** In the present work, we aimed to find a reproducible model to study the effects of Botulinum neurotoxins (BoNTs), that allowed a widespread visualization of the intoxicated nerve terminals.

**Introduction:** Despite the well-established successful use of BoNTs to treat a variety of human conditions, their mechanism of action is still not fully understood. Thus, there is an emergent need of new and accurate models to study the effects of BoNTs. However, considering their potential lethality, it is challenging to find reproducible models to study the local application of BoNTs in living animals that allow a widespread visualization of the intoxicated nerve terminals.

In these work, we studied the innervation pattern and the effect of BoNTs in a group of small subcutaneous cranial muscles that are responsible for moving the pinna in rodents. Although all are easily accessible and manipulated, we focused on the levator auris longus (LAL).

**Methods:** Animals were injected subcutaneously with the indicated doses of BoNT/A, in the cranial muscles area. Muscles were then dissected and prepared for wholemount staining for Synapsin-I, cleaved SNAP-25 (synaptosome-associated protein of 25 kDa) and β3-tubulin.

**Results:** Detection of cleaved SNAP-25, the end-product of the catalytic action of BoNT/A, was possible even with injections as low as 0.1 ng. Mapping of the injected muscle showed the effect of BoNT/A in the majority of the endplate population. Also, seven days after BoNT/A injection, a sprouting process was evident, a landmark of regeneration.

**Conclusion:** BoNTs delivery to the LAL is a sensitive, simple and reproducible model to study the mechanisms of action of these toxins as it allowed the evaluation of BoNT/A effects throughout the entire muscle, without sampling bias. Thus, we forward that the LAL manipulation may constitute an excellent model to clarify the mechanisms of action of BoNTs in the neuromuscular system.

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NLRP3 inflammasome as a potential target to reduce epileptic-like activity

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**Aim:** Decipher how inflammation drives epilepsy and how NLRP3 targeting impacts epileptic-like activity.

**Introduction:** Epilepsy is one of the most common neurological diseases in worldwide. Inflammation was linked to the presence of inflammasomes, cytosolic multiprotein complexes, which promote the release of proinflammatory cytokines, namely IL-1β. Although a feedback loop has been described between inflammation and epilepsy, the role of inflammasomes in epilepsy is still unknown. NLRP3 is the most studied inflammasome,1 activated by a two-signal process: 1) a priming signal (as lipopolysaccharides – LPS), which enhances the expression of NLRP3 and pro-IL-1β; and 2)