

Scientists find cells responsible for bladder cancer's spread

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Johns Hopkins scientists have tracked down a powerful set of cells in bladder tumors that seem to be primarily responsible for the cancer's growth and spread using a technique that takes advantage of similarities between tumor and organ growth. The findings, reported in the July *Stem Cells*, could help scientists develop new ways of finding and attacking similar cells in other types of cancer.

Researchers have long suspected that a subset of cells in cancerous tumors act much like developmentally primitive cells known as [stem cells](#), which spur organ development early in life and remain present in nearly all the body's organs to repair or replace injured and aging tissues. These cancer cells and stem cells share a variety of characteristics including an unlimited [lifespan](#) and a propensity to migrate through tissues.

These same properties are the ones that make cancer particularly dangerous, says David Berman, M.D., Ph.D., associate professor of pathology, oncology, and urology at the Johns Hopkins University School of Medicine. If researchers had a way to identify and specifically target cancer cells with these properties, they could wipe out the population that sustains tumors and makes them grow.

Other researchers have identified proteins on the surfaces of these cancer cells that could work as markers, but because other cells sometimes shared these proteins, this approach can lead to errors, Berman says.

In the new study, led by Berman's postdoctoral research fellow Xiaobing He, Ph.D., the researchers reasoned that if these stem-like cancer cells behave like healthy stem cells, they might be physically located in the same compartments in tissue where stem cells normally reside. Using a [surface protein](#) marker previously identified for healthy bladder stem cells, the Hopkins team searched for cells with the same marker in sections from 55 human bladder tumors. They found that cancer cells displaying the marker were localized in an area at the intersection of two layers of cells known as epithelium and stroma, the place where bladder stem cells are typically located.

Using cancer cell lines grown from other [bladder cancer](#) patients, the researchers separated cells displaying the stem cell marker from those without it and injected these two populations into different sets of mice. Mice injected with the cancer cells displaying the marker always grew tumors, but those injected with the other cancer cells rarely did, suggesting that the stem-like cancer cells have an ability to create new tissue much like healthy stem cells do.

When the researchers surveyed both cancer cell populations to see which of their genes were most active, they found that genes with roles that are well-known hallmarks of cancer, such as cell proliferation and metastasis, were significantly more active in the stem-like cells than in the other [cancer cells](#). Genes known to help cancers survive chemotherapy and radiation were also more active in the stem-like cells.

Source: Johns Hopkins Medical Institutions

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