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HIGH QUALITY CO-EXTRACTION OF DNA AND RNA FROM FFPE SAMPLES (FFPE RaD PREP)

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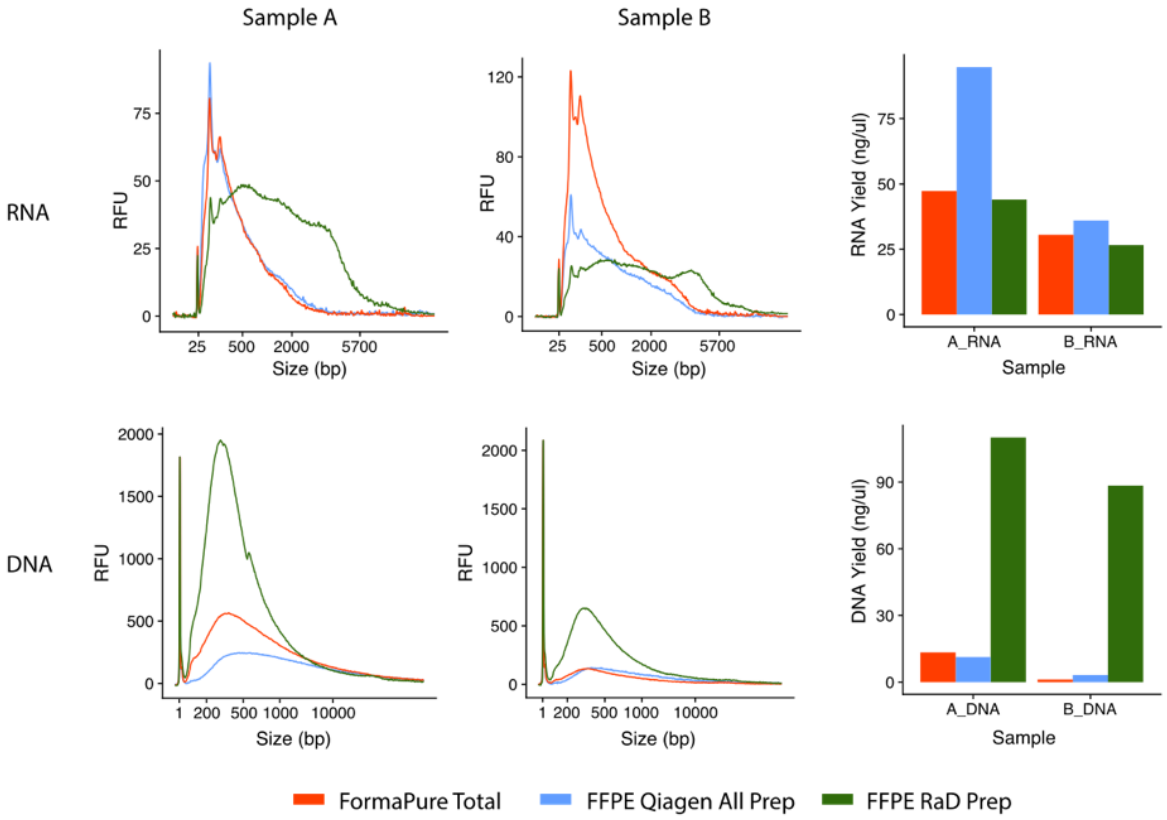

Figure 1. Qualitative and quantitative comparison of RNA and DNA extracted from two FFPE tissue samples A and B using three methods: FormaPure Total (Red), FFPE Qiagen All Prep (Blue) and FFPE RaD Prep (Green)

BACKGROUND

FFPE (Formalin Fixation and Paraffin Embedding) is the most common, convenient and cost-effective way of archiving tissues. Almost all clinical specimens, including biopsies, are routinely preserved in FFPE format for histopathological analysis. There is wide-spread interest in extracting nucleic acid sequence information from FFPE specimens. Although there are several commercially available kits for extraction, the quality of the extracted material, especially RNA, is very poor and the DNA yields are low. Also, very few kits can co-extract DNA and RNA from the same sample. In addition, most protocols are technically challenging and cannot be performed in a high-throughput manner. Thus, there is a need for an improved co-extraction method.

DESCRIPTION

Scientists from New York Genome Center's Innovation Lab and Methods Development Lab have developed a method to co-extract high quality DNA and RNA from the same FFPE tissue (the "FFPE RaD Prep" method). The FFPE RaD prep method uses novel digestion buffers based on saponified medium chain triglycerides (MCT) oil and thermostable proteases for efficient separation and high quality co-extraction of RNA and DNA from FFPE samples. Furthermore, SPRI beads are used for high-throughput nucleic acid purification making the whole process amenable to parallel processing and automation. The FFPE RaD prep approach doesn't require harsh organic solvents, thereby eliminating the need to use hazardous chemicals. RNA obtained from FFPE RaD prep has a consistently higher DV200 value than that obtained using extraction methods offered by current kits with similar yields (Figure 1). DNA from FFPE RaD prep shows the same size profile as extraction methods offered by current kits, but with greatly enhanced yields. These differences also translate into a higher number of fragments that contribute to sequencing libraries, resulting in greater sequence complexity, less duplicate reads and better data.

BENEFITS

- Co-extraction of high quality DNA and RNA
- Significantly enhanced DNA yield
- Heat for paraffin solubilization; no harsh solvents required
- Efficient separation of RNA and DNA fractions
- High throughput nucleic acid purification

APPLICATIONS

- Extraction from FFPE curls, slides and cores
- Extracted material can be used for next generation sequencing, microarray and qPCR

PATENT INFORMATION

US Provisional Patent Application #: 62/773,711

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