IN BRIEF

HIV

Spermatozoa capture HIV-1 through heparan sulfate and efficiently transmit the virus to dendritic cells

Ceballos, A. *et al. J. Exp. Med.* 26 Oct 2009 (doi:10.1084/jem.20091579)

There are three possible sources of HIV-1 transmission through semen: free virions, infected leukocytes and virion-associated spermatozoa. Until now, HIV-1 transmission by spermatozoa has been overlooked, but this study shows that spermatozoa are active carriers of HIV-1 and can transmit the virus to immune cells. Spermatozoa capture HIV-1 particles on their cell surface through heparan sulphate binding and can transmit the virus to dendritic cells (DCs) by cell–cell contact *in vitro*, leading to DC maturation. The authors suggest that spermatozoa could gain access to DCs *in vivo* from microabrasions of the mucosal surface induced during intercourse or could interact with DC protrusions, which squeeze between epithelial cells into the mucosal lumen.

CYTOKINES

A lymphotoxin-driven pathway to hepatocellular carcinoma

Haybaeck, J. *et al. Cancer Cell* **16**, 295–308 (2009)

The mechanism of how hepatitis B virus and hepatitis C virus (HBV and HCV) cause chronic hepatitis and hepatocellular carcinoma (HCC) is poorly understood. This study shows that the cytokines lymphotoxin-α (LTα) and LTβ, and their receptor LTβR, are involved in the development of hepatitis-induced HCC. Expression of LTα, LTβ and LTβR is higher in the livers of patients infected with HBV and HCV than in livers from healthy individuals. Overexpression of LTα and LTβ in mouse liver induced inflammation, hepatitis and HCC. The development of chronic hepatitis and HCC in mice is dependent on both lymphocytes and the expression of IκB kinase-β (IKKβ) by LT-responsive hepatocytes, but is independent of tumour necrosis factor receptor 1. Inhibition of LTβR signalling in mice that overexpress LTα and LTβ suppressed the development of chronic hepatitis and HCC. These results suggest that the LT signalling pathway is involved in HCC development after chronic hepatitis, making it a possible new therapeutic target for the treatment of HBV- or HCV-induced liver disease.

REGULATORY T CELLS

Adoptive therapy with redirected primary regulatory T cells results in antigen-specific suppression of arthritis

Wright, G. P. *et al. Proc. Natl Acad. Sci. USA* **106**, 19078–19083 (2009)

The suppressive effects of regulatory T (T_{Reg}) cells on the immune system have made these cells candidates for the treatment of autoimmunity. Wright *et al.* used gene therapy to transduce expression of an ovalbumin (OVA)-specific T cell receptor and forkhead box P3 (FOXP3) by $CD4^+$ T cells, which produced functional OVA-specific T_{Reg} cells. The authors used an antigen-induced arthritis model in which OVA was injected with the arthritis-inducing antigen mBSA (methylated bovine serum albumin). Adoptively transferred engineered T_{Reg} cells substantially decreased inflammatory swelling when OVA was present but not when the mice were challenged with mBSA alone, suggesting that although OVA was not an arthritis initiating self antigen, its presence was sufficient to induce T_{Reg} cell suppression of the arthritis. The authors suggest that engineered T_{Reg} cells could be effective for the treatment of autoimmunity when the initiating autoantigens are not known.