Study: Niacin may help immune system battle a deadly brain tumor

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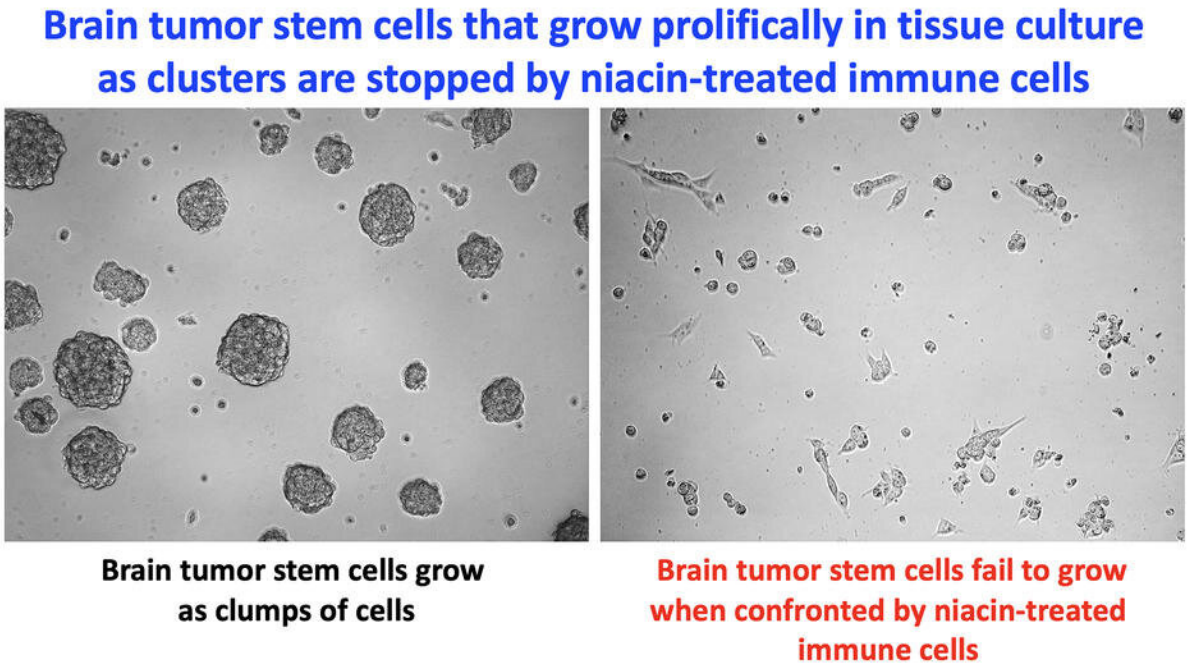


Slide showing brain tumour stem cells fail to grow when confronted with niacin-treated immune cells. Credit: Wee Yong

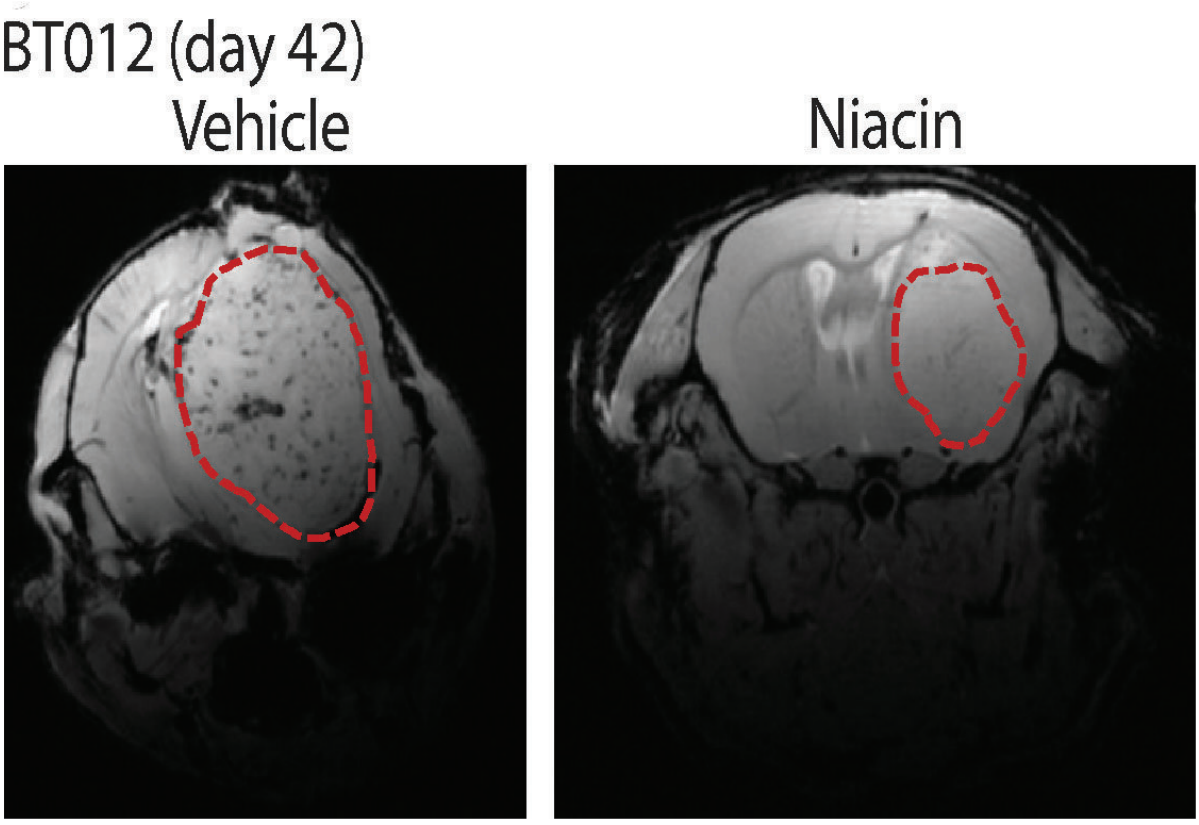
A new study by members of the Cumming School of Medicine (CSM) at the University of Calgary finds niacin, commonly called vitamin B3, combined with chemotherapy can help immune cells attack glioblastoma (a type of brain tumor), dramatically slowing progression of the disease, in mice. The results published in *Science Translational Medicine* found

the lifespan of mice with glioblastoma that received combination therapy tripled, increasing to 150 days from 40 days.

"It is a remarkable result. While it's not a cure, it's a promising step forward against this incurable disease," says Dr. Wee Yong, Ph.D., the principal investigator on the study and a professor in the departments of Clinical Neurosciences and Oncology at the CSM and member of the Hotchkiss Brain Institute and Arnie Charbonneau Cancer Institute. "The brain tumor stem cells for glioblastoma have been very resistant to treatment, so instead of targeting those cells we targeted the immune system to help the body to attack and destroy the stem cells."

Glioblastoma is the most aggressive form of brain cancer. Even with treatment, chemotherapy and radiation, most people die within 14 to 16 months of being diagnosed. One of the reasons this cancer is so deadly is because it hijacks the immune system, suppressing it and reprogramming immune cells to work for the tumor.

In the study, the researchers found that niacin therapy alone extended survival and that the combination therapy with temozolomide (a chemotherapy drug commonly used against glioblastoma) markedly prolonged survival by stimulating and re-educating immune cells to stop helping the cancer and instead, destroy it.



Niacin reduced the growth of patient-derived glioblastomas (red outline) in mice. Credit: S. Sarkar et al., Science Translational Medicine (2020)

"We were able to help immune cells do what they're supposed to do, attack and kill cancer cells," says Dr. Susobhan Sarkar, Ph.D., first author on the study. "We screened 1,040 compounds and found niacin had the properties needed to activate immune cells, specifically myeloid cells, and inhibit the growth of brain tumor initiating stem cells."

The study is supported by Alberta Innovates in collaboration with the Alberta Cancer Foundation and the HBI through a translational research grant donated by the Ronald and Irene Ward Foundation and the Canadian Institutes of Health Research (CIHR). The CIHR has already

provided funding to move this research forward to a clinical trial.

"We are very fortunate to have the support of the CIHR," says Yong. "We still require approvals from Health Canada and ethics. It's extremely important to follow strict protocols and conduct a clinical trial first, even though this treatment involves two well-known, existing therapies. It's important people don't rush out and try adding niacin on their own, as we need to confirm dosage, delivery and length of time for optimum clinical results."

More information: Susobhan Sarkar et al. Control of brain tumor growth by reactivating myeloid cells with niacin, *Science Translational Medicine* (2020). DOI: 10.1126/scitranslmed.aay9924

Provided by University of Calgary