

IHC In metastatic Clear Cell RCC from Sangoi et al, Adv Anat Pathol 17(6) Nov2010, p377-393

TITLE	DIAGNOSIS	USEFUL PANEL VERSUS METASTATIC CC-RC
Summary: CC-RCC Versus Adrenal Tumor	Adrenal cortical lesion	(+): Calretinin*, inhibin*, melanA*, SF-1 (-): EMA, PAX-2, PAX-8, hKIM-1
	Pheochromocytoma	(+): Chromogranin (-): EMA, PAX-2, PAX-8, hKIM-1
*>2+ diagnostic staining intensity/extent thresholds should be maintained. CC-RCC indicates clear cell renal cell carcinoma; EMA, epithelial membrane antigen; hKIM-1, human kidney injury molecule-1; SF-1, steroidogenic factor-1.		
Summary: CC-RCC Versus Breast Tumors	Ductal and lobular carcinoma	(+): Mammaglobin, GCDFP-15, GATA3 (-): hKIM-1, PAX-8 (rare weak staining)
	Myoepithelial lesions	(+): p63, SMA, S-100 protein, calponin, smooth muscle myosin heavy chain
CC-RCC indicates clear cell renal cell carcinoma; GCDFP-15, gross cystic disease fluid protein-15; hKIM-1, human kidney injury molecule-1; SMA, smooth muscle actin.		
Summary: CC-RCC Versus Lung Tumors	Adenocarcinoma with clear cell change	(+): TTF-1, SP-A (limited data) (-): hKIM-1*, PAX-2, PAX-8 (+): p63, CK5/6
	Squamous cell carcinoma carcinoma with clear cell change	(-): hKIM-1, PAX-2, PAX-8
	Acinic cell carcinoma	(+): a-1-antichymotrypsin, amylase (-): hKIM-1, PAX-2, PAX-8 (limited data for all 3 markers)
	Clear cell (sugar) tumor	(+): HMB45, MelanA, SMA (-): hKIM-1, PAX-2, PAX-8 (limited data for all 3 markers)
	Clear cell mesothelioma	(+): Calretinin, CK5/6, WT-1 (-): hKIM-1, PAX-2, PAX-8 (limited data for all 3 markers)
*Rare reported case of positivity in lung adenocarcinoma. CC-RCC indicates clear cell renal cell carcinoma; CK, cytokeratin; hKIM-1, human kidney injury molecule-1; SMA, smooth muscle actin; SP-A, surfactant apoprotein A; TTF-1, thyroid transcription factor-1.		
Summary: CC-RCC Versus Gynecologic Tract Tumors	Ovarian clear cell carcinoma	(+): p53*, CK7*, WT-1 (V): ER (-): CD10, RCCma*
	Uterine clear cell carcinoma	(+): p53*, CK7* (V): ER (-): CD10, RCCma*
*Not entirely specific. CC-RCC indicates clear cell renal cell carcinoma; CK, cytokeratin; ER, estrogen receptor; RCCma, renal cell carcinoma monoclonal antibody; V, variable.		

IHC In metastatic Clear Cell RCC from Sangoi et al, Adv Anat Pathol 17(6) Nov2010, p377-393

TITLE	DIAGNOSIS	USEFUL PANEL VERSUS METASTATIC CC-RC
Summary: CC-RCC Versus Male Genital Tract Tumors	Testis	(+): OCT3/4, SALL4
	Seminoma	(-): hKIM-1, PAX-2, PAX-8*
	Yolk sac tumor	(+): SALL4
		(-): hKIM-1
	Sex-cord stromal tumor with clear cells	(+): SF-1, inhibin
	Clear cell papillary cystadenoma	(-): hKIM-1, PAX-2, PAX-8
		(+): CK7*
	Prostate	(-): CD10
	Prostatic adenocarcinoma	(+): PSA, PSAP, NKX3.1
		(-): hKIM-1, PAX-2, PAX-8
	Clear cell cribriform hyperplasia, adenosis	(+): PSA, PSAP, p63 (basal cells
		(-): hKIM-1, PAX-2, PAX-8
*Not entirely specific. CC-RCC indicates clear cell renal cell carcinoma; CK, cytokeratin; hKIM-1, human kidney injury molecule-1; PSA, prostate-specific acid; PSAP, prostate-specific acid phosphatase; SF-1, steroidogenic factor-1.		
Summary: CC-RCC Versus Urinary Tract Tumors	Urothelial carcinoma with clear cells ("glycogen-rich" variant)	(+): p63, uroplakin, CK20, CK7*
		(-): PAX-2, hKIM-1*
	Clear cell adenocarcinoma	(+): CK7, CA125
	Nephrogenic adenoma	None (reliance on background morphologic patterns of nephrogenic adenoma)
*Not entirely specific. CA-125 indicates cancer antigen-125; CC-RCC, clear cell renal cell carcinoma; CK, cytokeratin; hKIM-1, human kidney injury molecule-1.		
Summary: CC-RCC Versus Mediastinal Tumors	Thymic clear cell carcinoma	(+): CD5; CD1a in thymic lymphocytes, S100 in interdigitating reticulum cells
		(-): hKIM-1
	Lymphoma with clear cells	(+): CD20, CD45, CD43 (CD15/CD30 for Hodgkin lymphoma)
		(-): hKIM-1
CC-RCC indicates clear cell renal cell carcinoma; hKIM-1, human kidney injury molecule-1.		

IHC In metastatic Clear Cell RCC from Sangoi et al, Adv Anat Pathol 17(6) Nov2010, p377-393

TITLE	DIAGNOSIS	USEFUL PANEL VERSUS METASTATIC CC-RC	
Summary: CC-RCC Versus Head and Neck Tumors	Thyroid tumors with clear cells	(+): TTF-1, thyroglobulin (-): hKIM-1, PAX-2	
	Parathyroid tumors with clear cells	(+): PTH, chromogranin (-): hKIM-1	
	Salivary gland		
	Epithelialmyoepithelial carcinoma, myoepithelioma/myoepithelial carcinoma/oncocytoma/oncocytic carcinoma	(+): Calponin and p63 (myoepithelial marker) (-): PAX-2, PAX-8, hKIM-1	
	Acinic cell carcinoma	(+): a-1-antichymotrypsin, amylase, PAS-D (-): PAX-2, PAX-8, hKIM-1	
	(Hyalinizing) clear cell carcinoma	(+): PAS (-): PAX-2 (limited data)	
	Mucoepidermoid carcinoma	(+): Mucin stain; squamous/intermediate cell presence (-): PAX-2, PAX-8, hKIM-1	
	Oropharynx Squamous cell carcinoma	(+): CK5/6, p63 (-): PAX-2, PAX-8, hKIM-1	
	Odontogenic		
	Clear cell odontogenic carcinoma	Very limited data (radiographic correlation is essential)	
	Calcifying clear cell odontogenic carcinoma	(+): CK5/6, p63, Congo red	
	Ameloblastoma	(+): CK5/6, p63	
	CC-RCC indicates clear cell renal cell carcinoma; CK, cytokeratin; hKIM-1, human kidney injury molecule-1; PAS-D, periodic-acid Schiff-diastase; PTH, parathyroid hormone; TTF-1, thyroid transcription factor-1		
	Summary: CC-RCC Versus Gastrointestinal/ Pancreaticobiliary/Hepatic Tumors	Pancreatobiliary tract	
		Clear cell or foamy gland pancreatic adenocarcinoma	(+): CK7, CEA, MUC1, mucin histochemistry (-): RCCma*
		Clear cell welldifferentiated neuroendocrine tumour	(+): Synaptophysin, chromogranin (-): hKIM-1, PAX-2 (limited data)
		Clear cell solidpseudopapillary neoplasm	(+): Nuclear b-catenin
	Gastrointestinal tract		
	Gastric clear cell carcinoma	(+): CK7, CEA (-): hKIM-1, PAX-8, and PAX-2 (limited data for all 3 markers)	
	Clear cell welldifferentiated neuroendocrine tumour	(+): synaptophysin, chromogranin (-): hKIM-1, PAX-2 (limited data)	
	Gastrointestinal stromal tumor, epithelioid type	(+): CD117, DOG-1 (-): CK AE1/AE3 (some positive with CK8 and 18)	
	Liver		
	Clear cell hepatocellular carcinoma	(+): Hepar-1, arginase-1, Glypican-3 (-): EMA*	
	Clear cellcholangiocarcinoma	(+): CK19, CK7* (-): CD10, PAX-8	
*Not entirely specific. CC-RCC indicates clear cell renal cell carcinoma; CEA, carcinoembryonic antigen; CK, cytokeratin; EMA, epithelial membrane antigen; hKIM-1, human kidney injury molecule-1; RCCma, renal cell carcinoma monoclonal antibody.			

IHC In metastatic Clear Cell RCC from Sangoi et al, Adv Anat Pathol 17(6) Nov2010, p377-393

TITLE	DIAGNOSIS	USEFUL PANEL VERSUS METASTATIC CC-RC
Summary: CC-RCC Versus Cutaneous Tumors	Adnexal tumor	(+): p63 and podoplanin (D2-40) (-): PAX-8
	Balloon cell nevi and melanoma	(+): S-100 protein, HMB-45, MelanA (-): PAX-2, PAX-8, hKIM-1 (limited data for all 3 markers)
CC-RCC indicates clear cell renal cell carcinoma; hKIM-1, human kidney injury molecule-1.		
Summary: CC-RCC Versus Bone Tumors	Chordoma	(+): Brachyury (-): PAX-2, CD10
CC-RCC indicates clear cell renal cell carcinoma		
Summary: CC-RCC Versus Soft Tissue Tumors	Paraganglioma	(+): Synaptophysin, chromogranin, S-100, MAP-2 (-): Cytokeratin, PAX-2, PAX-8 (limited data)
	Clear cell sarcoma of soft parts	(+): S-100, HMB-45, MelanA, EWS by FISH (-): Cytokeratin, PAX-2, hKIM-1
	Alveolar soft part sarcoma	(+): TFE3, PAS-D, TFE3 by FISH (-): Cytokeratin
	Ewing/PNET	CD99, EWS by FISH
	Rhabdomyosarcoma	(+): Desmin, myogenin, MyoD1
CC-RCC indicates clear cell renal cell carcinoma; FISH, fluorescence insitu hybridization; hKIM-1, human kidney injury molecule-1; MAP-2, microtubule-associated protein-2; PAS-D, periodic-acid Schiff-diastase; PNET, primitive neuroectodermal tumor.		
Summary: CC-RCC Versus Central Nervous System Tumors	Oligodendroglioma	(+): MAP-2, Olig2, Sox10, 1p/19q deletion, GFAP (variable)* (-): Cytokeratin, EMA
	Hemangioblastoma (stromal cells)	(+): S100, inhibin-a (variable), D2-40 (variable) (-): PAX-2, cytokeratin
	Germinoma	(+): OCT3/4, SALL4 (-): hKIM-1, PAX-2
	Neurocytoma	(+): Neu-N, MAP-2, synaptophysin (-): Cytokeratin
	Clear cell meningioma	(-): RCCma
	Clear cell ependymoma	(+): GFAP, EMA (dot-like) (-): Cytokeratin
*Stains gliofibrillary oligodendrocytes. CC-RCC indicates clear cell renal cell carcinoma; EMA, epithelial membrane antigen; GFAP, glial fibrillary acid protein; hKIM-1, human kidney injury molecule-1; MAP-2, microtubule-associated protein-2; RCCma, renal cell carcinoma monoclonal antibody.		