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Brain drugs break treatment barrier



The brain is protected by its blood supply

Researchers have found a way to get drugs to a part of the brain that has proved extremely difficult to target.

The breakthrough raises hopes of improving treatments for tumours and other diseases of the brainstem.

The brainstem is a complicated structure at the base of the brain which controls breathing, digestion, heart rate, blood pressure and arousal.

Tumours that arise in this area are called brainstem gliomas and account for more than 10% of brain tumours in children.

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These findings suggest that we can reach the brainstem to treat diseases
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Dr Russell Lonsler

It has proved very difficult to treat these tumours because the blood vessels which serve the brainstem are coated with a protective lining.

This 'blood-brain barrier' prevents potentially harmful contaminants from damaging delicate brainstem tissues.

However, it has also proved impervious to attempts by medical science to breach its defences with therapeutic drugs.

As a result, more than 90% of children with these tumours die within 18 months of diagnosis.

Potential solution**See also:**

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Now a team from the US National Institute of Neurological Disorders and Stroke (NINDS) has found a potential solution to the problem.

They have used a technique called convection-enhanced delivery (CED) to deliver a molecule similar in size to those used in cancer drugs into the brainstem, and have tracked its progress using sophisticated imaging equipment.

Researcher Dr Russell Lonser said: "These findings suggest that we can reach the brainstem to treat diseases, and we can ensure that treatment is targeted to the critical region by monitoring it in real time."

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The researchers haven't yet proven that it will work and be safe in people
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Dr Elaine Vickers

CED uses small differences in pressure to make molecules infused in a liquid flow through solid tissue.

This enables large molecular weight molecules, such as those used in drugs, to penetrate the brainstem.

Initial tests were carried out on rats, and were followed up with similar experiments on monkeys.

They showed that the molecule spread throughout the brainstem in amounts similar to those that would be needed to treat disease.

The researchers hope that if the technique is proven to be safe and effective it might eventually be used not only to treat brainstem tumours, but other neurological diseases, such as Parkinson's and epilepsy.

Dr Losner said: "Once we show that these drugs can safely be given to animals in this manner and that they're effective, we can move on to human trials.

"Right now, this method looks promising as a potential method for treating paediatric brainstem gliomas."

Dr Elaine Vickers, of Cancer Research UK, told BBC News Online: "One the reasons brain cancers can be so difficult to treat is that the blood brain barrier often prevents standard forms of chemotherapy from reaching the tumour.

"Any technique that can allow a treatment to

penetrate the barrier, and reach the tumour, would potentially be very useful.

"But it should be stressed that this research is still preliminary.

"The researchers have so far only used tracer molecules to test out the technique, and haven't yet proven that it will work and be safe in people."

The research is published in the Journal of Neurosurgery.

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