

Research to lead to brain tumor therapies

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Unique human in vitro model (cell culture) research currently underway at the Peninsula Medical School in the South West of England is set to identify and develop therapies for the treatment of multiple tumours in the brain.

The tumours are caused by mutations affecting a protein called merlin, which in turn cause cancers in a range of cell types including Schwann cells in the brain. Schwann cells produce the sheaths that surround and insulate neurons.

Although the tumours are benign, they are frequent, can be inherited and come in numbers. The sheer number of them can overwhelm a patient, often leading to deafness and eventually death. Patients can suffer from 20 to 30 tumours at any one time, and the condition typically affects older children and adults.

No therapy, other than invasive surgery aiming at a single tumour and which may not eradicate the full extent of the tumours, exists.

The condition of multiple tumours is known as neurofibromatosis type two (NF2) and affects one in every 2,500 people worldwide. It can affect any family, regardless of past history, through gene mutation and currently there is no cure.

Research at the Peninsula Medical School is led by Professor Oliver Hanemann. By working with human cells in vitro, Professor Hanemann and his team are able to find new therapeutic targets for NF2. They have



secured initial success by re-profiling an existing drug, sorafenib, and because they are using the human in cell culture model and re-profile new cancer drugs they do not need to carry out huge toxicity studies – which means they now can go straight to clinical trials and introduce therapies to patients sooner rather than later using sorafenib or similar drugs.

Said Professor Hanemann: "Ours is a unique model and a unique approach to the issue. We are on the verge of working with inpatient clinics to trial our latest breakthrough, and we are investigating other therapeutic targets using other drugs."

He added: "Using human in vitro cell culture, which is the unique aspect of our work, allows us to move seamlessly and relatively quickly from lab-based biochemistry to drug therapies, clinical trials and hopefully successful outcomes."

Maria Toman, chair, the Neurofibromatosis Association, commented: "The Neurofibromatosis Association, as the only charity working in the UK with patients and families affected by neurofibromatosis, welcomes this breakthrough heralding the possibility of new, non invasive treatment for NF2 with the potential to transform management of this debilitating and long term condition, and will be watching progress of the trials with close interest. Our members have benefited hugely from Professor Hanemann's clinical work since his arrival at the Peninsula Medical School and by his establishment of the first specialist neurofibromatosis clinic in the South West of England. We hope that similar approaches in neurofibromatosis type one, one of the commonest genetic diseases, will bring treatment trials in the near future."

CASE STUDY

Tom Wakenshaw, 21, from Gunnislake in Cornwall, first became aware



that there was a problem when he started to suffer from very bad headaches at age 15.

He was a pupil at Tavistock College at the time and in the middle of his GCSEs. He was referred for an MRI which identified a tumour on his brain, and was immediately rushed to Bristol for surgery to remove it.

Said Tom: "I had the operation, and then they told me afterwards that I had neurofibromatosis. When you're young you just take these things on board, which is what I did at the time. But it has had a huge effect on my life since."

Tom lives with his mother Val, and is currently being helped by the local Job Centre to try to find a job that can accommodate the effects of the neurofibromatosis. The condition causes him to get very tired and affects his balance. The operations he has had over the past years to remove more tumours have resulted in numb fingertips and feet.

He said: "I had a job as a window cleaner once, but a had an accident where a nail slipped between my toes. The worrying thing was that, even though it did not go into me, I couldn't feel it passing by my toes."

Tom is currently working with his local Job Centre which his finding him placements – his next is a six week spell working in the kitchen at the Bedford Hotel in Tavistock.

Tom is the youngest of four children, and some of his family live close by. Said Tom: "My Mum, Dad and brother live locally and see what it's like on a day-to-day basis. It's good to have them close by."

Tom attends the clinics run by Professor Oliver Hanemann at Derriford Hospital in Plymouth. "They're really useful, and a good opportunity to talk about how I'm doing," said Tom. "Professor Hanemann gives us



good ideas and suggestions to help cope with the condition, and just talking about it is a great help."

Source: The Peninsula College of Medicine and Dentistry

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