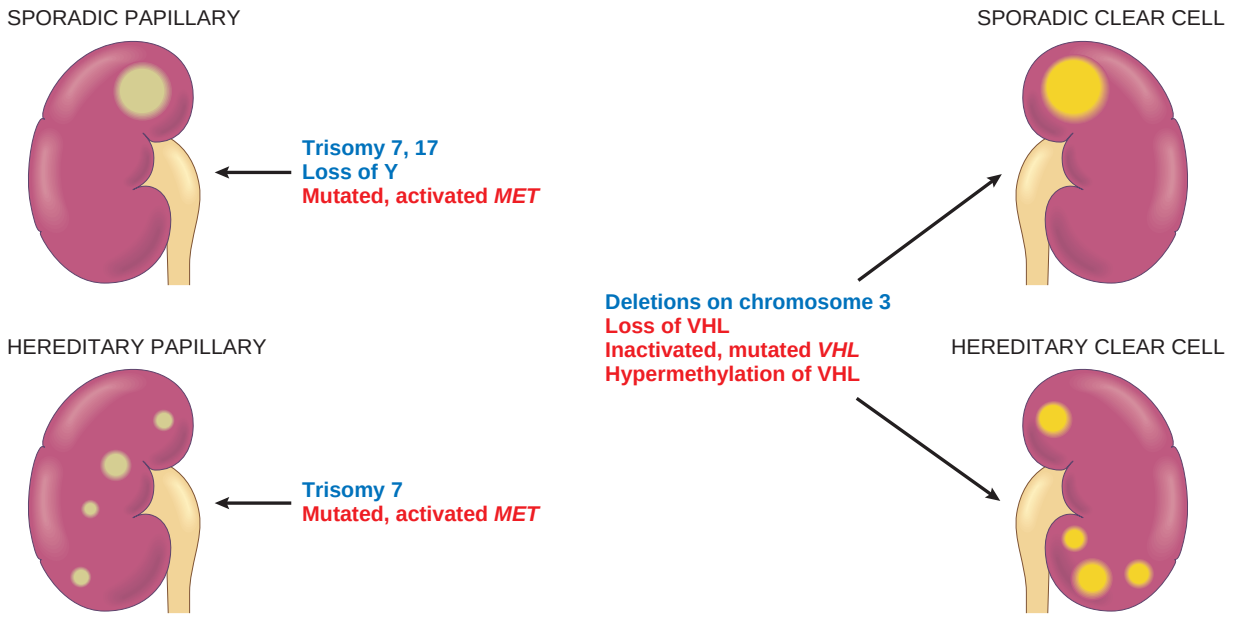

Figure 20-50 Cytogenetics (blue) and genetics (red) of clear cell versus papillary renal cell carcinoma. (Courtesy Dr. Keith Ligon, Brigham and Women's Hospital, Boston, Mass.)

mobility, invasion, and morphogenetic differentiation. Unlike clear cell carcinomas, papillary carcinomas are frequently multifocal in origin.

- *Chromophobe carcinoma* represents 5% of renal cell cancers and is composed of cells with prominent cell membranes and pale eosinophilic cytoplasm, usually with a halo around the nucleus. On cytogenetic examination these tumors show multiple chromosome losses and extreme hypodiploidy. Like the benign oncocytoma, they are thought to grow from intercalated cells of collecting ducts and have an excellent prognosis compared with that of the clear cell and papillary cancers. Histologic distinction from oncocytoma can be difficult.
- *Xp11 translocation carcinoma* is a genetically distinct subtype of renal cell carcinoma. It often occurs in young patients and is defined by translocations of the *TFE3* gene located at Xp11.2 with a number of partner genes, all of which result in overexpression of the TFE3 transcription factor. The neoplastic cells consist of clear cytoplasm with a papillary architecture.
- *Collecting duct (Bellini duct) carcinoma* represents approximately 1% or less of renal epithelial neoplasms. They arise from collecting duct cells in the medulla. Several chromosomal losses and deletions have been described, but a distinct pattern has not been identified. Histologically these tumors are characterized by malignant cells forming glands enmeshed within a prominent fibrotic stroma, typically in a medullary location. *Medullary carcinoma* is a morphologically similar neoplasm that is seen in patients with sickle cell trait.

MORPHOLOGY

Renal cell carcinomas may arise in any portion of the kidney, but more commonly affects the poles. **Clear cell carcinomas** most likely arise from proximal tubular epithelium, and usually occur as solitary unilateral lesions. They are bright yellow-gray-white spherical masses of variable size that distort the renal outline. The yellow color is a consequence of the prominent lipid accumulations in tumor cells. There are commonly large areas of gray-white necrosis and foci of hemorrhagic discoloration. The margins are usually sharply defined and confined within the renal capsule (Fig. 20-51). In clear cell carcinoma the growth pattern varies from solid to trabecular (cordlike) or tubular (resembling tubules). The tumor cells have a rounded or polygonal shape and abundant clear or granular cytoplasm, which contains glycogen and lipids (Fig. 20-52*A*). The tumors have

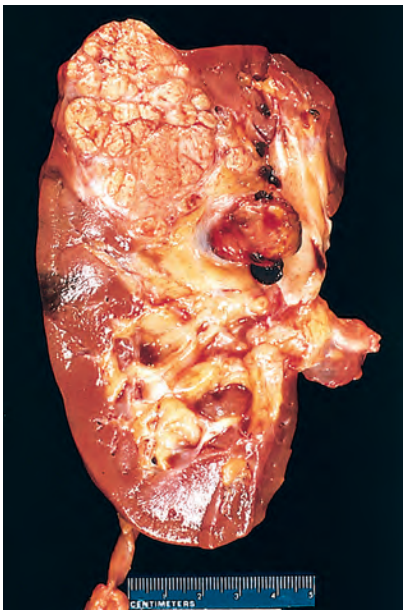

Figure 20-51 Renal cell carcinoma. Typical cross-section of yellowish, spherical neoplasm in one pole of the kidney. Note the tumor in the dilated thrombosed renal vein.