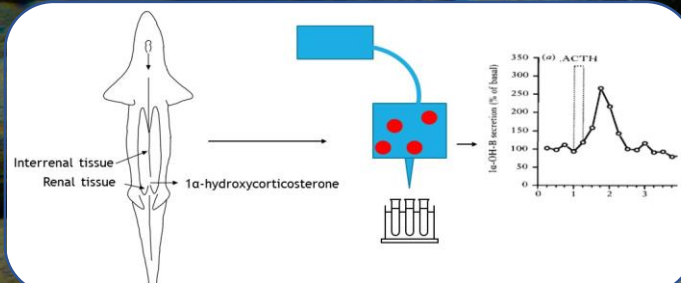


## Background

- Dominant corticosteroid in elasmobranchs is 1 $\alpha$ -hydroxycorticosterone (1 $\alpha$ -OH-B)
- Aids in mineral regulation
- Pathway not fully understood
- Predicted that Corticosterone is turned into 1-OH-B by 1 $\alpha$ -hydroxylase enzyme
- Genes for this enzyme not present in elasmobranchs

## Methods and Materials

- Dogfish (*Squalus suckleyi*) are readily accessible and abundant
- Interrenal tissue will be finely chopped and placed in a perfusion chamber
  - Perfuse collected every 15 minutes
- 1-OH-B concentration will be measured before and after ACTH administration (Fig 1)
- Antibiotics application to determine microbial role in synthesis (Fig 2)



# Finding 1 $\alpha$ -hydroxylase: A Novel Approach to Steroid Synthesis in Elasmobranchs

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Advised by Dr. Gary Anderson

## Objective

Determine if elasmobranch bacteria synthesize 1 $\alpha$ -hydroxylase

## Hypothesis

H: 1 $\alpha$ -hydroxylase is synthesized by bacteria

## Expected Results

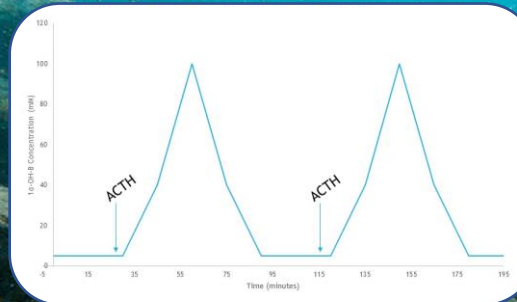


Figure 1

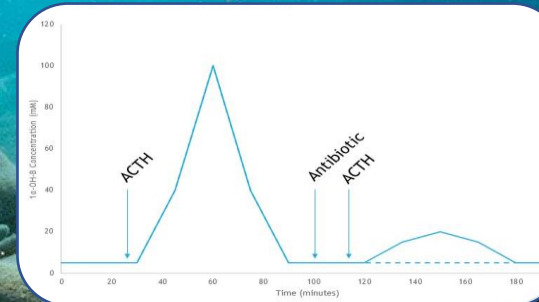


Figure 2

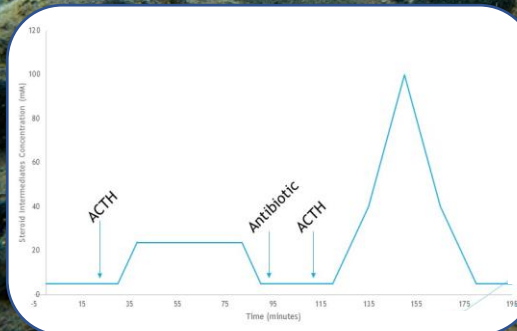


Figure 3

**Figure 1.** [1 $\alpha$ -OH-B] after ACTH stimulus of interrenal tissue

**Figure 2.** [1 $\alpha$ -OH-B] from ACTH stimulus after antibiotic treatment

**Figure 3.** [Intermediate] after ACTH and antibiotics



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## Conclusions

- Novel approach to steroid synthesis
  - Bacterially mediated within healthy tissue
- Could lead to methods to synthesize 1 $\alpha$ -OH-B in lab independent of fish
- Could lead to the understanding of the complete biosynthetic pathway of 1 $\alpha$ -OH-B
- Implications in husbandry



## References

- Anderson, W.G. 2012. The endocrinology of 1 $\alpha$ -hydroxycorticosterone in elasmobranch fish: A review. *Comp. Biochem. Physiol. - A Mol. Integr. Physiol.* **162**(2): 73–80. doi:10.1016/j.cbpa.2011.08.015.
- Armour, K.J., O'Toole, L.B., and Hazon, N. 1993. Mechanisms of ACTH- and angiotensin II-stimulated 1 $\alpha$ -hydroxycorticosterone secretion in the dogfish, *Scyliorhinus canicula*. *J. Mol. Endocrinol.* **10**: 235–244.