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# Transplantation of the 3D printed omental patch suppressed kidney fibrosis in CKD

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Chronic kidney disease (CKD), caused by various causes, leads to the end-stage of renal diseases (ESRD). Dialysis and kidney transplant are the only treatments existed in the market for ESRD. Although many clinical trials are being conducted to develop new treatments for kidney disease, there is no newly developed renal replacement therapies. In this study, we developed a new treatment using the autologous omental tissue that can delay the progression of ESRD. Omentum is one layer of the peritoneum, and it is known a rich source of biological materials that enhance cell growth and has rich matrix. Growth factors such as bFGF, PDGF, HGF, and VEGF in the omentum can play a key role in renal regeneration. Also, we observed the expression of key genes for kidney repair in omentum extracts by ELISA analysis. For these reasons, we applied the omentum as bio-ink for 3D printing. Micronized omental bio-ink was printed in the form of a therapeutic patch, then transplanted into the subcapsular layer in kidneys of the CKD rat model. After 14 days of transplantation, animal was sacrificed, and kidneys were histologically analyzed. From the results, lower glomerulosclerosis and tubular injury were shown in the patch treatment group compared to the untreated control group. Interestingly, high cellular proliferation was observed in regions near the patch. Also, there has been observed the reduced tubular atrophy in the treatment group. Therefore, we confirmed that the omental patch delays ESRD progression by reducing the renal fibrosis in CKD. This new approach has the potentials for future treatment of kidney repair and regeneration.