

## Letter about M&N Paper of Russo *et al.* 2017

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Dear Sir,

I read with interest but considerable concern a recent paper published in *Muscle and Nerve* by Pinheiro-Dardis et al. (Electrical stimulation delays reinnervation in denervated rat muscle doi: 10.1002/mus.25589). [1] I do not find that the data within the paper justify the claim of the title.

The typescript reports an experiment over two weeks during which the experimental animals were anesthetized daily for more than one hour, but it is not reported if the body weight in all groups increased over the two week study. The authors only state that the body weight of the experimental groups was 'around 25% less' than the normal control group that did not received daily anaesthesia. Unless the groups were set up with a considerable difference in mean body weight, the implication is that the growth rate of the experimental rats was reduced. Since the study focused on nerve regrowth and recovery of muscle function, this is a major point. In particular the apparently detrimental effect of electrical stimulation, which of course represents additional muscle activity, might be due to the relative lack of availability of nutrients for muscle growth. However the mean muscle weights, though reported to have been measured in the study, are not reported. It is not surprising that the experimental groups had a lower muscle mass than the N group given that the body mass was 25% lower and that the muscles had been denervated. The statement that the denervated-stimulated group at 15d differed from the other groups, is meaningless without the mean values of all the groups.

Furthermore, presence of nerve injury was assessed by microscopy of the nerve, but it is not reported what criterion was selected for deciding that there was no injury as mentioned under 'nerve morphology' in Material and Methods and how many animals were excluded based on it.

The assessment of excitability data is problematic. As the authors state, both chronaxie and rheobase tend to be increased with denervation, but the authors saw a decline in rheobase. They stress a greater increase in chronaxie in the denervated/stimulated group but in the denervated group the chronaxie showed no sign of returning to control values after 14 days so it is remarkable that the authors claim any effect on reinnervation.

Finally, the authors misuse the reference to the papers of Willand *et al.* [3-5] that makes the discussion misleading: they state that those papers show that electrical stimulation 'exacerbated' muscle atrophy

and force loss whereas even the titles of the papers show that their authors demonstrated that electrical stimulation enhances functional recovery and reduces muscle atrophy. Furthermore, I would like to stress that FES of denervated muscles may recover them from atrophy and degeneration [9-11].

It is important that readers are aware of these critical points to avoid the wrong conclusions on the value of electrical stimulation of denervated/reinnervating muscles.

### References

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