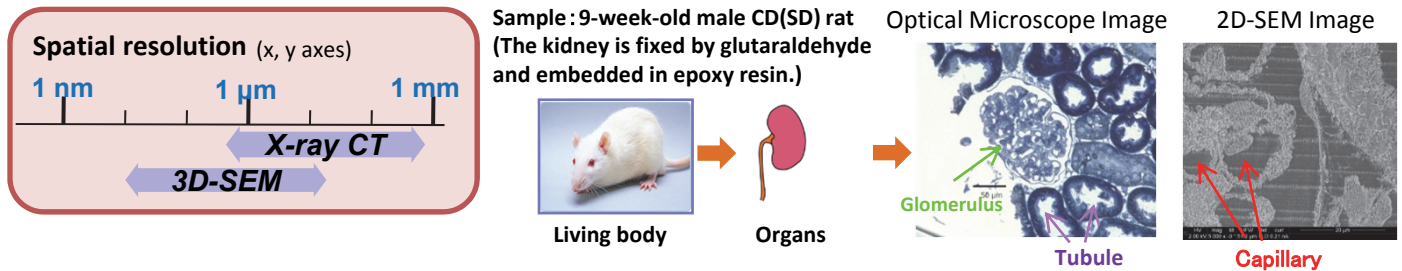


Three-dimensional analysis of rat kidney tissue using X-ray CT and 3D-SEM

The kidney tissue of a rat is three-dimensionally observed by X-ray CT and 3D-SEM. Through imaging of tubules of a kidney and mitochondria in podocytes, we examined these techniques as three-dimensional analysis tools for biological sample.



X-ray CT

Experimental Condition

- Instrument: nano3DX (RIGAKU)
- Tube voltage: 60 kV
- Tube current: 20 mA
- Voxel size: 1.07 μ m/voxel
- Observed area: 0.9 mm ϕ $\times$ 0.7 mm
- Exposure time: 35 sec/image
- Number of projections: 400 proj/180deg

<CT images>
(50 μ m step)

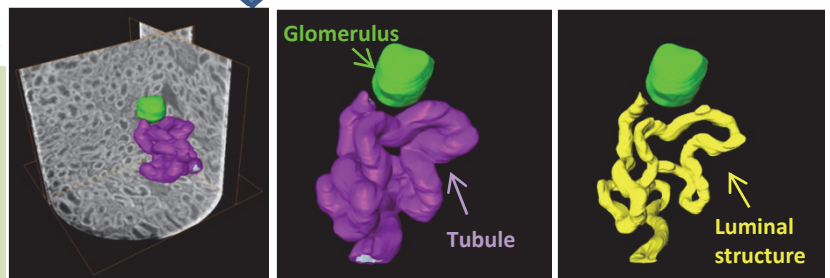
Tubule

Glomerulus

<Coloring a tubule>

Obtaining 3D information of internal structure in mm/sub-mm range

- Effective for targeting in 3D-SEM
- Capable of extracting 3D structure of one tubule

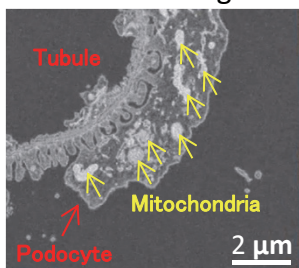


3D-SEM

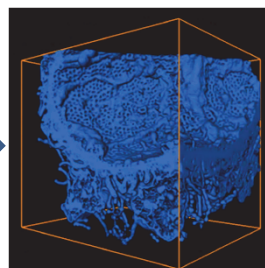
Experimental Condition

- Instrument: Helios G3 (FEI)
- SEM accelerating voltage: 2 kV
- Voxel size: 10 nm/voxel
- Number of images: 790
- Box Size: (X) 10.0 μ m
(Y) 10.0 μ m
(Z) 7.9 μ m

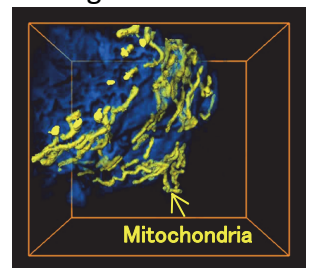
<2D-SEM image>



<3D-reconstructed image>



<Coloring mitochondria>



Podocytes with or without foot process are observed

Mitochondria in podocytes are elongated

- Precise 3D structure can be obtained with 10nm spatial resolution.
- 3D-SEM is an effective technique for 3D analysis of internal structure of cells.

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