



Discriminating Bladder Cancer Cells through Rheological Mechanomarkers at Cell and Spheroid Levels

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DESCRIPTION

Most bladder cancers are transitional cell carcinomas (cancers that usually begin in the cells that make up the lining of the bladder). Other types include squamous cell carcinoma (cancer that forms in thin, flat cells) and adenocarcinoma (cancer that forms in cells that produce and release mucus and other body fluids). Cells that form squamous cell carcinoma and adenocarcinoma arise in the lining of the bladder as a result of chronic irritation and inflammation. Bladder cancer most commonly arises in the cells lining the bladder (urothelial cells). Urothelial carcinoma can also occur in the kidneys and ureters, but is more common in the bladder. Most bladder cancers are diagnosed in the early stages when the cancer is treatable. However, even early stage bladder cancer can recur after successful treatment. For this reason, bladder cancer patients usually require follow up visits several years after treatment to check for bladder cancer recurrence. Bladder cancer begins when changes (mutations) occur in the DNA of the cells in the bladder. A cell's DNA contains instructions that tell it what to do. This change directs cells to proliferate rapidly and stay alive when healthy cells die. Abnormal cells can form tumors and invade and destroy normal body tissues. Over time, the abnormal cells may slough off and spread (metastasize) throughout the body. The bladder is a triangular organ located between the hipbones, above the urethra, and below the kidneys. Urine from the kidneys flows into the bladder, which is lined with a tissue called the urothelium. The urothelium is made up of cells that stretch when the bladder fills with urine and contract when it empties. The bladder can hold approximately 2 cups of urine. Bladder cancer occurs when certain cells in the tissue lining the bladder mutate or change and become abnormal cells that grow and cause tumors in the bladder. If left

untreated, bladder cancer can pass through the bladder wall, enter nearby lymph nodes, and spread to other areas of the body, such as the bones, lungs, and liver. Bladder cancer is the fourth most common cancer affecting men and men identified as male at birth (DMAB). Males and individuals with DMAB are four times more likely to develop bladder cancer than females and individuals designated as female at birth. Because the cancer is unaware of its symptoms, it is usually in an advanced stage. According to the Bladder Cancer Advocacy Network, women can pay attention to the first and most important symptom of bladder cancer, blood in the urine (hematuria), because women associate blood in the urine with common gynecological problems. Radical cystectomy involves removal of the bladder, adjacent organs, and regional lymph nodes. In men, the prostate and seminal vesicles are usually removed. In women, removal of the uterus, cervix, ovaries, and anterior vagina is standard. Urinary diversion *via* orthotopic neobladder is the preferred procedure for urinary diversion because it allows the patient to urinate, thereby improving the patient's quality of life. Some bladder cancer patients carry rare mutations in the RB1 gene. There are several types of cancer that affect the bladder. Bladder cancer rarely occurs in families, but some types may be genetically related. Having one or more close relatives with bladder cancer does not mean that she will get bladder cancer.

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CONFLICT OF INTEREST

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