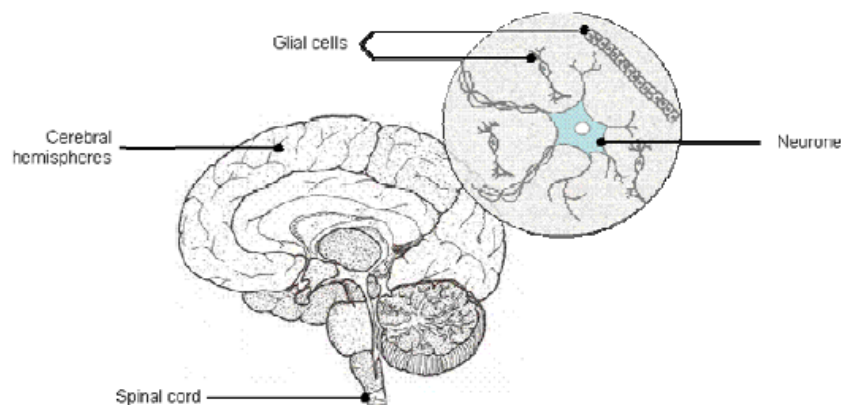


## Glioblastoma (cancer affecting the brain)

### What is brain cancer?

There are two main types of cells in the brain: neurones which transmit information, and glial cells that provide support for neurones (glial means 'glue' in Greek). Primary\* brain tumours, meaning tumours that originate in the brain, can develop from both neurones and glial cells. Glioma (cancer of the glial cells) is the most common type of primary malignant\*\* brain tumour, accounting for approximately one third of all cases diagnosed<sup>1</sup>.



### What is glioblastoma?

Glioblastoma (or glioblastoma multiforme; GBM) is the most common and most aggressive type of glioma<sup>1</sup>. GBM is generally located in the main lobes of the brain (otherwise known as the cerebral hemispheres), but can also be found in other brain regions. Most GBMs are advanced when diagnosed, and they can invade normal brain tissue and spread from the original tumour location, but rarely to areas beyond the brain<sup>2</sup>.

### Incidence:

- About 13,000 people each year are diagnosed with GBM in the Europe<sup>3</sup>.
- In patients with newly diagnosed GBM, current standard treatments provide median overall survival of a

little over one year<sup>4</sup> .

- In patients with relapsed<sup>\*\*\*</sup> or progressive<sup>\*\*\*\*</sup>GBM, the prognosis is particularly poor.
- Almost all patients with GBM die within five years<sup>4</sup> .

### Risk factors

- Age: Although GBM can occur at any age, the average age at diagnosis is 64 years<sup>1</sup> .
- Radiation: There is some evidence that exposure to radiation (e.g. previous radiotherapy to the head) may increase the risk of developing GBM<sup>5</sup> .
- Hereditary factors: Most GBMs occur spontaneously or without identifiable cause, although there is an increased incidence of GBM in families with a very rare hereditary disorder called Li-Fraumeni syndrome, the incidence and prevalence of which is unknown<sup>5,6</sup> .

### Symptoms

Increased pressure in the brain (raised intracranial pressure) is often a symptom of GBM. GBM symptoms may include:

- Headaches, sickness (vomiting) and visual problems.
- Changes in behaviour and personality.
- Fits (seizures).

### Management of glioblastoma

The prognosis for patients with GBM is very poor. The treatment options for GBM depend on many factors including the location and size of the tumour, and the overall health and age of the patient<sup>7</sup> :

- **Surgery:** If the tumour is located in a part of the brain where it can be removed without risking damage to the brain itself or subsequent brain function, then surgery will be typically undertaken to remove as much of the tumour as possible<sup>7</sup> .
- **Radiotherapy:** Usually radiotherapy is given following surgery with the aim of controlling tumour growth. However, not all patients are candidates for radiotherapy.
- **Chemotherapy:** Although chemotherapy has shown limited success in the treatment of GBM, the combination of radiotherapy and chemotherapy is the established standard of care in patients with newly diagnosed GBM. Chemotherapy does not distinguish between normal healthy cells and cancer cells and can therefore cause adverse side effects.
- **Biological therapy:** Avastin (bevacizumab) is an antibody that specifically binds and blocks VEGF (vascular endothelial growth factor). VEGF is the key driver of tumour angiogenesis – an essential

process of development and maintenance of blood vessels which is required for a tumour to grow and to spread to other parts of the body (metastasise). Recent clinical trial data suggest that Avastin may improve clinical outcomes for patients with relapsed or progressive GBM<sup>8,9,10</sup> as GBM has among the highest levels of VEGF of any solid tumour. In addition, adverse events in the BRAIN study were consistent with those previously seen with Avastin and no new safety signals were reported<sup>8,11</sup>.

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\* Primary brain cancer refers to a tumour that originates in the brain.

\*\* Malignant brain cancer refers to a tumour that is characterised by uncontrolled, invasive growth with the potential for metastasis.

\*\*\* Relapsed describes cancer that has come back in a patient who was thought to be cancer free.

\*\*\*\* Progressive refers to cancer that is growing, spreading or worsening despite treatment.

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