



## A/Professor Craig Smith

### Head, Comparative Development and Evo-Devo Laboratory



Monash Biomedicine Discovery Institute  
Development and Stem Cells Program

---

**EMAIL** [craig.smith@monash.edu](mailto:craig.smith@monash.edu)

---

**TELEPHONE** +61 3 9905 0203

---

**WEB** [med.monash.edu/anatomy/research/comparative-development-evo-devo-laboratory.html](http://med.monash.edu/anatomy/research/comparative-development-evo-devo-laboratory.html)

---

Our group takes a comparative approach to developmental biology, using the chicken embryo to study the genetic regulation of organogenesis and disease. Since development occurs outside the maternal body, chicken embryos can be readily accessed and genetically manipulated. Recent technical advances coupled with the sequencing of the chicken genome combine to make the avian embryo a powerful model for functional genomics. Specifically, we study gonadal and limb development. The research in our lab involves both established and cutting edge methods of molecular and developmental biology. We are particularly interested in Evolutionary Developmental Biology (so-called “Evo-Devo”), focusing on how developmental mechanisms have evolved in animals. Both the embryonic gonads and the limbs provide ideal models for exploring questions related to Evo-Devo.

### Research Projects

1. The role of G Protein Coupled Receptor 56 in Müllerian duct development
2. Identification of novel genes regulating formation of the Müllerian duct
3. ZNF385B: A novel genes involved in gonadal sex differentiation in the chicken embryo
4. Comparative analysis of limb morphogenesis in chicken and emu embryos



Unilateral delivery of GFP into an embryonic chicken gonad.

### Selected significant publications:

1. Lambeth LS, Morris K, Ayers KL, Wise TG, O'Neil T, Wilson S, Cao Y, Sinclair AH, Cutting AD, Doran TJ, **Smith CA**. 2016. Overexpression of Anti-Müllerian Hormone Disrupts Gonadal Sex Differentiation, Blocks Sex Hormone Synthesis, and Supports Cell Autonomous Sex Development in the Chicken. *Endocrinology* 157(3):1258-75.
2. Ayers KL, Lambeth LS, Davidson, NM, Sinclair AH, Oshlack A and **Smith CA**. 2015. Identification of candidate gonadal sex differentiation genes in the chicken embryo using RNA-seq. *BMC Genomics* 16:704.
3. Lambeth L, Raymond C, Roeszler KN, Kuroiwa A, Nakata T, Zarkower D and **Smith CA**. 2014. Over-expression of DMRT1 induces the male pathway in embryonic chicken gonads. *Developmental Biology* 398:160-172.
4. Ayers KL, Davidson N, Demiyah D, Roeszler KN, Grützner F, Sinclair AH, Oshlack A and **Smith CA**. 2013. RNA sequencing supports cell autonomous sex identity in chicken embryos and allows comprehensive annotation of W-chromosome genes. *Genome Biology* 14 (3):R26.
5. **Smith CA**, Roeszler K, Onhesorg T, Cummins, D, Farlie, P, Doran, T and Sinclair AH. 2009. The avian Z-linked gene, DMRT1, is required for male sex determination in the chicken. *Nature* 461, 267-271.