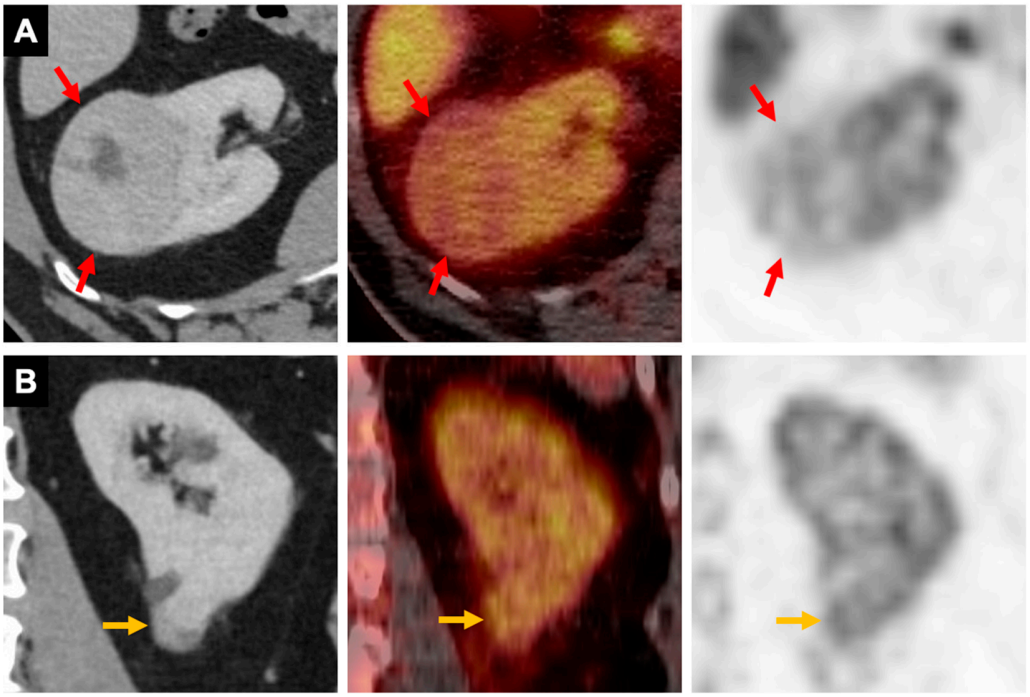
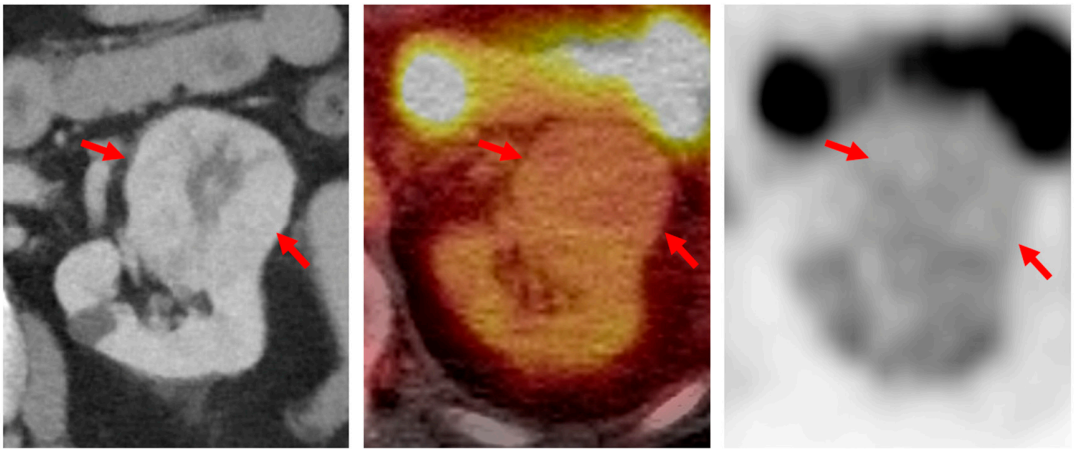
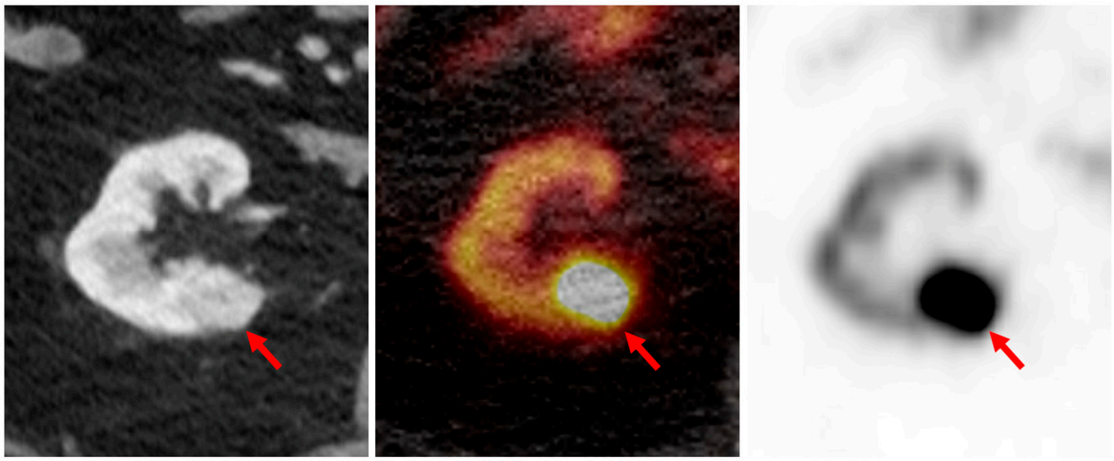


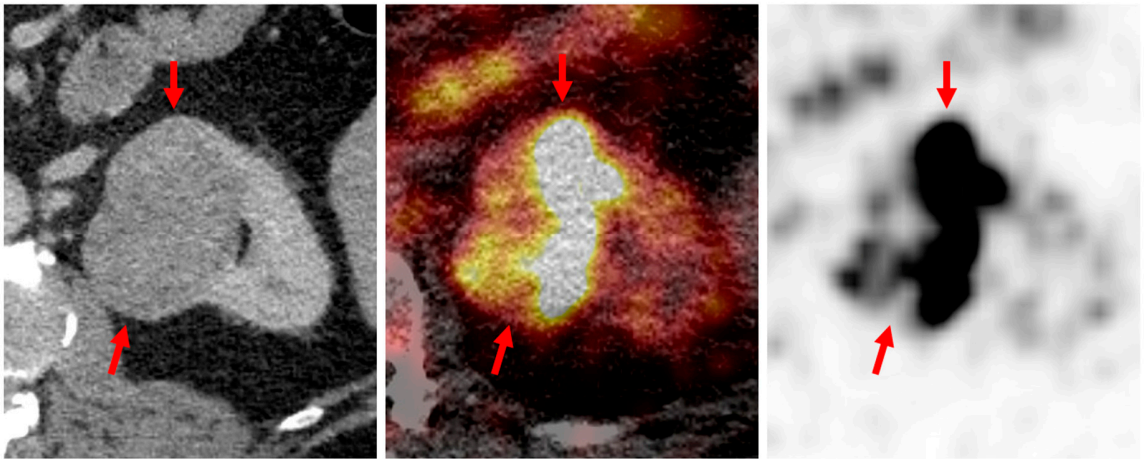

**Supplementary Figure S1.** A 67-year-old man (Patient #5 in Table 1) presented with incidental bilateral renal masses. Portal venous phase CT images (left), fused $^{89}$Zr-girentuximab PET/CT images (middle), and PET images (right) demonstrate a 6-cm right renal mass (red arrows, row **A**) and a 2-cm left renal mass (yellow arrows, row **B**), both showing uptake similar to that of the adjacent normal renal parenchyma. Biopsy of the right renal mass revealed oncocytoma.



**Supplementary Figure S2.** A 76-year-old man (Patient #6 in Table 1) was evaluated for an incidental left renal mass. Axial portal venous phase CT image (left) demonstrates a 5-cm enhancing mass (arrows) in the left upper renal pole. The lesion exhibits uptake similar to that of the adjacent normal renal parenchyma on the fused $^{89}$Zr-girentuximab PET/CT image (middle) and on the PET image alone (right). Subsequent biopsy confirmed the diagnosis of oncocytoma.



**Supplementary Figure S3.** A 63-year-old man (Patient #2 in Table 1) presented with an incidental right renal mass. Axial portal venous phase CT image (left) demonstrates an enhancing solid mass (arrows) in the right interpolar kidney. The lesion shows intense uptake on the fused $^{89}$Zr-girentuximab PET/CT image (middle) and PET image (right). The patient subsequently underwent concurrent biopsy and microwave ablation, with pathology confirming clear cell renal cell carcinoma.



**Supplementary Figure S4.** A 59-year-old man (Patient #4 in Table 1) was evaluated for an incidental left renal mass. Axial portal venous phase CT image (left) demonstrates a 7-cm mass (arrows) in the left upper renal pole. The lesion exhibits heterogeneously intense uptake on the fused $^{89}$Zr-girentuximab PET/CT image (middle) and PET image (right). The patient subsequently underwent left nephrectomy, with pathology confirming clear cell renal cell carcinoma.

**Supplementary Table S1.** PET/CT acquisition protocol

| | | | |
|---|---|---|---|
| **Attenuation correction CT** | | | |
| Field of view (abdominal) | Top of liver through both kidneys | Effective mAs | 30 |
| Field of view (whole body) | Vertex to mid thighs | Extended FOV | 780 mm |
| kV | 120 | Display FOV | 500 mm |
| Slice | 5 mm | Kernel | Br38 |
| Acquisition | 16 × 1.2 mm | Window | Abdomen |
| Rotation time | 0.5 s | Reconstruction type | Axial |
| Pitch | 1.5 | Reconstruction increment | 5.0 mm |
| Direction | Craniocaudal | | |
| **Positron emission tomography** | | | |
| Field of view | To match attenuation CT | Zoom | 1 |
| Time/Bed (abdominal) | 10-20 min/bed | Filter | Gaussian |
| Time/Bed (whole body) | 5 min/bed | FWHM | 6 |
| Image size | 220 mm | Scatter | Relative |
| Reconstruction | Iterative + Time of flight | Match CT slice | Yes |
| Iter/Subset | 4/5 | Volume Scaling | Yes |

Scanner: Biograph Vision 600 PET/CT scanner (Siemens Healthineers, Knoxville, TN, USA).