Plan Overview

A Data Management Plan created using DMPonline

Title: EFFECTS OF PHOTOBIOMODULATION THERAPY ON TRANSCRIPTOME IN CHRONIC DEMYELINIZATION INDUCED BY CUPRIZONE IN MICE

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Project abstract:

Oligodendrocyte death is the hallmark of demyelinating diseases which affect neurotransmission. Remyelination is blocked due to a neuroinflammatory environment, leading to neurodegeneration. Most demyelination therapy is mainly focused on inflammatory control. However, it is not effective for remyelination. Photobiomodulation therapy has been shown as a promising therapy. Previous studies demonstrated that infra-red laser modulates inflammatory responses, suppresses oxidative stress, decreases cell death, and boosts cell proliferation and neurogenesis. This study aims to investigate laser action mechanisms in attenuation of demyelination, and oligodendrocyte precursor cells stimuli, through immunohistochemical analysis, mitochondrial function, astrocytes and microglia modulation. Gene expression of proteins related to myelination and endoplasmic reticulum stress will be explored by transcriptome sequencing and RT-PCR.

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Copyright information:

EFFECTS OF PHOTOBIOMODULATION THERAPY ON TRANSCRIPTOME IN CHRONIC DEMYELINIZATION INDUCED BY CUPRIZONE IN MICE

Data Collection

What data will you collect or create?

This project is part of a major project entitled" Analysis of the effect of Low-Level Laser Therapy on chronic demyelination induced by cuprizone". The data collection will be generated from experimental protocol, using the cuprizone model of chronic demyelination in mice treated with therapeutic photobiomodulation. We will investigate the effects of the laser therapy on motor skills, transcriptome, oligodendrocyte precursor cells proliferation and differentiation, astrocytes activation, microglia activation, protein expression of endoplasmic reticulum stress and remyelination evaluation by transmission electron microscopy. The results obtained in the experiments will be plotted in Excel (Microsoft) software, images and videos will be stored in the cloud (Dropbox Folder).

How will the data be collected or created?

- Rota rod test of motor skills analysis

From animals' samples:

- Brain sections: immunohistochemistry, Luxol fast blue staining, electron microscopy - semi quantification and quantification. Mitochondrial integrity and mitochondrial membrane potential.

- Whole brain samples - Molecular analysis: transcriptome, RT-PCR of myelin genes, growth factors, cytokines, endoplasmic reticulum stress and Unfolded protein response.

Documentation and Metadata

What documentation and metadata will accompany the data?

- Videos from animals' rota rod tests and their analysis registered in Excel sheets

- Photomicrographs taken from immunohistochemistry, Luxol fast blue staining, electron microscopy, mitochondrial integrity, and mitochondrial membrane potential. The data will be achieved from semi-quantification analysis of the immunofluorescence, myelin density and G Ratio of remyelinated axons.

- Data from molecular analysis (transcriptome) and gene expression of myelin genes, growth factors, cytokines, endoplasmic reticulum stress and Unfolded protein response.

All the data collected from these protocols will be organised in Excel data sheets, separated in experimental groups (Control; Control Laser; Cuprizone and Cuprizone Laser) and stored in DropBox Folder.

Ethics and Legal Compliance

How will you manage any ethical issues?

All the procedures proposed in this project will submitted to the Ethics Committee on Animal Use of the Federal University of Sao Paulo (CEUA/UNIFESP).

How will you manage copyright and Intellectual Property Rights (IPR) issues?

Not applicable

Storage and Backup

How will the data be stored and backed up during the research?

All data will be stored in the cloud (DropBox). Simultaneously a backup of the data will be stored in two hard drives kept in different places.

How will you manage access and security?

The access to the cloud data depends on sharing authorization and password, which will be available only to authorized people with research purposes only.

Selection and Preservation

Which data are of long-term value and should be retained, shared, and/or preserved?

All the research data will be kept for 10 years in our servers and in the cloud (DropBox).

What is the long-term preservation plan for the dataset?

All the research data will be kept for 10 years.

Data Sharing

How will you share the data?

All data produced by this research will be available in scientific communications presented in congresses and in manuscripts to be submitted in peer reviewed scientific journals. In addition, after data being submitted, it will be made publicly available through the institutional repository.

Are any restrictions on data sharing required?

No.

Responsibilities and Resources

Who will be responsible for data management?

The project coordinator and the PhD student Katherine Chuere Nunes Duarte will be responsible for data management.

What resources will you require to deliver your plan?

Excel (Microsoft), Adobe Photoshop (Acrobat), GraphPad Prism, Image J, personal computer, 2 external Hard Drive and the IT personnel from the University assisting with data handling.