CD133: holy of grail of neuro-oncology or promiscuous red-herring?

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Abstract

The CD133 glycoprotein is a controversial cancer stem cell marker in the field of neuro-oncology, based largely on the now considerable experimental evidence for the existence of both CD133+ve and CD133-ve populations as tumour-initiating cells. It is thought that decreasing oxygen tension enhances the complex regulation and phenotype of CD133 in glioma. In light of these ideologies, establishing the precise functional role of CD133 is becoming increasingly critical. In this article, we review the complex regulation of CD133 and its extracellular epitope AC133, and associated alterations, to tumour cell behaviour by hypoxia. Furthermore, its role in functional modulation of tumours, rather than determination of a specific stem cell type is therefore alluded to, while evidence for and against its ability as a cancer stem cell marker in primary brain tumours, is critically evaluated. Thus, the suggestion that CD133 may be a central 'holy grail' in identifying core cells for propagation of malignant glial neoplasms seems increasingly less convincing. It remains to be seen, however, whether CD133 is randomly expressed on such brain tumour cell populations or whether it is of major significance to brain biological behaviour.

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PMID: 23106300 [PubMed - in process]