

new

ChargeSwitch® Genomic DNA Purification Kits

Reliable genomic DNA preparation performance—even from the very smallest of samples.

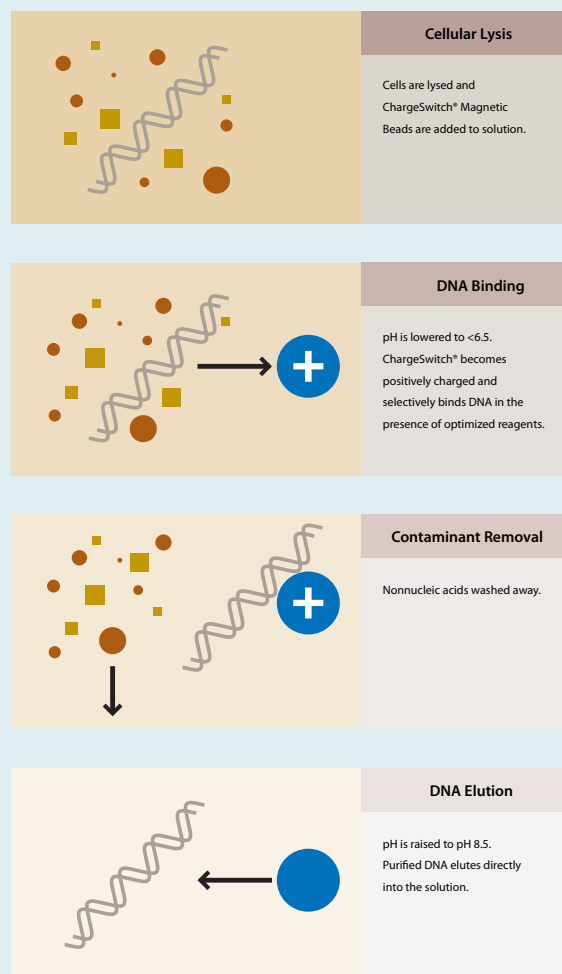
ChargeSwitch® Technology is a revolutionary yet simple nucleic acid purification method that provides high recovery yields even when working with very small samples. Using a special application of the pKa chemical concept, ChargeSwitch® purification employs 100% water-based buffers that “turn on” or “turn off” a pH-dependent ionic switch. It uses a covalent chemical linkage that enables the binding and release of nucleic acids to be mediated by simply changing the pH of the solution. Surfaces treated by ChargeSwitch® Technology carry a positive charge at low pH (<pH 6.5) and are neutral at higher pH (>pH 8.5) (Figure 1). Nucleic acids bind to the positive-charged ChargeSwitch® surface, while other sample components pass through. Increasing the pH elutes the bound nucleic acid. Purified nucleic acids are free of chaotropic salts, ethanol, and other common inhibitors.

ChargeSwitch® Technology is flexible and can be easily adapted for automation. Kits are available for purifying plasmid DNA, genomic DNA (gDNA), PCR preparations cleanup, and RNA. Here we discuss two of the ChargeSwitch® Genomic DNA Purification Kits (Table 1).

Ideal for Small-Scale Samples. In standard purification procedures such as anion exchange and silica methods, DNA is inherently lost during purification. A small quantity of material is irreversibly bound to tube surfaces and in the dead volume of the matrix or membrane. This loss is a significant percentage for ultrasmall samples. With ChargeSwitch® Technology, the pH change triggers an adjustment in the surface attraction that releases the bound nucleic acid into the elution buffer, enabling recovery of the maximum percentage of nucleic acid. Employing a 100% aqueous method, any carryover of buffer components like ethanol or chaotropic salts (found in traditional chemistries) can be detrimental to sensitive downstream reactions. ChargeSwitch® Technology Kits include 100% water-based buffers that completely avoid the introduction of common enzyme inhibitors that can limit downstream applications, particularly when using very low levels of DNA.

ChargeSwitch® gDNA Micro Tissue Kit. This kit provides the high levels of performance required to purify high-quality genomic DNA from the smallest, most

Figure 1. Overview of ChargeSwitch® Technology.



DNA is purified in a low-salt, water-based environment, avoiding the introduction of known enzymatic inhibitors such as organic solvents, ethanol, and concentrated chaotropic salts. As a result, DNA purified using ChargeSwitch® Technology performs exceptionally well in challenging downstream processes.

Table 1. ChargeSwitch® Genomic DNA Purification Kits source materials and expected yields.

Kit	Source Material	Expected Yield
ChargeSwitch® gDNA Micro Tissue Kit	Mouse ear clips or 3 mg to 5 mg tissue	Up to 5 µg
ChargeSwitch® gDNA Mini Tissue Kit	0.5 cm tail tips or 20 mg to 25 mg of tissue	Up to 30 µg

Featured Products

demanding applications such as laser-microdissected tissue samples (3 mg to 5 mg) and mouse ear clips. In a recent study, ChargeSwitch® Technology was used to purify DNA from laser-microdissected sperm cell heads, demonstrating successful real-time PCR from a relative sensitivity of 1.5 cells (Figure 2). The ChargeSwitch® gDNA Micro Tissue Kit offers the flexibility of an overnight or rapid protocol to maximize efficiency in the laboratory. Whatever your choice, you will achieve reliable PCR performance from a range of microtissue samples.

ChargeSwitch® gDNA Mini Tissue Kit. This kit is ideal for conducting high-quality DNA purification of miniscale tissue samples, including 0.5-cm tail tips or 20 mg to 25 mg of a wide variety of tissues. This quick and reliable protocol enables purification from multiple tissue types (Figure 3). Purified gDNA is ideal for genotyping and high-efficiency PCR processing.

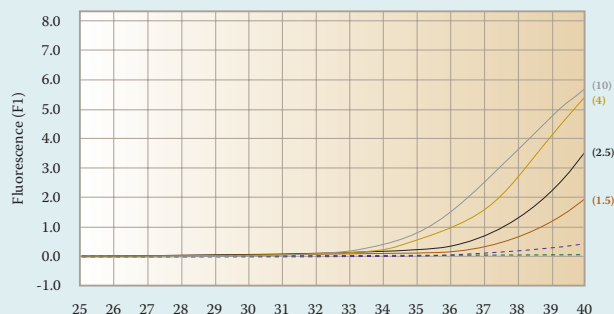
Formatted for Automation. ChargeSwitch® Technology features a magnetic bead format for easy scalability. The beads capture nucleic acids in solution through the charge-switch interaction. By simply altering the amount of beads used, you can customize the purification protocols to suit your specific needs. ChargeSwitch® protocols are compatible with standard liquid-handling robots, removing centrifugation or filtration steps and using reagents that will not clog lines or cause vapor pressure buildup (Figure 4). These uniformly shaped, specialized submicron beads provide a large surface area as well as the benefit of homogeneity, enabling them to stay in suspension longer without constant mixing to maintain uniform suspension.

Reliable Purification. ChargeSwitch® Technology is available for purifying gDNA from a variety of sources, including tissue, bacteria, blood, plants, buccal cells, and forensic samples. Kits are also available for purifying plasmid DNA and cleaning up PCR reactions. By taking advantage of the pH-dependent ChargeSwitch® concept, each kit provides reliable, high-quality purification of nucleic acid free from contaminants.

To order ChargeSwitch® Genomic DNA Purification Kits, please visit www.invitrogen.com/naprep or contact us at locations worldwide (see page 103).

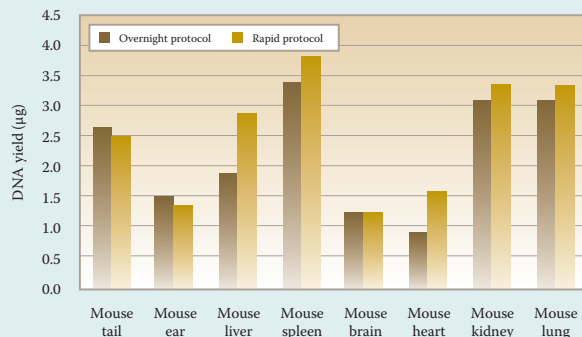
Product	Quantity	Catalog No.
ChargeSwitch® gDNA Micro Tissue Kit	50 preps	CS11203
ChargeSwitch® gDNA Mini Tissue Kit	25 preps	CS11204
MagnaRack™ Magnetic Rack (1.5-ml tube)	1 rack	CS15000
MagnaRack™ Magnetic Separator (24 well)	1 separator	CS15024
MagnaRack™ Magnetic Separator (50-ml tube)	1 separator	CS15050
MagnaRack™ Magnetic Separator (96 well)	1 separator	CS15096

Figure 2. Ultrasensitive purification from laser-microdissection samples.



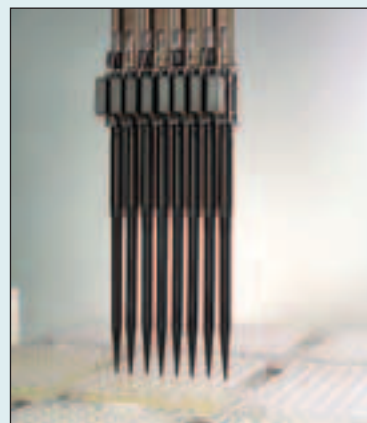
Diluted aliquots from 50 (black and red) and 20 (orange and grey) pooled single sperm cells collected by laser microdissection and pressure catapulting were amplified by PCR for the amolgenin gene. Numbers in brackets show input of corresponding cell equivalents as starting template. Dotted curves represent negative controls from a control sample catapulted from an empty glass area (green) or from an unspecified product (purple).

Figure 3. Reliable purification across multiple tissue types.



ChargeSwitch® gDNA Micro Tissue Kit used to purify genomic DNA from various tissue types. In analysis of DNA purity, A_{260}/A_{280} ratios of 1.7 to 1.9 were obtained.

Figure 4. ChargeSwitch® protocols are ready for automation.



ChargeSwitch® Technology protocol for the Freedom EVO™ System (Tecan).