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Researchers identify novel metabolic programs driving aggressive brain tumors

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Researchers at Moffitt Cancer Center have identified metabolic signatures that may pave the way for personalized therapy in glioma, a type of tumor that starts in the brain.

The study appears online in the October issue of Cancer Research, a publication of the American Association for Cancer Research.

According to the authors, little has been known about the underlying metabolic alterations that may drive the growth of the most aggressive type of glioma, termed glioblastoma.

"For the first time, we have described global metabolomic signatures in glioma," said study corresponding author Prakash Chinnaiyan, M.D., an assistant member in Moffitt's Experimental Therapeutics Program. "This use of metabolomics, which is the global quantitative assessment of metabolites within a biological system, has enabled us to identify some of the central metabolic pathways that allow for these tumors to grow. Our findings provide a unique insight into the underlying biology of glioma and appear to have prognostic significance."

The metabolic studies were carried out at Metabolon Inc. of Durham, N.C., using a nontargeted platform that enabled quantitative analysis of a broad spectrum of molecules.

The established approach for both understanding and treating cancer has largely been genotype based. Unfortunately, clinical gains offered by this

level of understanding have been limited, largely based on the complex nature of signaling pathways associated with tumor growth and the inability to delineate the key functional signaling pathways driving growth in an individual tumor.

Chinnaiyan added that although cancers have access to a variety of such pathways, there are a limited number of metabolic strategies they can employ.

"Simply put, with regards to tumor growth, there are several means to the same end. Rather than studying and targeting the means, tumor metabolism represents the end consequence of these aberrant signaling pathways," Chinnaiyan said.

More study will be required to determine the relative importance of these and other metabolic pathways in subtype designation and their overall influence on malignant glioma metabolism. The research team wrote "understanding the glioma metabolome offers the potential for several levels of clinical application, including the possibilities for prognostication and opportunities for personalizing treatment to an individual tumor's metabolic phenotype."

Provided by H. Lee Moffitt Cancer Center & Research Institute