Blocking blood vessel formation prevents brain tumor recurrence in mice

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Patients with glioblastoma multiforme (GBM), an extremely aggressive brain tumor, have a very poor prognosis. Despite high dose radiotherapy, 75% of patients die within two years, usually as a result of tumor recurrence within the irradiation field. Martin Brown and colleagues, at Stanford University School of Medicine, have now provided insight into the mechanism of such recurrence by studying a mouse model of GBM in which a human GBM cell line was grafted into the brain of mice, thus highlighting potential new therapeutic approaches to the treatment of GBM.

Formation of new blood vessels is an essential component of tumor recurrence. In the study, the authors found that in their GBM model, irradiation induced recruitment to the tumor site of cells able to facilitate blood vessel formation by a process known as vasculogenesis. Further analysis indicated that these cells were recruited by the soluble molecule SDF-1, which bound to the protein CXCR4 on the surface of the recruited cells. Importantly, disrupting the SDF-1/CXCR4 interaction prevented the recruitment of vasculogenic cells to the tumor site and thereby blocked postirradiation development of functional tumor vasculature, resulting in abrogation of tumor regrowth. The authors suggest that these data might be readily applicable to the clinic because a small molecule inhibitor of SDF-1/CXCR4 interactions is already clinically approved to obtain stem cells for transplantation.

In an accompanying commentary, Jeffrey Greenfield and David Lyden, at Weill Cornell Medical College, New York, discuss the importance of

the study by Brown and colleagues and suggest that treatment for GMB should be tailored to target the specific blood vessel forming pathway operational at a given stage of disease.

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