

Distribution of vasopressin 1a receptor binding in the brain of coyotes (*Canis latrans*)

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Introduction

Vasopressin. Known as Arginine Vasopressin (AVP), it is a neuropeptide hormone that plays a role in the biological basis of social attachment in monogamous species. AVP functions in the brain to modulate social memory, territoriality, and social attachment between pair-bonded adult mates of the same species.

Coyotes. A unique species in the context of social research because they are socially monogamous and have been shown to also exhibit sexual and genetic monogamy, which is rare among mammals.

Our Goal. Establish the distribution of vasopressin 1a receptors (AVPR1a) throughout the coyote forebrain in order to compare their receptor distribution map to other known monogamous species. Provide a neuroanatomical foundation for future studies of the AVP system of coyotes.

Predictions. Based off of previous studies we predict that we will find receptors in the lateral septum, ventral pallidum, cingulate cortex, and hypothalamus

Methods

Animals. Our tissue samples included five brains that were opportunistically collected from captive-housed coyotes at the USDA Millville Predator Research Center that were euthanized for reasons unrelated to the current study.

Specimen preparation. The samples were fresh frozen on dry ice within hours of death and sectioned at 20 microns using a cryostat. We processed them using AVPR1a autoradiography according to well established procedures¹.

Analysis. We used a brain atlas from a beagle, which has a similar structure to the coyote, for a comparative analysis to identify the areas of brain that contain AVPR1a

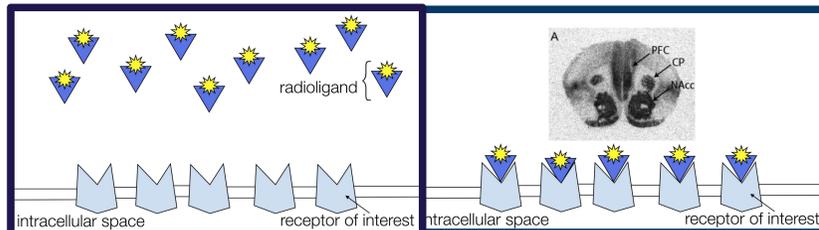


Figure 2. Graphic illustration of autoradiography.



Figure 1. A pair of coyotes (*Canis latrans*).

Results

- Anterior olfactory nucleus on autoradiograms A,B
- Lateral stria olfactoria on autoradiogram C
- Gyrus rectus on autoradiogram D, F
- Frontal Gyrus on autoradiogram E
- Lateral septum on autoradiogram G

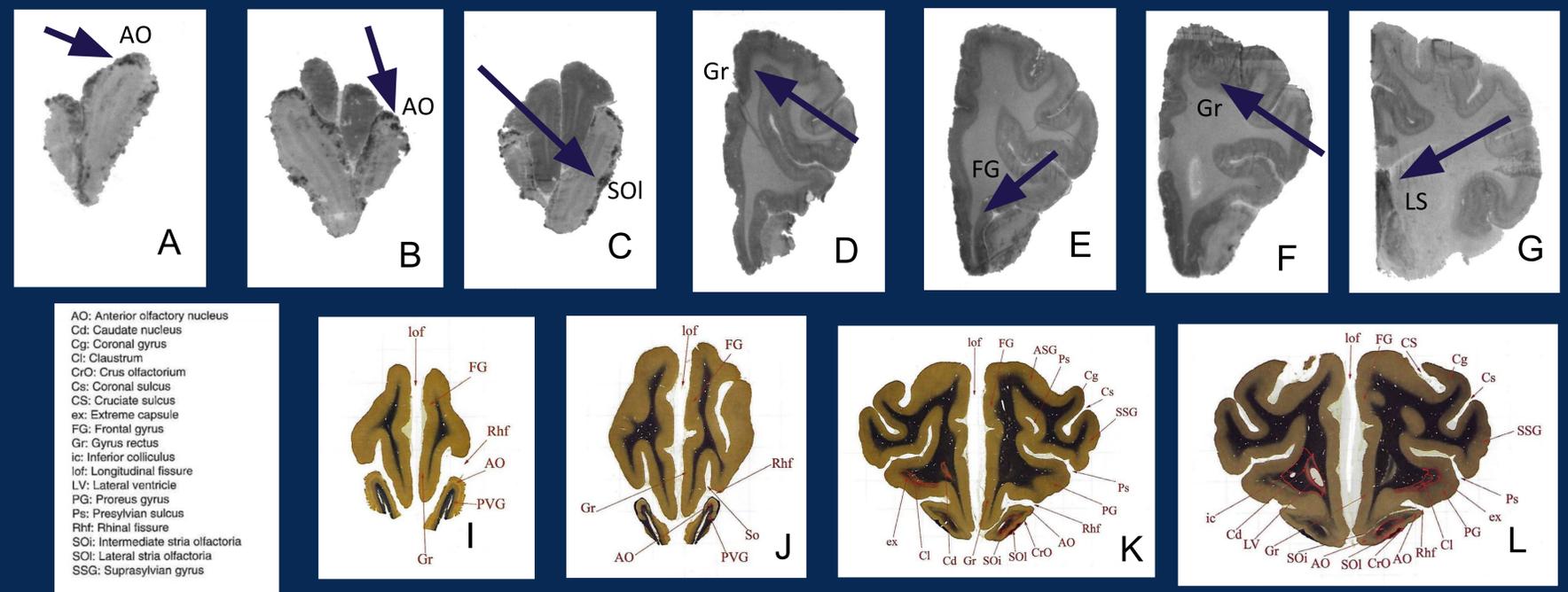
Conclusions & Future Directions

1. AVPR1a receptors are spread in various regions of the coyote brain, which is a similar pattern to other monogamous species.
2. AVPR1a is in areas involved in olfactory processing.
3. Future directions include:
 - a. counter stain sections to determine anatomical boundaries.
 - b. continue to section beyond the forebrain and compare to known receptor distributions in other monogamous mammals.

Acknowledgements

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Figure 3. Distribution of Vasopressin 1a receptor (AVPR1a) in coyotes



a) images A-H are autoradiograms of the coyote brain tissue, images I-L are from the beagle brain atlas² for reference of brain areas

References

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2. Palazzi, Xavier. *The Beagle Brain in Stereotaxic Coordinates*. Springer, 2011.