



Recent discovery of highly differentiated ZZ male and ZW female sex chromosomal system involving a pair of micro-chromosomes in bearded dragon *Pogona vitticeps* (Ezaz et al. 2005) is a significant breakthrough in the study of sex chromosomal evolution in vertebrates.

Our research interests focus on mammalian genes and genomes. We compare the genomes of distantly related mammals and other vertebrates to understand how the genomes have changed in evolution. We specialize in Australian mammals (kangaroos and platypus) and reptiles (snakes and lizards). These distantly related species give us information about the function of genes in all mammals, including humans.

This comparative strategy is now widely accepted, and huge genome projects are under way to sequence the genomes of marsupials and monotremes. We are providing expertise on international projects to sequence the genomes of the platypus, the opossum and the tammar wallaby.

The availability of this sequence is enormously widening our horizons, providing the means to look in depth into the organization, function and evolution of genome regions. Of special interest to us are the genes that control sex and regulate the activity of chromosomes.

COMPARATIVE GENOMICS

Group Leader: Prof. Jenny Graves

HIGHLIGHTS

- Our Centre is mid-way through characterizing our target chromosomes. We produced a definitive cytogenetic map of the whole tammar genome, and are establishing beachheads for detailed mapping of the X chromosome and chromosome 5.
- We have isolated and characterized many genes on the X and 5, including the wallaby versions of genes that are involved in human sex and intelligence, and that code for visual pigments and blood proteins.
- Used the first whole marsupial Genome Sequencing to understand the evolution of the major histocompatibility complex that codes for transplantation antigens.
- We discovered sex chromosomes in lizards and turtles that were thought not to have sex chromosomes.



Genomics in kangaroos and wallabies, our model marsupials, illuminates the functions of the genome in all mammals.