Medical Xpress

Stress pushes brain cancer cells to adapt, shows study

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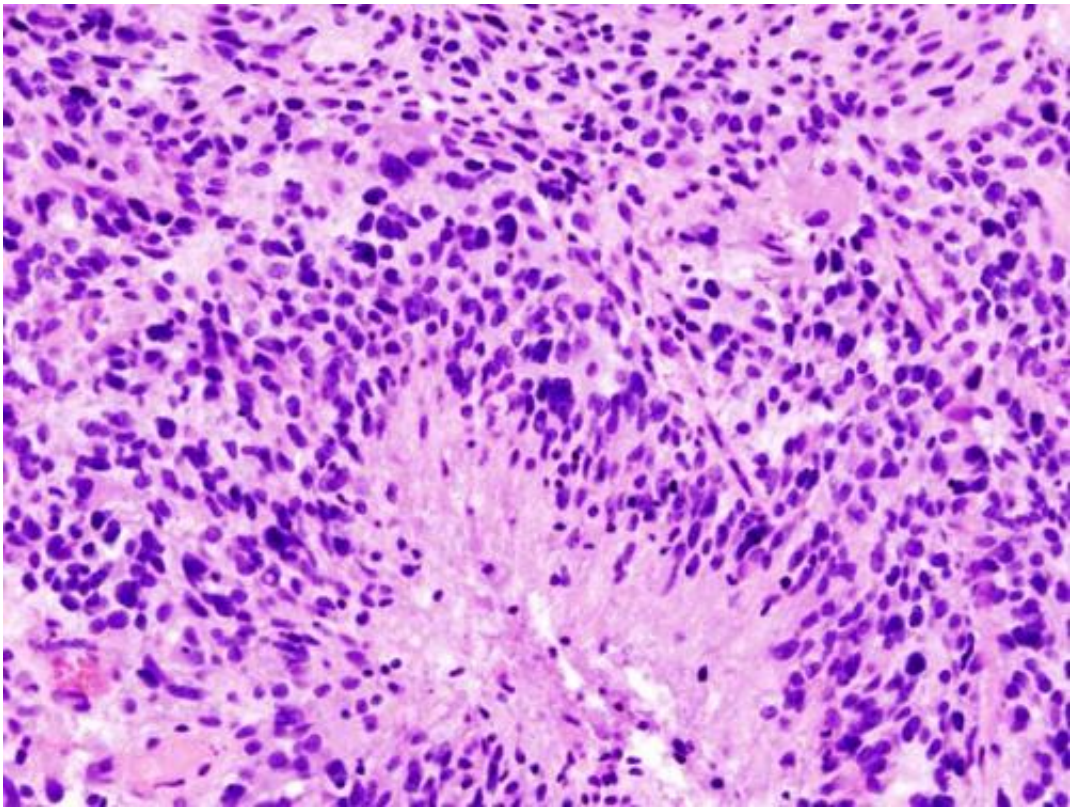

Glioblastoma (histology slide). Credit: Wikipedia/CC BY-SA 3.0

Glioblastoma multiformes is a potentially devastating brain tumor. Now, a collaboration between UConn Health and The Jackson Laboratory (JAX) is discovering what makes them so adaptable and dangerous and sometimes able to evade treatments.

Gliomas are insidious tumors that originate from the glia, the supportive tissue in the brain. They grow through the brain and sometimes the spinal cord, intertwining with and sticking to normal brain and nerve cells in a way that makes them difficult to cut out. The name glioma means "glue tumor" in Latin. About three people of every 100,000 in the US will get it according to the National Cancer Institute, most commonly after age 60.

Glioblastoma treatment usually includes surgery, radiation and then chemotherapy. Unfortunately, these tumors are difficult to treat with medication, inevitably adapting to evade the anti-cancer drugs that at first seemed to shrink the cancer. New evidence reported by JAX researchers in collaboration with UConn Health Neurosurgery in the September 30 issue of *Nature Genetics* shows that tumor cells can change which genes they express, and when, in response to environmental stress—such as when they're being attacked with chemotherapy drugs. These are called epigenetic changes because the cancer cells don't change the genes themselves. Instead, they seem to be chemically modifying their genes on the fly, covering them or uncovering them as necessary to survive.

UConn Health Chief of Neurosurgery Ketan Bulsara coordinates UConn Health's collaboration on this project, identifying appropriate patient samples to contribute with Dr. Qian Wu from neuropathology and Dr. Kevin Becker, Director of Medical Neuro-Oncology. "This paper highlights a mechanism by which the tumor potentially adapts to our treatment methods. By understanding these evasion methods the tumor utilizes, we can more effectively neutralize them. This transformative work has truly given us great insights into glioblastoma multiformes. The work led by Dr. Verhaak at The Jackson Laboratory, who is one of the most, if not the most, preeminent researcher in brain tumor research, will continue to pave new insights for us into this devastating tumor and ultimately help improve patient care," Bulsara says.

More information: Kevin C. Johnson et al, Single-cell multimodal glioma analyses identify epigenetic regulators of cellular plasticity and environmental stress response, *Nature Genetics* (2021). DOI: 10.1038/s41588-021-00926-8