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Study sheds light on role of stem cells in children's brain tumor

New research from scientists at Queen Mary, University of London shows how the most common type of children's brain cancer can arise from stem cells.

Scientists know relatively little about medulloblastomas or why some cases respond better to treatments than others.

The new research, published today in *Oncogene**, shows that medulloblastomas can grow from a type of brain stem cell and that these cancers are a distinct form of the disease which may require a completely different approach to treatment.

Medulloblastomas account for one in five of all children's brain tumours. They are most common in children between the ages of three and eight but they can also affect young adults.

Silvia Marino, Professor of Neuropathology at Queen Mary, University of London, led the study. She said: "This type of brain tumour can pose a great challenge to doctors. In some children, treatment works well but in others the cancer is aggressive and far harder to treat.

"As scientists we've been trying to understand how these cancers which look the same can behave so differently.

"This study is a major advance for us because it shows for the first time that some of these tumours develop from endogenous stem cells.

"This is important for two reasons. First, it could help us to tell which cancers will respond well to treatment and which will need a more aggressive therapy. Second, this new understanding could help us to find much-needed new drugs for the disease."

Previous research has shown that human brains contain a small number of stem cells – called neural stem cells - which enable the brain to repair itself to some degree. Professor Marino and her team studied equivalent cells taken from mouse brains.

They found that two particular genes called Rb and p53, which are already known to play a role in cancer, could malfunction in these cells and allow the cells to grow uncontrollably. They also found that in mice, these cells turned into medulloblastomas.

The researchers then looked more closely at the genetic makeup of these tumours and found a particular pattern which they compared with tumours taken from patients with medulloblastomas. They found that patients whose tumours also had this genetic pattern were those with the worst survival chances.

The researchers believe that their findings are a crucial first step in understanding the most aggressive form of this disease. They can now begin to look for new ways to tackle the disease in a more effective and possibly less toxic way.

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*Cerebellar stem cells act as medulloblastoma-initiating cells in a mouse model and a neural stem cell signature characterizes a subset of human medulloblastomas, Sutter R, et al, *Oncogene*, 2010, 1-12

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