

Automated sample preparation and tissue DNA extraction.

Workflow highlights

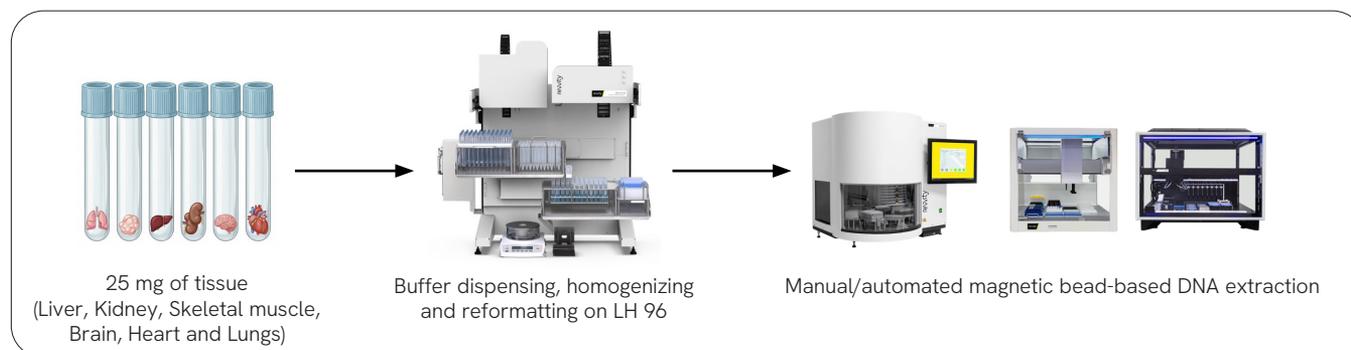
- End-to-end sample preparation for a variety of fresh or bio-banked tissues.
- Compatible with multiple tissue types in a single sample preparation method.
- Consistency in eluted DNA through normalization of sample to lysis buffer, complete lysis of cellular matrices, and removal of operator induced error.

Methods

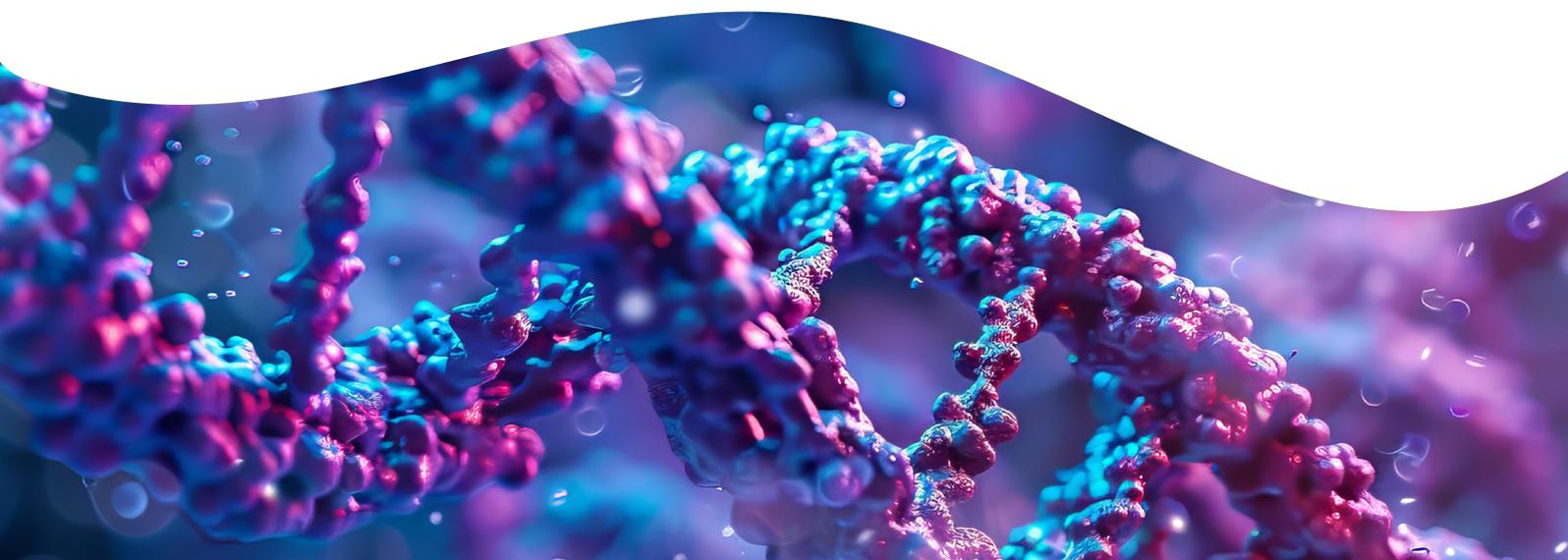
Mouse tissues including liver, kidney, brain, heart, skeletal muscle, and lungs (n=16) were excised and stored at -80 °C prior to sectioning. Approximately 25 mg (±1 mg) of frozen tissue was sectioned and transferred into 5 mL round-bottom tubes.

A lysis buffer-proteinase K master mix was prepared according to the kit instructions, and 600 µL was dispensed into each tube using the LH 96 dispense function. Samples were homogenized on the LH 96 automated homogenizer workstation using 5 mm Omni Tip™ plastic homogenizing probes under the conditions listed in Table 1.

Following homogenization, samples were incubated off-deck at 70 °C for 15 minutes, then centrifuged at 3,500 × g for 10 minutes. A 300 µL aliquot of each lysate was transferred to a 96-well plate using the reformatting function on the LH 96, and nucleic acids were extracted using a magnetic bead-based protocol per the kit instructions. Nucleic acids were eluted in 60 µL of elution buffer and quantified using a Thermo Scientific™ NanoDrop™ 2000 Spectrophotometer.



| Figure 1: Overview of the automated tissue homogenization and DNA extraction workflow.



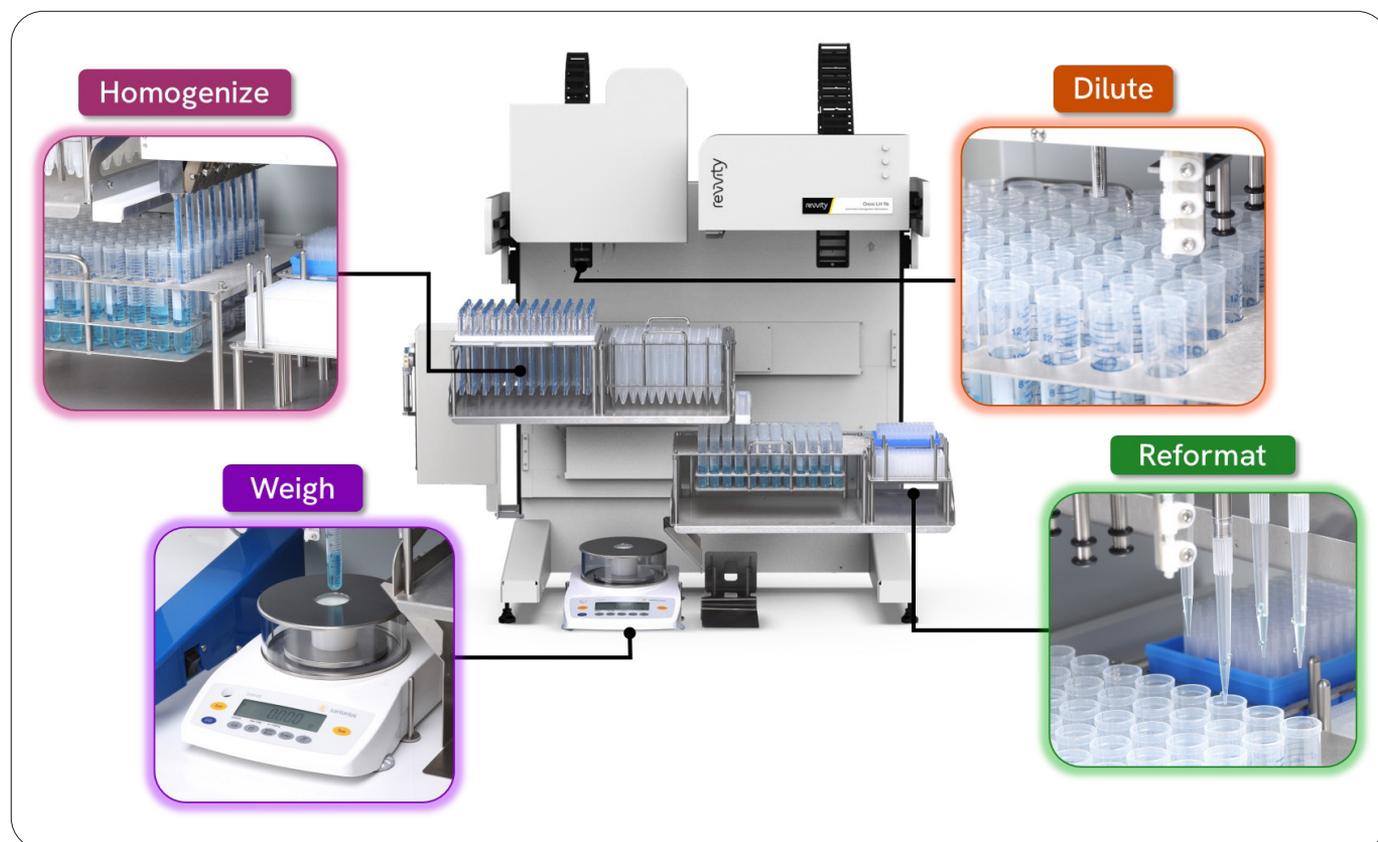


Figure 2: Automated tissue homogenization setup on the LH 96 automated homogenizer workstation, showing sample weighing, buffer addition, homogenization using 5 mm Omni Tip plastic homogenizing probes, reformatting into a 96-well plate, and optional passive cooling in 5 mL tube racks.

Homogenizing parameters			
Homogenization speed	20,000 rpm	Up/down velocity	25 mm/s
Homogenization duration	100 sec	Left/right distance	4 mm
Height from bottom of tube	2 mm	Left/right velocity	25 mm/s
Up/down distance	5 mm	Delay for each movement	0 msec
Touchoff probes parameters			
Height below tube rim	20 mm	Touchoff speed	12,000 rpm
Distance from center of tube	3 mm	Touchoff duration	5 sec
Reformatting parameters			
Reformat volume	250 μ L	Dispense flow rate	50 μ L/s
Aspiration height from bottom	5 mm	Dispense height from bottom	5 mm
Aspiration flow rate	50 μ L/s		

Results and conclusions

- All tissue types were effectively homogenized on the LH 96 using 5 mm Omni Tip plastic homogenizing probes.
- High quantity and quality DNA was successfully extracted from the lysate, with the quality ratios within the expected range making it compatible with DNA related downstream applications.
- Tissue-dependent differences in DNA yield reflect inherent biological variation rather than limitations of the homogenization or extraction process.
- This fully automated, end-to-end solution provides a robust and reproducible approach for tissue homogenization and DNA extraction, reducing hands-on time while ensuring consistent data quality across sample types.
- Homogenized samples can also seamlessly integrate with automated nucleic acid extractors (e.g., chemagic™ 360) as well as liquid handling platforms supporting manual magnetic bead-based kits (e.g., Fontus™ or AssayMate™ workstations).

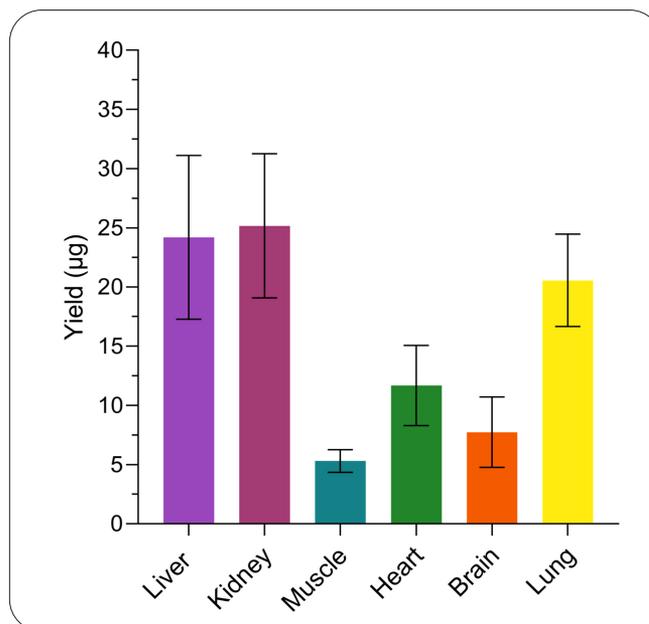


Figure 3: DNA yield from multiple tissue samples (n=16) with error bars representing the standard deviation.

Table 1: Average DNA concentration, purity ratios (A260/A280 and A260/A230), and reproducibility for samples extracted from different mouse tissues after automated homogenization.

Organs (n=16)	Average of nucleic acid conc. (ng/µl)	Standard deviation of nucleic acid conc.	A260/280	A260/230	RSD
Brain	128.90	47.95	1.89	1.57	37%
Heart	194.63	54.57	1.91	1.90	28%
Kidney	419.46	98.27	1.98	2.07	23%
Liver	403.23	111.60	2.02	1.96	28%
Lung	342.75	62.85	1.89	2.00	18%
Muscle	88.37	15.53	1.91	1.86	18%

Ordering info

Item	Part number	Description
LH 96 platform	53-0001	LH 96 automated homogenizer workstation
Standard sample tube racks	23-HWR-18	Sample rack 5 mL x 96 round bottom tubes - standard
Cooling sample tube racks and accessories	23-HWR-28	Sample rack 5 mL x 96 round bottom tubes - passive cooling
Probe racks	23-HWA-13E	Rack for 5 mm clean probes
	23-HWA-13B	Disposal rack for dirty probes
Disposable homogenizing probes	30550	5 mm plastic homogenizing probes (25/pk)
	32550	5 mm plastic homogenizing probes (50/pk)
	34550	5 mm plastic homogenizing probes (100/pk)
	35550	5 mm plastic homogenizing probes (500/pk)
	3M550	5 mm plastic homogenizing probes (1000/pk)
Bulk tubes	19-6605-500	5 mL round bottom tubes (500/pk)
Pipette tips	6076541	Pipette filter tips, clear, 175 μ L (960/pk)
	6077741	Pipette filter tips, clear, 900 μ L (2304/pk)
	6077762W	Pipette conductive filter tips, 1000 μ L, wide-bore (2304/pk)
Well and reservoir plates	27-520	2 mL 96 round well plates (10/pk)
	6008730	1 well reservoir plate (25/pk)
	6008710	4 well reservoir plate (25/pk)

