

## Cell Marque™ Tissue Diagnostics

# A Comparative Study of IDH1 R132H Between Rabbit Monoclonal MRQ-67 and Mouse Monoclonal H09

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## Background

Isocitrate dehydrogenase 1 (IDH1) R132H specific mutation occurs frequently in diffuse and anaplastic gliomas and secondary glioblastomas. Due to its high incidence in specific types of brain tumors, the presence of the IDH1 R132H mutation helps distinguish grade II and III diffusely infiltrating gliomas and secondary glioblastomas from primary glioblastomas.<sup>1</sup> IDH1 status is important to determine as it has recently been incorporated into the 2016 WHO guidelines of glioma classification.<sup>1</sup> IDH1 R132H monoclonal antibodies have been developed to identify the R132H protein that is present in some gliomas. This allows the antibody to identify tumor cells containing the R132H protein that may be present in diffuse astrocytomas.<sup>1-2</sup>

## Design

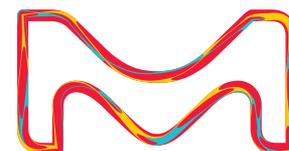
This is a comparative study between IDH1 R132H rabbit monoclonal MRQ-67 from Cell Marque™ Tissue Diagnostics (Rocklin, CA) and mouse monoclonal H09 from Dianova (Hamburg, Germany). Both antibodies were designed to recognize the R132H protein. Formalin-fixed paraffin-embedded tissue sections of oligodendroglioma, astrocytoma, glioblastoma, and normal brain were tested by routine IHC using an autostainer.

## Results

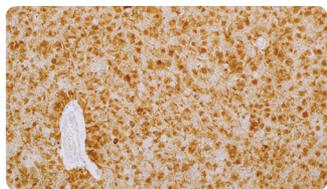
Both the rabbit monoclonal MRQ-67 and the mouse monoclonal H09 labeled IDH1 R132H mutants in multiple types of gliomas including 50% (8/16) of astrocytomas (Fig. 1), 60% (3/5) of oligodendrogliomas (Fig. 2), and 14.3% (1/7) of glioblastomas. Both clones stained IDH1 mutant samples in a diffuse pattern with primarily cytoplasmic signal localization. The MRQ-67 clone demonstrated stronger staining in astrocytoma cases compared to the H09 clone. Additionally, both clones were able to identify a foci of positive tumor cells as well as diffuse infiltrative astrocytoma cells in sections of a brain specimen where the majority of neurons and glial cells demonstrated no reactivity (Fig. 3). Four normal brain samples that were tested generated no positive signal when stained with either clone.

Table 1

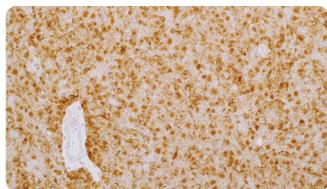
IDH1 R132H IHC Staining Data		
Tissue	Cases Stained (Clone MRQ-67)	Cases Stained (Clone H09)
Astrocytoma	8/16	8/16
Oligodendroglioma	3/5	3/5
Glioblastoma	1/7	1/7
Normal Brain	0/4	0/4



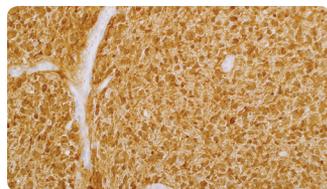
**Figure 1:** Immunostaining comparison of anti-IDH1 R132H clones MRQ-67 and H09 in astrocytoma samples.



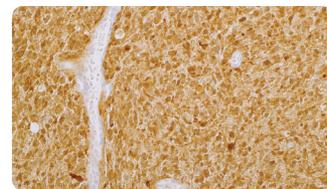
**Figure 1A:** Astrocytoma Case 1 stained with anti-IDH1 R132H (MRQ-67) (200X magnification)



**Figure 1B:** Astrocytoma Case 1 stained with anti-IDH1 R132H (H09) (200X magnification)

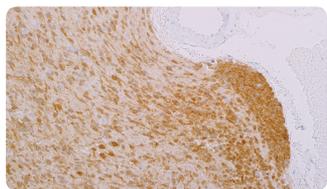


**Figure 1C:** Astrocytoma Case 2 stained with anti-IDH1 R132H (MRQ-67) (200X magnification)

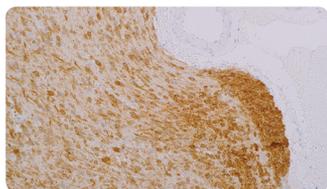


**Figure 1D:** Astrocytoma Case 2 stained with anti-IDH1 R132H (H09) (200X magnification)

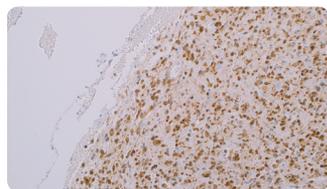
**Figure 2:** Immunostaining comparison of anti-IDH1 R132H clones MRQ-67 and H09 in an oligodendroglioma sample.



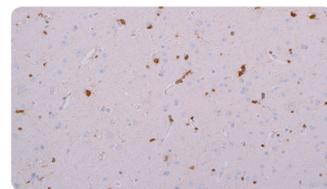
**Figure 2A:** Oligodendroglioma Case 1 stained with anti-IDH1 R132H (MRQ-67) (200X magnification)



**Figure 2B:** Oligodendroglioma Case 1 stained with anti-IDH1 R132H (H09) (200X magnification)



**Figure 3A:** Neoplastic Brain Case 1 stained with anti-IDH1 R132H (MRQ-67) (200X magnification)



**Figure 3B:** Neoplastic Brain Case 1 stained with anti-IDH1 R132H (MRQ-67) (200X magnification)

**Figure 3:** Immunostaining with anti-IDH1 R132H (MRQ-67) showcasing a small foci of tumor cells and diffusely infiltrating astrocytoma cells in an otherwise normal brain sample where the majority of neurons and glial cells are negative.

## Conclusion

The Novel rabbit monoclonal MRQ-67 showed stronger staining in astrocytoma cases and slightly weaker staining in other gliomas. Overall MRQ-67 anti-IDH1 R132H is comparable to the mouse monoclonal H09 in that they were both in agreement in all positive and negative cases tested.

## References:

1. Capper D et al. Characterization of R132H mutation-specific IDH1 antibody binding in brain tumors. *Brain Pathol.* 20 (1): 245-254, 2010.
2. Van den Bent MJ et al. Interlaboratory comparison of IDH mutation detection. *J Neurooncol* 112: 173-178, 2013.

## Intended Use:

IDH1 R132H (MRQ-67) Rabbit Monoclonal Antibody is intended for laboratory use in the detection of the IDH1 R132H mutant protein in formalin-fixed, paraffin-embedded tissue stained in qualitative immunohistochemistry (IHC) testing.

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