



Co-extraction of RNA, DNA and proteins

Multianalyte kits for a wide range of
sample types



Legal disclaimer



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Multianalytes – co-extraction of RNA, DNA and proteins



Kits for co-extraction of RNA, DNA and proteins



Co-extraction of RNA and DNA from cells and tissue



Allprotect – simultaneous stabilization of DNA, RNA and proteins



Co-extraction of RNA and protein from cells and tissue



Co-extraction of RNA, DNA from FFPE samples



Co-extraction of RNA, DNA from low-biomass samples



Selecting the right kit – multianalytes

Kits for co-extraction of RNA, DNA and proteins







| Sample | Kit | Features | Processing | Sample amount | Format | Elution volume |
|----------------------------|--|--|---------------------------------------|---|--|-----------------------------------|
| Single-spin | | | | | | |
| Tissue and cells | AllPrep DNA/RNA Mini (50) | Simultaneous purification of DNA and RNA from cells and tissues | Manual (centrifugation) | 1 x 10 ⁷ cells or 30 mg tissue | Mini column | 100 µL |
| | QIAwave DNA/RNA Mini (50) | Eco-friendlier version of the AllPrep DNA/RNA Mini | Manual (centrifugation) | 1 x 10 ⁷ cells or 30 mg tissue | Mini column | 100 µL |
| | AllPrep DNA/RNA Micro (50) | For simultaneous purification of DNA and RNA from small samples | Manual (centrifugation) | 5 x 10 ⁵ cells or 5 mg tissue | Micro column (RNA)/ Mini column (DNA) | DNA: 30 µL RNA: 10 µL |
| | AllPrep DNA/RNA/miRNA Universal (50) | Simultaneous purification of DNA and RNA/miRNA from cells and tissues | Manual (centrifugation) | 1 x 10 ⁷ cells or 30 mg tissue | Mini column | 100 µL |
| | AllPrep DNA/RNA/Protein Mini (50) | Simultaneous purification of DNA, RNA and protein from cells and tissues | Manual (centrifugation) | 1 x 10 ⁷ cells or 30 mg tissue | Mini column | DNA: 100 µL RNA: 30 µL |
| | AllPrep RNA Protein (50) | Simultaneous purification of RNA and native proteins from cells | Manual (centrifugation) | 700 µL lysate | Mini column | 30–50 µL |
| FFPE | AllPrep DNA/RNA FFPE (50) | Simultaneous purification of DNA and RNA from FFPE samples | Manual (centrifugation) | <10 µm sections of 150 mm ² surface area or two 20 µm sections of 150 mm ² surface area | Micro column | RNA: 14-30 µL DNA: 30-100 µL |
| 96-well | | | | | | |
| Cells and tissue | AllPrep DNA/RNA 96 (4x 96) | Simultaneous purification of DNA and RNA from cells and tissues | Manual (centrifugation and/or vacuum) | Up to 2 x 10 ⁶ cells/up to 10 mg tissue | 96-well plate | 50–100 µL |
| Magnetic bead based | | | | | | |
| FFPE | EZ2 AllPrep DNA/RNA FFPE (48) | Automated simultaneous purification of DNA and RNA from FFPE samples | Automated EZ2 | Max. 4 x 10 µm sections or 2 x 20 µm sections | Cartridge/ mag beads | RNA: 50–60 µL; DNA: 100–120 µL |
| Low biomass sample | AllPrep DNA/mRNA Nano (12) | Simultaneous purification of genomic, high molecular weight DNA (gDNA) and mRNA from low-biomass samples | Manual (magnetic rack) | Low-biomass samples (rare cells, CTCs, fetal cells, stem cells, T-cells) | Magnetic beads | 25 µL |

Co-extraction of RNA and DNA from cells and tissue



High-quality DNA and RNA from the same sample

- Maximal yields of DNA and RNA from precious samples
- Rapid purification with short, streamlined protocols
- Streamlined protocols for 96-well plates
- Ready-to-use DNA and RNA for any downstream analysis

| |  Small samples |  Eco-friendly |  Difficult-to-lyse |  | |
|-----------------------|---|---|--|---|---|
| | <u>AllPrep DNA/RNA Micro</u> | <u>AllPrep DNA/RNA Mini</u> | <u>QIAwave DNA/RNA Mini</u> | <u>AllPrep DNA/RNA/miRNA Universal</u> | <u>AllPrep DNA/RNA 96</u> |
| Format | Micro column | Mini column | Mini column | Mini column | 96-well plate |
| Target | | gDNA/ RNA (>200 nt) | | gDNA/RNA/miRNA (>200 nt) | gDNA/ RNA (>200 nt) |
| Sample | <5 x 10 ⁵ cells <5 mg tissue | <1 x 10 ⁷ cells, < 30 mg tissues | <1 x 10 ⁷ cells, 30 mg tissues | <1 x 10 ⁷ cells, < 30 mg tissue | Up to 2 x 10 ⁶ cells Up to 10 mg tissue |
| Elution volume | DNA: 30 µL RNA: 10 µL | 100 µL | 100 µL | 100 µL | 50–100 µL |
| Processing | Manual or QIAcube Connect | | | | Manual (centrifugation or centrifugation/vacuum) |
| Features | Optimized for small samples | | Eco-friendly | Difficult-to-lyse, fiber- and lipid-rich tissues, enzymatic lysis | High throughput format |

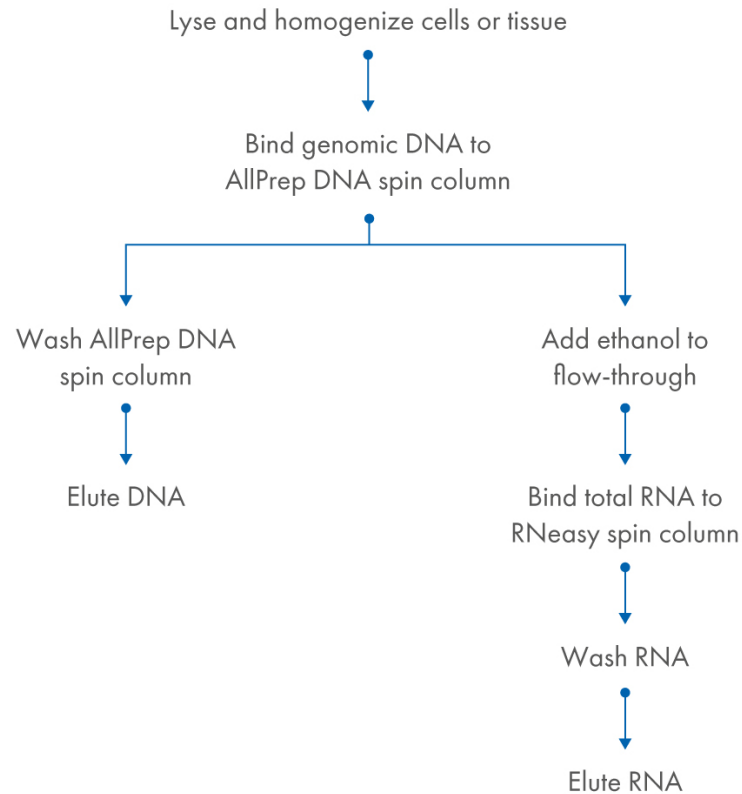


Did you know? Co-purification is often utilized in applications such as gene expression studies, where researchers need both RNA (for mRNA analysis) and DNA (for genomic DNA analysis) from the same sample to gain a comprehensive understanding of gene regulation and function.

AllPrep DNA/RNA Kits – co-extraction of RNA, DNA from cells and tissue

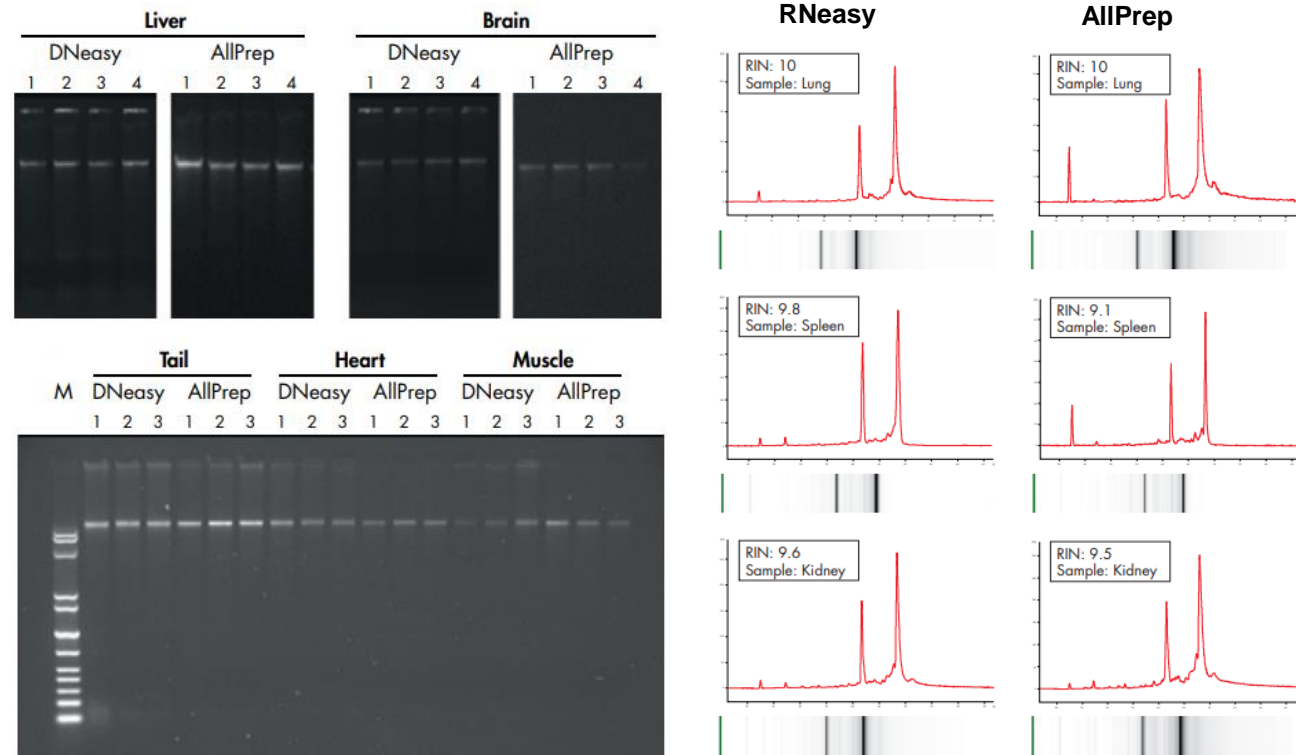


AllPrep DNA/RNA procedure



For more information see Technical Information: [Comparison of the yield and quality of genomic DNA and RNA purified using AllPrep Kits or dedicated kits for a single nucleic acid type](#)

Yield & quality of co-extracted vs individually isolated nucleic acids from rat tissues

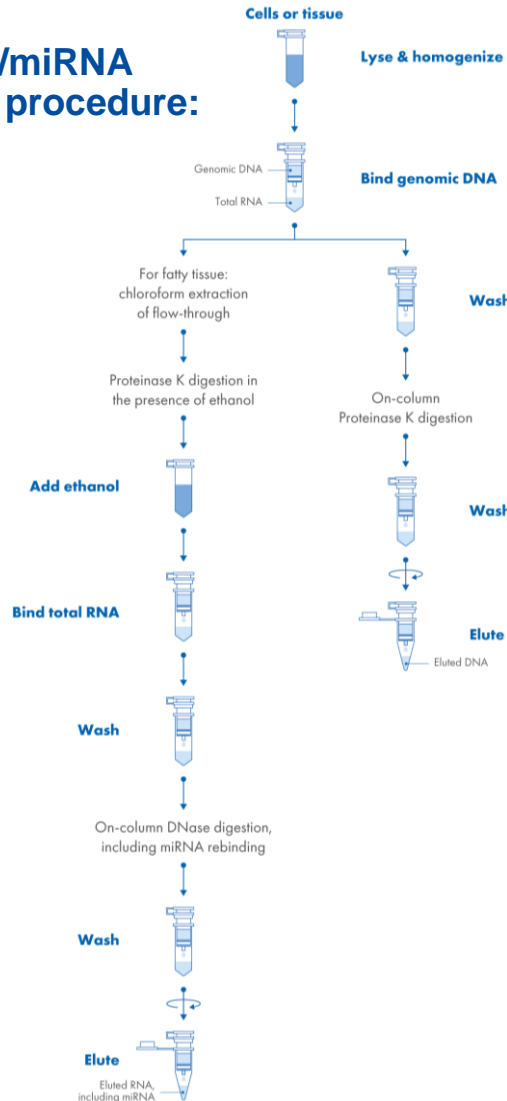


- Nucleic acids isolated: gDNA and RNA
- Co-extraction kits used: **AllPrep DNA/RNA Mini Kit** or **AllPrep DNA/RNA/miRNA Universal Kit**
- Individual nucleic acids isolation kits used: DNeasy Blood & Tissue Kit or RNeasy Mini Kit
- The yield and quality of co-extracted gDNA and RNA from various tissue types were similar to individually isolated nucleic acids

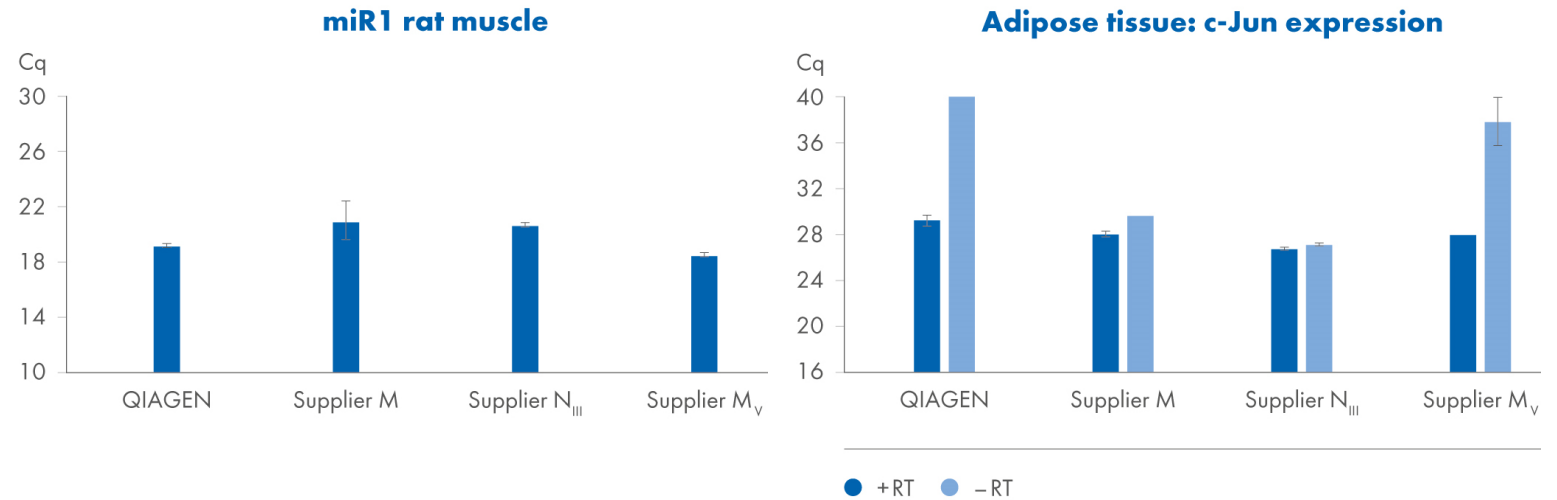
AllPrep DNA/RNA/miRNA Universal Kit – co-extraction of RNA, DNA from difficult-to-lyse, fiber- and lipid-rich tissues



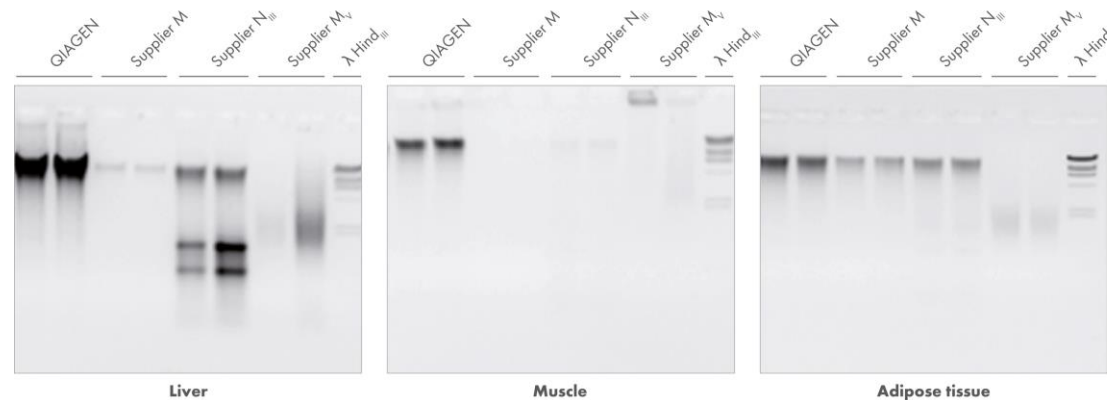
AllPrep DNA/RNA/miRNA Universal procedure:



High yields of miRNA from rat muscle and pure RNA from difficult-to-lyse adipose tissue using the AllPrep DNA/RNA/miRNA Universal Kit



High yields of better-quality DNA from various types of tissue, including difficult-to-lyse adipose tissue using the AllPrep DNA/RNA/miRNA Universal Kit

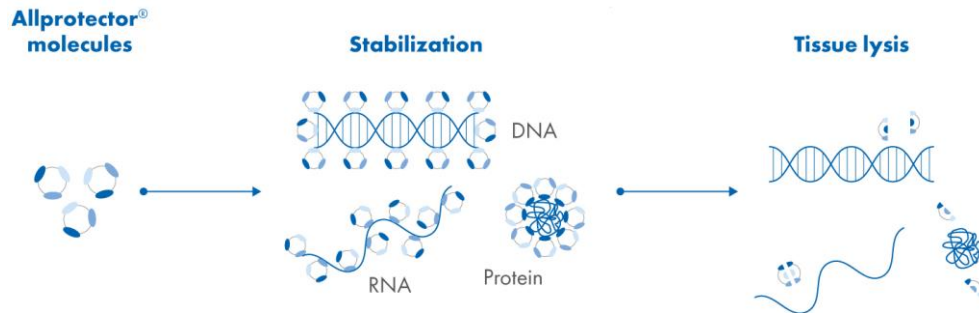


Data obtained through experiments conducted by QIAGEN R&D in Hilden, Germany.

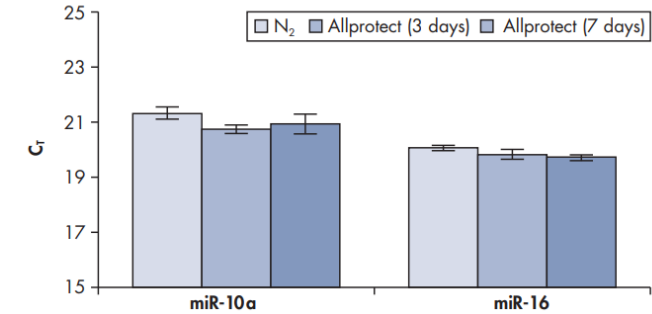
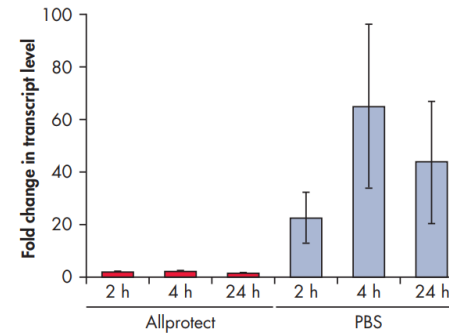
Allprotect – simultaneous stabilization of DNA, RNA and protein



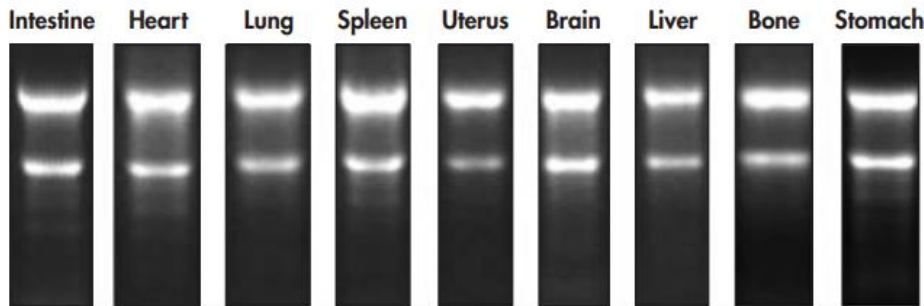
Mechanism of Allprotect stabilization



Prevent gene induction after sample collection and effectively stabilize miRNA



Effective stabilization of RNA in a variety of tissues



- Various rat tissues were stored in Allprotect Tissue Reagent at 25°C for 3 days.
- Total RNA was purified from 10 mg tissue using the following kits: RNeasy Fibrous Tissue Mini Kit (heart), RNeasy Lipid Tissue Mini Kit (brain and bone), RNeasy Mini Kit (all other tissues).
- Purified total RNA was analyzed on a 1% formaldehyde agarose gel.

QIAGEN kits compatible with Allprotect Tissue Reagent

| Analytes purified | Recommended kit |
|--|---|
| Genomic DNA, total RNA and total protein | AllPrep DNA/RNA/Protein Mini Kit |
| Genomic DNA and total RNA | AllPrep DNA/RNA Micro Kit AllPrep DNA/RNA Mini Kit AllPrep DNA/RNA/miRNA Universal Kit |
| Genomic DNA | DNeasy Blood & Tissue Kit QIAamp DNA Mini Kit |
| Total RNA | RNeasy Plus Micro Kit (for small tissue samples) RNeasy Mini Kit (for easy-to-lyse tissues) RNeasy Plus Mini Kit (for easy-to-lyse tissues) RNeasy Fibrous Tissue Mini Kit (for fibrous tissues) RNeasy Lipid Tissue Mini Kit (for fatty tissues) RNeasy Microarray Tissue Mini Kit (for tissue samples for microarray analysis) |
| Total protein | Qproteome Mammalian Protein Prep kit |

Co-extraction of RNA and protein from cells and tissue

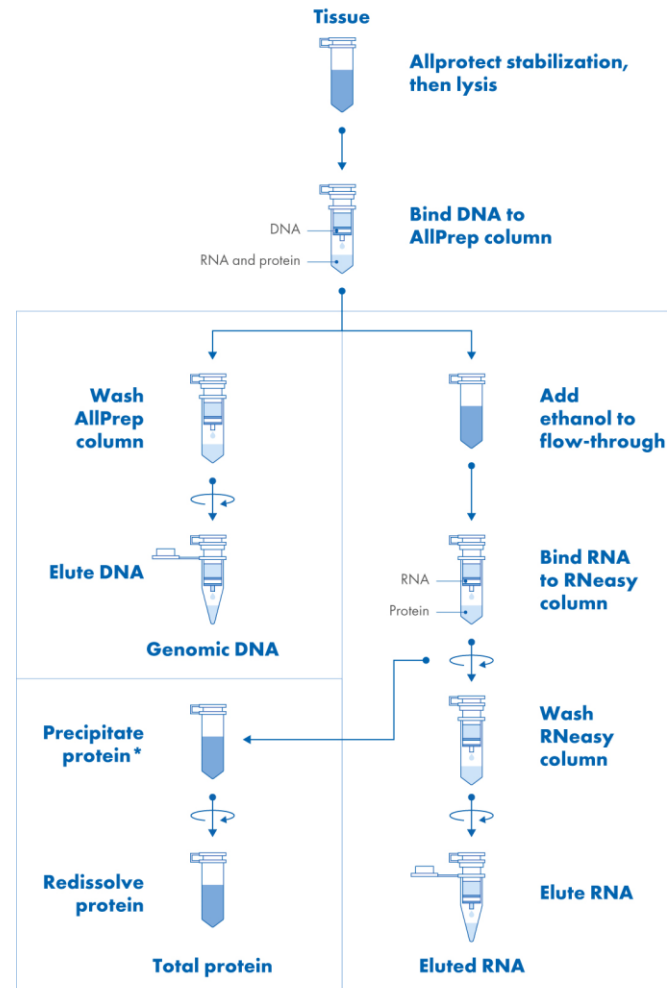


Mechanism of Allprotect stabilization



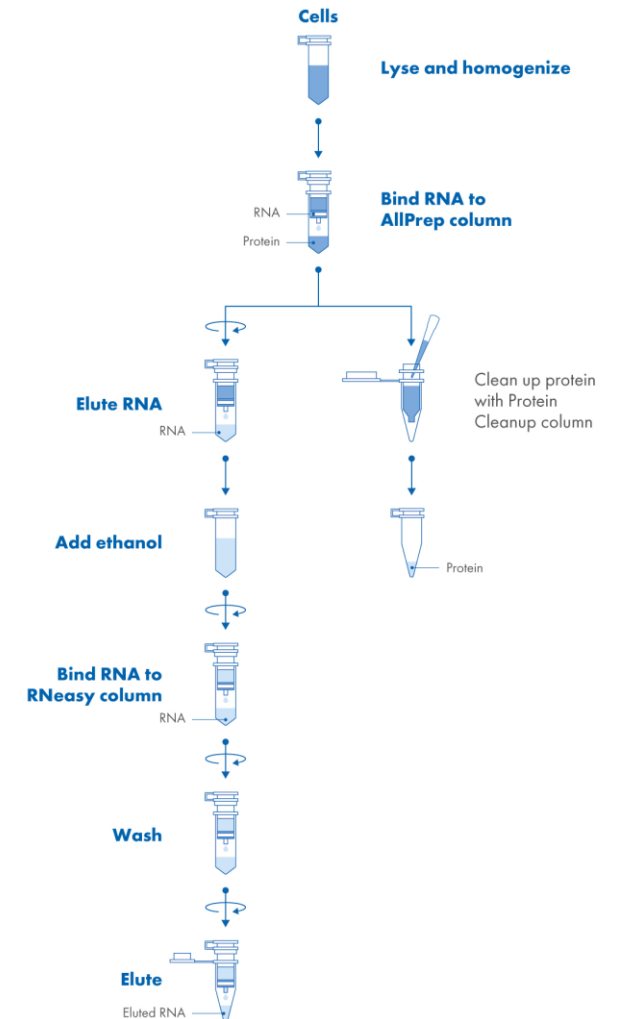
| | AllPrep DNA/RNA/Protein Mini | AllPrep RNA Protein |
|-----------------------|---|-----------------------------------|
| Format | Mini column | Mini column |
| Target | gDNA, RNA (>200 nt), protein (denatured) | RNA (>200 nt), and native protein |
| Sample | <1 x 10 ⁷ cells, <30 mg tissue | 700 µL |
| Elution volume | RNA: 30–50 µL, DNA: 100–200 µL | 30–50 µL |
| Processing | Manual (centrifugation) | |
| Features | Can be used in combination with Allprotect Tissue Reagent | |
| Protein | Denatured, suitable for western blots | Native protein |

AllPrep DNA/RNA/Protein Procedure



* Using a novel protein precipitation solution.

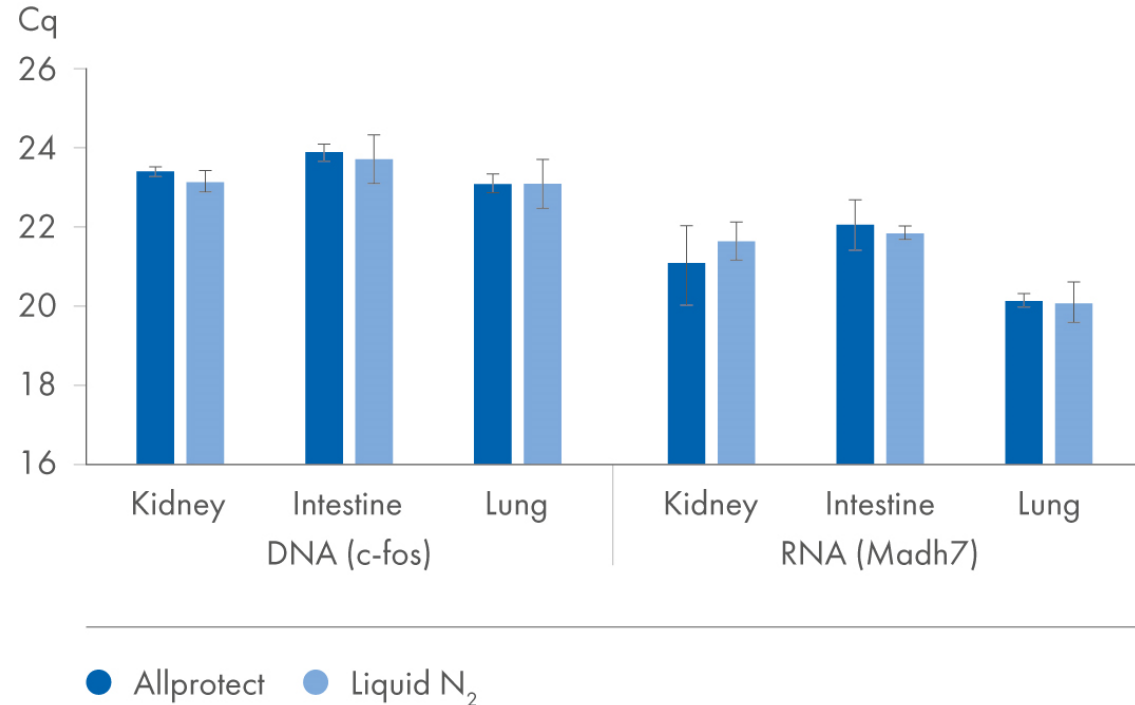
AllPrep RNA/Protein Procedure



AllPrep DNA/RNA/Protein Mini – co-extraction of DNA, RNA and protein from cells and tissue

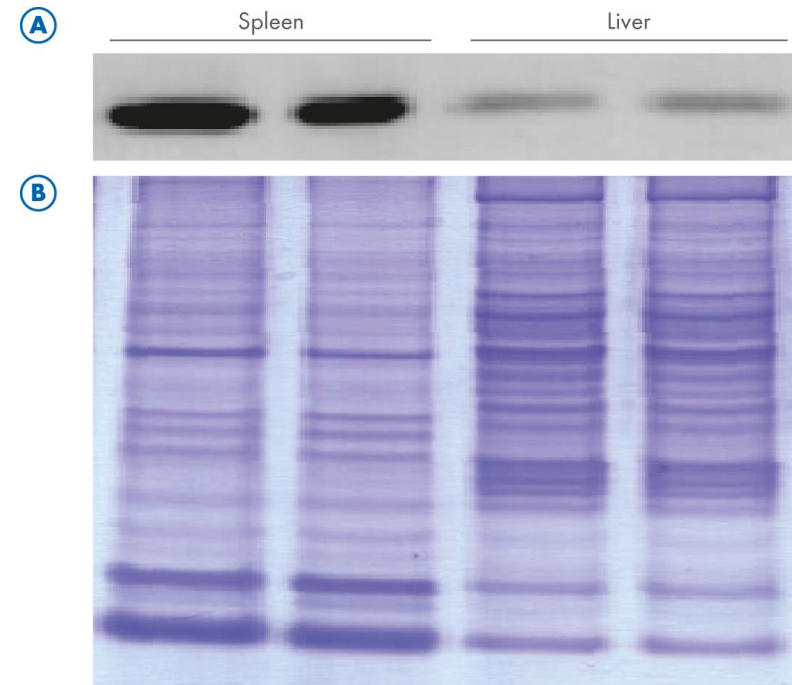


DNA/RNA – real-time PCR and RT-PCR analyses



- Rat tissues were stabilized in Allprotect Reagent, and DNA and RNA were purified using the AllPrep DNA/RNA/Protein Mini Kit
- The Cq values in real-time PCR and real-time RT-PCR analyses were similar to those achieved with tissues stabilized in liquid nitrogen

Protein – western blotting and SDS-PAGE



- Rat tissues were stabilized in Allprotect Reagent, and protein was purified using the AllPrep DNA/RNA/Protein Mini Kit
- Duplicates were run on an SDS-PAGE gel, followed by [A] western blotting for ERK2 and [B] Coomassie staining

AllPrep DNA/RNA FFPE – co-extraction of RNA, DNA from FFPE samples



Maximum output from minimal sample input

- Releases DNA/RNA while maintaining integrity
- Effectively separates RNA and DNA
- Comprehensive DNA and RNA analysis from the same FFPE sample

To learn more about successful molecular analysis from FFPE samples, [visit the FFPE resource center](#) or [download the Technical guidelines](#)



| | AllPrep DNA/RNA FFPE | EZ2 AllPrep DNA/RNA FFPE |
|-----------------------|---|--------------------------------|
| Format | Mini column | Cartridge/ mag beads |
| Target | gDNA, RNA including miRNA (>18 nt) | |
| Sample | FFPE, max. 4 x 10 µm sections or 2 x 20 µm sections | |
| Elution volume | RNA: 14–30 µL; DNA: 30–100 µL | RNA: 50–60 µL; DNA: 100–120 µL |
| Processing | Manual (centrifugation) | Automated on EZ2 |

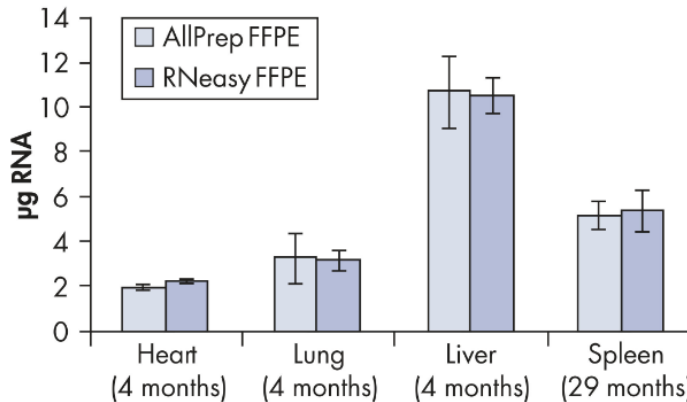
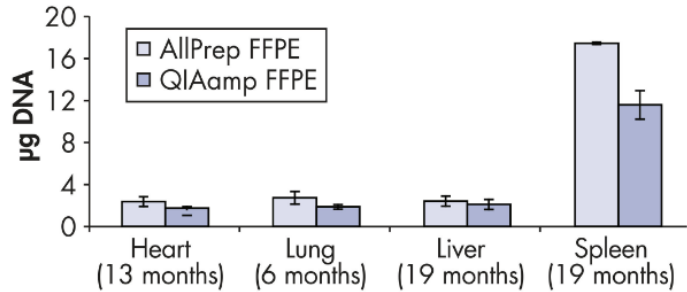


Did you know? Because healthy and tumor cells are often distributed heterogeneously in tumor tissue, the cellular makeup of various sections from the same sample may differ. Consequently, purifying a sample by simply dividing it in half for distinct DNA and RNA purification results in the purification of DNA and RNA from different populations of cells, each of which may have unique features. This is avoided by purifying DNA and RNA from the same sample simultaneously

AllPrep DNA/RNA FFPE – co-extraction of RNA, DNA from FFPE samples

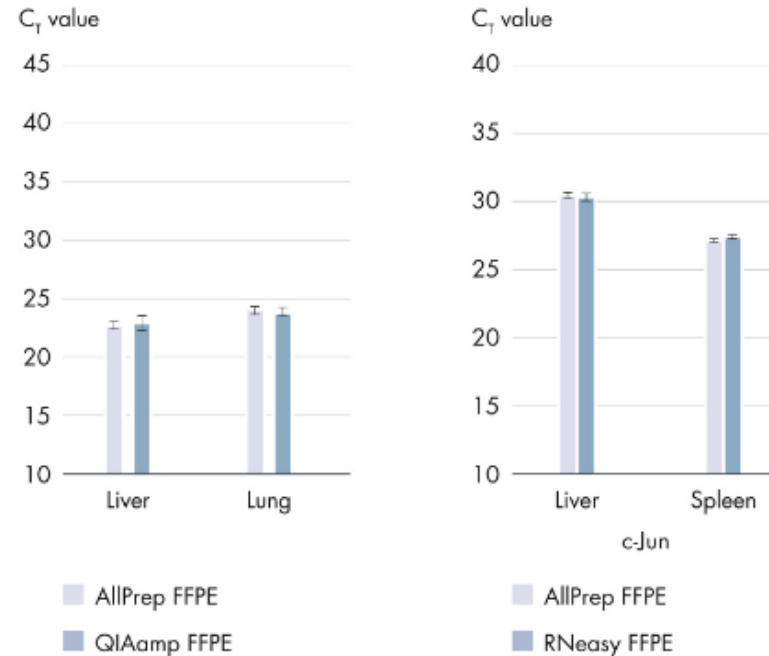


Purification of DNA and RNA from FFPE samples



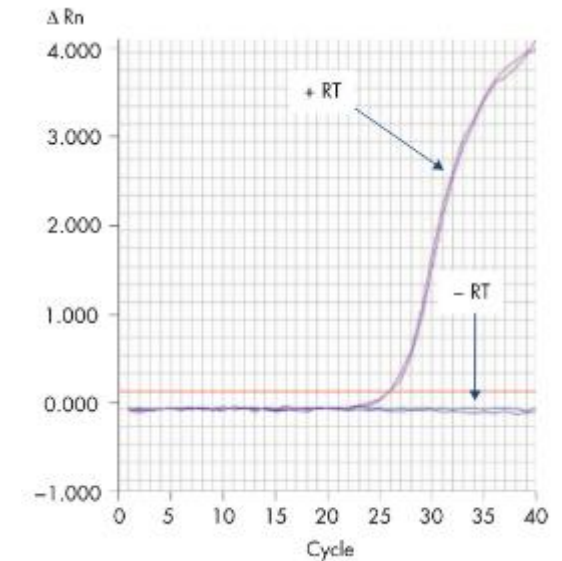
- Genomic DNA was purified from various FFPE rat tissues, which were stored at room temperature for the indicated times (A)
- RNA was purified from various FFPE rat tissues that were stored at room temperature for the times indicated (B)

Reliable amplification of DNA and RNA from FFPE samples



- DNA and RNA were purified from various FFPE rat tissues using either the AllPrep DNA/RNA FFPE Kit or, as a control, dedicated kits for DNA or RNA purification from FFPE samples (QIAamp DNA FFPE Tissue Kit or RNeasy FFPE Kit)
- The AllPrep Kit and the dedicated kits provided comparable Ct values, indicating that all kits achieved similar efficiency in recovering usable DNA or RNA.

Efficient removal of gDNA from DNA eluate



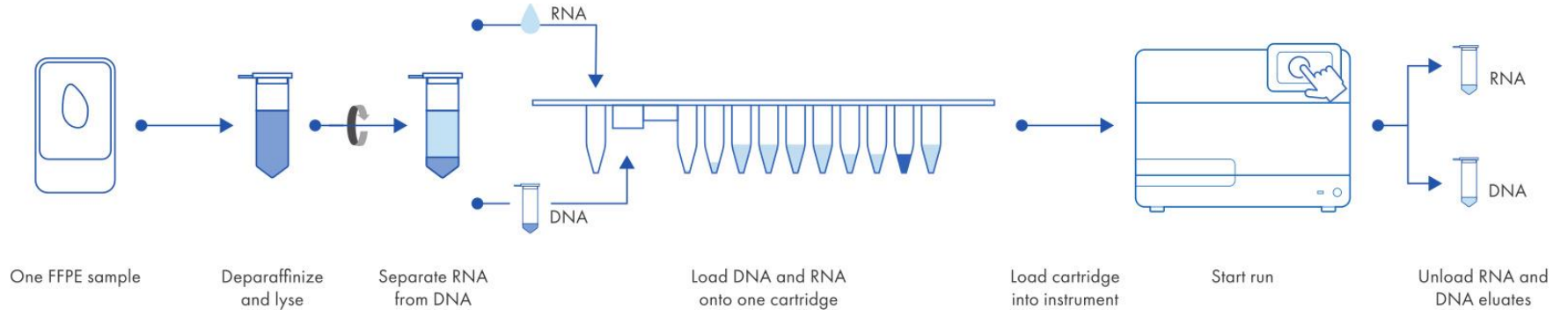
- Analysis of Jun expression was carried out without reverse transcriptase (-RT).
- The amplification plot for the spleen sample, a DNA-rich tissue, indicated the virtual absence of genomic DNA contamination.

EZ2 AllPrep DNA/RNA FFPE – automated, simultaneous purification of DNA and RNA from FFPE samples

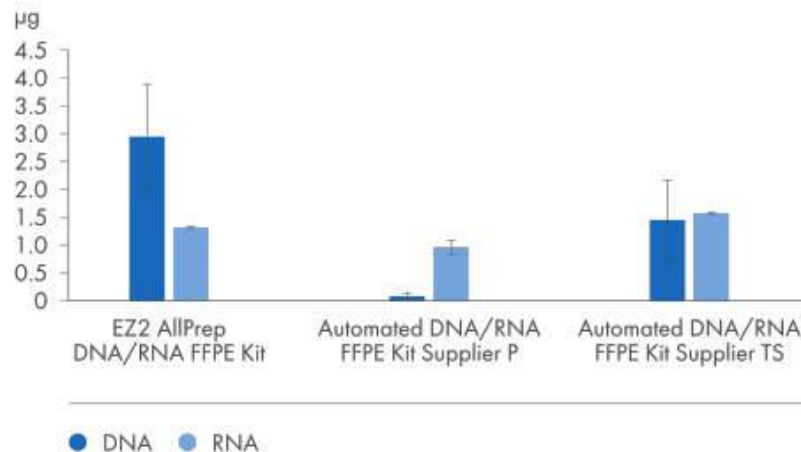


Patented technology to extract DNA and RNA from the same sample – no need to divide the sample

- Elution of DNA and RNA in separate fractions offers convenient downstream analysis
- Reduces sample consumption
- Optimizes crosslink removal for both DNA and RNA
- No overnight proteinase K incubation

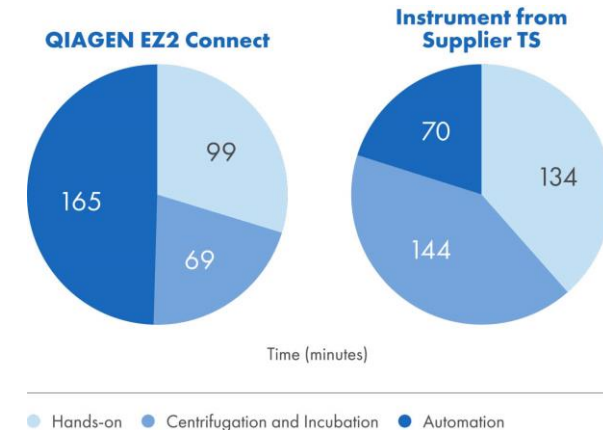


DNA and RNA yields from human spleen



- RNA and DNA were extracted from human spleen FFPE tissue samples according to manufacturer's instructions
- For the EZ2 AllPrep DNA/RNA FFPE Kit, the fast-decrosslinking workflow was used. Nucleic acid yield was quantified using a Qubit RNA HS Assay or a Qubit dsDNA BR Assay

High degree of automation

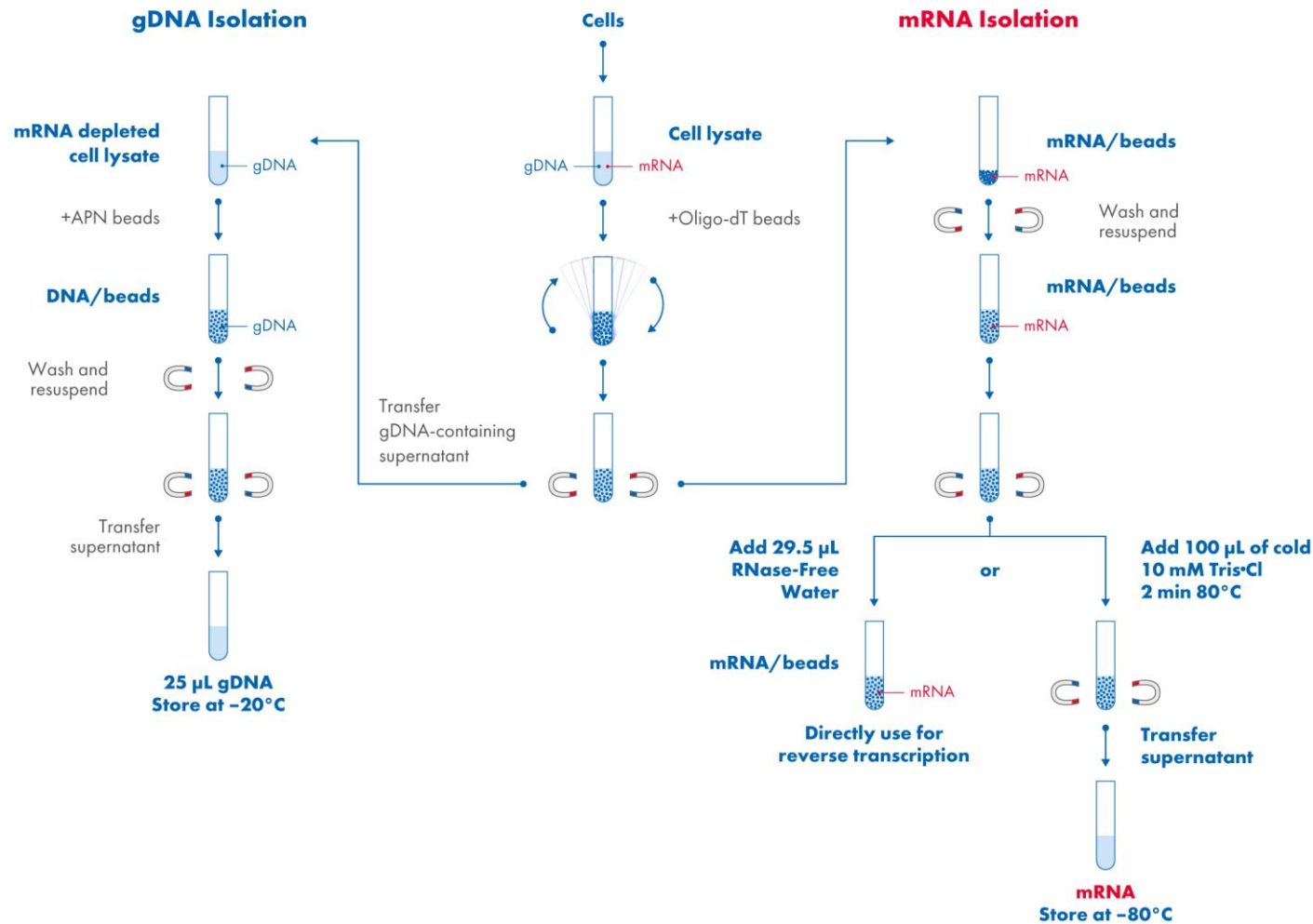


- The EZ2 Connect workflow for extraction using the AllPrep DNA/RNA FFPE Kit offers a clear automation advantage
- Approximately 50% of the entire run time is automated and requires 35 minutes less hands-on time than the workflow from Supplier TS

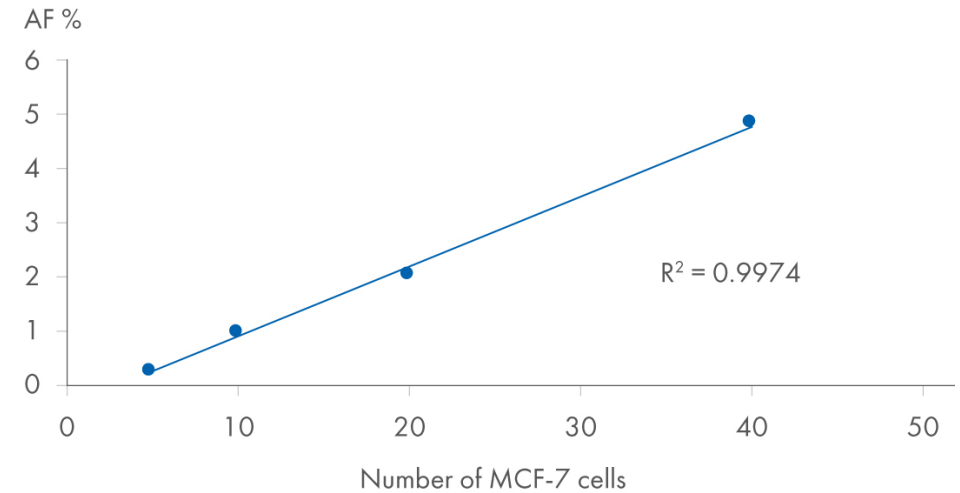
AllPrep DNA/mRNA Nano – co-purification of HMW DNA and mRNA purification from low-biomass samples



AllPrep DNA/mRNA Nano Kit Procedure

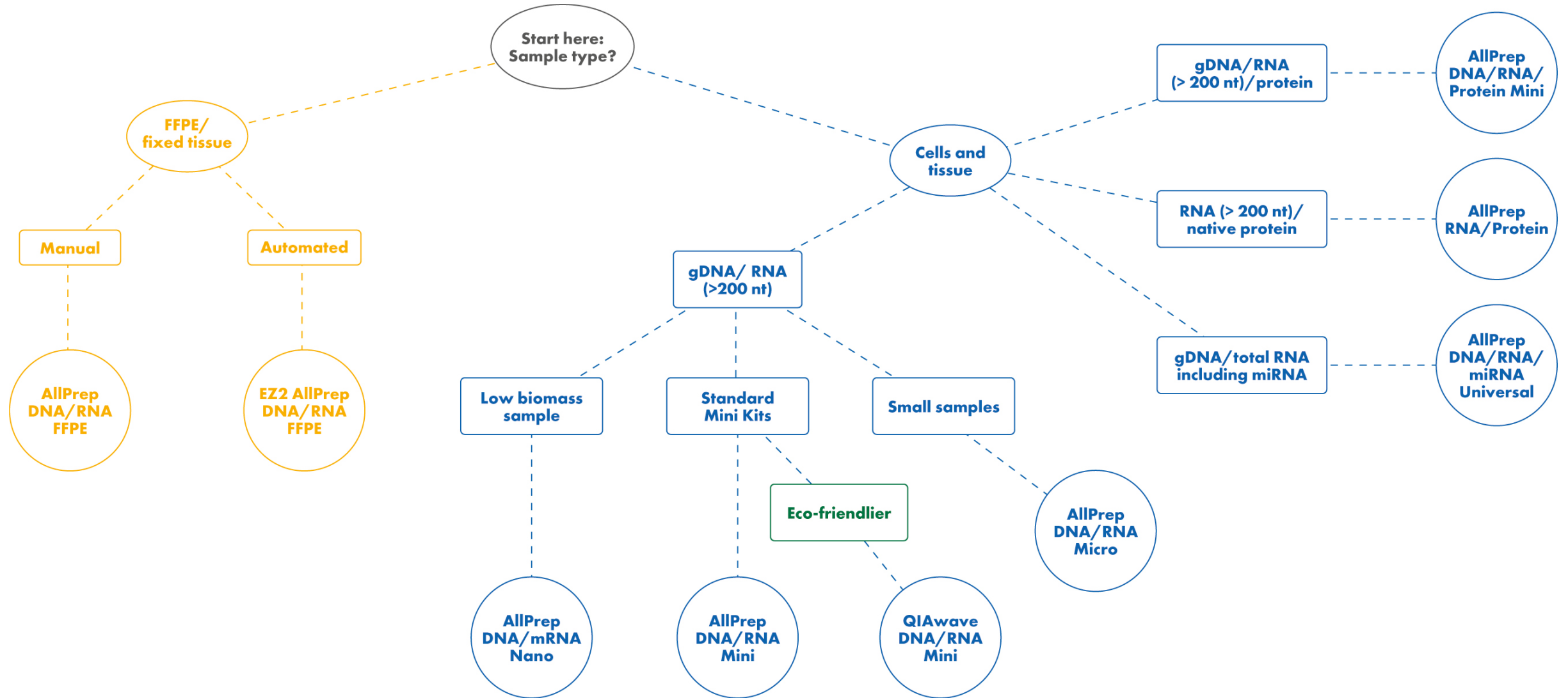


Works with minimal amounts of cells



- Pyrosequencing for *PIK3CA* hotspot mutation E545K was done on gDNA isolated using the AllPrep DNA/mRNA Nano Kit
- Mutation detection is feasible down to five MCF-7 cells spiked in 5 mL of blood

Choose the right kit for your multianalyte workflow





Thank you for your attention. Questions?

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