Biopsy Sample Manipulation and Imaging System

This technology offers a more precise imaging method of biological specimen by imaging around the circumferential surface. An elastic tube holds the specimen while automatically rotating for the specimen for imaging and reduces the processing of distorted images.

What is the Problem?

Small samples of human tissue are often required for a definitive disease diagnosis and prognosis. Needle biopsy specimens from tissue are less invasive and costly than surgically removed tissue samples. Often these needle biopsy tissues are removed from the body in a vital or living state, although chemically-and mechanically fragile. The processing steps often require chemical fixation using alcohol or formalin to halt unwanted chemical changes and prevent mechanical damage. To provide optical contrast in imaging the cells and tissue, stains are applied to highlight different structures, immediate and rapid processing of such specimens can provide valuable information, such as whether the needle was sampled from the tumor and provided an adequate amount of material to make a diagnosis and chemical analysis. The current methods of handling needle biopsy-specimens are a series of manual steps that adhere the cells or thin sections of the tissue onto glass slides for observing the fixed and stained specimen on an optical microscope. This method takes from several hours to several days and is destructive to the cells and tissue. If the needle did not adequately sample the targeted region, such as a tumor, the patient will need to return to repeat the needle biopsy procedure which adds cost, more suffering, and risk of sampling error. Furthermore, the conventional view of the cells and tissue is two-dimensional (2D), and depth information is lost.

What is the Solution?

The solution is a device that enables microscopic imaging around the circumferential surface of a biological specimen sampled from tissue by axially stretching an elastic tube that is holding the specimen, thereby temporarily retaining the specimen so that it may be rotated and imaged with precision. This imaging system provides precise imaging with an increased surface area allowed by imaging the circumferential surface.

What is the Competitive Advantage?

The current methods involve fixing on a slide, which provides a 2D view, which loses some information and provides a distorted image, on top of taking a significant amount of time to

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process. This system provides automated specimen processing that can add more information and reduce processing time.

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