Introduction

The Jackson’s chameleon, Trioceros jacksonii, is native to the highlands of central Kenya. Though well known for their advanced visual abilities, the brain of the chameleon and other reptiles of the Chihuahuan Desert are not well studied. In the mammalian brain, hypocretin 1/orixin (H/O) has been found to regulate arousal, wakefulness, and appetite while neuropeptide Y (NPY) plays an important role in homeostatic processes. Spatial arrangement of NPY in the reptilian brain has been found to be similar to the mammalian brain, implying equivalent functions.

The importance of NPY in the chameleon extends to the visual system as well. Since NPY and H/O have an interactive importance particularly in feeding, we aim to create a more complete analysis of the T. Jacksoni brain by focusing on the optic tectum and hypothalamus.

This project is only the initial step of a larger investigation. We hope to learn about brain cytoarchitecture and cell characterization across various organisms in order to identify better tools for the study of human neuroanatomy.

The objective of the present study was to identify the spatial arrangement of NPY and H/O in addition to characterizing the cytoarchitecture of the chameleon brain.

Materials and Methods

Immunohistochemistry (IHC). Fixed frozen T. jacksonii chameleon brain was cut (20 μm-thick) and collected in phosphate-buffered saline. Sections were reacted with primary and secondary antibodies as listed in Table 1. Sections were then coverslipped using buffered glycerol. Specificity issues were addressed by applying multiple control tests during the immunohistochemistry runs (data not shown). Nissl. Sections were mounted on gelatin-coated slides, dehydrated in ethanol, defatted in xylene, stained in 0.5% thionin, and differentiated in 0.4% acetic acid. Slides were coverslipped with DPX.

Wide Field Epifluorescence Imaging. Tissue was examined with a Zeiss M2 Axiosmager equipped with an X-Y-Z motorized stage and filter sets appropriate for the fluorophores we used. The microscope was connected to a cooled EXI Retiga Blue camera driven by Volocity Software (Perkin-Elmer Corporation) installed on a Blue camera driven by Volocity Software (Perkin-Elmer Corporation) installed on a

Conclusions

Characterization of NPY and H/O in the chameleon brain is important in order to determine their role in homeostatic processes. Also, it is necessary to investigate the neuroanatomy of T. Jacksoni because it will facilitate the design and execution of future in vivo studies.

Our results confirm the analysis made by Bennis et al. (2000) on the Chameleo chameleon, we found NPY containing cells in the midbrain, including the geniculatus lateralis pars dorsalis, periventricular hypothalami, substantia nigra and optic tectum. Additionally, we found robustly labeled fibers in two distinct regions of the hindbrain; additional analysis is required to determine their location. Specificity issues were encountered with H/O antibody that are currently being addressed.

The present study is the first attempt to create a cytoarchitectonic and immunohistochemical characterization of NPY and H/O in the chameleon brain. Further characterization is currently being done to ultimately create a chameleon brain atlas.

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