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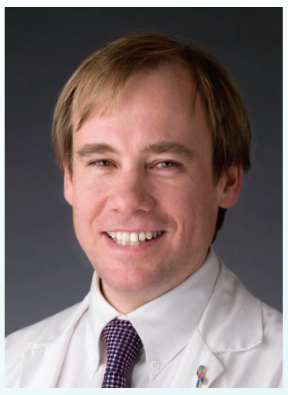

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nature REVIEWS CLINICAL ONCOLOGY

Biopsies: next-generation biospecimens for tailoring therapy

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The majority of samples in existing tumour biobanks are surgical specimens of primary tumours. Insights into tumour biology, such as intratumoural heterogeneity, tumour–host crosstalk, and the evolution of the disease during therapy, require biospecimens from the primary tumour and those that reflect the patient's disease in specific contexts. Next-generation 'omics' technologies facilitate deep interrogation of tumours, but the characteristics of the samples can determine the ultimate accuracy of the results. The challenge is to biopsy tumours, in some cases serially over time, ensuring that the samples are representative, viable, and adequate both in quantity and quality for subsequent molecular applications. The collection of next-generation biospecimens, tumours, and blood samples at defined time points during the disease trajectory—either for discovery research or to guide clinical decisions—presents additional challenges and opportunities. From an organizational perspective, it also requires new additions to the multidisciplinary therapeutic team, notably interventional radiologists, molecular pathologists, and bioinformaticians. In this Review, we describe the existing procedures for sample procurement and processing of next-generation biospecimens, and highlight the issues involved in this endeavour, including the ethical, logistical, scientific, informational, and financial challenges accompanying next-generation biobanking.

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