New therapeutic use of Botulinum neurotoxin type A: pro-regenerative action in paraplegia recovery

- SCHEDA
- APPROFONDIMENTI

Identificativo proposta:TOIT20211026002 **RICHIEDI MAGGIORI INFORMAZIONI**

An Italian research team developed a new therapeutic use of botulinum neurotoxin type A (BoNT/A) for functional recovery after spinal trauma in a preclinical model. A single spinal injection of BoNT/A, one hour after trauma (in the acute phase), reduces inflammation, preserves neurons from cell death and promotes regeneration leading to complete functional recovery from paralysis and to the restoration of spinal sensitivity. Technical, research, licensing and financial cooperation are sought.

The team works in a research institute belonging to a public research institution based in Italy. The research team is focusing its research on inflammatory and chronic pain transmission and modulation The team achieved important and innovative results in the following fields: a) use of toxins of bacterial origin, b) new drugs with new therapeutic use, c) knockout or transgenic mice for specific proteins involved in nociception or that reproduce a genetic pathology. Three main goals are pursued: 1) study the mechanisms that rule the transmission of pain information along the nervous system appointed to pain transmission and control; 2) investigate the degeneration processes associated to neuropathies; 3) identify new pharmacological treatments in a therapeutic perspective. Recent studies have led the Italian group to analyse the Botulinum neurotoxin type A (BoNT/A), a potent biological toxin widely used in clinical practice for treatment of various disorders such as dystonia, including muscle spasticity, headaches and overactive bladder. Over the course of more than 20 years, the therapeutic spectrum of BoNT/A has been successively expanded and, due to its high efficacy, duration of action and satisfactory safety profile, it has been used empirically in a variety of neurological, otolaryngological, ophthalmological, urological, gastrointestinal, and proctological disorders, as well as pain and migraine. In their recent studies, the Italian team have demonstrated that BoNT/A is able to counteract neuropathic pain symptoms caused by peripheral nerve injury. Moreover, they patented a novel use of BoNT/A in the treatment of spinal injuries and alleviation of symptoms associated with them, from pain to paralysis. The patented invention demonstrates that, in a preclinical model of spinal trauma, BoNT/A is an efficacious treatment for complete recovery from paralysis (paraplegia/tetraplegia) and restoration of spinal sensitivity. BoNT/A was spinally administered during the acute phase of spinal trauma. Behavioural analysis, evaluating motor recovery, spinal reflex and pain response, evidenced a complete functional recovery from paralysis two weeks after BoNT/A administration. Regeneration induced by BoNT/A was evidenced also from motor evoked potentials of the hindpaw. Immunohistochemical and molecular assays revealed BoNT/A long-lasting effect, reduction in astroglial scar, apoptosis, inflammatory events and remyelinization. The Italian group is looking for these kinds of cooperation: - financial support to improve R&D and cover the patent costs (i.e. business angels); - technical cooperation with pharmaceutical and biotech companies to improve the compound vehicle (device, volume/concentration, etc) and for sharing skill and resources (i.e the pharmaceutical company should be able to provide the researchers with the toxin). - research cooperation: the ideal partner is able to transfer technology from animals to human (clinical trials). - license cooperation: institution of the team will grant the patent rights to a pharmaceutical/biotech company which will be able to conduct the necessary clinical trials and commercial activities . The licence agreement will be discussed with the support of the technology transfer office of the research institution of the team, and in compliance with the internal policy and regulations.

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