

Plan Overview

A Data Management Plan created using DMPTool

Title: An evolutionary perspective on endothelial cardiovascular control in vertebrates and its functions

Creator: Renato Filogonio

Affiliation: Universidade Federal de São Carlos (ufscar.br)

Principal Investigator: Gilberto De Nucci

Contributor: Cléo Alcantara Costa Leite, Tobias Wang

Funder: São Paulo Research Foundation (fapesp.br)

Template: Digital Curation Centre (português)

Project abstract:

Nitric oxide (NO), is commonly produced within the endothelial cells and is argued to possess potent vasodilatory effects. NO may induce nitration of catecholamine neurotransmitters, resulting in corresponding 6-nitroderivatives. Recently, the 6-nitroderivatives were demonstrated to affect vascular tone and cardiac chronotropy and inotropy. Additionally, a new family of catecholamines, also from endothelial origin, have been identified by the research group led by prof. Gilberto De Nucci, at the University of Campinas. These novel catecholamines are being suggested to play a pivotal role in the cardiovascular system regulation. These suggestions are supported by a series of *in vitro* experiments showing *i)* a complete inhibition of vasomotion in arterial rings denuded from the endothelium and subjected to electrical field stimulation (EFS), and *ii)* a positive chronotropic effect of 6-nitrodopamine in isolated rat atrium, estimated to be 100-fold more potent than adrenaline and noradrenaline, and 10,000-fold more potent than dopamine. Finally, the suggestion that the endothelium may secrete acetylcholine and catecholamines demand an urgent reappraisal of the role of the endothelium in the regulation of the cardiovascular system. In this proposal, I intend to investigate the role of the endothelium and the ensuing novel catecholamines on the cardiovascular system from an evolutionary and functional perspective. Using Nile tilapias (*Oreochromis niloticus*), I intend to unravel the putative functional role of the 6-nitrodopamine in cardiovascular regulation during acute hypoxia, and to identify putative catecholamines formed in the different vascular beds. Measurements of *in vivo* arterial pressure and heart rate of fish chronically exposed to L-NAME under normoxia and acute hypoxia will test if 6-nitroderivatives are relevant to the cardiovascular responses to hypoxia. These will be complemented by *in vitro* studies of vascular regulation in the myograph, and cardiac chronotropy/inotropy using *Langendorff* preparations, and measure of catecholamines using mass spectrometry. Using the novel experimental model of decerebrate rattlesnakes (*Crotalus durissus*), I will measure the hemodynamics of the pulmonary circulation to analyze its dependency on the vagal regulation and endothelium-derived production of acetylcholine. *In vitro* myography and EFS will be utilized to identify the specific muscarinic receptors responsible for the cholinergic vasoconstrictions observed in reptiles. Finally, using cornsnakes (*Pantherophis guttatus*) I intend to identify the catecholamines

produced in various vascular beds using mass spectrometry. I will also utilize *in vivo* and *in vitro* measurements to identify the responses of those vascular beds to the injection of different catecholamines. The project will count with the collaboration of prof. Cléo A. C. Leite (UFSCar) and prof. Tobias Wang (Aarhus University – Denmark).

Start date: 06-01-2023

End date: 05-31-2025

Last modified: 02-09-2023

Copyright information:

The above plan creator(s) have agreed that others may use as much of the text of this plan as they would like in their own plans, and customize it as necessary. You do not need to credit the creator(s) as the source of the language used, but using any of the plan's text does not imply that the creator(s) endorse, or have any relationship to, your project or proposal

An evolutionary perspective on endothelial cardiovascular control in vertebrates and its functions

Serão criados e coletados dados sobre hemodinâmica e reatividade vascular e cardíaca por meio de programas de registro de dados (LabChart).

Os dados serão registros dos experimentos e serão criados concomitantemente à realização dos protocolos experimentais.

O repositório de dados da UNICAMP (<http://repositorio.unicamp.br/>) disponibiliza livre acesso às informações e produtos dos projetos em desenvolvimento na UFSCar, (artigos científicos, livros, capítulos de livros, patentes, teses, dissertações de mestrado, apresentações em congressos entre outras).

Os metadados que acompanharão os dados são: título, autores, resumo, direito de acesso, assunto, e sites de acesso

Os experimentos serão submetidos ao conselho de ética em pesquisa da UNICAMP antes do início das atividades

Direitos autorais dos dados publicados serão transferidos para as revistas responsáveis pela publicação dos artigos científicos ou, quando possível a publicação via open-access, os direitos serão mantidos com os autores e o acesso, público.

Os dados serão armazenados utilizando o serviço de armazenamento Dropbox, pelo link:

<https://www.dropbox.com/home/ENDOTHELIUM>

O acesso aos dados será restrito aos membros envolvidos do projeto.

Question not answered.

Question not answered.

Os dados analisados serão disponibilizados em repositórios com acesso público (ex: Figshare)

Não há restrições

Renato Filogonio será responsável pela produção dos metadados, coleta, armazenamento, backup e compartilhamento dos dados

Não serão necessários recursos extras para a entrega do plano.
