



Corticotropin -Releasing Factor (CRF) and Partner Loss in Coyotes

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Research Introduction

- The loss of a loved one often results in grief, stress, and loneliness, and the results of how losing social bonds shape our behavior as humans can be seen mirrored in both primate and non-primate species.
- Corticotropin-releasing factor (CRF) plays a main role in a range of behaviors following stress and anxiety, and causes the HPA axis to release cortisol, a stress hormone that regulates many body processes
- Despite a broad range of research on CRF receptors and cortisol levels conducted on prairie voles, there has been a lack of studies conducted in Canids that have experienced partner loss
- Coyotes display consistent monogamy in their species, which is a similar trait seen in human social behavior. This allows us to better understand and study the biological factors of both monogamy and social bonds in humans

Therefore, our goal would be to understand the variation in distribution of CRF receptors in the brains of the coyotes who have lost their pair mate by mapping CRF receptors in order to further explore the relationship between loss of social bonds and CRF receptors and cortisol levels in monogamous species.



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

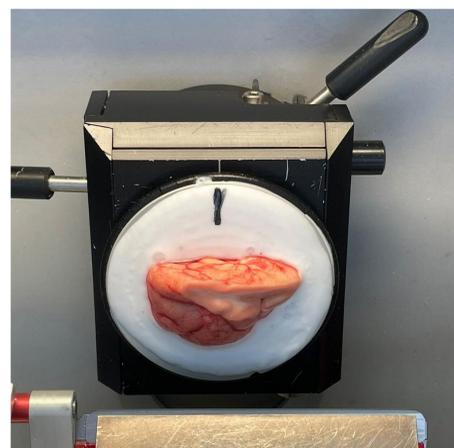


Figure 2. Part of the coyote brain during slicing session in lab

Research Methods

- **Animal specimens:** The sample size that this project would be carried out on will be the opportunistically acquired coyote brain tissue from 4 paired and 3 widowed female coyotes from the USDA's Predator Research facilities in Millville, Utah.
- **Tissue preparation:** The mapping of CRF receptors would be done by slicing coyote brain tissue blocks of 20µm on a cryostat and mounted onto slides (figure 3).
- **Receptor binding autoradiography:** 125I-Sauvagine will be used in this project due to its nature of being able to bind onto both CRF 1 and CRF 2 receptors.



Figure 3. Cartoon illustration of a cryostat

Figure 4. shows the process of the receptor binding autoradiography in an illustrated form.

As seen in Figure 5, the darker areas of this autoradiography method would show the abundance of presence of CRF receptors in the brain.

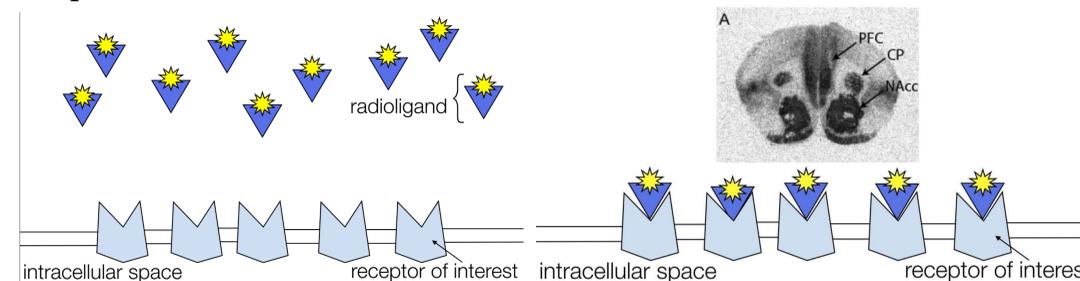


Figure 4. Illustration of autoradiography

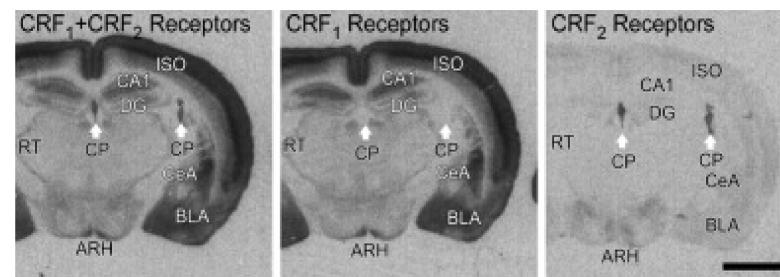


Figure 5. Distribution of CRF receptors in a mouse brain
From *Journal of Comparative Neurology*, by Tan L. A., Vaughan J. M., Perrin M. H., Rivier J. E., & Sawchenko P. E. (2017)

Expected Results

- Both CRF1 and CRF2 receptors will be found in the pituitary, throughout the neocortex, the amygdala, and hippocampus.
- **Pituitary:** CRF1 receptor is likely to be more abundant than CRF2
- **Cerebral cortex:** Both generally abundant
- **Amygdala:** CRF2 receptors are greatly observed while CRF1 receptors and moderately observed
- **Thalamus and cerebellum:** only CRF 1 receptors will be observed

Current Progress and Future Directions

- **Current progress:** Coyote brain slicing has begun
- **Future directions:** Complete slicing of 7 female coyote brains for sample to be collected. Afterwards, autoradiography would be carried out to determine if our hypothesis of the regions of the brain in which both CRF1 and CRF2 receptors would be found was accurate

References

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