Pattern recognition receptor-initiated innate antiviral response in adipocytes

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Adipose tissue had long been considered as a site that stores energy. Although wide range of viruses can infect adipose tissues, innate antiviral response of adipose cells has not been investigated. Adipose cells are equipped with innate antiviral system. Major virus sensors including Toll-like receptor 3 (TLR3), melanoma differentiation-associated antigen 5 (MDA5) and retinoic acid-inducible gene I (RIG-I) are constitutively expressed in preadipocytes and adipocytes. Poly(I:C), a common agonist of TLR3, MDA5 and RIG-I, induced the expression of type I interferons in the two types of adipose cells through the activation of IFN-regulatory factor 3 and upregulated proinflammatory factors such as TNF-α and IL-6 through the activation nuclear factor kappa B. Cytosolic DNA sensor p204 and its signaling adaptor stimulator of interferon (IFN) genes (STING) were constitutively expressed in adipocytes. Synthetic herpes simplex viral DNA (HSV60), a p204 ligand, induced type I IFN expression by activating IFN regulatory factor 3. Many major antiviral proteins, including IFN-stimulating gene 15, 2'5'-oligoadenylate synthetase and Mx GTPase 1 could be activated by both poly(I:C) and HSV60. poly(I:C) inhibited preadipocyte differentiation in a dose-dependent manner, but not in a time-dependent manner. Endogenously transfected poly (I:C) severely impaired the adipogenesis of preadipocytes compared with exogenously added poly(I:C). Further study indicates that poly (I:C) inhibited the differentiation of mouse preadipocytes through PRR-mediated secretion of TNF-α. HSV60 inhibited the differentiation of preadipocytes to mature adipocytes and enhanced the proliferation of adipose cells. Most of these studies have concentrated on immune cells, principally macrophages, dendrite cell and T cells whose metabolic state is also critical to their immune function. The study reports that not only immune cells, but also adipocytes, which are important cells in the body's metabolic state, and their precursor cells during anti-virus infection.

Speaker Biography

Lili Yu focuses her research on the function of pattern recognition receptors in adipose cells and passion *in virus* infection causing weight loss and gain. She got her PhD degree at Peking Union Medical College (PUMC) in Beijing of China in 2014 following the Dr. Daishu Han. Then she worked at Xinxiang Medical University to continue the study which will demonstrate whether these effects observed in vitro can translate to the whole animal and from the mouse model to humans. Currently, she is a visitor at Pennington Biomedical Research Center as a Postdoc.

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