Plan Overview

A Data Management Plan created using DMPTool-Stage

Title: Neurobiology of social bonding in the blue-fronted parrot (Amazona aestiva): characterization of diencephalon regions and mapping of immunoreactive neurons to oxytocin and vasopressin

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Funder: São Paulo Research Foundation (fapesp.br)

Template: Digital Curation Centre (português)

Project abstract:

The Amazona aestiva parrot is a potential model in neuroscience, as it brings together characteristics such as intelligence, relatively large brain, imitation of human speech, monogamy and complex social interaction, with the formation of social pairs composed by allogrooming receptors and donors. This transcends the hygiene function and provides opportunities to strengthen bonds between social pairs. Thus, Amazona aestiva is an interesting model to investigate neurobiological substrates behind the formation of social bonds in birds. However, in this species, studies on the structural organization of the diencephalon or the distribution of neuropeptides associated with the formation of social pairs have not yet been performed. In this way, the project aims to describe for the first time the cytoarchitecture of the diencephalon regions and map the distribution of oxytocinergic and vasopressinergic neurons of parrots kept in captivity with three different forms of social grouping: individuals that form social pairs (allogrooming donors or allorooming receivers) and isolated individuals who do not form social pairs. Fifteen parrots from the Center for Medicine and Research in Wild Animals (CEMPAS) of the Faculty of Veterinary Medicine and Animal Science of Botucatu will be used. Initially, individuals will be observed to characterize the social interaction. After euthanasia, the brains of the animals will be processed by the Nissl method and immunohistochemistry of tyrosine hydroxylase, for a cytoarchitectonic study of the diencephalon and the neurons immunoreactive to oxytocin and vasopressin will be identified for mapping through 3D reconstruction and counting by stereology. The dataset obtained in this project will contribute to the understanding of the role of these neuropeptides in the formation of social bonds in birds and to the elaboration of an unprecedented atlas on the neuroanatomy and neurohistology of the brain of the Amazona aestiva parrot.

Start date: 02-28-2021

End date: 02-28-2025

Last modified: 03-27-2023

Copyright information:

Neurobiology of social bonding in the blue-fronted parrot (Amazona aestiva): characterization of diencephalon regions and mapping of immunoreactive neurons to oxytocin and vasopressin

Data obtained by behavioral observation, biometric parameters (weight, size) and morphological brain parameters of parrots will be collected. Data will be grouped based on the classification of each animal with respect to allogrooming behavior, in captivity, when organized into social pairs (allogrooming donor and recipient) or when remaining as isolated individuals. Quantitative and qualitative data will be organized into data sheets and documents. Data will be expressed by ethograms, images, tables, charts, graphs and three-dimensional models of the diencephalon for cytoarchitectonic description and mapping of oxytocinergic and vasopressinergic neurons.

Data will be obtained by systematic observation of parrots in captivity, during and after euthanasia for brain collection, blood samples and biometric parameters. All procedures performed with the live animal will be accompanied by a team of veterinarians specializing in wild animals. Each animal will receive an experiment registration number at the Neuromorphology Laboratory and all the data obtained will be informed in a laboratory chart (printed and digital) built in a database (filemaker software). All data collected will be linked to the experiment registration number. The captured images will be named by the experiment's registration number, followed by informative parameters about the sample being analyzed (histological series, slide, position of the histological section on the slide, foographed structure and objective used for capture). Morphometric data will be collected using scales, rulers, compasses and tissue morphometry will be performed with computer programs (Image J and Neurolucida), with images captured in the optical microscope.photomicrographs

Data sheets and documents (tables, diagrams, figures, 3D brain models and photomicrographs). The main metadata will be the Neuromorphology Laboratory records where each experiment will be identified with a unique registration number and all information about the experiment will be documented in the laboratory database (filemaker software).Each brain collected will give rise to 10 series of histological sections, numbered from 1 to 10 and regularly spaced, which will be stored in a tissue bank of the Laboratory of Neuromorphology under de the experimental registration number.

All animal and data aquisition procedures were approved by the Ethical Committee for Animal Research of São Paulo State University (CEUA – protocol#132/2016, protocol#0168/2021) and by Chico Mendes Institute for Biodiversity Conservation of Environment Ministry (ICMBio, SISBIO#6453531, SISBIO#78416-1).

Copyrights and IPR of the research will be determined by the research group to communicate the results in scientific meetings and during the manuscript writing of articles, chapters or books that will be published.

The data will be stored and backed up during the course of research activities on cloud storage (Google Drive) as well on hard drives in university's computers.

Data will be available to all researchers involved in the project. However, edition and backup will be restricted to project administrator and the principal investigator.

All Data collected will be stored in backup hard drives. The data better discussed and organized will be published (proceedings of meetings, articles, chapters and books) in order to share the results with scientific community. Also, it will could be create new projects from the results and samples collected.

This data management plan will be permanently archived, under an open access regime, in the Institutional Repository of the Universidade Estadual Paulista "Júlio de Mesquita Filho" - UNESP. Data presented in publications will be available to the editorial board of the journals and may be included as supplementary data. The backup of unpublished data will be kept by the research group until the results are published. All slice remaining obtained from brain parrots will be storage in the parrot brain database from Laboratory of Neuromorphology in Biosciences Institute at Sao Paulo State University (UNESP).

Data will be shared in scientific events (conferences, congress, webinar, etc) or/and will be published as articles, chapters and books.

There are no restrictions of sharing the published data. Thus, it will be available as dataset at Institutional Repository of the Universidade Estadual Paulista "Júlio de Mesquita Filho" - UNESP or other repository of data asked by publishers (for exemple: Harvard Dataverse site https://dataverse.harvard.edu/).

All data management will be restricted to project administrator and the principal investigator.

The Neuromorphology Laboratory has the necessary IT resources (software and computers) to execute this data management plan. We also have institutional support for internet access, cloud data storage and permanent institutional data repository. In addition, this data management plan will be important for collaboration with other researchers to improve collection and analysis procedures.

Planned Research Outputs

Model representation - "3D models of parrot diencephalon"

3D models of parrot diencephalon with a map of distribution of oxitocinergic and vasopressinergic neurons

Dataset - "Parrot brain bank (Amazona aestiva)"

Parrot brain bank (Amazona aestiva). 10 series of histological sections per each parrot encephalon colleted in this project.

Planned research output details

Title	Type	Anticipated release date	Initial access level	Intended repository(ies)	Anticipated file size	License	Metadata standard(s)	May contain sensitive data?	May contain PII?
3D models of parrot diencephalon	Model representation	Unspecified	Open	UNESP Institutional Repository		None specified	None specified	No	No
Parrot brain bank (Amazona aestiva)	Dataset	Unspecified	Open	None specified		None specified	None specified	No	No