DEFECT OF BDH2 CONTRIBUTES TO DNA HYPMETHYLATION IN CD4+ T CELLS OF SYSTEMIC LUPUS ERYTHEMATOSUS

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Background and aims A lot of evidences have confirmed that genomic DNA hypomethylation play an important role in the pathogenesis of systemic lupus erythematous (SLE). However, the mechanism of DNA hypomethylation in lupus CD4+ T cells remain unclear. Previous study showed that depletion of the mammalian siderophore by inhibiting expression of 3-OH butyrate dehydrogenase (BDH2) results in abnormal accumulation of intracellular iron and mitochondrial iron deficiency in cultured mammalian cells. In this study, we investigate whether BDH2 is involved in regulating DNA hypomethylation in CD4+ T cells of SLE.

Methods 20 SLE patients and 20 healthy controls were recruited. CD4+ T cells were isolated by magnetic beads. All patients fulfilled at least 4 of the SLE classification criteria of ACR. mRNA and protein levels were detected by real-time PCR and western blot. Global DNA methylation level was measured by Global DNA Methylation Assay–LINE-1 kit. CD4+ T cells were transfected by nucleofector.

Results Compared with normal controls, BDH2 mRNA and protein levels were decreased significantly in SLE CD4+ T cells, which are positively correlated with the global DNA methylation levels. Knockdown of BDH2 with siRNA in normal CD4+ T cells decreased the global DNA methylation level compared with negative control. In contrast, overexpressing BDH2 with expression plasmid can increase the global DNA methylation level in SLE CD4+ T cells.

Conclusions BDH2 expression was defect in CD4+ T cells of SLE patients, which contributes to the genomic DNA hypomethylation of CD4+ T cells in SLE patients.

THE SIGNIFICANT ROLE OF TOLL-LIKE RECEPTOR IN SYSTEMIC LUPUS ERYTHEMATOSUS

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Background and aims Until nowadays, the exact aetiology of SLE (Systemic Lupus Erythematosus) is still unknown. It is currently accepted that there are several factors responsible for complex immunological disorders contributing to its development. Recent studies have shown that abnormal stimulation of innate immunity may have a great influence on the immunopathogenesis of SLE. Since TLRs (Toll-Like Receptors) are essential modulators of innate immune response, its role in SLE pathogenesis has raised great interest, particularly of those recognising nucleic acid, the main antigenic target in SLE.

Analyse the role of TLR in the pathogenesis of SLE.

Methods We look up for scientific article comprehensively in Medline, Science Direct, PubMed, and Cochrane Database. We found 20 article based on bibliography and keywords from the database.

THE ROLE OF TLR8 IN LUPUS NEPHRITIS

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Background and aims Lupus nephritis (LN) is a significant cause of morbidity and mortality. In recent systems biology work we found that renal macrophage functional pathways that link phagocytosis with activation of TLR pathways and disposal of excess cellular components are shared between mice and humans with lupus nephritis. Surprisingly we found that in two different lupus strains there is marked upregulation of renal TLR8 expression restricted to resident renal macrophages.

Methods Because mouse TLR8 does not recognise ssRNA, we generated NZW/B6.Yaa mice expressing a functional form of human TLR8 as a BAC transgene to examine the effect of human TLR8 on systemic immunity and renal inflammation. TLR8 mRNA was quantitated by qPCR. Male and female mice were followed clinically for up to one year and harvested for flow cytometry analysis of spleens and kidneys. 24-week-old male mice were administered TL-506 subcutaneously for 4 weeks and harvested after 8 weeks.

Results A single dose of human TLR8 in NZW/B6.Yaa mice did not exacerbate disease or accelerate disease or change the immune phenotype of the spleens or kidneys. However administration of a TLR8 agonist to male NZW/B6.Yaa mice appeared to enhance germinal centre formation and plasma cell generation in transgenic mice.

Conclusions A single dose of human TLR8 in NZW/B6.Yaa mice does not exacerbate disease or accelerate disease or change the immune phenotype of the spleens or kidneys. However administration of a TLR8 agonist to male NZW/B6.Yaa mice appeared to enhance germinal centre formation and plasma cell generation in transgenic mice.

THE ROLE OF NEUTROPHILS IN ORGAN TISSUE DAMAGE IN SLE

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Background and aims Systemic lupus erythematous (SLE) is a chronic autoimmune disease characterised by high levels of autoantibodies and multi-organ damage. Neutrophils are the...
most abundant leukocytes in Human blood, but it is not clear whether neutrophils exert an important role in the pathogenesis of organ tissue damage in SLE.

**Methods** We used lupus-prone mouse model and model of lupus serum-induced tissue inflammation in mouse to investigate the role of neutrophils in the organ damage of SLE.

**Results** We found that there was a little neutrophil infiltration in the inflammatory sites of skin, liver, brain and joint in lupus-prone mice. We also found that there was also little neutrophil infiltration in the site of skin inflammation induced by lupus serum in normal mouse. The severity of skin inflammation induced by lupus serum was not significantly decreased in mice with neutrophil depletion compared to ones without neutrophil depletion. But we found that neutrophils were actually involved in tissue injury induced by lupus IgG. Further studies showed that lupus IgG stimulated and activated neutrophils, and cause the death of neutrophils. Studies also confirmed that Fas plays an important role in neutrophils apoptosis.

**Conclusions** Our study indicates that neutrophils participate in the early stage of lupus organ damage, and then they died through activation-mediated apoptosis. These findings promote the understanding of the role of neutrophils in the tissue injury with SLE.

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**Abstracts**

**340** TLR8 ACTIVATION IN NEUTROPHILS IMPAIRS IMMUNE COMPLEX PHAGOCYTOSIS THROUGH FURIN-DEPENDENT SHEDDING OF FCGRIIA

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**Background and aims** Neutrophils play a crucial role in host defense through mechanisms including phagocytosis and formation of neutrophil extracellular traps (NETs), a recently identified neutrophil cell death process in which DNA is extruded together with cytoplasmic and granular content to trap and eliminate extracellular pathogens. Although beneficial from a host-pathogen perspective, exaggerated neutrophil activation has been linked to autoimmunity, in particular the rheumatic disease systemic lupus erythematosus (SLE) where nucleic acid-containing immune complexes (IC) drive inflammation. Toll-like receptor (TLR) agonists, such as nucleic acid-containing immune complexes (IC) drive inflammation. Toll-like receptor (TLR) agonists, such as nucleic acids, are important components of pathogens, enabling enhanced phagocytosis by macrophages and dendritic cells, but the role of TLR signalling in processing of SLE ICs and downstream inflammatory neutrophil effector functions is not known.

**Methods** Standard Methods.

**Results** We observed that both FcgR- and TLR8-engagement were required for NETosis, whereas TLR8 activation, through the RNA component of the ICs, suppressed further IC-mediated phagocytosis. Mechanistically, TLR8 ligation induced PI3K-dependent ROS generation through NADPH oxidase, and subsequent furin-dependent proteolytic cleavage of the N-terminal part of FcgRIIA shifting neutrophils away from phagocytosis of ICs toward NETosis. TLR8 activated neutrophils promoted cleavage of FcgRIIA also on plasmacytoid dendritic cells and monocytes resulting in impaired overall clearance of ICs and increased complement C5a generation. Importantly, ex vivo derived activated neutrophils from SLE patients demonstrated a similar cleavage of FcgRIIA that was correlated with markers of disease activity as well as complement activation.

**Conclusions** Therapeutic approaches aimed at blocking TLR8 activation would be predicted to increase phagocytosis of circulating ICs while disarming their inflammatory potential.