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Editorial

Tissue is Still the Issue for Precision Oncology: A Novel Web-Based Platform for Lesion Selection and Biopsy Specimen Acquisition

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Biomarker-driven approvals and tissue-agnostic approvals have opened up precision oncology to the community. Genomically targeted therapies and immune-checkpoint inhibitors have completely altered the treatment landscape of multiple solid tumors. However, not all patients respond to treatment. Even those who initially respond develop resistance. To understand the resistance and/or response mechanisms to these novel agents, acquisition of tissue is central. Although liquid biopsy technology has emerged, tissue-based comprehensive evaluation still remains the gold standard. Image-guided biopsy procedures for tumor characterization have now been well integrated into clinical trials to facilitate biomarker development, optimize patient selection, and understand resistance and/or response mechanisms in addition to opening up opportunities for co-clinical trials using patient-derived xenografts.[1]

Sequential biopsy procedures provide valuable structural, cellular, biological, and molecular information for understanding tumor genome, tumor microenvironment, and unravelling mechanisms of acquired resistance. They remain important for advancing precision oncology. Clinical next-generation sequencing–based, high-throughput molecular profiling technologies have greatly improved personalized cancer therapy.[2] However, tissue acquisition is not without challenges. To perform molecular profiling assays, an adequate amount of high-quality tissue is required to yield sufficient assay inputs, such as nucleotide acid, RNA, DNA, protein, and so on. Of note, consistency in sampling the designated site is crucial to control for intertumoral and intratumoral heterogeneity for an accurate understanding of the dynamic changes in the tumor and immune microenvironment before and after treatment. However, in standard practice, the optimal biopsy site at the time of each procedure is chosen independent of previous biopsy procedure. In addition, healthcare professionals from multiple specialties may identify different lesions. In caring for a patient enrolled in a clinical trial, multiple teams can be involved, such as a clinical trial investigator, primary medical oncologist, surgical oncologist, diagnostic radiologist, radiation oncologist, and interventional radiologist, who may approach the biopsy site with different perspectives, which could be challenging. Therefore, Dr. Mingxian Xu and colleagues[3] have collaborated with a multidisciplinary group of experts to develop a uniform workflow to address these challenges. In their recent article published in the *Journal of Immunotherapy and Precision Oncology*, Xu et al[3] describe a six-step workflow to improve biospecimen acquisition

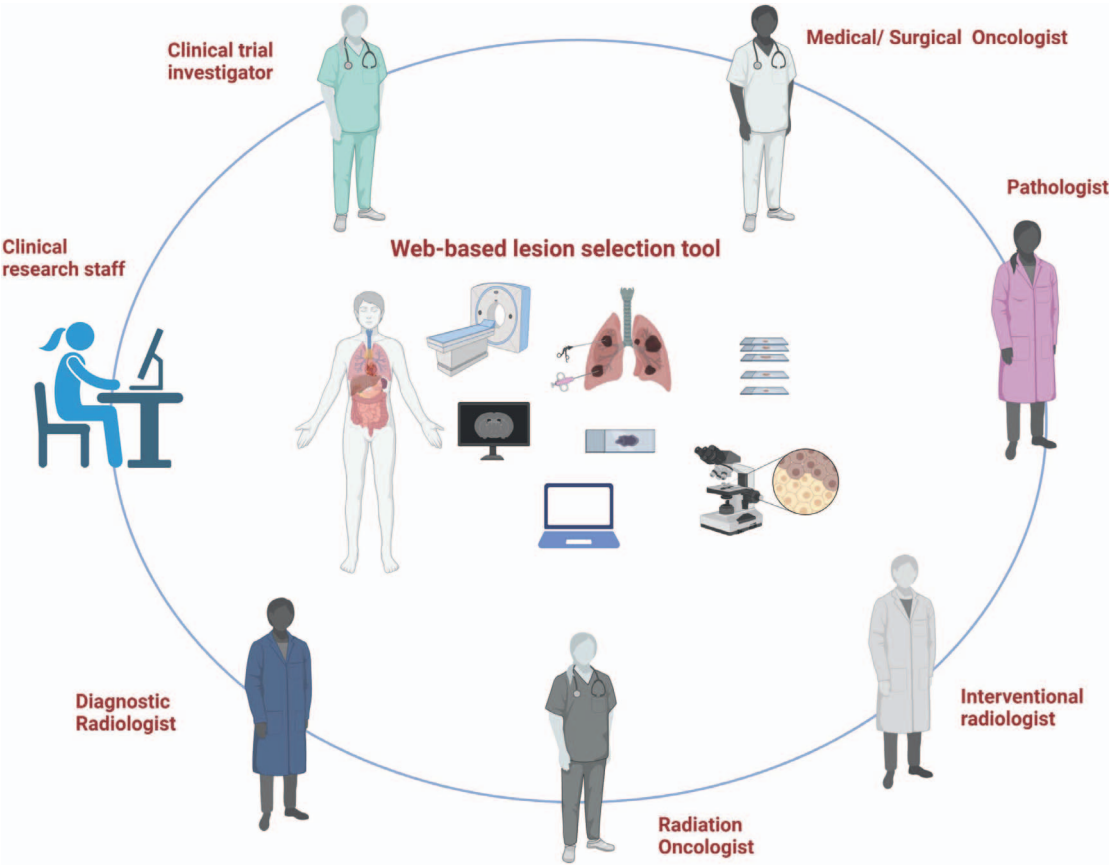

Figure 1. Biopsy collection is usually performed by interventional radiology, and yet relies on collaborative efforts of multiple disciplines including oncology, diagnostic radiology, radiation oncology, interventional radiology, and histopathology. The web-based lesion selection platform (i.e., Naing tool) improves communication and consistency (illustration created by biorender.com).

from a designated site consistently. Their innovative approach could be applied to sample any biopsiable tumor in any hospital setting.

Biopsy collection is usually performed by interventional radiology, and yet relies on collaborative efforts of multiple disciplines, including oncology, diagnostic radiology, radiation oncology, interventional radiology, and histopathology. Clear, consistent, and efficient communication among multiple disciplines is essential to ensure the designated sampling accuracy. Effective closed-loop communication is critical to patient care. Herein, the authors established an online lesion selection workflow, namely the *Naing tool*, to provide a communication platform to the oncology team with an authorized team of multidisciplinary collaborators.[3] Furthermore, the six-step workflow in this platform streamlines the entire lesion selection and biopsy collection process and provides guidance and tracking for biopsy collection among the various stakeholders (Fig. 1).

In the study, Xu et al[3] demonstrated that use of this platform significantly improved biopsy sampling consistency ($p = 0.007$) and substantially increased the number of biopsy cores obtained per timepoint (baseline and on-treatment-1, $p < 0.001$; on-treatment-2, $p = 0.055$) compared with the control group. However, larger studies are warranted to validate these findings. In addition, funding is needed to adequately maintain the lesion selection tool and operations and to compensate personnel. Nonetheless, given its potential to enhance our understanding of the tumor microenvironment by improving our ability to perform a biopsy at the designated site consistently, the lesion selection tool could be a worthwhile venture to explore to further advance clinical research and patient care, as in the era of precision oncology "when tumor is the rumor, tissue is still the issue."

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