IN BRIEF

INFECTIOUS DISEASE

Blockade of NKG2D on NKT cells prevents hepatitis and the acute response to hepatitis B virus.

Vilarinho, S. *et al. Proc. Natl Acad. Sci. USA* **104**, 18187–18192 (2007)

Understanding the immunopathogenesis of liver disease following infection with hepatitis B virus (HBV) is important for the development of new therapeutics. The authors previously established mouse models of primary HBV infection in which non-classical natural killer T (NKT) cells that do not recognize the classical NKT-cell ligand α-galactosylceramide were shown to be sufficient to induce hepatitis. In the present study, the role of the NK- and NKT-cell activating receptor NKG2D in hepatitis was addressed. Surface expression of NKG2D by NK and NKT cells and of the NKG2D ligand RAE1 (retinoic acid early transcript 1) by hepatocytes was modulated during acute infection, and blockade of the NKG2D–ligand interaction prevented acute hepatitis and liver injury. The results support a model in which non-classical NKT cells are activated by HBV infection, leading to the production of cytokines that then activate NK cells.

VACCINES

A novel M cell-specific carbohydrate-targeted mucosal vaccine effectively induces antigen-specific immune responses.

Nochi, T. *et al. J. Exp. Med.* 5 November 2007 (doi:10.1084/jem.20070607)

With a few exceptions, mucosal vaccines are not in widespread use primarily because vaccine efficacy does not compare favourably with that of injectable vaccines. Membranous or microfold cells (M cells) are located in Peyer's patches and in the villous epithelium, and are specialized for the uptake of luminal antigens, which they efficiently transport to professional antigen-presenting cells. In this study, the authors developed a monoclonal antibody (NKM 16-2-4) that specifically targets M cells, but not epithelial cells or goblet cells, by recognition of α(1,2)-fucose-containing carbohydrates. Oral vaccination using botulinum toxin conjugated to the antibody resulted in protective immunity against lethal doses of botulinum toxin. So, the use of NKM 16-2-4 might prove useful in enhancing the efficacy of mucosal vaccines.

AUTOIMMUNITY

Roquin represses autoimmunity by limiting inducible T-cell co-stimulator messenger RNA.

Yu, D. *et al. Nature* **450**, 299–303 (2007)

Sanroque (*san/san*) mice are homozygous for a mutation in ROQUIN (also known as Rc3h1), a member of the RING-type ubiquitin ligase protein family. These mice develop a lupus-erythematosus-like autoimmune disease accompanied by lymphocyte accumulation as a result of increased expression of the T-cell co-stimulatory molecule ICOS (inducible T-cell co-stimulator). Yu and colleagues found that decreasing the *Icos* gene dosage by breeding sanroque mice with *Icos*-knockout mice resulted in a less severe autoimmune syndrome, showing that the mutation in ROQUIN disrupts a repressive pathway that controls ICOS expression. Further experiments showed that ICOS expression is generally controlled by the binding of the microRNA miR-101 to a conserved region in the 3′ untranslated region of the *Roquin* mRNA. So, in sanroque mice, regulation of ICOS expression is disrupted as a result of defective miR-101-mediated repression.