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Neural stem cells, the subventricular zone and ...

https://link.springer.com/article/10.1007/s11060-016-2123-z

Apr 23, 2016 Abstract. Over the past decade, advances in neuroscience have suggested that neural stem cells resident in specific regions of the adult brain may be involved in development of both primary and recurrent glioblastoma. Neurogenesis and malignant transformation occurs in the subventricular zone adjacent to the lateral ventricles.

Cited by: 23 Author: Andrew W. Smith, Minesh P. Mehta, A. G... Publish Year: 2016

Neural Stem Cells of the Subventricular Zone as the Origin ...

https://www.ncbi.nlm.nih.gov/pmc/articles/PMC31482066

Neural Stem Cells of the Subventricular Zone as the Origin of Glioma Stem Cells. There is still controversy about the cell of origin of GBMs. NSCs are good candidates since they are more susceptible to malignant transformation than differentiated cells in the adult brain (9, 99). This susceptibility is derived of their ability to self-renew, proliferate, and bypass checkpoints and apoptosis by having the

Subventricular zone

The subventricular zone is a region situated on the outside wall of each lateral ventricle of the vertebrate brain. It is present in both the embryonic and adult brain. In embryonic life, the SVZ refers to a secondary proliferative zone containing neural progenitor cells, which divide to produce neurons in the process of neurogenesis. The primary neural stem cells of the brain and spinal cord, termed radial glial cells, instead reside in the ventricular zone.

Wikipedia

Frontiers | Neural Stem Cells of the Subventricular Zone ...
<https://www.frontiersin.org/articles/10.3389/fonc.2019.00779>

Glioblastoma (GBM) is the most malignant primary brain tumor in humans. The World Health Organization classified this tumor as **Grade IV glioblastoma**, and consists of poorly differentiated cells with vascular proliferation and pseudopalisading necrosis. **Glioblastomas** are characterized by rapid cell infiltration and invasion, frequent relapses a...

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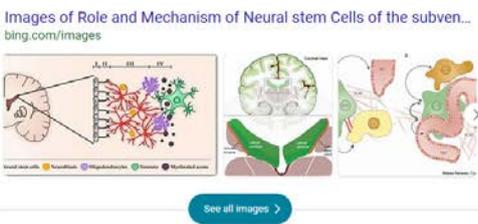
The vast majority of GBMs (80% of cases) are considered primary GBMs; they develop rapidly de novo in elderly patients without clinical or histological evidence of a less malignant precursor lesion. Secondary GBMs progress from low-grade gliomas such as diffuse astrocytomas or anaplastic astrocytomas and are prevalent in younger patients. Histologically, primary and secondary GBMs are indistinguishable, but they carry specific genetic alterations in cancer-driving genes (61). Typical for primary GBMs are epider...

Cited by: 23 Author: Esperanza R. Matarredona, Angel M. Pastor
 Publish Year: 2019

The Role of SVZ Stem Cells in Glioblastoma
<https://pubmed.ncbi.nlm.nih.gov/30934929>

One potential source for these are neural stem cells (NSCs) located in the subventricular zone, which is one of two niches in the adult nervous system where NSCs with the capacity of self-renewal and proliferation reside. These cells normally give rise to neuronal as well as glial progenitor cells.

Cited by: 22 Author: Christine Altmann, Stefanie Keller, Mirko H...
 Publish Year: 2019



Cancers | Free Full-Text | The Role of SVZ Stem Cells in ...
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Neural stem cells (NSCs), a subpopulation of astroglial cells, are self-renewing cells with the capacity to differentiate into multiple neural cell types like neurons and glial cells (astrocytes and oligodendrocytes) (reviewed in). During development, NSCs are obligatory for the formation of the nervous system.

Cited by: 22 Author: Christine Altmann, Stefanie Keller, Mirko H...
 Publish Year: 2019

Neural stem cells promote glioblastoma formation in nude mice.
<https://www.ncbi.nlm.nih.gov/pubmed/30945128>

Neural stem cells promote glioblastoma formation in nude mice. ... since we have discovered that recurrent glioblastomas were inclined to be derived from subventricular zone (SVZ), where NSCs reside. We want to clarify whether NSCs are involved in glioblastoma relapse. ... These results imply the potential role that NSCs play in speeding up ...

Cited by: 4 Author: J. Wang, J. Liu, H. Meng, Y. Guan, Y. Yin, Z. ...
 Publish Year: 2019

The Subventricular Zone, a Hideout for Adult and Pediatric ...
<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7870981>

Jan 26, 2021 - There is increasing evidence that glioma stem cells (GSCs) contribute to tumor recurrences. In fact, GSCs can migrate out of the tumor mass and reach the subventricular zone (SVZ), a neurogenic niche persisting after birth. Once nested in the SVZ, GSCs can escape a surgical intervention and resist to treatments.

Author: Amaud Lombard, Marina Digregorio, Cl... Publish Year: 2021

The Role of Microglia in Glioblastoma
<https://pubmed.ncbi.nlm.nih.gov/33585220>

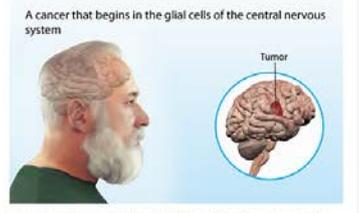
We also show how microglia interact with glioblastoma cells and the epigenetic mechanisms involved. Regarding the interactions between microglia and neurogenic niches, some authors indicate that glioblastoma stem cells (GSC) are similar to neural stem cells (NSC), common stem cells in the subventricular zone (SVZ), suggesting that this could be the origin of GB.

Cited by: 1 Author: Noelia Gerbaldi-Doldán, Cecilia Fernández...
 Publish Year: 2021

Human glioblastoma arises from subventricular zone cells ...
<https://www.nature.com/articles/s41586-018-0389-3>

Aug 01, 2018 - Given that the accumulation of somatic mutations has been implicated in gliomagenesis, studies have suggested that neural stem cells (NSCs), with ...

Glioblastoma
 Medical Condition



A cancerous tumor which develops in the brain. The tumor forms in the star shaped cells of the brain called astrocytes, which supports the nervous system.

- Very rare (Fewer than 20,000 cases per year in US)
- Requires lab test or imaging
- Treatments can help manage condition, no known cure
- Can last several years or be lifelong

The exact cause is not known. It is associated with certain genetic changes, and environmental factors. It is characterized by headache, nausea, dizziness, blurred vision and seizures. Treatment is difficult due to the fact that the tumor cells are very resistant to conventional therapies. Further, many drugs cannot cross blood-brain barrier to act on the tumor.

Symptoms

The symptoms include:

- Persistent headaches
- Nausea
- Vomiting
- Blurred vision
- Changes in cognitive abilities
- Memory loss
- Personality Changes
- Seizures
- Muscle weakness
- Difficulty in speaking

Treatments

Treatment is difficult due to the fact that the tumor cells are very resistant to conventional therapies. Further, many drugs cannot cross blood-brain barrier to act on the tumor.

Medication

- Chemotherapy: To kill cancerous cells. Temozolomide

Medical procedures: Neurosurgery

Therapies: Radiation therapy

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Name of Journal: *World Journal of Stem Cells*

Manuscript NO: 64977

Manuscript Type: REVIEW

Role and mechanism of neural stem cells of the subventricular zone in glioblastoma

Zhang GL *et al.* SVZ NSCs regulate GBM progression

Gui-Long Zhang, Chuan-Fang Wang, Cheng Qian, Yun-Xiang Ji, Ye-Zhong Wang

Abstract

Glioblastoma multiforme (GBM), the most frequently occurring malignant brain tumor in adults, remains mostly untreatable. Because of the heterogeneity of invasive gliomas and drug resistance associated with the tumor microenvironment, the prognosis is poor, and the survival rate of patients is low. Communication between GBMs and non-glioma cells in the tumor microenvironment plays a vital role in tumor growth and recurrence. Emerging data have suggested that neural stem cells (NSCs) in the subventricular zone

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Role and mechanism of neural stem cells of the subventricular zone



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The human adult subventricular zone contains **astrocyte-like neural stem cells (NSCs) that are probably reminiscent of the radial glia present in embryonic brain development**. There are numerous molecules involved in the biology of subventricular zone NSCs that are also instrumental in glioblastoma development.

Author: Esperanza R. Matarredona, Angel M. Pastor

Cited by: 24

Publish Year: 2019

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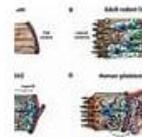
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Author: Esperanza R. Matarredona, Angel M. Pa...