

Brain Tumour

What is a brain tumour?

A brain tumour is a mass of unnecessary and abnormal cells growing in the brain. A tumour that starts in the brain is a primary brain tumour, which in turn may be grouped into "benign" and "malignant" tumours.

A benign tumour consists of very slow growing cells, usually has distinct borders, and rarely spreads. Treatment and/or surgery is often effective; however, if a benign tumour is located in a vital area of the brain, it can be considered life threatening (rather than "malignant"). So, unlike most benign tumours, non-invasive tumours of the brain/central nervous system have the potential to be fatal.

A malignant brain tumour is life threatening, invasive and usually rapid growing. This is in contrast to other malignant tumours of the body that are invasive but grow more slowly.

Primary brain tumours rarely spread outside the brain and spinal cord. In order to be labelled a cancer, a tumour must have the ability to metastasize and spread to other organs of the body.

Research at QBI

QBI's Professor Brent Reynolds, together with colleagues in Italy and USA, has identified a protein that dramatically inhibits brain cancer stem cells in laboratory animals.

Professor Reynolds said brain cancer killed more than 1,200 Australians annually and any treatment that inhibited the growth of brain tumours would be likely to lead to a better patient prognosis.

"We have discovered that the naturally occurring molecule, bone morphogenetic protein-4 (BMP4), appears to target

the cells responsible for brain tumour initiation and long-term progression," Professor Reynolds said.

"The morbidity rate for patients with certain types of brain tumours is often tragically high, with a life expectancy of less than a year."

Currently doctors treat brain tumours with a combination of surgery, radiation, chemotherapy or steroid therapy.

Significantly, when the international team studied mice implanted with cells from a human brain tumour, the BMP4 protein was shown to inhibit tumour growth and extend their life.

Alternatively, all animals that received a placebo in place of BMP4 died within three months.

The US scientist who first isolated a tumour stem cell from the human brain, Professor Dennis Steindler, Executive Director of the McKnight Brain Institute at the University of Florida, said the approach of the Reynolds team and their collaborators was both novel and important.

"This will be one of the first studies to apply insights from the molecular biology of cancer stem cells to a potentially new therapeutic approach for treating primary human brain cancers," Professor Steindler said.

Given the strength of these results, Professor Reynolds said he and his colleagues were working to develop the use of BMP4 for future clinical trials.

Updated November 2007



Fast facts

- In Australia each year there are almost 1,400 new cases of malignant brain tumours and hundreds more of benign brain tumours (which can be just as deadly if the tumour is in a vital area).
- More than 1,200 people die each year from brain tumours.
- The number of new cases of malignant brain tumours in Australia has increased by 21% during the last 10 years.
- The numbers of new cases and of deaths per 100,000 population due to brain tumours in Australia are high by world standards, and survival after 5 years is poor – only 1 in 4 cases.
- Brain cancer is also one of the few cancers which occur in children, with 115 new cases a year.

Source: *Brain Tumour Australia*

QBI Communications

Ron Hohenhaus
07-3346 6414
r.hohen@uq.edu.au

QBI Development (Donations)

Jenny Valentine
07-3346 6413
j.valentine1@uq.edu.au

The Queensland Brain Institute
The University of Queensland
St Lucia, Brisbane, AUSTRALIA
www.qbi.uq.edu.au