Mini Review
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A review on genetical and environmental causes of brain tumor

Abstract

Brain tumor is a disorder that affects numerous people worldwide with a wide spectrum of symptoms. According to the provided evidence, some cases are due to inheritance of specific mutations while other cases of the disease seem to be related to environmental factors such as exposure to certain chemicals that are inevitable in specific jobs.

Keywords: brain tumor, cns, mri, cad, glioma, tumor suppressor genes

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Introduction

Bain and spinal cord together make up what is known as the Central Nervous System (CNS). Brain tumor is the result of abnormal cell growth. The location of brain tumors determines how the tumor influences body functions. It also indicates what symptoms will follow the tumor. For detecting and tracking the expansion of tumor, Magnetic Resonance Imager (MRI) is used. Computer-aided diagnosis (CAD) has been developed to increase the ability to diagnose primary indications of the disease such as small masses and minor calcifications.[1] Worldwide incidence of deaths due to malignant brain tumor is approximately 2.8 per 100,000 for men and 2.0 per 100,000 for women.[2] Common symptoms of patients with brain tumor include feeling dizzy, diplopia, blur vision or in some cases loss of vision, vomiting, nausea, bilateral papilledema, hemorrhage in the eyes which are all implications of intracranial pressure.[3] Researchers are not certain about the origin of Cancer Stem Cells; they might arise from normal stem cells or from differentiated cells. However, there is proof that CSCs become more like stem cells or progenitor cells of the tissue where they arise from. For instance, brain CSCs express markers such as CD133 and Nestin that are normally expressed in neural progenitor and stem cells.[4] Present evidence shows that malignant cancer cells originate from self-renewing, multipotent cells which are named cancer stem cells (CSCs).[5] Researchers have shown that a number of polymorphisms are associated with glioma. A glioma is a kind of tumor that originates from glial cells of the brain or the spine. Gliomas account for about 30 per cent of all brain tumors and about 80 percent of all the malignant brain tumors. Investigators have evaluated the association of some polymorphism with gliomas. According to their findings most of the cancer-related genes are involved in DNA repair, carcinogen metabolism and immune function. However the majority of these cancer-related polymorphisms are found in DNA repair genes which are due to their key role in maintaining genomic stability and integrity.

For example, gliomas have proven to be associated with specific variants of excision repair cross-complementing 1 (ERCC1) and excision repair cross-complementing 2 (ERCC2), glioma tumor suppressor candidate of unknown function (GLTSCR1), methylguanine-DNA methyltransferase (MGMT), PRKDC gene which is also named x-ray repair cross-complementing group 7 (XRCC7) and the chromatin assembly factor 1, subunit A gene (CHAF1A).[6–8] According to some research, there is a significant association between certain jobs and the occurrence of brain tumor. For instance, an investigation has shown that men who were occupied in electricity- related jobs experienced a remarkably higher proportion of brain tumors.[9]

Conclusion

It can be said that brain tumor is affected by both the genetic and environmental factors. Thus, it can be inherited due to mutated genes or acquired depending on the exposure to carcinogenic factors.

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Conflict of interest

Conflict of interest is not applicable for this study.

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