

Spotlight On:

Rev. 0.2

Carbonic Anhydrase IX (CA IX) (MRQ-54 (also known as M75))

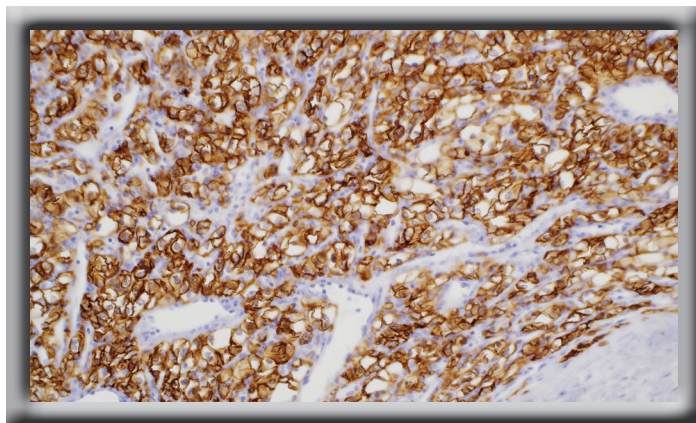
Renal cell carcinoma (RCC) is the 10th most common cancer worldwide. Within the realm of renal neoplasms, there are several subtypes such as clear cell RCC, papillary RCC, chromophobe RCC, and oncocytoma. Clear cell RCC is the most common variant of RCC, making up approximately 80% of RCC cases, followed by papillary RCC (about 11% of RCC cases) and chromophobe RCC (4% of RCC cases). Each subtype has different morphological and immunohistochemical characteristics, and different behavioral patterns. Because of ambiguous morphological and histochemical expressions, clear cell RCC and chromophobe RCC may be difficult to differentiate. Antibodies such as anti-RCCma and anti-PAX8 detect metastatic RCC but do not readily distinguish RCC subtypes from one another. In routine tissue sections, CA IX can be useful in distinguishing clear cell RCC (CA IX +) from chromophobe RCC and oncocytoma (CA IX -) when used in combination with other immunohistochemical markers, such as cytokeratins 7 and 34betaE12. CA IX is typically highly expressed in clear cell RCCs compared with other RCC subtypes, (CA IX expression in papillary RCC is not as diffuse as in clear cell RCC, and chromophobe RCC is typically negative for CA IX.).¹⁻³

Carbonic anhydrase IX is also expressed in urothelial carcinomas, but not in collecting duct carcinomas. Thus CA IX may be utilized in a panel to help distinguish urothelial carcinomas from collecting duct carcinomas.²

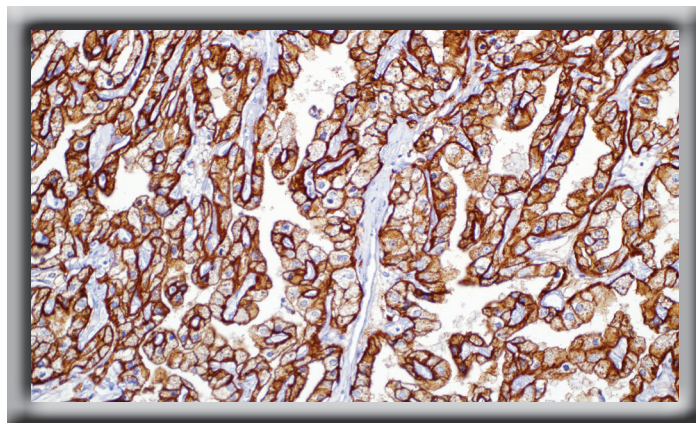
CA IX is not specific for renal malignancies, having also been found in carcinomas of the lung, breast, cervix, uterus, colon, esophagus, ovary, and nasopharynx. Therefore, it is not useful as a solitary marker for determining site of tumor origin.^{1,3}

Features of Carbonic Anhydrase IX (CA IX):

- For *in vitro* diagnostic use.
- Intense membranous staining.
- Positive in 85-100% clear cell renal cell carcinomas.
- Used in a panel with TTF-1 and thyroglobulin to distinguish metastatic clear cell RCC in thyroid glands.
- Used in a panel with PAX-2, Ksp-cadherin, and CD117 to distinguish clear cell RCC from chromophobe RCC.
- May help differentiate urothelial carcinomas from collecting duct carcinomas.



CA IX is strongly and diffusely immunoreactive with clear cell renal cell carcinoma, whereas normal renal tubules (right lower corner) are negative for this antibody.



Papillary renal cell carcinoma cells show strong staining with anti-CA IX.

1. Genega EM, et al. Carbonic anhydrase IX expression in renal neoplasms: correlation with tumor type and grade. *Am J Clin Pathol.* 2010 Dec;134(6):873-9.
2. Gupta R, et al. Diagnostic implications of transcription factor Pax 2 protein and transmembrane enzyme complex carbonic anhydrase IX immunoreactivity in adult renal epithelial neoplasms. *Am J Surg Pathol.* 2009 Feb;33(2):241-7.
3. Al-Ahmadie HA, Alden D, Qin LX, et al. Carbonic anhydrase IX expression in clear cell renal cell carcinoma: an immunohistochemical study comparing 2 antibodies. *Am J Surg Pathol.* 2008;32: 377-382.

Ordering Information:

0.1 ml concentrated.....379M-14
0.5 ml concentrated.....379M-15

1 ml concentrated379M-16
1 ml prediluted379M-17

7 ml prediluted379M-18
5 Positive Control Slides.....379S