João Morais

Msc in Neurobiology

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SUMMARY

- **I am a** neurobiology MSc with research experience in systems and behavioral neuroscience.
- **I have experience in** animal behavior, stereotaxic surgeries, optogenetics, immunohistochemistry.
- **I am interested in** the deconstruction of cognitive processes through the exploration of their behavioral and neural correlates.
- **I am looking for** a research project that makes use of behaving animals to analyze and model neural activity in circuits that can be identified, recorded, and/or perturbed.

RESEARCH EXPERIENCE

RESEARCH TECHNICIAN, Barcelona, Spain

Institut Català de Nanociència i Nanotecnologia (ICN2), March 2022-October 2022

- Designed a multiplex staining protocol to assess the expression of different 5-HT receptors among excitatory and inhibitory neurons.
- Preprocessed and processed raw neural electrophysiology data using adapted Python scripts to tailor files for spike sorting and local field potential.
- Studied the modulation of prefrontal-hippocampal neural dynamics by 5-HTR7 using SPSS to analyze power spectrum, phase-amplitude coupling, phase coherence, and signal directionality.

RESEARCH TECHNICIAN / MSC STUDENT, Lisbon, Portugal

Champalimaud Centre for the Unknown, September 2018 - September 2021

- Maintained and implemented a head-fixed foraging task automated setup, using Arduino boards, python, and Matlab, to study decision-making in behaving mice.
- Prepared mice for acute electrophysiology and optogenetics experiments by performing custom stereotaxic surgeries that included viral microinjection and the implantation of optic fibers, headbar, and ephys apparatus.
- Contributed to the implementation and fine-tuning of the optogenetics stimulation protocol.
- Independently managed a diverse experimental cohort, from reception to transcardiac perfusion.
- Imaged brain slices (Axioscan), quantified infected cells using QPath, and mapped brain slices using QuickNII.
- Co-authored two scientific papers in high-impact peer-reviewed journals.

BSC INTERNSHIP STUDENT, Porto, Portugal
Institute for Research and Innovation in Health (i3S); Faculty of Medicine of Porto University (FMUP)
March 2017 - December 2017

- Conducted surgeries for local drug delivery (bupivacaine) and implemented a urethral lesion model in female rats, contributing to a study on the regeneration of the lesioned external urethral sphincter.
- Independently managed dozens of samples from the collection, processing in paraffin, and slicing to various histological staining techniques, including immunohistochemistry, to facilitate an in-depth analysis of urethral tissues.
- Executed image acquisition using fluorescence microscopy to capture detailed visuals of the treated urethras. Analyzed and quantified results on ImageJ.
- Published our results as an abstract in a peer-reviewed local journal as a poster session.

EDUCATION

MASTER IN NEUROBIOLOGY - Faculdade de Medicina da Universidade do Porto
Dissertation: “Behavioral effects of DRN stimulation on a Head-fixed Foraging Task” (Porto, Nov. 2019)

BACHELOR IN GENETICS AND BIOTECHNOLOGY - Universidade de Trás-os-Montes e Alto Douro
Dissertation: “Bupivacaine on external Urethral sphincter regeneration” (Vila Real, Sep. 2017)

PUBLICATIONS

A RESERVOIR OF FORAGING DECISION VARIABLES IN THE MOUSE BRAIN
Fanny Cazettes, Luca Mazzucato, Masayoshi Murakami, Joao P Morais, Elisabete Augusto, Alfonso Renart, Zachary F Mainen
Nat Neurosci . 2023 May;26(5):840-849. doi: 10.1038/s41593-023-01305-8. Epub 2023 Apr 13

PHASIC ACTIVATION OF DORSAL RAPHE SEROTONERGIC NEURONS INCREASES PUPIL SIZE
Fanny Cazettes , Davide Reato, João P Morais, Alfonso Renart, Zachary F Mainen
Curr Biol . 2021 Jan 11;31(1):192-197.e4. doi: 10.1016/j.cub.2020.09.090. Epub 2020 Nov 12.

BUPIVACAINE TREATMENT ENHANCES THE REGENERATION OF THE LESIONED EXTERNAL URETHRAL SPHINCTER OF THE RAT: PS173
Morais, J. P; Torrado, M; Avelino, A.
Porto Biomed J . 2017 Sep-Oct;2(5):203-204. doi: 10.1016/j.pbj.2017.07.068. Epub 2017 Sep 1.
