IN BRIEF

NEUROIMMUNOLOGY

Electroacupuncture for sepsis

Previous studies have indicated that the vagus nerve can control inflammation, but the clinical applications of direct vagal stimulation are currently limited. Ulloa and colleagues now show that activation of the sciatic nerve through electroacupuncture, or by direct electrical stimulation, induces vagal activation of aromatic-L-amino acid decarboxylase in the adrenal gland, which leads to dopamine production in the adrenal medulla. In turn, dopamine inhibits lipopolysaccharide-induced inflammatory cytokine production, which controls systemic inflammation and rescues mice from polymicrobial peritonitis. Dopamine D1 receptor agonists mimic the anti-inflammatory potential of electroacupuncture and can rescue mice with adrenal insufficiency from peritonitis even when administered after the onset of sepsis. As there is no currently approved treatment for severe sepsis, these results hold promise for a clinical strategy combining electroacupuncture with dopaminergic agonists.

ORIGINAL RESEARCH PAPER Torres-Rosas, R. *et al.* Dopamine mediates vagal modulation of the immune system by electroacupuncture. *Nature Med.* **20**, 291–295 (2014)

REGULATORY T CELLS

Fingerprinting the peacemakers

Does gene expression by regulatory T (T_{Reg}) cells differ between individuals, and might this influence our susceptibility to disease? Ferraro *et al.* used genome-wide expression profiling of T cells from healthy humans and patients with diabetes to address this question. They found that T_{Reg} cells from different individuals generally share a defined T_{Reg} cell-associated gene signature; however, there is more inter-individual variability in the expression levels of T_{Reg} cell signature genes compared with other genes. Notably, genes that control T_{Reg} cell effector functions were expressed more variably than genes that encode lineage-commitment factors. Both genetic and environmental factors seem to promote variability in the expression of T_{Reg} cell signature genes, and interestingly, T_{Reg} cells become more 'T_{Reg} cell-like' (that is, show higher expression of T_{Reg} cell signature genes) with increasing age and body mass index. Variability in the expression level of any single gene was not associated with diabetes, but the overall expression of T_{Reg} cell signature genes was slightly altered in patients with type 1 diabetes.

ORIGINAL RESEARCH PAPER Ferraro, A. *et al.* Interindividual variation in human T regulatory cells. *Proc. Natl Acad. Sci. USA* http://dx.doi.org/10.1073/pnas.1401343111 (2014)

MHC MOLECULES

Expanding the detectable peptide repertoire

MHC class I molecules present short peptides derived from intracellular proteins at the cell surface, which enables $CD8^+$ T cells to 'screen' these cells for signs of infection or cancer. Defining the exact peptide repertoire of MHC class I molecules could aid the design of vaccines and other immunotherapies. A new study describes an improved mass spectrometry-based method for identifying such peptides. Mommen *et al.* found that combined electron-transfer and higher-energy collision dissociation increased the detectable peptide repertoire by approximately threefold compared with more established techniques. This study offers some interesting new insights: in particular, although previous work suggested that each intracellular protein is represented by only a single peptide on MHC class I molecules, the authors' data indicate that at least two peptides from most proteins are presented at the cell surface.

ORIGINAL RESEARCH PAPER Mommen, G. P. M. *et al.* Expanding the detectable HLA peptide repertoire using electron-transfer/higher-energy collision dissociation (EThcD). *Proc. Natl Acad. Sci.* USA http://dx.doi.org/10.1073/pnas.1321458111 (2014)