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Scientists identify cell changes leading to impaired 'artificial kidney' function

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Molecular targets identified by a Spanish research team may hold the key to freedom for some sufferers of kidney disease. A new study published in Disease Models & Mechanisms (DMM), dmm.biologists.org, reveals the cellular signals which cause one treatment for kidney failure to lose its usefulness over time.

One of the most devastating aspects of kidney failure is the strict, time-consuming treatment regimen. Normally, healthy kidneys take on the role of filtering and cleaning the blood. Therefore patients with diseased kidneys traditionally need to attend a dialysis clinic to have their blood cleaned through a special filter. This treatment requires three regular clinic visits per week, with each session lasting three to five hours.

An alternative to this treatment involves creation of an "artificial kidney" in a process known as peritoneal dialysis (PD). Fluid is inserted into the abdominal cavity, and the blood vessel-rich cavity lining, the peritoneum, acts as a filter for the blood. Exchanges of dialysis fluid can take place at home, thus freeing patients of a rigid schedule of clinic visits.

However, the filtration ability of the peritoneum can lose efficiency over time, requiring patients to discontinue PD. In order to understand this change in the peritoneum, scientists Raffaele Strippoli, Miguel del Pozo and colleagues examined the dialysis fluid from PD patients, and identified molecular signals that cause abnormal changes in the peritoneum. They also found that pharmacologically disrupting these

signals causes these abnormal cells to revert back to their original state, as they normally existed in the abdominal cavity lining.

These findings support further research on maintaining the effectiveness of PD, and indicate that perhaps even former PD patients could once again have an option to use PD rather than traditional hemodialysis. Additionally, the cellular changes studied in the peritoneum are similar to cell transformations in tumor formation and inflammation. Their findings may aid in greater understanding of cell change in these situations, as well.

Source: The Company of Biologists