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한국 내 신장이식환자의 말초혈액 내에서 급성거부반응 진단을 위한 5개의 유전자 바이오마커 검증 연구

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A Validation Study of a Five-gene Set Biomarker from Peripheral Blood for Acute Rejection Diagnosis after Kidney Transplantation in Korea

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Background: Renal biopsy, an invasive diagnosis, is followed and required after kidney transplantation for acute allograft rejection (AR) diagnosis. However, if we provide non-invasive diagnosis using peripheral blood, it may not only improve patient compliance but also reduce the risk of biopsy complications and financial burden. Five AR specific genes in peripheral blood were discovered previously in United States to be significantly and differently expressed in AR patients than in controls. This study aims to validate if these five genes are also useful to detect AR in Korean kidney transplant patients and to find the differences between the races.

Methods: The five-gene biomarker panel (DUSP1, NKTR, MAPK9, PSEN1, PBEF1) was validated using peripheral blood samples collected from kidney transplanted patients in Korea. The isolated RNA from peripheral blood was reverse transcribed to cDNA and subjected to qPCR and data analysis. qPCR was performed to analyze gene expression of the five biomarkers.

Results: Blood samples were collected from 114 patients (30 AR and 84 controls) at an average of 9 month after transplantation and total peripheral blood RNA was isolated. Upregulation of NKTR (4.51±0.35 vs. 3.17±0.42) and MAPK9 (2.45±0.23 vs. 1.05±0.14) and downregulation of PSEN1 (55.76±4.67 vs. 100.80±21.66) in AR patients complies with the previous study. However, DUSP1 (50.94±4.87 vs. 48.59±7.40) and PBEF1 (9.71±1.25 vs. 8.32±2.19) showed no differences in gene expression level between AR patients and controls.

Conclusions: These results partly confirm the results from the previous study and validate the possibility of three genes, NKTR, MAPK9 and PSEN1, as non-invasive biomarkers for AR in peripheral blood samples from kidney transplanted patients in Korea. Although the DUSP1 and PBEF1 genes do not confirm the previous results, they suggest that different results may have shown due to the difference in races and the number of the tested patients.

Key Words: 급성이식거부반응, 신장이식, 바이오마커
Acute allograft rejection, Kidney transplantation, Biomarker