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New method of tissue banking makes gene analysis more practical for lung cancer

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Analyzing the genes expressed by cancer cells allows for a better understanding of that patient's specific disease and in turn, a more personalized approach to treatment. But obtaining the RNA from a tumor in the lungs in order to conduct the genetic analysis is a challenging prospect. Currently, lung cancer researchers are limited to using RNA extracted from early-stage tumors removed during surgery. The small quantities of tissue extracted during routine diagnostic biopsies have not been useful to researchers, due to their small size and the variety of ways they have been processed.

Since oftentimes surgery is not an option in advanced lung cancer, genetic analysis of the tumor is critical, there is a need to obtain good quality RNA samples from tumor tissue taken via biopsy, no matter how the biopsy procedure is conducted.

In a study in the July edition of the Journal of Thoracic Oncology, Malcolm H. Lawson describes a process to successfully obtain and to store high quality RNA from lung tumor biopsies. Lawson and fellow researchers at the Cancer Research UK Cambridge Research Institute and Papworth Hospital, both in the United Kingdom, received consent from patients to take extra biopsies for research purposes during the diagnostic procedure. Biopsies were obtained using the three most frequently used techniques -- endobronchial biopsy forceps, transbronchial needle aspirate - or CT-guided needle biopsy. Acceptable RNA for gene expression analysis was extracted from 72 percent of lung cancer biopsies.

Lawson and team immediately froze some of the biopsies in liquid nitrogen, while the others were first treated with an RNA preservative (RNAlater) before freezing. Use of the RNA preservative resulted in higher quality, more intact RNA from biopsies taken via all methods.

Storage in the RNA preservative doubled the number of biopsies that met the minimum yield and quality criteria for analysis compared with immediate freezing (10 of 16 biopsies vs. 5 of 16). Using the RNA preservative, 70 percent of biopsies taken by needle aspiration were suitable for analysis compared with 40 percent frozen, and 50 percent of the RNA preservative endobronchial biopsies were acceptable compared with 17 percent of the frozen ones. A full 100 percent of the CT-guided needle biopsies met the criteria when treated with RNA preservative.

"This is a novel model for tissue banking lung cancer diagnostic specimens that greatly increases the number and type of tumors available for gene expression studies," Dr. Lawson said. "If used widely, it makes personalized medicine for lung cancer patients a more practical proposition."

More information: journals.lww.com/jto

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