Abstract Type : Oral presentation
Abstract Submission No.: A-0415
Abstract Topic : Non-dialysis CKD

Transgelin as a Novel Fibrotic Biomarker for Detecting Early CKD

Jae Hoon Chang[1], Seongmin Cheon[3], Jeeyoung Kim[1], Kyu-Hong Kim, Yong Chul Kim[1], Dong Ki Kim[1], Kook Hwan Oh[1], Seung-Hee Yang, Yon su Kim[1]
[1]Department of Internal Medicine-Nephrology, Seoul National University Hospital, Korea, Republic of
[2]Department of School of Biochemical Sciences and Technology, Chonnam National University, Korea, Republic of
[3]Department of Kidney Research Institute, Seoul National University College of Medicine, Korea, Republic of

Objectives : Transgelin, a 22kDa calponin family protein, was identified by Seoul University Kidney Research Institute not only as an early diagnosis biomarker for kidney fibrosis in chronic kidney disease(CKD), but also as a novel drug target for fibrosis inhibition. We identified potential ligands through deep-learning model and confirmed their therapeutic efficacy in hTECs cells.
Methods : A total of 450 CKD patients were selected from KoreaN cohort study for Outcome in patients With Chronic Kidney Disease(KNOW-CKD), including 150 patients in each CKD stage(1, 2, and 3), along with 150 individuals with normal kidney function. Transgelin levels in serum and urine samples were measured using ELISA. The association between Transgelin levels and clinical parameters were analyzed using linear regression.
Results : Transgelin levels in both serum and urine samples were significantly elevated in CKD patients compared to controls ($p<0.001$) and strongly associated with spot urine protein-to-creatinine ratio (uPCR, $p<0.001$) and spot urine albumin-to-creatinine ratio (uACR, $p<0.001$), with a rapid increase observed at low uPCR (<0.3 g/g) and uACR (<300 mg/g) levels. No significant associations were found between Transgelin levels and age, BMI, BSA, or MAP. Interestingly, women exhibited lower Transgelin levels than men, which may be attributed to the kidney protective effects of estrogen. Additionally, we explored potential Transgelin inhibitors using transformer-based deep-learning model for protein-ligand binding prediction. Among the identified compounds, JS-K($C_{13}H_{16}N_6O_8$), a glutathione/glutathione S-transferase-activated nitric oxide generator, was selected for further validation. Molecular docking analysis confirmed its binding affinity, and treatment with JS-K in human kidney 2 cells demonstrated wound healing effect under both normoxic and hypoxic conditions, while also mitigating reactive oxygen species induced damage.
Conclusions : Transgelin is a potential biomarker for early detection of CKD, as its levels correlate with proteinuria even in the early stages. Furthermore, JS-K may serve as a therapeutic candidate for preventing CKD progression by targeting Transgelin mediated fibrosis.

Figure1.png

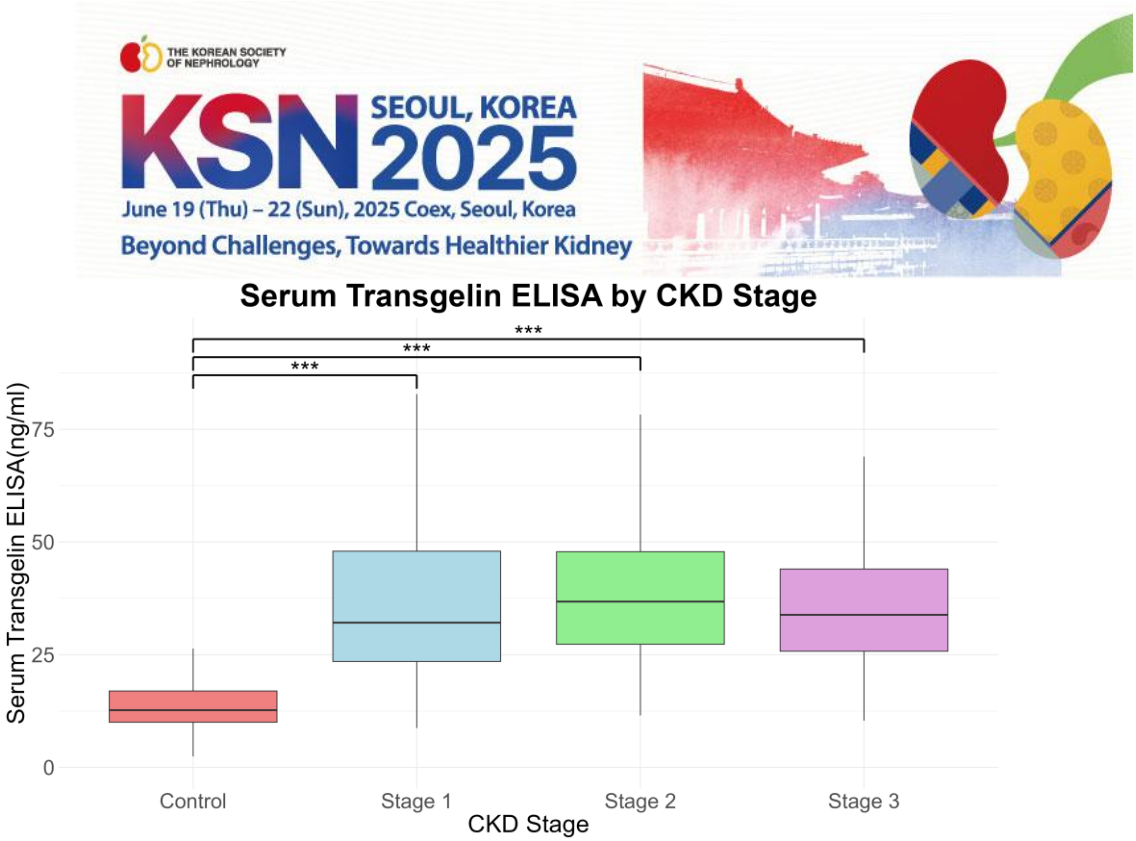
THE KOREAN SOCIETY OF NEPHROLOGY
KSN SEOUL, KOREA 2025
June 19 (Thu) – 22 (Sun), 2025 Coex, Seoul, Korea
Beyond Challenges, Towards Healthier Kidney
Serum Transgelin ELISA by CKD Stage
***
***
***
Serum Transgelin ELISA(ng/ml)
75
50
25
0
Control
Stage 1
Stage 2
Stage 3
CKD Stage

Figure1.png

THE KOREAN SOCIETY OF NEPHROLOGY
KSN 2025 SEOUL, KOREA
June 19 (Thu) – 22 (Sun), 2025 Coex, Seoul, Korea
Beyond Challenges, Towards Healthier Kidney