Plan Overview

A Data Management Plan created using DMPTool

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Title: Genotypic and Phenotypic Evaluation Tissue-Specific of α-Linolenic Bioconversion to Eicosapentaenoic and Docosahexaenoic Fatty Acids in Rodents

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Project abstract:

Omega-3 polyunsaturated fatty acids are considered essential and need to be acquired through food. Among the main ones, the following stand out: eicosapentaenoic acid (EPA) and docosahexaenoic acid (DHA), sources of alcoholic sources of animal origin (cold water fish and fish oil capsules), and alpha-linolenic acid (ALA) found in seeds and vegetable oils of chia, linseed, canola, and soy. However, there are some difficulties in accessing food sources of EPA and DHA, especially in western regions, which are related to economic factors, palatability, and food culture. Omega-3 fatty acids contribute beneficially to health promotion, as they are associated with anti-inflammatory effects and prevention of adverse implications in chronic diseases, such as cardiovascular diseases. Most studies attribute these effects to EPA and DHA, as they are already in active form. They do not require the enzymatic actions of elongases and desaturases, unlike ALA which needs to be metabolized into long-chain fatty acids. However, this attribution may be mistaken and underestimate the real effects ALA provides, since studies use the proportions of plasma or membrane lipids as biomarkers of dietary intake. Currently, there are some obstacles to estimating the bioconversion rate of ALA in humans in vivo, however, considering that bioconversion occurs mainly in the liver, but also in extrahepatic tissues, serum and membrane measurement of ALA, EPA, and DHA, may represent only the post-metabolization, surplus released by the tissues. Therefore, this study aims to investigate the tissue-specific bioconversion of ALA, present in flaxseed oil, into EPA and DHA in healthy mice. For this purpose, the lipid profile of the following tissues will be evaluated: hippocampus, hypothalamus, pituitary gland, cerebellum, retina, aorta, heart, lung, muscle, liver, epididymal adipose tissue, subcutaneous adipose tissue, brown adipose tissue, kidney, and testicle, at times 0h, 2h, 4h, 8h, 16h, and 24h, through mass spectrometry and the behavior of gene expression of the enzymes Δ5

desaturases (Fads2), Δ6 desaturase (Fads1) and elongases 5 (Elovl5) and 2 will also be investigated (Elovl2). Investigating the ALA bioconversion rate can help guide new nutritional recommendations for omega-3 in physiological and pathological conditions and contribute to health promotion and prevention, through nutritional strategies. In addition, food choices that prioritize plant sources contribute to global sustainability.

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End date: 02-08-2027

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Copyright information:

Genotypic and Phenotypic Evaluation Tissue-Specific of α-Linolenic Bioconversion to Eicosapentaenoic and Docosahexaenoic Fatty Acids in Rodents

Gene expression; Protein content; Blood biochemical parameters; Anthropometrics; Fatty acids profile; Physiological mice
parameters

The data will be generated from experimental tests on cells, animals, and human data banks. The variables obtained in specific equipment will be plotted in software such as Excel (Microsoft).

There will be samples (blood and tissues [hypothalamus, hippocampus, cerebellum, heart, lungs, kidneys, muscle, liver, white and brown adipose tissue, ovary, and testis]), animal body measurements, graphs, and spreadsheets.

Experiments with rodents - all procedures will be approved by the local ethical committee.
The generated data from these experiments will be available, at least not protected by industrial secrets.

If an intellectual product is generated, the authors involved in the creation will be invited to join the authorship.

The data will be stored in real-time, in the cloud (Google Drive - System provided and recommended by our Institution). At the end of the collection, the data will also be stored on 3 hard drives, kept in different locations and far from each other.

After being processed, analyzed, and plotted in graphs, the data already used will be available in the repository created
exclusively for this project, located at: www.nutrigen-lab.com/repositorio
The address will be accessed only with a password or after registering the interested parties on the site itself. To obtain access to individual data, the interested researcher will contact the LabGeN coordinator directly by email at dennys@unicamp.br.
By signing this Term, the researcher undertakes to use the data exclusively for the research described there, protect the
information and ensure that the data will not be publicly disclosed or disclosed to third parties.
Initially, individual-level information will be stored for 10 years on three physically separate servers to maintain redundancy.

The data generated from rodents: The data will be stored for, at least, 10 years in our servers. It also will be available to
scientific journals repository.
After publication, data from experimental animals or cells will be free accessed, or under journal laws.

All generated data will be stored for, at least, 10 years on our servers.

Grouped information (i.e., not representing individual-level data) collected and generated by this project will be immediately shared in Scientific meetings, Thesis, published articles, and repository banks when required by journals

To obtain access to individual data, the interested researcher will contact the LabGeN coordinator directly at dennys@unicamp.br. By signing this Term, the researcher undertakes to use the data exclusively for the research

described there, protect the information, and ensure that the data will not be publicly disclosed or disclosed to third parties.

All students and researchers involved in this project are responsible for inputting and maintaining the correct and organized data in the system. The backup system occurs automatically and does not requires human action.
The researcher responsible for the analytical part of the project, Dennys Esper Cintra, will conduct periodic audits to
confirm the proper implementation of data entry. The implementation of this plan will require periodic acquisition of hard
drives for expansion of storage and backup systems.

We will only require hardwares and repository data bank maintenance.
