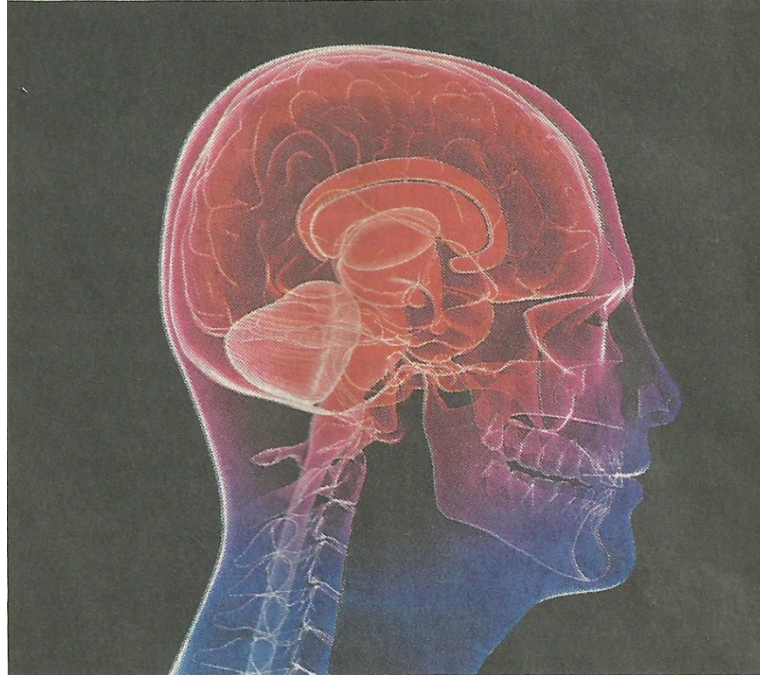


A Vaccine to Prevent Brain Cancer



Scientists are working to develop a vaccine against the deadly brain cancer and clinical trials for it are likely to begin early next year.

Researchers have identified a gene mutation that results in glioma or brain cancer. A vaccine is now being developed to target this mutation.

"This frequent and highly specific mutation immediately aroused our attention as immunologists. In the cancer cells, the exchange of amino acids lends the protein novel properties that can be recognized by the body's own immune cells," said Michael Platten of German Cancer Research Centre (DKFZ), Heidelberg, Germany.

An identical "typo" in the DNA causes the exchange of a single, specific protein building block (amino acid) in an enzyme called isocitrate dehydrogenase 1 (IDH1).

As a result, most cancer cells do not follow the original building plan for the protein. At the 132nd position in the molecule's sequence, they insert the amino acid histidine instead of arginine.

"This suggested that we might be able to use a vaccine to alert the patient's immune system to mutant IDH1, fighting the tumour without damaging healthy cells," Platten explained.

The researchers constructed an artificial version of the segment of IDH1 with the characteristic mutation using individual amino acids.

This version of the peptide, which consisted of 15 building blocks, exactly matched one of the presentation molecules on the surface of the tumour cells.

"After vaccinating the animals with the peptide, we were able to detect immune cells and antibodies that specifically recognized the altered IDH1 of tumour cells rather than the normal form of the enzyme in healthy cells," said Theresa Schumacher, first author of the study.

In animal tests, this specific immune response induced by the vaccination arrested the growth of cancer cells that exhibited the characteristic IDH1 mutation.

As hoped, the vaccination did not disrupt the functioning of the normal IDH1 enzyme, which plays a role in the energy metabolism of all healthy cells in the body.

"This is a good sign. It suggests that vaccinations based on the peptide can in fact support the body's own immune system in fighting cancer cells," Platten said.