



NEUROPROTECTIVE PROPERTIES OF CONDITIONED MEDIUM DERIVED FROM HUMAN DENTAL PULP STEM CELLS ON MOTONEURONS IN AMYOTROPHIC LATERAL SCLEROSIS MICE MODEL $SOD1^{G93A}$

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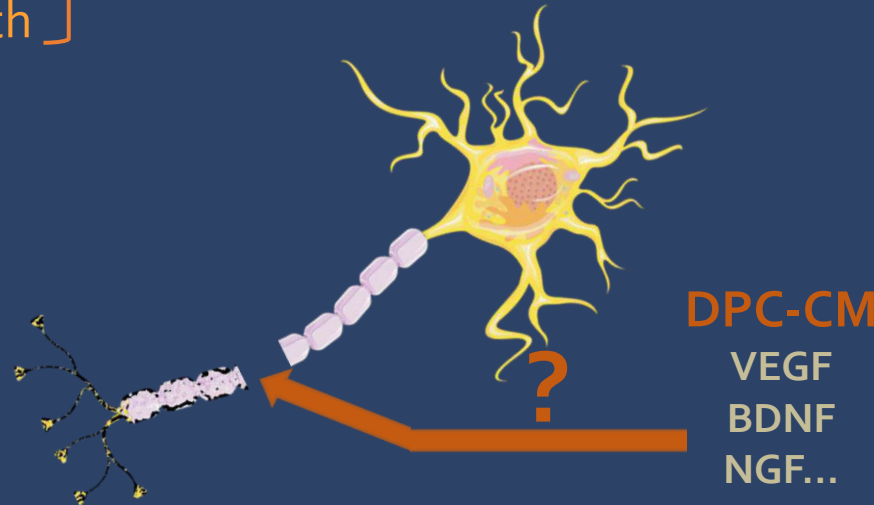
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Aim

Determine the effect of Dental Pulp Cell Conditioned Medium (DPC-CM) on:

- Survival
 - Axonal growth
- } Wild type and ALS Sod1^{G93A} motoneurons (MNs)



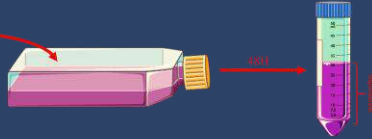
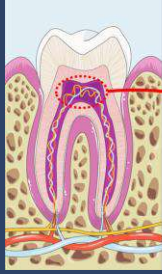
➤ Dental Pulp Cells (DPCs):

- accessible source (Bonaventura et al., 2019).
- secrete neurotrophic and growth factors (Nesti et al., 2011; Chouaib et al., 2020).

➤ Central nervous system has low bounded capability in regenerating neurons (Bjorklund & Lindvall., 2000).

Methodology

Preparation of conditioned medium



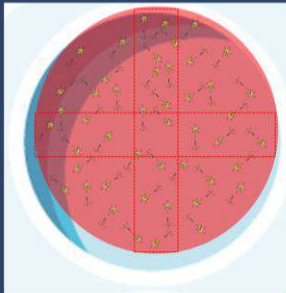
Motoneuron culture

C-: without neurotrophic factors
C+: with GDNF, CNTF and BDNF



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Survival



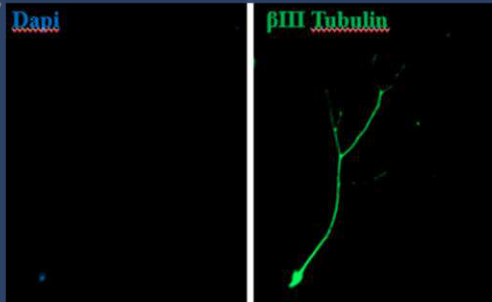
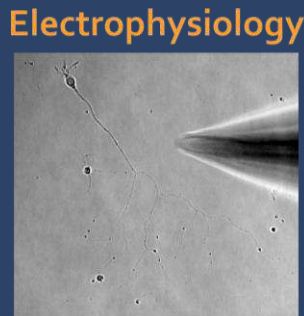
Axonal length

Islet1 and Islet 1/2

Dapi/βIII Tubulin
Islet1 & Islet 1/2

Dapi

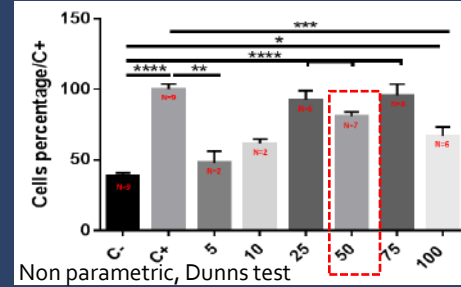
βIII Tubulin



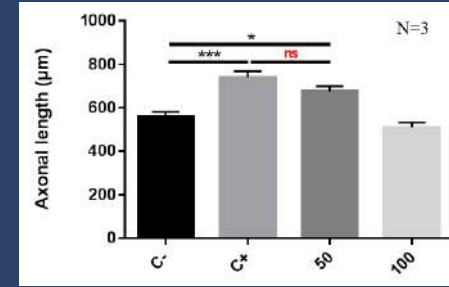
Results

WT MNs

Dose Response / Survival

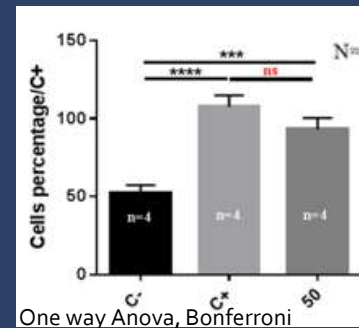


Axonal length

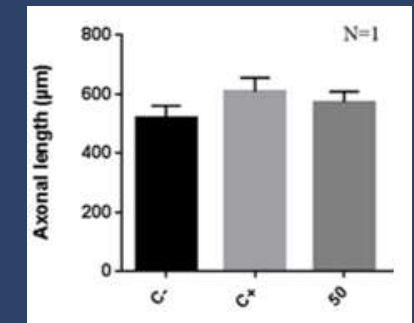


SOD₁^{G93A} MNs

Survival Test



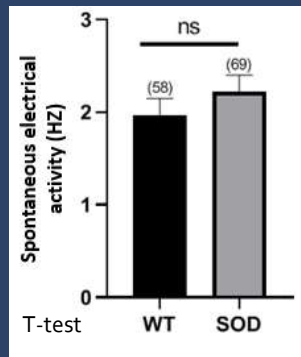
Axonal Length



50% DPC-CM improves survival and axonal length of WT and SOD₁^{G93A} MNs

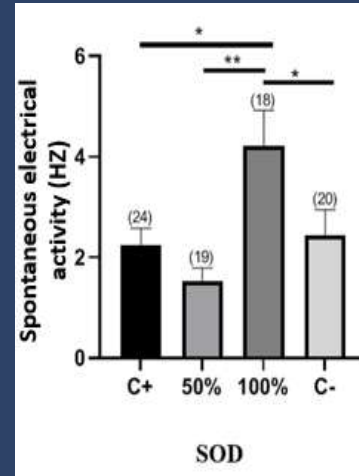
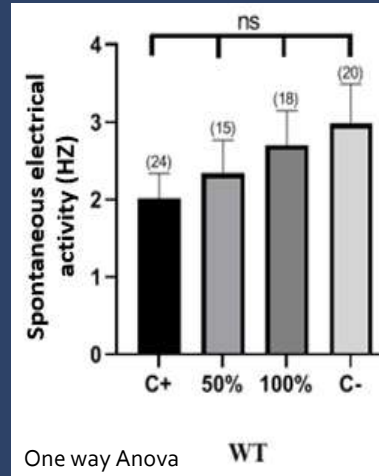
Results

Spontaneous electrical activity



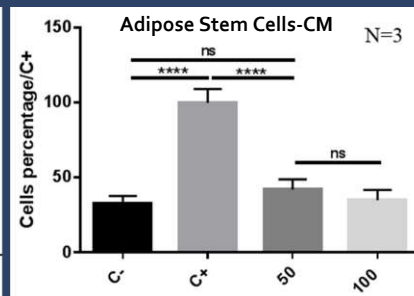
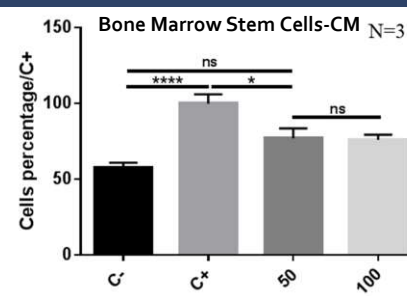
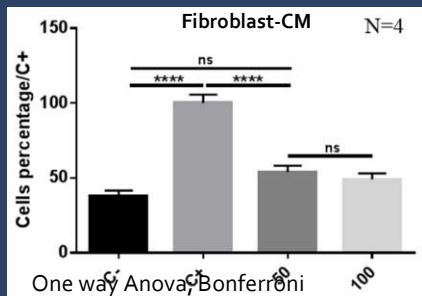
WT and SOD₁^{G93A} MNs have similar spontaneous electrical activity

Effect of CM on spontaneous electrical activity



50% DPC-CM doesn't affect the spontaneous electrical activity of WT and SOD₁^{G93A} MNs

Effect of other conditioned media



CM other than DPC-CM have no effect on the survival of WT MNs

Conclusion

DPC-CM could be a potential solution for MN disorders (ALS)

DPC-CM diluted at 50% didn't affect the electrical activity

Perspectives

Detect the active proteins in the DPC-CM that have the neurotrophic effect

Using Zebrafish ALS model to validate the effect of the identified proteins secreted by DPCs