

Our research seeks to elucidate genetic, molecular and evolutionary mechanisms that regulate the development, form and function of animals. We take a multidisciplinary approach, using genetics, genomics, molecular biology, cell biology and advanced live imaging, to tackle these problems.

We study model organisms such as the vinegar fly and the mouse to advance our understanding of cell structure and function, animal development and the genetic basis of evolution.

We then apply knowledge gained from these studies to advance our understanding of organisms as diverse as coral and humans, providing a basis for improved approaches to environmental and biomedical problems.



The fly, *Drosophila melanogaster*, may be small in stature, but it packs a mighty punch in the world of genetic, cell and developmental biomedical research.

MOLECULAR GENETICS & EVOLUTION

Group Leader: Prof. Robert Saint

HIGHLIGHTS

- The year saw the retirement of Professor Desmond Clark-Walker, a long term member of, and contributor to, the Molecular Genetics and Evolution group through his studies of yeast molecular genetics. Prof. Clark-Walker continues to be a Visiting Fellow in the group. The year was also marked by the arrival of Dr Ruth Arkell, formerly a group leader at the UK Medical Research Council Mammalian Genetics Unit. Dr Arkell won the prestigious Viertel Fellowship for biomedical researchers. Her research group studies the roles of regulatory genes that control early mammalian development.
- Fundamental research on the *Flightless I* gene and protein has led to the discovery that wound healing may be improved by altering the levels of this protein. This discovery was made in collaboration with researchers at the Child Health Research Institute, Adelaide, and has led to the filing of two patents concerned with the discovery and its successful delivery to wounds. The discovery is now entering the commercialization phase.
- Further characterization of the coral genome continues to strengthen our conviction that the genomic diversity of the coral *Acropora*, which we estimate at 20–25,000 genes, is comparable to that of many other animals and considerably greater than that of the fruitfly, the animal with the first fully sequenced genome. Furthermore, the coral has genes belonging to at least six of the seven developmental pathways common to higher animals. These findings point to a genetically more sophisticated common ancestor than was previously believed.
- Our ability to study genetic and molecular mechanisms during animal development relies on a detailed description of the behaviour of cells during development. This year we developed an innovative way of using a photoactivatable fluorescent protein in living *Drosophila* embryos to characterize the way in which cells of the mesoderm, one of the three primary embryonic germ layers, migrate in a directed fashion to generate different tissue types such as muscle and fat body.

Photo: Lynn Jones