MDR glioblastoma cell lines were created in response to prolonged doxorubicin chemotherapy. CD133, DNA dependent protein kinase (DNA-PK) and MDR protein 1 (MDR1) were markedly elevated in these cells.

CD133 and DNA-PK may increase MDR1 via the phosphoinositide 3 kinase (PI3K)-Akt signaling pathway. PI3K downstream targets Akt and nuclear factor NF-κB, which interacts with the MDR1 promoter, were also elevated in these cells. Downregulation of CD133 and DNA-PK by small interfering RNA, or inhibition of PI3K or Akt, decreased Akt, NF-κB and MDR1 expression. The results indicate that CD133 and DNA-PK regulate MDR1 through the PI3K- or Akt-NF-κB signal pathway. Consequently, a novel chemotherapeutic regimen targeting CD133 and DNA-PK in combination with traditional protocols may increase chemotherapeutic efficacy and improve prognosis for individuals who present with glioblastoma [1].

1)
Xi G, Hayes E, Lewis R, Ichi S, Mania-Farnell B, Shim K, Takao T, Allender E, Mayanil CS, Tomita T. CD133 and DNA-PK regulate MDR1 via the PI3K- or Akt-NF-κB pathway in multidrug-resistant glioblastoma cells in vitro. Oncogene. 2015 Mar 30. doi: 10.1038/onc.2015.78. [Epub ahead of print] PubMed PMID: 25823028.