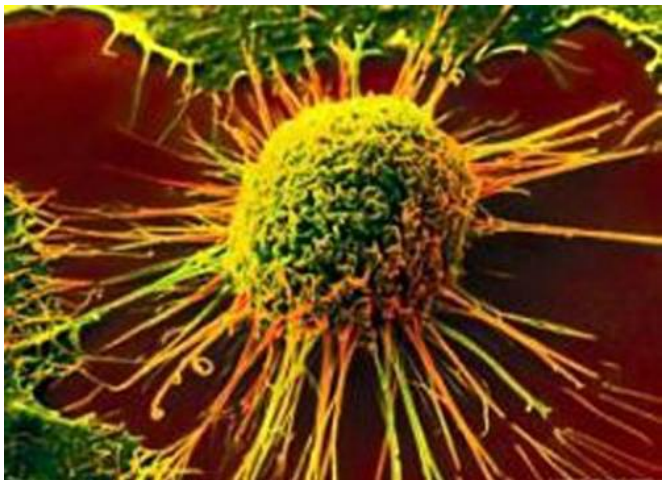
# Study suggests metastasis gets its start much earlier than thought

19 May 2020, by Bob Yirka



A team of researchers from Stanford University in the U.S. and Southern University of Science and Technology in China has found evidence that suggests metastasis of cancerous tumors may get its start much earlier than previously thought. In their paper published in the journal *Nature Genetics*, the group describes their whole-exome sequencing analysis of multiple types of tumors that resulted from metastasis and what they learned about it.

Prior research has shown that metastasis is the primary factor in cancer-related deaths. Metastasis is the spread of cancer cells from an initial site in the body to another. It typically happens when cells from a tumor detach and travel through the bloodstream to another part of the body where they attach and begin multiplying into a new tumor. Unfortunately, despite massive amounts of effort by the medical science community, the natural history of metastasis is still not very well understood—and neither is their clonal evolution. And as the researchers note, scientists still do not even really understand the impact that medical treatment has on metastasized tumors, other than whether they are successful or not. In this new effort, the researchers sought to learn more about the spread of tumors by conducting an analysis of data associated with cancer patients, both those whose cancer had metastasized and those whose did not.

The work by the team involved collecting and analyzing whole-exome sequencing data on 457 paired primary and metastasized tumors from 136 patient files, including samples from patients with colorectal, breast or lung cancer. Notably, some of the data included genetic information on tumors that had not yet been exposed to treatment.

In studying the data, the researchers found lower-than-expected numbers of clonal mutations in metastasized tumors, which, they note, suggested that seeding occurred early in the development of the secondary tumors—in some cases, years earlier. They also found that treatment had an impact on clonal evolution—treated metastasized tumors had more private mutations than those that were untreated.

The researchers also used a computational approach to create estimates of the time lag between when metastasis seeding occurred in the patients under study and when a biopsy was first taken. They found it to be an average of two to four years. They suggest that the spread of such cancers can take place soon after transformation occurs in the original tumor and that it can take many years to diagnose.

**More information:** Zheng Hu et al. Multi-cancer analysis of clonality and the timing of systemic spread in paired primary tumors and metastases, *Nature Genetics* (2020). DOI: 10.1038/s41588-020-0628-z

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