



One-Step DNA Purification

One-Step DNA Purification

Genomic DNA purification is an essential first step in molecular biology, genomics, biotechnology, forensic analyses, and clinical research. Its quantity and quality are critical for successful immediate and downstream applications such as restriction enzyme digestion, PCR analysis, DNA labeling, qPCR, STR, etc. Large-scale DNA purification requires efficient purification of sufficient quantities of inhibitor-free nucleic acids from collecting large amounts of different sample materials such as blood, saliva, buccal cell, etc. Although the past decade has seen significant advances in DNA purification technology, it is still a big challenge for traditional methods to efficiently purify sufficient quantities of inhibitor-free nucleic acids from high-volume small samples. That is mainly due to the loss of DNA from tedious laboratories procedure. Although DNA purification can be accomplished by using a variety of different methods, the most common DNA extraction methods include Organic extraction, Solid phase extraction, Chelex extraction, and Direct PCR.

Organic extraction

Organic extraction is performed using PEG or phenol-chloroform extraction, followed by ethanol precipitation. These methods are not only time-consuming manual processes and make it easy to lose the DNA sample but also have a potential safety hazard and chemical disposal issues.

Chelex extraction

Chelex is a chelating resin that arrests polyvalent ions such as Ca^{2+} and Mg^{2+} to prevent DNA degradation by DNases. The benefits of utilizing Chelex include (a) simple and rapid procedure, (b) no usage of organic solvents, and (c) no multiple tube transfers. (d) No loss of DNA. However, the drawback of this method is that the PCR inhibitors are still present in the sample, and the DNA yielded is single-stranded, which means it is only used for PCR-based analyses and not for RFLP.

Direct PCR

Direct PCR, also called extraction-free PCR, is a DNA amplification method directly from a test sample without being subjected to prior DNA extraction and purification steps. This technique avoids the tedious extraction procedure and reduces the cost. However, the methods can only be applied using Tth DNA polymerase and not the widely used Taq DNA polymerase. Furthermore, extraction-free PCR technologies do not work consistently well in diverse samples.

Solid phase extraction

The most efficient nucleic acid extraction and purification methods must be developed and used to ensure successful downstream genetic profiling by PCR. The following processes are involved in DNA extraction: (1) rupture of cytoplasmic and nuclear membranes; (2) separation and purification of DNA from other cell lysate components such as lipids, proteins, and other nucleic acids; and (3) concentration and



purification of DNA. It is critical to ensure the quality and quantity of the isolated DNA to carry out the intended downstream applications when selecting an appropriate method for DNA extraction. Other factors to consider while optimizing the DNA extraction procedure include Time, cost, potential toxicities, yield, laboratory equipment, skill requirements, and the sample amount necessary for the protocol. Currently, two isolation strategies are used for DNA purification: negative chromatography purifying selection and positive chromatography purifying selection. In negative chromatography, impurities bond on the adsorbent, allowing DNA to pass through the chromatographic column. In contrast, positive chromatography retains the desired DNA in the stationary phase while unbound contaminants flow through the column.

Classic silica-derived spin columns and magnetic beads used for DNA and RNA purification are based on positive chromatography purifying selection. High chaotropic salt concentrations, such as guanidine hydrochloride, bind DNA or RNA to silica. The silica column or beads is washed with a salt/ethanol solution after nucleic acid binding to eliminate additional biomolecules from the sample. Finally, the column or beads is eluted using Tris elution buffer or water to remove the pure DNA or RNA. Such bind-wash-elute procedures are time-consuming, requiring multiple washing and spinning steps. Repetitive spin steps can cause considerable DNA loss (20-40%) and shearing. Furthermore, chaotropic salts and other impurities can easily pass through the eluted DNA or RNA, compromising ultimate purity and quantification as well as downstream enzymatic activities like PCR.

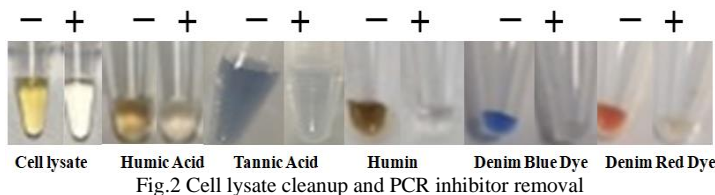
In contrast, negative chromatography purifying selection is a new nucleic acid purification technology that avoids the requirement for high salt binding and ethanol wash procedures, resulting in purer DNA and RNA preparations and more robust results. In negative chromatography, the multifunctional adsorbents efficiently capture and hold sample impurities such as protein, lipid, and ionic components in the sample while allowing nucleic acids to pass through the column, decreasing the number of steps and plastic materials required for purification. Additionally, since it does not touch the DNA and RNA molecules, no nucleic acids will get lost during the purification procedure.

Negative chromatography has three main advantages over positive chromatography:

- Simplified workflow-Single step, fast
- Superior performance- High quality and maximized DNA recovery with minimal loss of DNA.
- Waste reduction- Use fewer plastic tubes and no toxic substances.

BcMag™ One-step DNA Purification System

BcMag™ One-step DNA Purification System uses novel Negative chromatography magnetic beads to quickly deliver higher quality and superior DNA yield from biological samples. Those samples include blood, animal cells, plants, body fluids, stains, swabs of body fluids, Strip removed cells, cigarette butts, Hair, fingernail scrapings, epithelial cells, bite marks, semen, touch DNA samples, etc. The specially designed magnetic beads with our proprietary surface chemistry function simultaneously to lyse cells and capture the PCR inhibitors once mixed with the sample. The magnetic beads-PCR inhibitor complex was then magnetically removed by a magnet while the pure DNA remaining in the solution was ready for downstream analysis.



BcMag™ One-step DNA Purification System uses one tube, one step, and no toxic chemicals protocol to purify DNA from hundreds of samples without using expensive equipment in less than an hour.

Workflow of One-Step DNA purification system

1. Add functional magnetic beads to the sample.
2. Mix the samples with the magnetic beads and heat to lyse the cells.
3. Vortex for 5 minutes for the beads to capture the PCR inhibitors.
4. Remove the beads with a magnet.
5. Aspirate the supernatant containing the pure ready-to-use DNA.

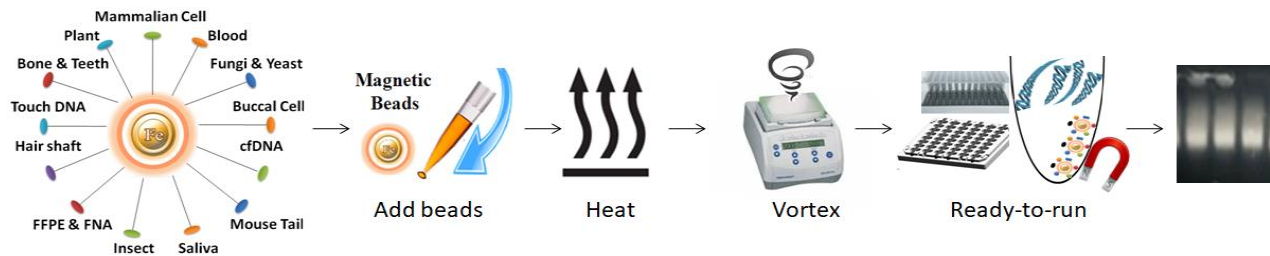
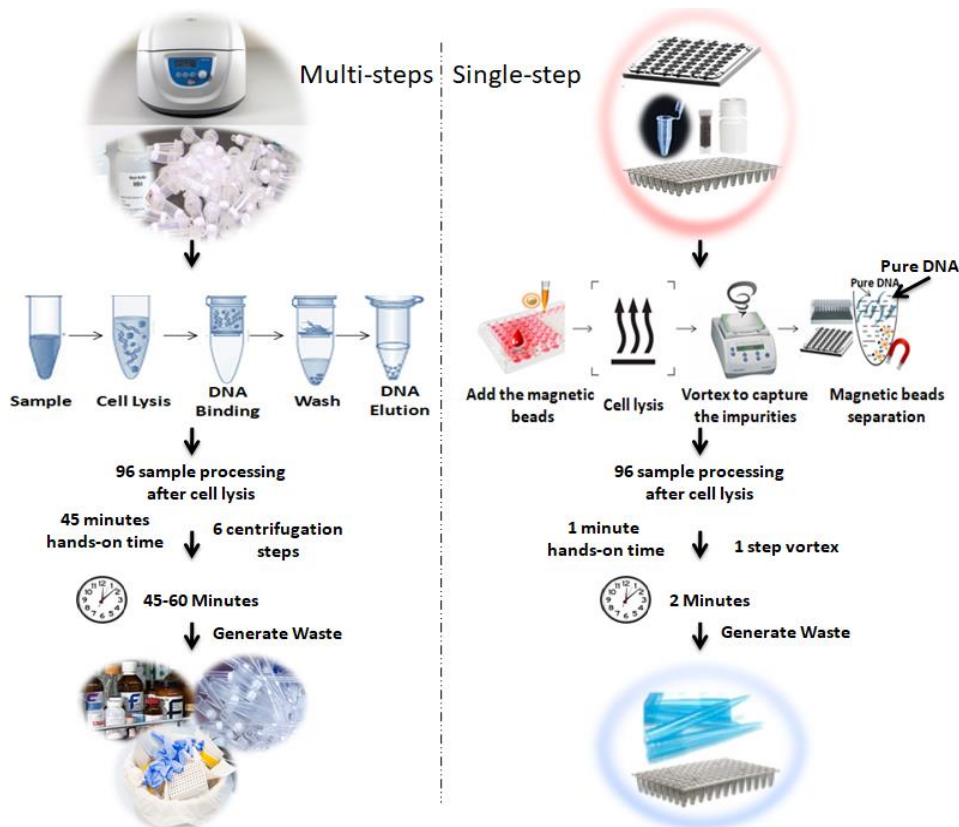


Fig.3 Workflow of One-Step DNA Purification

The workflow comparison of positive and negative DNA purification.



Scientists use magnetic bead separation as a quick, efficient, and hygienic alternative to traditional filtration, centrifugation, and separation processes. These tiny beads have a high surface-to-volume ratio and a small size range of 0.1-10 μm , which makes them easy to manipulate through an applied magnetic field. Combined with automated liquid handling and robust detection instrumentation, these properties enable a wide range of high-throughput applications.

Some of the key features and benefits of magnetic bead separation include:

- Rapid and efficient purification protocol: This method does not require prior DNA isolation for subsequent use in direct workflows, and it eliminates the need for liquid transfer and multiple tubes.
- Ultrafast: The process can purify up to 96 samples in less than an hour.
- Higher purity and DNA yield with minimal contamination with RNA from various trace samples.
- Effective removal of inhibitors: Magnetic bead separation can remove various substances such as polyphenolic compounds, humic/fulvic acids, acidic polysaccharides, tannins, melanin, heparin, detergents, denim dyes, divalent cations such as Ca^{2+} , Mg^{2+} , etc. (Fig.2).
- Cost-effective: This method eliminates the need for columns, filters, laborious repeat pipetting, and organic reagents.
- High throughput: Magnetic bead separation is compatible with many different automated liquid handling systems.

In summary, magnetic bead separation is a fast, efficient, and clean method with several advantages over traditional separation processes. It offers a rapid and efficient purification protocol, ultrafast processing time, higher purity and DNA yield, effective removal of inhibitors, cost-effectiveness, and high-throughput compatibility with many automated liquid handling systems.

Related Article

- [One-Step Forensic DNA Purification](#)
- [cfDNA and Its Applications](#)
- [One-Step PCR Purification](#)
- [PCR Inhibitor](#)

Mammalian Cell DNA purification

BcMag™ One-Step Mammalian Cell DNA Purification Kit allows rapid and efficient purification of genomic DNA from cells. It uses novel negative selection chromatography magnetic beads to quickly capture impurities such as PCR inhibitors from cell lysate (See "PCR inhibitor removal"), leaving the DNA untouched. It reduces the risk of DNA loss and carryover of extraction buffers from the traditional and tedious bind-wash-elute procedure. The purification kit provides a fast and simple method for DNA extraction with only one tube, no liquid transfer, and no requirement for carrier RNA. After preparing the lysates, it enables the processing of 96 samples in less than 15 minutes, with less than 1 minute of hands-on Time.



Principle and Workflow of mammalian cell DNA purification

Explore product

[One-Step Mammalian Cell DNA Purification Kit](#)

Bone and Teeth DNA Isolation

BcMag™ Bone and Teeth DNA Purification Kit are designed to extract total nucleic acids from bone and teeth samples efficiently and sequentially. The kit uses our unique proprietary magnetic beads in combination with an optimized demineralization buffer for higher yield and super-quality DNA. Purified genomic DNA has the highest integrity and can be used in various downstream applications such as qPCR, STR, etc. The procedure employs mild lysis conditions, avoiding harsh conditions such as alkaline lysis and toxic chemicals for lysing cells to maintain DNA integrity and the time-consuming cleanup of organic solvent from the sample.



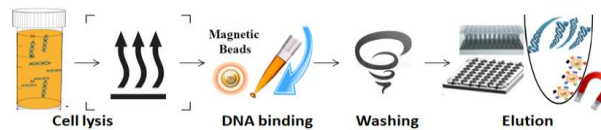
Workflow of Bone and Teeth DNA Purification Kit

Explore Product

[Bone-Teeth DNA Purification Kit](#)

cfDNA purification

BcMag™ Cell-Free DNA Purification Kit is designed to extract cfDNA from human plasma efficiently and sequentially. The kit uses our unique proprietary magnetic beads and an optimized buffer system. It can efficiently isolate circulating cell-free DNA (cfDNA) from 100 μL - 10 ml (Typical yields about 25 nanograms of cfDNA) of human plasma using Cell-Free DNA BCT collecting tubes. The procedure employs mild lysis conditions, avoiding harsh conditions such as alkaline lysis and toxic chemicals for lysing cells to maintain DNA integrity and the time-consuming cleanup of organic solvent from the sample. Purified cfDNA has the highest integrity and can be used in various downstream applications such as qPCR, ddPCR, NGS analysis, etc. When combined with an automation system, multiple samples can be isolated simultaneously. Alternatively, samples can be processed manually using a magnetic stand.



Workflow of cfDNA Purification Kit

Explore product.

- [Cell-Free DNA Purification Kit](#)
- [cfDNA and Its Applications](#)

Rootless Hair DNA Purification

BcMag™ Rootless Hair DNA Purification Kit is designed to extract total nucleic acids from single hair shaft samples efficiently and sequentially. The kit uses our unique proprietary lysis buffer to efficiently lyse hair cells and magnetic beads to purify hair shaft DNA.



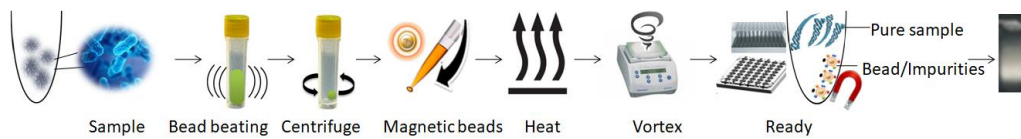
Workflow of Hair Shaft DNA purification

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[Rootless Hair DNA Purification Kit](#)

Bacteria DNA Purification

BcMag™ One-step Bacteria DNA Purification Kit allows rapid, column-free extraction of genomic DNA from microorganisms, such as Gram-positive or Gram-negative bacteria. The kit uses our unique proprietary magnetic beads and buffers to efficiently lyse cells and remove all impurities simultaneously in an aqueous buffer, leaving the DNA untouched. The procedure employs mild lysis conditions, avoiding harsh conditions such as alkaline lysis and toxic chemicals for lysing cells to maintain DNA integrity and the time-consuming cleanup of organic solvent from the sample. Furthermore, the magnetic beads eliminate PCR inhibitors from samples in a single step without DNA extraction. It increases DNA integrity, boosts nucleic acid yields, and minimizes DNA loss caused by typical DNA purification techniques' time-consuming "bind-wash-elute" procedure. Following sample lysis, the straightforward one-step purification technique enables the simultaneous processing of >96 samples and produces pure DNA in less than 30 minutes. Purified genomic DNA has the highest integrity and can be used in various downstream applications such as qPCR.



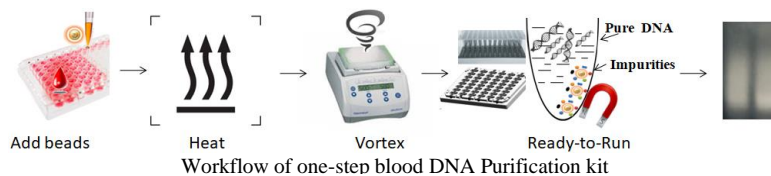
Workflow of one-step bacteria DNA Purification kit

Explore product.

[One-Step Bacteria DNA Purification Kit](#)

Blood DNA Extraction

BcMag™ One-step Blood DNA Purification Kit allows rapid and efficient purification of genomic DNA from whole blood, serum, plasma, or other body fluids. The kit uses our unique proprietary magnetic beads to efficiently lyse cells and remove all impurities simultaneously in an aqueous buffer, leaving the DNA untouched. The procedure employs mild lysis conditions, avoiding harsh conditions such as alkaline lysis and toxic chemicals for lysing cells to maintain DNA integrity and the time-consuming cleanup of organic solvent from the sample. Furthermore, the magnetic beads eliminate PCR inhibitors from samples in a single step without DNA extraction. It increases DNA integrity, boosts nucleic acid yields, and minimizes DNA loss caused by typical DNA purification techniques' time-consuming "bind-wash-elute" procedure. Following sample lysis, the straightforward one-step purification technique enables the simultaneous processing of >96 samples and produces pure DNA in less than 30 minutes. Purified genomic DNA has the highest integrity and can be used in various downstream applications such as qPCR, STR, etc.



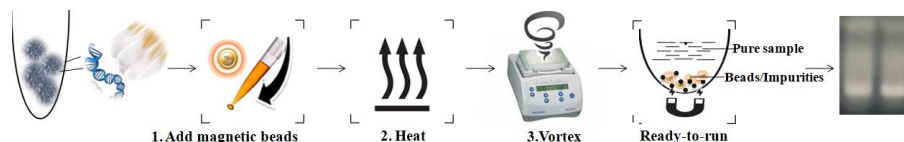
Explore product

[One-Step Blood DNA Purification Kit](#)

Buccal Cell DNA Purification

BcMag™ One-Step Buccal Cell DNA Purification Kit allows rapid and efficient purification of genomic DNA from buccal swabs or pelleted cells from a mouthwash. It uses novel negative selection chromatography magnetic beads to quickly capture and remove the impurities, such as PCR inhibitors from cell lysate, leaving the DNA untouched. It reduces the risk of DNA loss and carryover of extraction buffers from the

traditional tedious bind-wash-elute procedure. The purification kit provides a fast and straightforward DNA extraction method with only one tube, no liquid transfer, and no requirement for carrier RNA. After preparing the lysates, Hundreds of samples can be processed in less than 30 minutes without using expensive equipment.



Principle and Workflow of Buccal Cell DNA Purification

Explore product.

[One-Step Buccal Cell DNA Purification Kit](#)

FFPE & FNA DNA Purification

BcMag™ One-Step FFPE & FNA DNA purification Kit is designed to extract total nucleic acids from 2µm - 5µm Formalin-Fixed, Paraffin-Embedded (FFPE) tissue or Fine Aspiration Biopsy samples efficiently and sequentially. The kit employs our unique magnetic beads to efficiently remove paraffin from FFPE tissue samples in an aqueous buffer while simultaneously rehydrating the tissue. The procedure eliminates flammable and odorous xylene or d-limonene and the time-consuming cleanup of organic solvent from frequently hardly visible tissue pellets commonly employed for deparaffinization. Furthermore, the kit is unique because the magnetic beads can remove PCR inhibitors from samples in a single step without needing DNA extraction. Therefore, it increases nucleic acid yields and avoids DNA loss caused by the time-consuming "bind-wash-elute" procedure used in traditional DNA purification techniques. Following sample lysis, the straightforward one-step purification technique is ideal for the simultaneous processing of >96 samples and produces pure DNA in less than 30 minutes. Purified genomic DNA has the highest integrity and can be used in various downstream applications such as qPCR, mutation screening, microarray analyses, sequencing, Southern blotting, and SNP analysis.



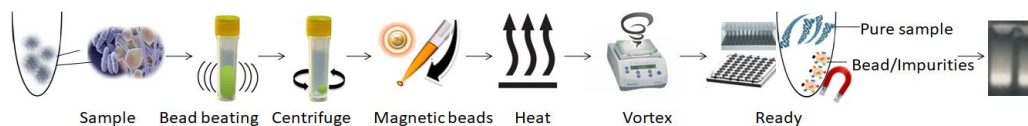
Principle and Workflow of FFPE & FNA DNA Purification

Explore product.

[One-Step FFPE and FNA DNA purification Kit](#)

Fungi & Yeast DNA Purification

BcMag™ One-Step Fungi & Yeast DNA Purification Kit allows rapid, column-free extraction of genomic DNA from microorganisms, such as fungi and yeast. The kit uses our unique proprietary magnetic beads and buffers to efficiently lyse cells and remove all impurities simultaneously in an aqueous buffer, leaving the DNA untouched. The procedure employs mild lysis conditions, avoiding harsh conditions such as alkaline lysis and toxic chemicals for lysing cells to maintain DNA integrity and the time-consuming cleanup of organic solvent from the sample. Furthermore, the magnetic beads eliminate PCR inhibitors from samples in a single step without DNA extraction. It increases DNA integrity, boosts nucleic acid yields, and minimizes DNA loss caused by typical DNA purification techniques' time-consuming "bind-wash-elute" procedure. Following sample lysis, the straightforward one-step purification technique enables the simultaneous processing of >96 samples and produces pure DNA in less than 30 minutes. Purified genomic DNA has the highest integrity and can be used in various downstream applications such as qPCR.



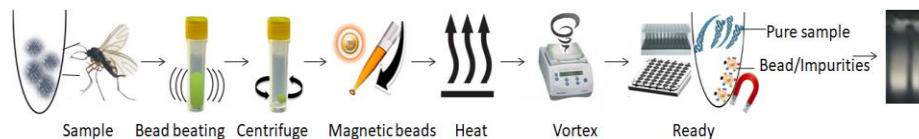
Workflow of one-step fungi, yeast DNA purification

Explore product.

[One-Step Fungi and Yeast DNA Purification Kit](#)

Insect DNA Extraction

BcMag™ One-Step Insect DNA Purification Kit allows rapid, column-free extraction of genomic DNA from fresh, frozen, or stored insect specimens such as mosquitoes, bees, lice, ticks, and *D. melanogaster*. The kit uses our unique proprietary magnetic beads and buffers to efficiently lyse cells and remove all impurities simultaneously in an aqueous buffer, leaving the DNA untouched. The procedure employs mild lysis conditions, avoiding harsh conditions such as alkaline lysis and toxic chemicals for lysing cells to maintain DNA integrity and the time-consuming cleanup of organic solvent from the sample. Furthermore, the magnetic beads eliminate PCR inhibitors from samples in a single step without DNA extraction. It increases DNA integrity, boosts nucleic acid yields, and minimizes DNA loss caused by typical DNA purification techniques' time-consuming "bind-wash-elute" procedure. Following sample lysis, the straightforward one-step purification technique enables the simultaneous processing of >96 samples and produces pure DNA in less than 30 minutes. Purified genomic DNA has the highest integrity and can be used in various downstream applications such as qPCR.



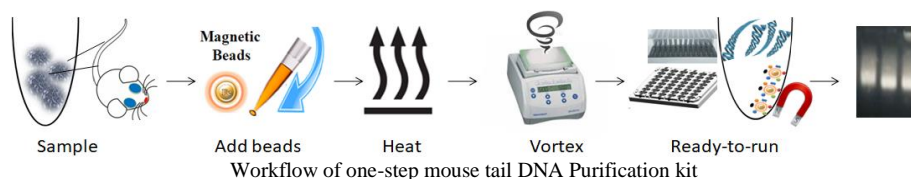
Workflow of one-step insect DNA Purification

Explore product.

[One-Step Insect DNA Purification Kit](#)

Mouse Tail DNA Purification

BcMag™ One-step Mouse Tail DNA Purification Kit allows rapid, column-free extraction of genomic DNA from mouse tail, ear, ear punch, or other animal tissue. The kit uses our unique proprietary magnetic beads and buffers to efficiently lyse cells and remove all impurities simultaneously in an aqueous buffer, leaving the DNA untouched. The procedure employs mild lysis conditions, avoiding harsh conditions such as alkaline lysis and toxic chemicals for lysing cells to maintain DNA integrity and the time-consuming cleanup of organic solvent from the sample. Furthermore, the magnetic beads eliminate PCR inhibitors from samples in a single step without DNA extraction. It increases DNA integrity, boosts nucleic acid yields, and minimizes DNA loss caused by typical DNA purification techniques' time-consuming "bind-wash-elute" procedure. Following sample lysis, the straightforward one-step purification technique enables the simultaneous processing of >96 samples and produces pure DNA in less than 30 minutes. Purified genomic DNA has the highest integrity and can be used in various downstream applications such as qPCR.

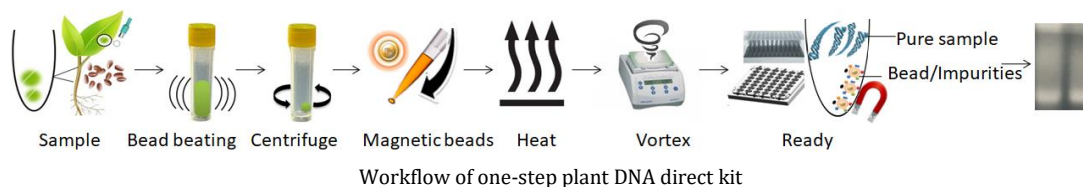


Explore product.

[One-Step Mouse Tail DNA Purification Kit](#)

Plant DNA Purification

BcMag™ One-Step Plant DNA Purification Kit allows rapid, column-free extraction of genomic DNA from various plant sample sources, including leaves, stems, buds, flowers, fruit, seeds, etc. The kit uses our unique proprietary magnetic beads and buffers to efficiently lyse cells and remove all impurities simultaneously in an aqueous buffer, leaving the DNA untouched. The procedure employs mild lysis conditions, avoiding harsh conditions such as alkaline lysis and toxic chemicals for lysing cells to maintain DNA integrity and the time-consuming cleanup of organic solvent from the sample. Furthermore, the magnetic beads eliminate PCR inhibitors from samples in a single step without DNA extraction. It increases DNA integrity, boosts nucleic acid yields, and minimizes DNA loss caused by typical DNA purification techniques' time-consuming "bind-wash-elute" procedure. Following sample lysis, the straightforward one-step purification technique enables the simultaneous processing of >96 samples and produces pure DNA in less than 30 minutes. Purified genomic DNA has the highest integrity and can be used in various downstream applications such as qPCR.

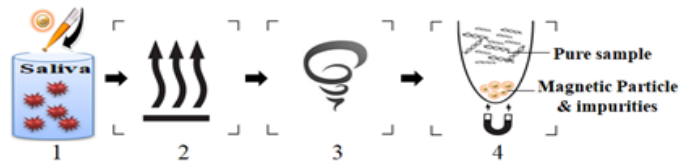


Explore product.

[One-Step Plant DNA Purification Kit](#)

Saliva Viral RNA-DNA Isolation

BcMag™ One-Step Saliva Viral RNA-DNA Purification Kit uses novel negative selection chromatography magnetic beads to quickly capture impurities such as PCR inhibitors from cell lysate, leaving the DNA /RNA untouched. Unlike standard tedious bind-wash-elute protocol, this convenient single-step and the extraction-free procedure does not contain traces of organic solvents, chaotropic salts, or EDTA, reducing the risk of DNA/RNA loss and carryover of extraction buffers, and recovers almost 100% DNA/RNA. The purification kit provides a fast and simple method for DNA/RNA purification with only one tube, no liquid transfer, and no requirement for carrier RNA. Hundreds of trace samples such as saliva and nasal-pharyngeal swabs in saline solution, nasal swabs, buccal swabs & sputum/saliva swabs can be processed in less than 15 minutes without using expensive types of equipment. The purified nucleic acid is ready for downstream applications: PCR, RT-PCR, RT-qPCR, LAMP, RT-LAMP.



Workflow of One-Step Saliva Viral RNA-DNA Purification

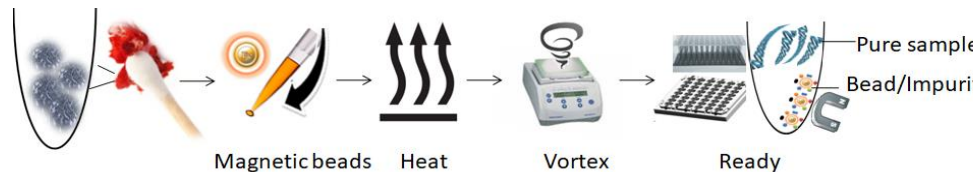
1. Add functional magnetic beads to the sample.
2. Mix the samples with the magnetic beads and heat to lyse the cells.
3. Mix by pipetting or vortexing to capture the impurity.
4. Magnetic capture the beads and aspirate the supernatant containing the pure ready-to-use

Explore product.

[One-Step Saliva Viral RNA and DNA Purification Kit](#)

Touch DNA Purification

BcMag™ One-Step Touch DNA Purification Kit uses novel Negative chromatography magnetic beads to quickly deliver higher quality and superior DNA yield from most trace touch samples. Those samples include body fluids, stains, swabs of body fluids, Strip removed cells, cigarette butts, Hair follicles, fingernail scrapings, epithelial cells, bite marks, semen, touch DNA samples, etc. The specially designed magnetic beads with our proprietary surface chemistry function simultaneously to lyse cells and capture the PCR inhibitors once mixed with the sample. The magnetic beads-PCR inhibitor complex was then magnetically removed by a magnet while the pure DNA remaining in the solution was ready for downstream STR analysis. The purification kit provides a fast and simple method for DNA purification with only one tube, no liquid transfer, and no requirement for carrier RNA. It reduces the risk of DNA loss and carryover of extraction buffers from the traditional and tedious bind-wash-elute procedure. After preparing the lysates, it enables the processing of 96 samples in less than 15 minutes, with less than 1 minute of hands-on Time.

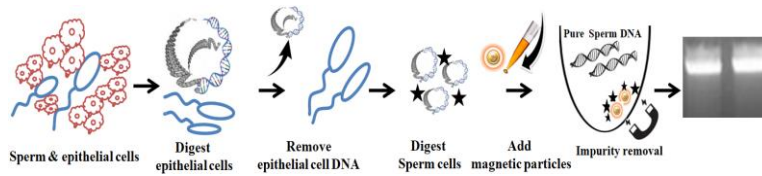


Explore product.

[One-Step Touch DNA Purification Kit](#)

Sexual Assault Casework DNA Purification

BcMag™ Sexual Assault Casework Purification DNA Kit provides quick and efficient purification of male DNA from a trace amount of sexual assault samples. The kit uses novel negative selection chromatography magnetic beads to quickly capture impurities such as PCR inhibitors from cell lysate, leaving the male DNA untouched. It reduces the risk of DNA loss and buffers carryover from the time-consuming bind-wash-elute technique. The purification kit provides a quick and easy way to purify DNA. Quantitative PCR and STR analysis work well with pure DNA.



Workflow of sexual Assault Casework DNA Purification kit

Explore product.

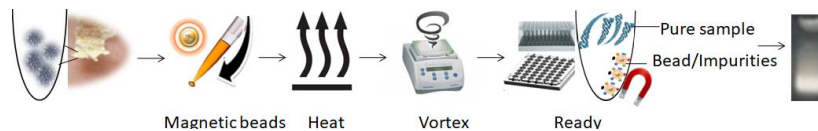
[Sexual Assault Casework DNA Purification Kit](#)

One-Step Dandruff Cell DNA Purification Kit

BcMag™ One-Step Dandruff Cell DNA Purification Kit allows rapid and efficient purification of genomic DNA from Dandruff. It uses novel negative selection chromatography magnetic beads to quickly capture and remove the impurities, such as PCR inhibitors from cell lysate, leaving the DNA untouched. It reduces the risk of DNA loss and carryover of extraction buffers from the traditional tedious bind-wash-elute procedure. The purification kit provides a fast and straightforward DNA extraction method with only one tube, no liquid transfer, and no requirement for carrier RNA. After preparing the lysates, Hundreds of samples can be processed in less than 30 minutes without using expensive equipment.

Principle and Workflow (Fig.1 “Principle and Workflow”)

The *specially* designed magnetic beads with our *proprietary* surface chemistry function capture the impurity once mixed with the sample. The magnetic beads-impurity complex is then magnetically removed by a magnet while the pure DNA remains in the solution.

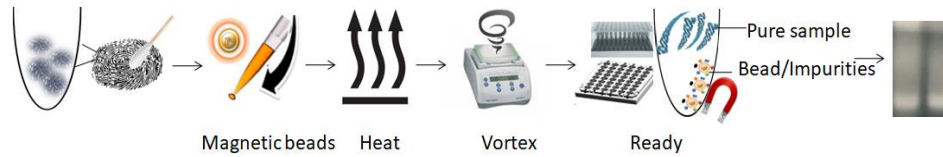


Explore product.

[One-Step Dandruff DNA Purification Kit](#)

BcMag™ One-Step Fingerprint DNA Purification Kit

The principle of the BcMag™ One-Step Fingerprint DNA Purification Kit is based on negative selection chromatography using magnetic beads. The kit utilizes specially designed magnetic beads with a proprietary surface chemistry that can capture impurities, such as PCR inhibitors, from the sample. Once mixed with the sample, the magnetic beads bind to the impurities and form a magnetic beads-impurity complex. The workflow of the purification process involves three main steps: Sample Preparation: The biological sample is lysed and processed to release the DNA. Purification: The lysate is mixed with the magnetic beads, and the impurities are captured by the beads. The magnetic beads-impurity complex is then magnetically removed from the solution by using a magnet. Elution: The pure DNA remains in the solution and can be easily transferred by simply pipetting the DNA-containing solution to a new tube. Overall, the BcMag™ One-Step Fingerprint DNA Purification Kit provides a fast and straightforward DNA extraction method with only one tube, no liquid transfer, and no requirement for carrier RNA, allowing for rapid processing of hundreds of samples in less than 30 minutes without the need for expensive equipment.



Explore product.

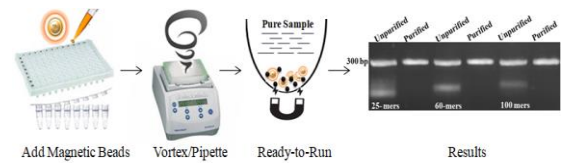
[One-Step Fingerprint DNA Purification Kit](#)

NGS Cleanup

BcMag™ One-step NGS Cleanup kit is specially designed for ultrafast and efficient purification of DNA after adaptor ligation and PCR or possible replacement of size selection procedure after adaptor addition.

The protocol is not only straightforward (one tube and one step, as shown in Fig.12) but also very flexible in removing different size DNA fragments by adjusting processing time, buffer's pH, and detergent concentration.

The magnetic Beads are added directly to the finished PCR reactions or other DNA reactions and mixed by a vortex mixer or pipetting to capture and remove the impurities (e.g., excess primer, dimer, adapter, salt, detergent, dNTPs, and enzyme).



After mixing, the beads are magnetically removed, while the supernatant contains the purified and ready-to-run DNA. In just 1 minute, the purified DNA is ready for downstream applications, such as Sanger Sequencing, Restriction Digestion, Cloning, SNP Detection, or Library Preparation for NGS. The beads enable 96 samples to be processed simultaneously in less than 10 minutes.

Features and Advantages:

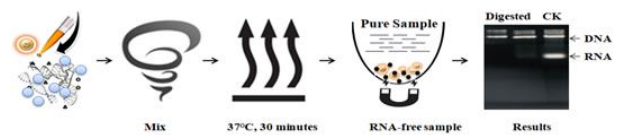
- Simple protocol: No liquid transfer, One-tube, One-step
- Ultrafast: One-minute protocol
- Higher purity and recovery > 90% DNA.
- Effective Cleanup: Removes excess primer (<100-mer ssDNA), dimer, adapter, a salt such as Mg²⁺, detergent, dNTPs, enzymes, and dye.
- Cost-effective: Eliminates columns, filters, laborious repeat pipetting, and ethanol
- High throughput: Compatible with many different automated liquid handling systems
-

Explore product.

- [One-Step NGS Cleanup Kit](#)
- [Next Generation Sequencing](#)

RNA removal

BcMag™ One-Step RNA Removal Kit uses magnetic beads conjugated with a high purity of Ribonuclease A. Ribonuclease A is an endoribonuclease that originates from the bovine pancreas. RNase A is a single-chain polypeptide with a molecular mass of 13.7 kDa. RNase A is an endoribonuclease that unspecifically degrades ribonucleic acid (RNA) into smaller components. The magnetic bead immobilized with RNase A can efficiently remove RNA from biological samples with no nucleases remaining in the solution due to the nuclease stably and covalently conjugated with the magnetic beads.



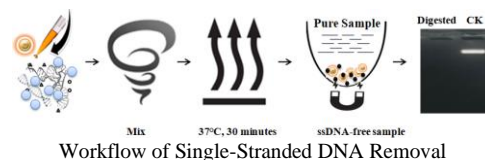
Workflow of RNA removal

Explore product.

[One-Step RNA Removal Kit](#)

Single Stranded DNA Removal

BcMag™ Single-Stranded DNA Removal Kit uses magnetic microspheres covalently conjugated with a high purity of Exonuclease I (ExoI) to remove single-stranded DNA from the solution. ExoI is derived originally from *E. coli*. This enzyme is a 55 kDa exonuclease that hydrolyzes single-stranded DNA (ssDNA) stepwise in a 3'→5' direction. This Exonuclease is highly specific for single-stranded DNA and does not react with double-stranded DNA or RNA and DNA strands with terminal 3'-OH groups blocked by phosphoryl or acetyl groups. Exonuclease I is tolerant of a wide range of buffer conditions and can typically be added to PCR reactions. The Exonuclease I can be inactivated by heat treatment at 80°C for 15 minutes. The magnetic bead immobilized with ExoI can efficiently remove single-stranded DNA, such as PCR primer, from reactions with no nucleases remaining in the solution due to the nuclease being stably and covalently immobilized with the magnetic beads.

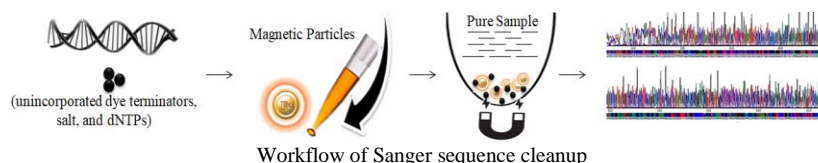


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[One-Step Single-Stranded DNA Removal Kit](#)

Sanger sequence cleanup

BcMag™ One-Step Sequencing Cleanup Kit is specifically designed for fast and efficient purification of the post-Sanger Sequencing reaction. The entire protocol takes only one tube and is complete in less than 5 minutes. The magnetic beads are added directly to the finished sequencing reactions and vortexed to capture the impurities (e.g., unincorporated dyes, dNTPs, residual salts, and other interfering components). After vortexing, the beads are magnetically captured, while the clean supernatant can be directly loaded onto a capillary sequencer.

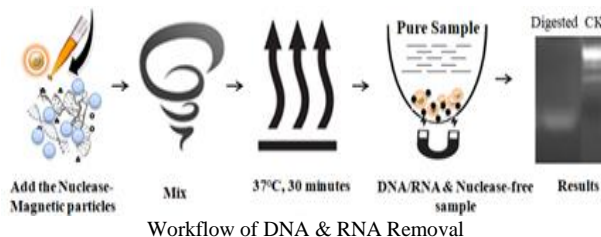


Explore product.

[One-Step Sequencing Cleanup Kit](#)

DNA & RNA Removal

BcMag™ One-Step DNA & RNA Removal Kit uses magnetic beads conjugated with ultra-pure recombinant endonuclease to remove DNA and RNA. The recombinant endonuclease is encoded by the same gene of Merck Benzozase nuclease or TurboNuclease) of *Serratia marcescens* produced in *E. coli*. This nuclease nonspecifically digests all kinds of DNA and RNA, including variants of single- and double-stranded, circular, linear, or supercoiled DNA and RNA to 5'-phosphorylated oligonucleotides of 2-8 bases in length and is free of protease activity. The nuclease immobilized magnetic bead can efficiently remove all the nucleic acids (DNA and RNA) from protein solution with no endonuclease remaining in the solution due to the nuclease stably and covalently conjugated with the magnetic Beads.

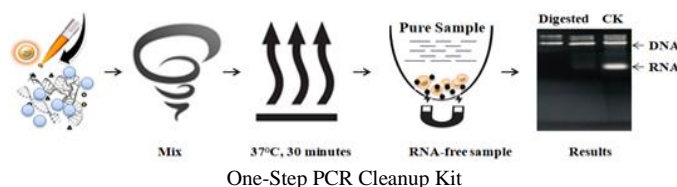


Explore product.

[One-Step DNA and RNA Removal Kit](#)

One-Step PCR Cleanup Kit

BcMag™ One-Step PCR Cleanup Kit is a specially designed kit for ultrafast and efficient purification of post PCR or other DNA reactions. The protocol is not only straightforward (one tube and one step, as shown in following picture) but also very flexible in removing different size DNA fragments by adjusting processing time,



buffer's pH, and detergent concentration. The magnetic Beads are added directly to the finished PCR reactions or other DNA reactions and mixed by a vortex mixer or pipetting to capture and remove the impurities (e.g., excess primer, dimer, adapter, salt, detergent, dNTPs, and enzyme). After mixing, the beads are magnetically removed, while the supernatant contains the purified and ready-to-run products. In just 1 minute, the purified DNA is ready for downstream applications, such as Sanger Sequencing, Restriction Digestion, Cloning, SNP Detection, or Library Preparation for NGS. The beads enable 96 samples to be processed simultaneously in less than 10 minutes.

Features and Advantages:

- Simple protocol: No liquid transfer, One-tube, One-step
- Ultrafast: One-minute protocol
- Higher purity and recovery > 90% DNA.
- Effective Cleanup: Removes excess primer (<100-mer ssDNA), dimer, adapter, a salt such as Mg^{2+} , detergent, dNTPs, enzymes, and dye.
- Cost-effective: Eliminates columns, filters, laborious repeat pipetting, and ethanol
- High throughput: Compatible with many different automated liquid handling systems

Learn more.

[One-Step PCR Cleanup Kit](#)

One-Step PCR inhibitor removal Kit

BcMag™ One-Step PCR inhibitor removal Kit provides one-step removal of PCR inhibitor from impure DNA samples before PCR, RT, and other downstream applications based on negative chromatography. The magnetic beads are superparamagnetic and modified with our proprietary chemistry. When mixed with inhibitor-containing samples, the beads instantly capture and remove the PCR inhibitors. At the same time, only pure DNA remains in the solution and is ready for all downstream applications. The beads can effectively remove many common inhibitors such as polyphenolic compounds, humic/fulvic acids, acidic polysaccharides, tannins, melanin, heparin, detergents, denim dyes, and divalent cations such as Ca^{2+} , Mg^{2+} , etc.

Workflow

The protocol is straightforward and fast: one tube, one step, and one Step. Add the magnetic beads directly to the pre-purified DNA samples and vortex or pipette to capture and remove the impurities. After vortexing/pipetting, the beads are magnetically removed, while the supernatant contains the purified and ready-to-run products. Unlike standard bind-wash-elute protocol, this convenient procedure does not contain traces of organic solvents, chaotropic salts, or EDTA and is almost 100% DNA recovery. The beads enable 96 samples to be processed simultaneously in less than 10 Steps with cost-effective lab vortex mixers.

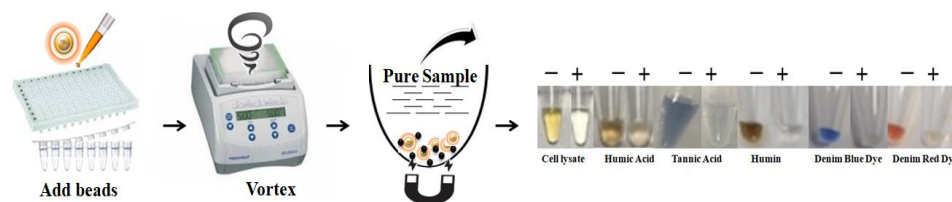


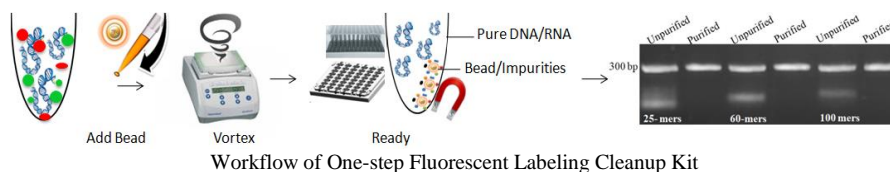
Fig.9 Workflow for PCR inhibitor removal

Explore product.

[One-Step PCR Inhibitor Removal Kit](#)

Fluorescent Labeling Cleanup

BcMag™ One-Step Fluorescent Labeling Cleanup Kit has specially formulated resin with proprietary surface chemistry. It removes the excess free (non-conjugated) fluorescent dyes, primer, dimer, adapter, salt, detergent, labeled dNTPs, dNTPs, and enzymes from the finished labeling reaction. The protocol is not only straightforward but also very flexible in removing different size DNA fragments by adjusting processing time, buffer pH, and detergent concentration. Compared with the dye removal columns, the resin can quickly and efficiently remove free dyes from the sample with just a single step and enables an individual or 96 sample to be processed simultaneously in less than 1 or 10 minutes with very little hands-on time. Since the magnetic resin only adsorbs the free dye, primer, dimer, adapter, salt, detergent, dNTPs, and enzyme, the labeled DNA/RNA rate is exceptionally higher than >90%. Moreover, the magnetic beads can remove most of the dyes if the appropriate amount of samples and buffer conditions are used.



Explore product.

[One-Step Fluorescent Labeling Cleanup Kit](#)