

TECHNIQUES TO MEASURE NEPHRON NUMBER IN THE KIDNEY IN VIVO

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Value Proposition: Method that uses non-contrast MRI to measure nephron number for individualized assessment of kidney functional capacity.

Technology Description

Researchers at Washington University in St. Louis have developed a method of using non-contrast MRI to detect functional nephron number in the kidneys. Total nephron number is established at birth. A low nephron number is considered a significant risk for the susceptibility of chronic kidney disease (CKD), hypertension, and susceptibility to CKD after acute kidney injury. current clinical markers of kidney health (serum creatinine and estimated glomerular filtration rate (eGFR)) are insensitive to early progression of kidney disease, cannot determine functional nephron number primarily due to compensatory mechanisms that maintain GFR, and are not able to noninvasively measure functional nephron number in individuals.

This method is the first non-contrast, in vivo measurement of nephron number using MRI that could be used for individualized assessment of kidney functional capacity that is not reflected in current clinical metrics and could guide interventions, facilitate transplant allocation, and stratify patients for clinical trials in new therapies.

Stage of Research

Proof of concept. Demonstrated that nephron autoregulation can be detected in animal kidney, has not been clinically validated as a diagnostic.

Publications

Bennett KM, Baldelomar EJ, Morozov D, Chevalier RL, Charlton JR. New imaging tools to measure nephron number in vivo: opportunities for developmental nephrology. J Dev Orig Health Dis. 2021 Apr;12(2):179-183. doi: 10.1017/S204017442000001X. Epub 2020 Jan 27. PMID: 31983353; PMCID: PMC8765346.

Applications

- Detection of functional nephron number
- Chronic kidney disease prevention

Key Advantages

- Non-invasive assay that determines functional nephron number
- Has higher resolution than ultrasound
- No markers needed

Patents

Patent pending

Related Web Links – [Kevin Bennett Profile](#); [Bennett Lab](#)