cytiva

TECHNOLOGY LICENSING OPPORTUNITIES

Extraction of materials from regions of interest in a sample

Inventor:
John Nelson
Wei Gao
Christopher Michael Puleo
Todd Frederick Miller
Christine Lynne Pitner
David Andrew Shoudy
Alex David Corwin

Patent family:
Granted: US9625355B2,
Pending: US-DIV US20170175105A1
Cytiva Reference: 275220/280767

Licensing Contact:
Louise Sarup
louise.sarup@cytiva.com

Invention Summary

Techniques for extracting biological molecules from an existing sample, such as a pathology slide.

Background

Medical researchers often obtain patient samples, such as biopsies, and preserve them as pathology slides, core samples, etc., for diagnosis and visualization. When these samples contain particular regions of interest, researchers may wish to extract materials from these regions of interest for additional studies. For example, a slide may include both tumor and normal cells, and it could be desirable to extract DNA from only the tumor cells in the slide to assess the DNA for the presence of particular mutations. However, extraction of material from only a region of interest and without damaging the material is complex. For example, in laser capture micro-dissection, a focused laser beam ablates tissue to define a region of interest but damage the surrounding material. Other techniques may involve tissue encapsulation, which introduces an additional material to the sample.

Technology

A system for extracting material from a region of interest, comprising:

- a fluid delivery base;
- a first channel within the fluid delivery base and open to a first channel end at a sample-facing surface of the fluid delivery base, where the first channel consists of a first channel opening configured to couple to a fluid inlet to fluidically couple the fluid inlet to the first channel end;
- a second channel within the fluid delivery base and terminating at a second channel end at the sample-facing surface of the fluid delivery base, where the second channel comprises a second channel opening configured to couple to a fluid outlet to fluidically couple the fluid outlet to the second channel end;
- an adaptor coupled to the first channel opening and the second channel opening, where the adaptor comprises an interior channel that couples the first channel end to the fluid inlet;
- a gasket coupled to the sample-facing surface and comprising a gasket opening aligned with an area of the sample-facing surface comprising the first channel end and the second channel end;
- a support comprising a sample-supporting surface configured to hold a sample against the gasket and an opposing surface; and
- an alignment member coupled to the opposing surface, where the fluid delivery base is separable from the support and configured to move along a plane of the sample-supporting surface to align with the alignment member.

Figure 1: The microfluidic consumable creates a gasket-enclosed microfluidic chamber on FFPE tissue samples. The silicone gasket defines the extraction region, and a magnetic or motor-driven force creates a hermetic seal around the region of interest

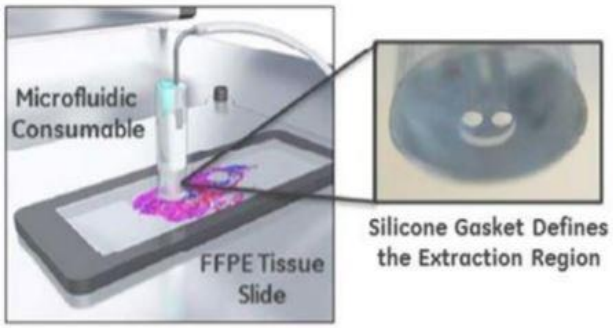
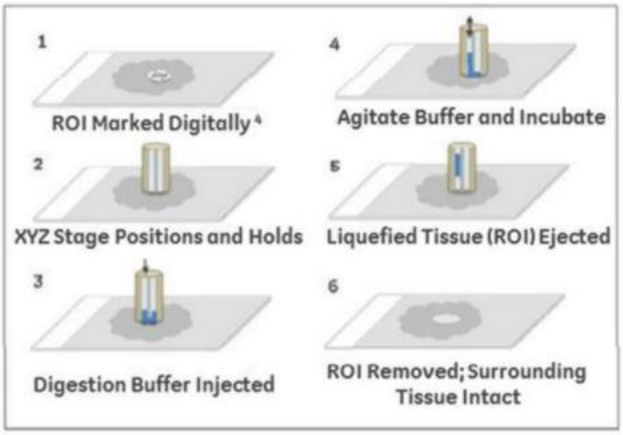


Figure 2 Schematic of the extraction protocol using the device and digestion buffer



Additional Information

Surrette C; Shoudy D; Corwin A; et al. Microfluidic Tissue Mesodissection in Molecular Cancer Diagnostics. SLAS Technol. 2017, 22, 425–430