

Deployable Tubular Biopsy Device

This technology offers a biopsy tool design for the bile duct biopsy procedure. This method allows for improved navigational accuracy using thin, circumferential blades supported by a hollow sheath and actuated by a helical plunger.

What is the Problem?

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Clinical sampling of tissue that is read by a pathologist is currently the gold standard for making a clinical diagnosis of disease, but the few minimally invasive techniques available to physicians for biliary biopsy procedures have low sensitivity, increasing the likelihood of false negative diagnoses. Biopsy forceps are the preferred method for sampling tissue in the bile duct, but they are limited by poor navigational accuracy and small sample size.

What is the Solution?

The solution is a novel biopsy tool design that overcomes the drawbacks associated with the current methods for the bile duct biopsy procedure. The biopsy tool consists of thin, circumferential blades supported by a hollow sheath and actuated by a helical plunger. Once a constriction or suspicious region is located, the tool is deployed to form a cutting annulus capable of uniformly collecting tissue samples around the circumference of the duct. It is actuated by pulling a metal braided cable sleeve to contact the plunger and compress and twist the tool along its axis. This causes the blades to buckle laterally, which deploys them outward and presses them into the ductal tissue. The deployed tool is pulled by both the cable sleeve and support sheath to cut the constricted ductal tissue section. After cutting, the cable sleeve is released to allow the elastic blades to close and trap tissue within them. Once the procedure is completed, the biopsy tool is retracted into an optional sheath for tissue analysis by a pathologist.

What is the Competitive Advantage?

The most common biopsy method in the bile duct is brush sampling of cells for cytology. However, the sensitivity of standard biliary brushings has historically been low, around 30%-60%. It has been suggested that the low sensitivity of brush cytology is mainly due to inadequate cellular sampling. With this solution, epithelial to deeper submucosal tissues can be obtained for proper tissue diagnosis, as well as a sufficient amount of sample to perform an accurate analysis. Unlike biopsy forceps, this method allows for improved navigational accuracy which will improve outcomes.

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Category

Hardware/Robotics
Selection of Available
Technologies

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