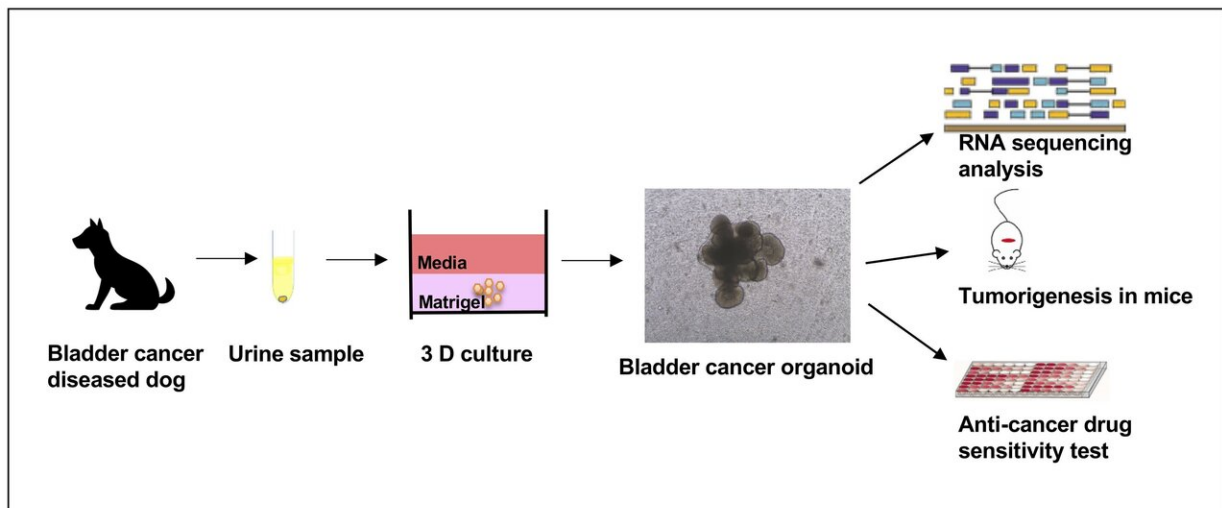


From urine samples to precision medicine in bladder cancer through 3-D cell culture

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Establishment of urine-derived bladder cancer organoid culture method. Credit: Tatsuya Usui, DVM, PhD

A research collaborative led by scientists from institutions in Japan including Tokyo University of Agriculture and Technology (TUAT) has developed a new experimental cancer model for dog bladder cancer. Urine samples were used for a 3-D cell culture method called organoid culture. This method will allow clinicians to determine the proper chemotherapy and to identify new biomarkers of both dog and human bladder cancer in the near future. The results are published in *Cancer Science*.

About 0.01 percent of humans suffer from [bladder cancer](#). The most common symptom of [cancer](#) is blood in the urine and pain during urination. In the United States, 80,470 people have been diagnosed with bladder cancer in 2019, and 17,670 have died. About 90 percent of all bladder cancers are [transitional cell carcinoma](#), which is usually invasive. In dogs, this cancer is detected very late, resulting in poor survival.

"For dogs, bladder cancer should be diagnosed as early as possible," said Tatsuya Usui, DVM, Ph.D., corresponding author on the paper and senior assistant professor in the Laboratory of Veterinary Pharmacology, Department of Veterinary Medicine at TUAT in Japan. "It was, however, very hard to grow bladder cancer cells on flat dishes, which is a traditional 2-D cell culture method." The researchers then tried a 3-D cell culture method called organoid culture. They collected [urine samples](#) from bladder cancer dogs and successfully grew bladder cancer cells in urine using this culture system. The cells grown in the 3-D cell culture express the same set of genes as the original cancer tissues do.

"Those results encouraged us to test anti-cancer drugs on cells grown in the 3-D cell culture. As we expected, the sensitivity of each drug can be easily monitored," said Usui. "It is now possible that bladder cancer cells from each dog using this system can be treated by several [anti-cancer drugs](#). We can then find which drug is more effective for each dog in the lab before actual treatment. So we would like to apply the system of urine sample-derived dog bladder cancer 3-D culture to precision veterinary medicine. In addition, we have opened a new avenue for establishing the novel therapeutic strategy against urological cancer in both dog and human."

More information: Mohamed Elbadawy et al, Establishment of a novel experimental model for muscle-invasive bladder cancer using a dog bladder cancer organoid culture, *Cancer Science* (2019). [DOI: 10.1111/cas.14118](#)

Provided by Tokyo University of Agriculture and Technology

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