Automated NGS Library Preparation with Covaris Focused-ultrasonicator Workflow Solution

NGS Workflow Solution

Authors:

Guillaume Durin

Covaris, Inc.

Brian Gerwe

Sheryl Duffy

PerkinElmer, Inc.

Waltham, MA

Covaris® Partnering in automated NGS extraction solutions

Introduction

Building on PerkinElmer's established automation and applications expertise across the genomics workflow, from extraction to analysis, we automated the sample transfer process post-DNA shearing on the Covaris® Focused-ultrasonicators. The Covaris® mechanical DNA Shearing is the gold standard for fragmentation in NGS library preparation because of it's robust, unbiased, and scalable protocols. Based on proprietary and patented Adaptive Focused Acoustics (AFA™) technology, the Covaris® Focused-ultrasonicators deliver controlled bursts of high-density acoustic energy (AFA-energetics™) to enable highly controlled sample processing in a temperature-controlled, non-contact, closed vessel environment. Uniquely, all AFA™ Focused-ultrasonicators are calibrated to NIST traceable standards, ensuring highest quality and standardized results.

The DNA, isolated using PerkinElmer's chemagen extraction technology, is sheared in a Covaris® microTUBE (available in either an eight strip or a 96 well SBS format) that have been optimized to work with AFA™ energetics. Typically, microTUBEs are sealed by either a slit-septa or aluminum foil, and this leads to manual recovery of the processed DNA and perhaps a source of downstream variation. To overcome this obstacle, we designed an automated solution to transfer the fragmented DNA to the next step of the library preparation workflow. Post DNA shearing, the Covaris® microTUBE plate is manually placed on either the JANUS® G3 or Sciclone® G3 Automated Workstation platform that has been integrated with the Cedrex plate holder for automated high-throughput septum piercing (part number 115840). Using the flexibility of our JANUS G3 WinPrep™ software, a simple method allows for the total or cherry-picked wells from the Covaris® microTUBE.

The increased efficiency from automating this process enables the throughput of difficult sample types such as FFPE, NGS library preparation.

PerkinElmer®

For the Better

Automated Sequence Ready Library Preparation from FFPE Samples

PerkinElmer and Covaris® FFPE Extraction and Nucleic Acid Isolation

Active paraffin removal and tissue rehydration with Covaris® AFA™ technology. DNA is then isolated from solution with chemagic bead-based technology.

Covaris® Focused-ultrasonicator for Mechanical Nucleic Acid Shearing

Covaris® employs AFA™ technology for controlled shearing of nucleic acids. Mechanical DNA shearing is isothermal; ensuring both unbiased fragmentation and high recovery of double-stranded DNA. The samples are processed in Covaris® microTUBE Plates or strips that are sealed by slit-septa or aluminum foil.

PerkinElmer and Covaris® Automated Sample Processing of Sheared DNA

PerkinElmer has developed a specially optimized adapter to hold the Covaris® microTUBE plate on the deck of their liquid handling platforms. This enables hands-free DNA transfer onto next steps of the library preparation workflow.

PerkinElmer Automated Sample Analysis

The PerkinElmer LabChip® GX Touch delivers rapid electrophoresis separation with assays for genomic DNA integrity analysis, DNA smear, and DNA/ RNA fragment analysis.
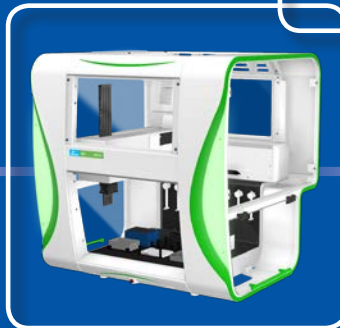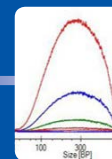
PerkinElmer Automated NGS Library Preparation

PerkinElmer offers multiple Automated Workstations to match your sequencing throughput. We have more than 50 automated NGS sample preparation protocols, from the chemistries and sequencing platforms that you rely on most.

For more information, please visit www.perkinelmer.com/genomics
For Research Only. Not for use in diagnostic procedures.

PerkinElmer®

For a complete listing of our global offices, visit www.perkinelmer.com/ContactUs

012951_01   PKI