

## 1. Technical details:

### - Title

NOVEL BIOENGINEERED WRAPS FOR NERVE INJURY WITHOUT SUBSTANCE LOSS: A PRE-CLINICAL STUDY

### - Keywords (separated by commas)

Tissue engineering, peripheral nerve injury, wraps

### - Text (max. 250 words)

**Introduction.** In case of peripheral nerve injuries (PNIs) without substance loss, end-to-end nerve repair adjuvated by implantation of an absorbable nerve wrap improves the repair outcomes. The aim of the study was to assess the preclinical efficacy of two novel biodegradable wraps based on synthetic oxidized polyvinyl alcohol (OxPVA) and a natural leukocyte-fibrin-platelet membrane (LFPm) we developed, versus the commercial product NeuraWrap™.

**Material and methods.** After sciatic nerve transection and neurorrhaphy, thirty Sprague-Dawley rats were randomly implanted with a) NeuraWrap™; b) OxPVA; c) LFPm wraps. Twelve weeks later, functional recovery was assessed and explanted nerves underwent to morphological and morphometric study by histology (hematoxylin and eosin staining - H&E; Toluidine-Blue staining) and immunohistochemistry (anti-CD3, -F4/80, -S100 - $\beta$ -tubulin staining); ultrastructural analysis was performed by Transmission Electron Microscopy (TEM).

**Results.** All wraps assured nerve function recovery; no scar tissue/neuromas were visible at dissection. LFPm-wraps were completely resorbed, while residues were observed for OxPVA and NeuraWrap™. In all groups, biocompatibility was confirmed by absence of significant inflammatory infiltrate as showed by histology and immunohistochemistry (CD3 and F4/80) which also proved the nervous origin of the repaired tissue (S-100 and  $\beta$ -tubulin), later assessed also by TEM. According to morphometry, OxPVA and LFPm wraps were effective in promoting nerve regeneration especially in the distal portion.

**Conclusions.** Bioengineered OxPVA and LFPm wraps promoted lesion recovery and may be considered an interesting alternative to the commercial NeuraWrap™.

### - Presentation type (to choose between poster or oral).

Oral presentation

### - Topic (to choose one from the following):

#### - Regional's code

Lower limb

#### - Sistem's code

Neuroanatomy

#### - Section

Peripheral nervous system

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