Neverending Story – ZZ/ZW Sex determination in the dragon

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The Australian dragon lizard *Pogona vitticeps* has a complex means of determining sexual fate. It has ZZ/ZW sex chromosomes as in birds, but the developmental pathways leading to male or female developmental outcomes can be captured by environmental temperature. What would normally become a male (a ZZ individual) is reversed to a female phenotype by high temperatures. Ancient and ubiquitous mechanisms involving chromatin-modifier genes appear to be integrally involved in the reprogramming of sexual outcomes by temperature. Equally interesting are the genes and regulatory processes that govern sexual development under the influence of sex chromosomes. In contrast to fish, amphibians, birds and mammals, no definitive sex determining gene has been identified for a reptile. *Pogona* has some interesting candidates – transcription factor gene Nr5a1 is on the sex chromosomes (though on the PAR) and generates striking differences in isoform profiles in the ZZ and ZW individuals. Copies of *Amh* and its receptor gene *Amhr2* have been recruited as copies on the Z but not the W chromosome. There are interesting autosomal genes and elements differentially expressed in the embryo before any of the obvious candidate genes. Interactions between the autosomal *Amh* and *AmhR2, Amh-Z* and *AmhR2-Z* and *Nr5a1* (through intermediaries) are potentially complicated. *Pogona* may represent a transitional state where a dominant influence is yet to emerge.