

**P016** The role of Mbd2 in immune system gene regulation  
**Aimee M. Deaton, John R. Grainger, David Brownstein,  
Heather Owen, Adrian Bird**

*The Wellcome Trust Centre for Cell Biology,  
University of Edinburgh*

A role for the transcriptional repressor and methyl-CpG binding protein, Mbd2, in regulating the immune system is emerging. It has previously been shown that when Mbd2 is absent the IL-4 and IFN- $\gamma$  genes are aberrantly expressed during T helper cell differentiation. We are currently using the process of T helper cell differentiation to identify Mbd2 immune system targets using a ChIP-on-chip approach. We will then examine targets to assess the contribution that modulation of DNA methylation patterns makes to the process of T cell specialisation. We have also observed that generation of immune suppressing T<sub>reg</sub> cells is enhanced in Mbd2<sup>-/-</sup> mice both *in vitro* and *in vivo*. We are further assessing the T<sub>reg</sub> phenotype by examining histone modifications and Mbd2 binding at the FoxP3 locus, as FoxP3 is the master switch for directing T<sub>reg</sub> cell fate. We have, in addition, observed hyperplasia and eosinophil infiltration in the oesophagus of Mbd2<sup>-/-</sup> mice, which mirrors the symptoms of a human immune-associated disease. Expression microarrays have identified a number of genes that are misregulated in the Mbd2<sup>-/-</sup> oesophagus. An immune system conditional knockout will be used to ascertain whether the oesophagus phenotype can be attributed to immune system dysfunction in Mbd2<sup>-/-</sup> mice and to assess the role of Mbd2 in the immune system more thoroughly.