KSN 2020
FULLY VIRTUAL MEETING

**Abstract Type : Oral**
**Abstract Submission No. : OR-1403**

# Lactobacillus acidophilus KBL409 Decreases Fibrosis and Preserves Kidney Function in Mice with Chronic Kidney Disease

**Hyoungnae Kim[1]**, Jimin Park[2], Bo Young Nam[2], Ki Uk Lee[3], Seok Cheon Song[3], Tae-Wook Nam[3], Shin-Wook Kang[4], GwangPyo Ko[5], Seung Hyeok Han[4]
[1]Department of Internal Medicine-Nephrology, Soonchunhyang University Seoul Hospital, Korea, Republic of
[2]Department of Severance Biomedical Institute, Yonsei University College of Medicine, Korea, Republic of
[3]Department of KoBiolabs, Inc., KoBiolabs, Inc., Korea, Republic of
[4]Department of Internal Medicine-Nephrology, Yonsei University College of Medicine, Korea, Republic of
[5]Department of Environmental Medical Biology, Seoul National University College of Medicine, Korea, Republic of

**Objectives:** Dysbiosis of the intestinal microbiota has recently been reported to play an important role in the pathogenesis of various diseases including chronic kidney disease (CKD). Here, we aimed to evaluate whether probiotics supplement can have protective effects against kidney injury in animal CKD model.

**Methods:** Among candidate strains, *Lactobacillus acidophilus* KBL409 was selected because it can maintain intestinal integrity and decompose p-cresyl sulfate *in vitro*. *In vivo* animal model of CKD was induced by feeding diet containing 0.2% adenine diet to C57BL/6 mice. These mice were administered with KBL409 at a dose of $1x10^9$ CFU daily for 4 weeks. To clarify mechanisms of probiotics *in vitro*, sodium butyrate (10 mM) and acetic acids (10 mM), short-chain fatty acids that are the end products of commensal bacteria, was administered to primary mouse tubular epithelial cells (TECs) treated with TGF-β or p-cresyl sulfate.

**Results:** CKD mice showed prominent kidney fibrosis, higher expression levels of profibrotic markers and higher levels of serum creatinine and albuminuria. KBL409 administration significantly improved structural alterations and kidney function, and decreased albuminuria. In addition, increased macrophage infiltration in CKD mice was reduced by KBL409 treatment together with a shift from M1 to M2 macrophage. Notably, NLRP3 inflammasome pathway was activated in CKD mice evidenced by increased expression of Nlrp3, Asc, IL-18 and cleaved caspase-1, which were significantly decreased by KBL409 administration. Furthermore, elevated levels of systemic inflammation (TNF-α and IL-6) and oxidative stress (8-hydroxy-2'-deoxyguanosine), and impaired intestinal permeability in CKD mice were attenuated by KBL409. *In vitro*, TECs treated with TGF-β and p-cresyl sulfate showed increased expression of NLRP pathway genes and profibrotic markers. These alterations were reversed by administration of short-chain fatty acids.

**Conclusions:** These results demonstrate that probiotic supplementation with *Lactobacillus acidophilus* KBL409 provide beneficial effects against kidney injury.