Supplemental Methods:

The following measurements were obtained from the sectioned renal biopsy scanned images and used for stereological analyses:

1. The area of cortex (periodic acid-Schiff (PAS) stained section and Masson trichrome stained section)
2. The number and total area of complete non-sclerotic glomerular (NSG) tufts (PAS section)
3. The number and total area of partial NSG tufts (PAS section). These are tufts on the section edge that have been bisected by the biopsy needle.
4. The number and total area of globally sclerotic glomeruli (GSG) (PAS and Trichrome sections).
5. Area of non-tubular regions within 5 consecutive circles (totalling 1 mm^2) along the PAS section of cortex.
6. The number of complete tubular profiles within these 5 circles.
7. The number of partial tubular profiles within these 5 circles.

For morphometric analyses, we counted partial NSG tufts as 0.5 complete tufts (the average area of partial NSG tufts was approximately half the average area of complete NSG tufts). The profile NSG area density was calculated: $\frac{\text{Total number of NSG}}{\text{Area Cortex}}$.

To improve detection of the less common and smaller GSG, both the PAS and trichrome stained sections were used to calculate the profile GSG area density: $\frac{\text{Total number of GSG on both sections}}{\text{Total area cortex between both sections}}$.
We used Weibel and Gomez stereological models(1) to characterize three-dimensional properties from the two-dimensional biopsy sections:

Glomerular density was calculated separately for NSG and GSG since the size of the glomeruli affects their detection on two-dimensional biopsy sections (GSG are much smaller than the NSG):

$$\text{NSG Density (glomeruli/mm}^3\text{)} = \sqrt[2]{\frac{NSG\ Area\ Density\ (glomeruli/mm^2)^3}{\frac{Total\ area\ of\ NSG(\mu m^2)}{Area\ Cortex\ (\mu m^2)}}} \text{ X } \frac{1}{1.382}$$

$$\text{GSG Density (glomeruli/mm}^3\text{)} = \sqrt[2]{\frac{GSG\ Area\ Density\ (glomeruli/mm^2)^3}{\frac{Total\ area\ of\ GSG(\mu m^2)}{Area\ Cortex\ (\mu m^2)}}} \text{ X } \frac{1}{1.382}$$

The total glomerular density was simply the sum of the GSG density and the NSG density.

The mean NSG volume was calculated:

$$\text{NSG Volume (mm}^3\text{) = } \frac{\text{Mean profile area NSG(um}^2\text{)}^{\frac{3}{2}} \text{ x } 1.38}{1.01} \text{ X } \frac{1}{1000000000}$$

The mean profile tubular area was calculated by the following formula:

$$\text{Mean profile tubular area (um}^2\text{) = } \frac{1000000\ um^2 - area\ of\ nontubular\ structures}{\text{Number of complete tubules} + 0.5 \times \text{Number of partial tubules}}$$

Supplemental References:

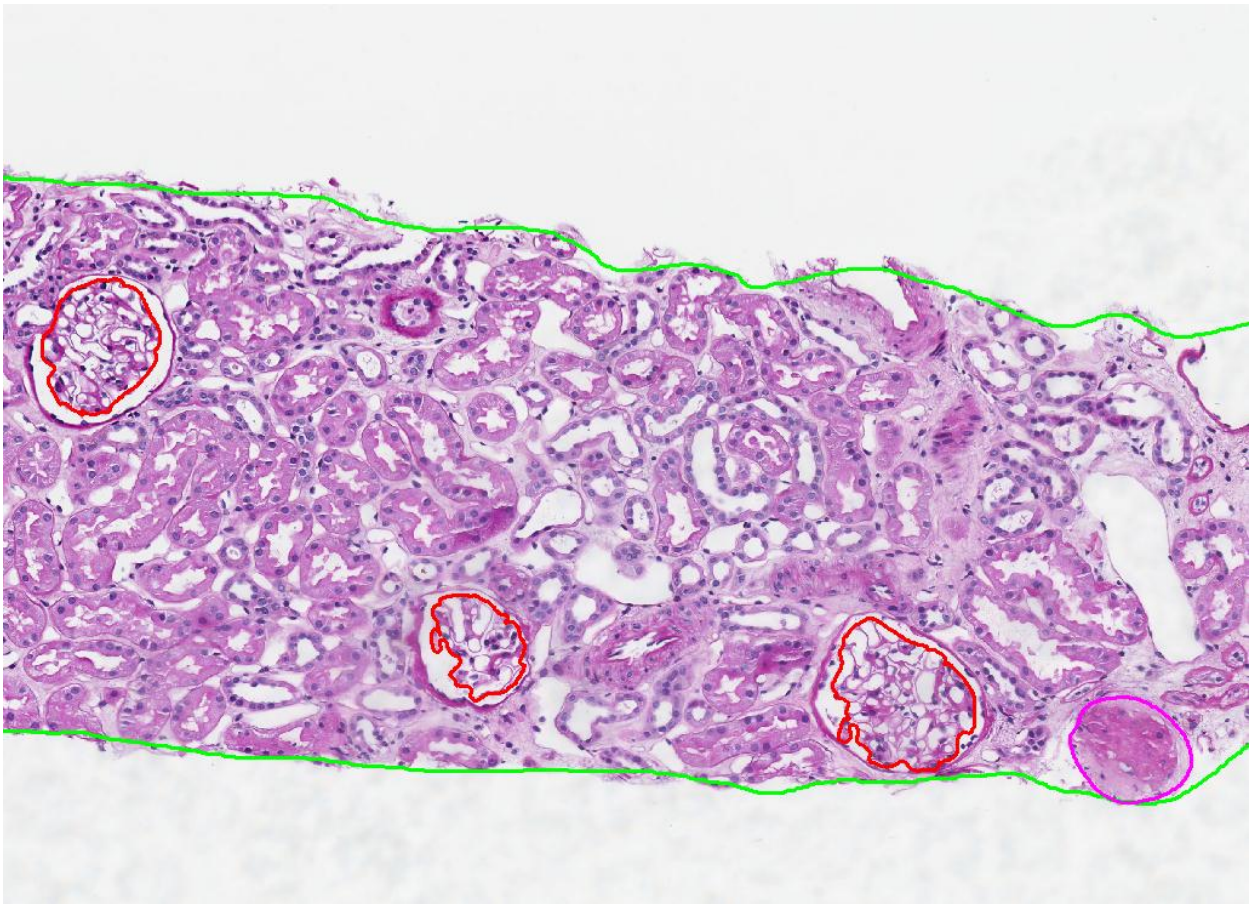
1. Weibel ER, Gomez DM**.** A principle for counting tissue structures on random sections. Journal of applied physiology. 1962;17:343-8.

Supplemental Tables:

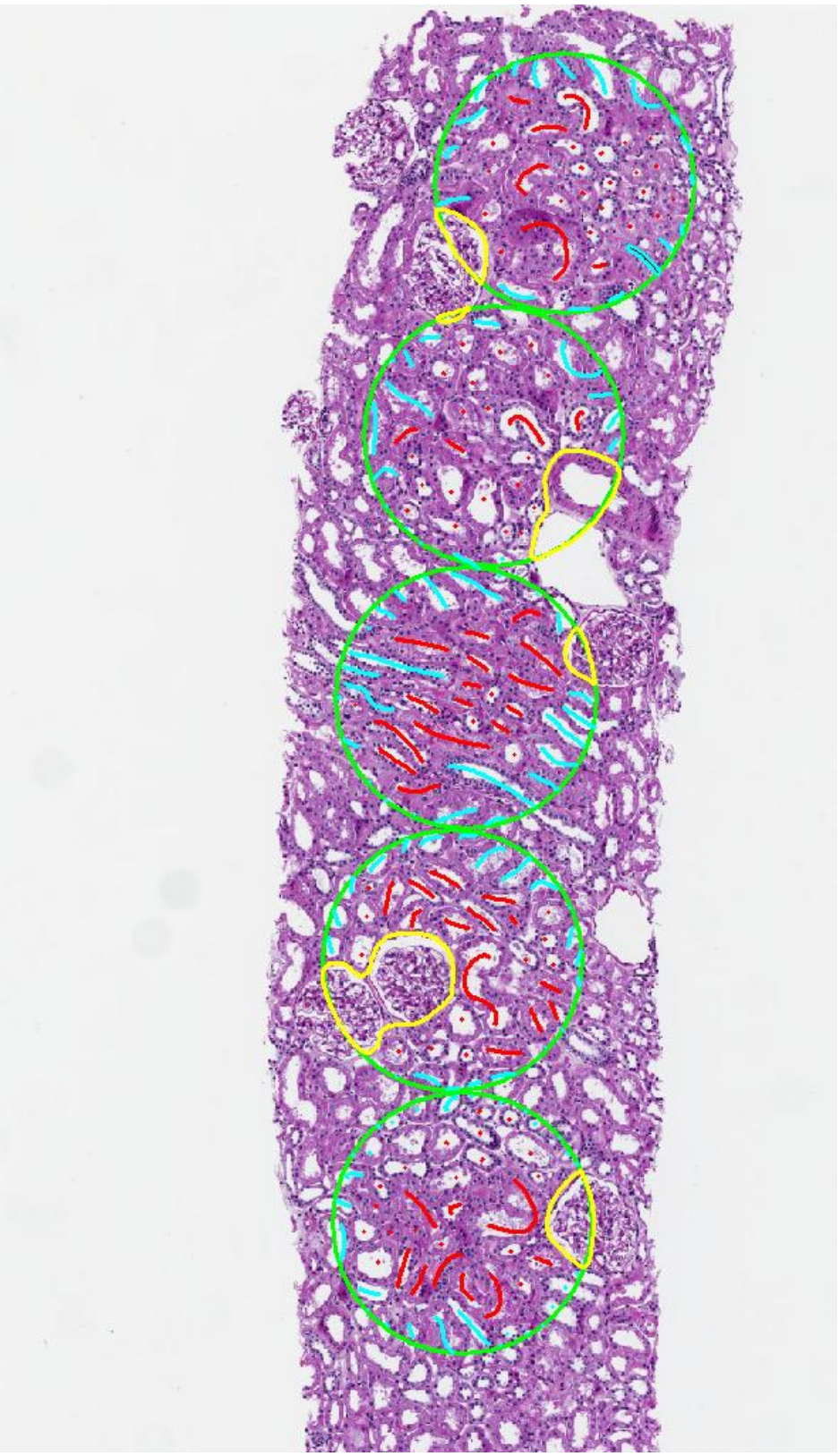
Supplemental Table 1. Intraclass correlation analysis based on 31 donors with two biopsy cores and the remaining 1364 with one biopsy core.

Morphometric characteristic of renal biopsy	**Measurement error or within-individual CV (SD)**	**Between-Individual CV (SD)**	***Intraclass correlation coefficient**
Mean glomerular volume, mm^3	29% (0.00082)	26% (0.00072)	0.44
Mean profile tubular area, um^2	27% (1266)	18% (851)	0.31
Glomerular Density, per mm^3	25% (4.1)	35% (5.5)	0.65
NSG Density, per mm^3	27% (4.0)	34% (5.2)	0.61
GSG Density, per mm^3	193% (1.5)	70% (0.53)	0.12

*Intraclass correlation is the between-individual variance divided by the total variance (within-individual and between-individual)
CV = Coefficient of Variation; SD = Standard Deviation.



Supplemental Figure 1A. Representative renal biopsy section showing the outline of cortex (green), complete non-sclerotic glomeruli (red), and globally sclerotic glomeruli (magenta).



Supplemental Figure 1B. Representative renal biopsy section showing the 5 consecutive 0.2 mm circles (green), each full (red) or partial (cyan) tubule, and the outline of all non-tubular structures within the circles (yellow).