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A urine-based new diagnostic approach for diabetic kidney disease

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Diabetic kidney disease (DKD) is one of the major complications of Diabetes mellitus. Also, DKD is known as either structural or functional kidney damage that occurs due to diabetes mellitus. Nowadays, measuring the excreted amount of albumin (protein) in urine is an indicator for screening DKD. However, it has several laps, and usually, albumin appears in urine after kidney damage as a result of Diabetes. Therefore, discovering a non-invasive new diagnostic tool is essential for early diagnosis and prompt treatment to avoid the rapid worsening of the disease. This research aims to develop reliable and sensitive diagnostic tools for detecting DKD. Eighty-two urine samples were collected from healthy volunteers and chronic kidney disease (CKD) patients, including DKD. A molecule called RNA was extracted from the cells present in the urine samples. The quantitative polymerase chain reaction (qPCR) technique was used to study the expression pattern of ANXA3 and NGAL genes in DKD patients compared to healthy controls. These genes, NGAL and ANXA3, are related to the molecular mechanism of diabetes and kidney disease and were selected and underwent qPCR reactions. The RNA extracted from urine samples was converted into complementary DNA and used for PCR. The fold changes of each gene expression in DKD and other CKD patients were calculated using the relative quantification method. The results showed about four-fold increased NGAL expression compared with healthy controls was seen in DKD patients. It was not observed in other chronic kidney disease patients. Further, there was a two-fold increase in early stages of CKD than late-stage, indicating that NGAL could be used to detect the early stage of CKD. Additionally, the findings showed that a very high level of ANXA3 gene expression was found in DKD patients. It was nearly 783-fold and considered high compared with other CKD categories. From these findings of the research, ANXA3 and NGAL could be better non-invasive tools to diagnose the exact condition of DKD. However, it needs more samples to validate before applying for clinical trials.

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