

Effect of Thyroid Hormone Concentration on the Transcriptional Response Underlying Induced Metamorphosis in the Mexican Axolotl (Ambystoma)

¹Page, R.B., S.R. Voss¹, A.K., Samuels¹, J.J. Smith¹, S. Putta¹, and C.K. Beachy²

¹Department of Biology, University of Kentucky, Lexington, KY; ²Department of Biology, Minot State University, Minot, ND

Background and Objective: Thyroid hormones induce gene expression programs that orchestrate amphibian metamorphosis. In contrast to anurans, many salamanders do not undergo metamorphosis. However, they can be induced to undergo metamorphosis via exposure to thyroxine (T₄).

Methods: We induced metamorphosis in Mexican axolotls (*Ambystoma mexicanum*) using 5 and 50 nM T₄, collected skin from the head at four time points (days 0, 2, 12, 28) and used microarray analysis to quantify mRNA abundances.

Results: We identified 402 genes that were statistically and two-fold differentially expressed between T₄ treatments. In addition, we used linear and quadratic regression to identify 542 and 709 genes that were differentially expressed by greater than two-fold in the 5 and 50 nM T₄ treatments, respectively.

Discussion and Conclusions: T₄ concentration affected the timing of gene expression and the shape of temporal gene expression profiles. However, essentially all of the identified genes were similarly affected at both dosage levels. Many common genes underlie the transcription profile during metamorphosis in salamanders and frogs, characterized in *Xenopus laevis*, yet there are a substantial number of differences.

Grant Support

NIH Grant Numbers P20RR-016741 and P20RR-16481 from INBRE, NCRR

NIH Grant Number 5-R24-RR016344-06 from NCRR

NSF Grant Number IBN-0242833 from CAREER