

Landmark study published in "Nature": Decoding myofibroblast origins in human kidney fibrosis

Aachen, 16.11.2020 – Under the leadership of Prof. Rafael Kramann, Director of the new Institute for Experimental Internal Medicine and Systems Biology at the Uniklinik RWTH Aachen, Dr. Christoph Kuppe and Dr. Mahmoud Ibrahim, both members of the new institute, as well as other collaboration partners, succeeded in identifying the cellular origin of human renal fibrosis in a study. The research results have now been published under the title "Decoding myofibroblast origins in human kidney fibrosis" in the renowned scientific journal *Nature*. The study has provided an unprecedented map of human chronic kidney disease with a single cell resolution and identified promising novel therapeutic targets.

Renal fibrosis (scarring of the kidney) is the consequence of virtually all chronic progressive injury to the kidney. This is a pathological deposition of connective tissue that ultimately destroys the architecture of the organ and leads to organ failure. To date, there is no effective anti-fibrotic therapy option to halt the loss of kidney function in chronic kidney disease. One reason for this is that the origin, functional heterogeneity and regulation of the scarring cells during renal fibrosis are not yet fully understood.

In the recently published work and in collaboration with national and international partners, the processes involved in the development of kidney fibrosis driving chronic kidney disease have now been mapped at high resolution. A groundbreaking discovery was made. "With the help of single-cell RNA sequencing, a powerful technology that allows to map the transcriptome (gene expression) of single cells from any organ, we were able to map all human kidney cells at unprecedented high resolution in homeostasis and chronic kidney disease. This revealed different subpopulations of pericytes and fibroblasts as the most important cellular sources of scar producing myofibroblasts", explains Prof. Kramann. The high-resolution cell atlas of the human kidney in homeostasis and chronic kidney disease is the basis for identifying the cell type responsible for scarring and organ failure in the human kidney and also guides the development of novel therapies. "In a so-called proof-of-concept experiment, to prove that the technology can be utilized for target discovery, we were able to show that inhibition of one of the identified targets actually ameliorated fibrosis in cells and human kidney organoids (mini kidneys in the dish)." said the institute director, explaining the results of his study.

Develop targeted treatment strategies

The scientists hope that the new findings will enable them to develop targeted therapeutics for the vast and growing patient population suffering from chronic kidney disease.

You can find the publication here: <https://www.nature.com/articles/s41586-020-2941-1>

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Über die Uniklinik RWTH Aachen (AöR)

Die Uniklinik RWTH Aachen verbindet als Supramaximalversorger patientenorientierte Medizin und Pflege, Lehre sowie Forschung auf internationalem Niveau. Mit 36 Fachkliniken, 28 Instituten und sechs fachübergreifenden Einheiten deckt die Uniklinik das gesamte medizinische Spektrum ab. Hervorragend qualifizierte Teams aus Ärzten, Pflegeern und Wissenschaftlern setzen sich kompetent für die Gesundheit der Patienten ein. Die Bündelung von Krankenversorgung, Forschung und Lehre in einem Zentralgebäude bietet beste Voraussetzungen für einen intensiven interdisziplinären Austausch und eine enge klinische und wissenschaftliche Vernetzung. Rund 8.000 Mitarbeiterinnen und Mitarbeiter sorgen für patientenorientierte Medizin und eine Pflege nach anerkannten Qualitätsstandards. Die Uniklinik versorgt mit 1.400 Betten rund 50.000 stationäre und 200.000 ambulante Fälle im Jahr.