

Patient-Derived Xenograft Models for Urinary Biomarker Discovery

Opinion

Patient-Derived Xenograft Models (PDX) are made by grafting tumor from individual patients into an immune-deficient animals. They are considered advanced platforms that can accurately resemble the human tumor counterpart genetically, and in many respects functionally. These models are more and more important for personalized medicine. But as far as I can find there is still not many studies in biomarker development when PDX model and biomarker were used as key words for pubmed search. No items found when PDX model (or Patient-Derived Xenograft) and urine were used.

I proposed a few years ago that urine can be better biomarker source because biomarkers are changes associated with the disease and blood is controlled to relatively constant by homeostatic mechanisms of the body [1]. I want to propose that PDX mice can be used for urine biomarker discovery.

The advantage is that in urine whenever a human specific peptide (protein) is identified, it is from the human tumor. In this way, we can identify which proteins can be released from this human tumor into urine as potential biomarker. It is hard to find such a straight forward experimental design.

Of course there is disadvantage. The immunodeficient mice are used for tumor engraftment and propagation. These mice lack functional elements of the immune system to avoid rejection of foreign tissues and permit engraftment of the tumor. For this reason, PDX models can not reflect the immune response. The urine biomarker panel of this tumor will not include the ones related to immune response.

Overall, since there is no such study yet, it is definitely worth doing it especially for the companies working with PDX projects. The urine samples are thrown away if not used. In case if there

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is any candidate biomarker discovered, it will be an extra intellectual property for the company. Since each company has hundreds of models from all different human tumors, it is likely that some valuable conclusions can be reached when those data are analyzed together.

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