ZYMO RESEARCH

The Beauty of Science is to Make Things Simple®

Personalized Lab Automation

Plug-and-play DNA/RNA Purification

Pain Point: Custom Unique Workflows

Most desired workflows are unique and may require a flexible custom solution

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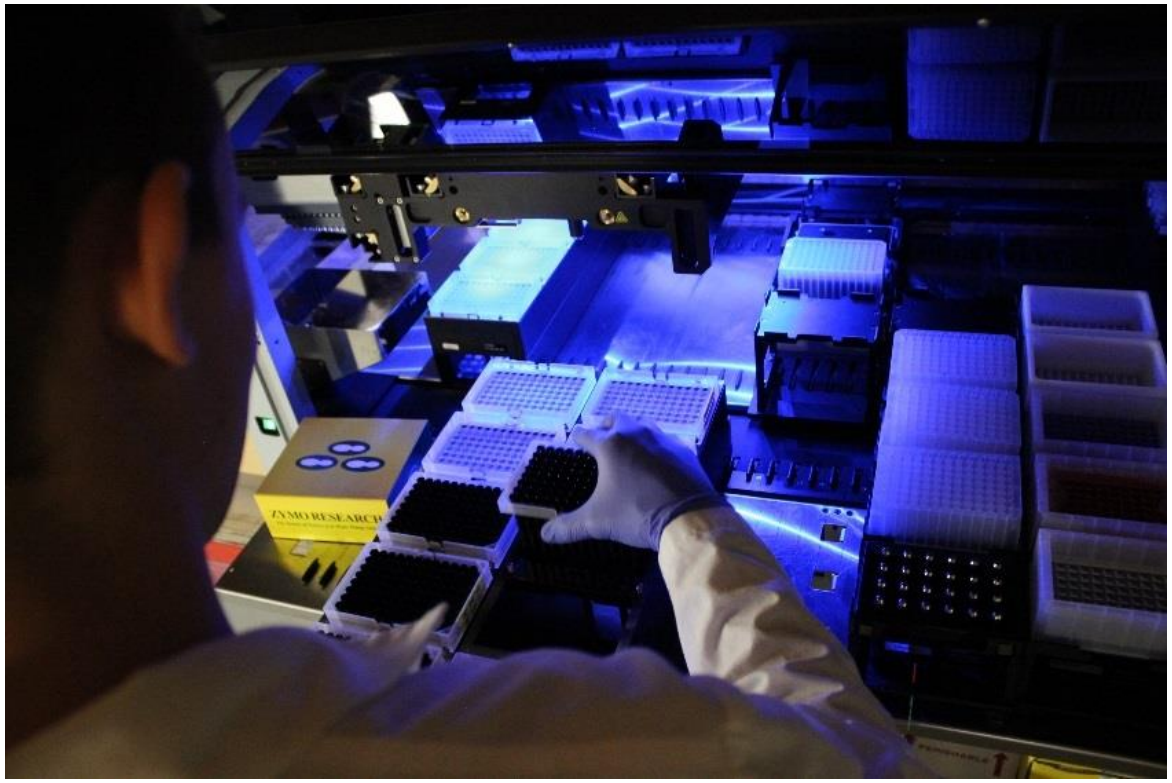
Pain Point: No Scripting Experience



Lack of knowledge of how to script on robotic platforms

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Zymo: Your Partner in Automated Sample Prep

- Free support service for every MagBead Customer
- We make automated NA extraction plug-and-play:
  - Custom Solutions
  - Flexibility
  - Scripting
  - Troubleshooting
  - Technical Support
  - Workflow Validation

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Robotic Platform Expertise

Zymo Research and Hamilton Robotics Forge Partnership to Automate Epigenetics Research

More accurate, faster, and simpler workflows with automated methods are now available

Thermo Kingfisher

Tecan

Eppendorf

IO RESEARCH

Application Notes

Hamilton, Tecan, & More!

Application Note

TECAN. ZYMO RESEARCH

Direct-zol™-96 MagBead RNA

Catalog Nos. R2100 - R2105

High-throughput, automated purification of DNA-free RNA *directly* from samples in TRIzol®, TRI Reagent®, or similar without phase separation.

Never Phase Separate Again!

Introduction

The **Direct-zol™-96 MagBead RNA** facilitates purification of high quality (DNA-free) RNA directly from samples stored in TRIzol®, TRI Reagent® or similar reagents. While exceptional in providing RNA stabilization and inactivating infectious agents, these reagents are complicated by phase separation, precipitation, and potential phenol carryover. The innovative, Direct-zol™ procedure from Zymo Research bypasses phase separation/precipitation requirements and eliminates phenol carryover. The **Direct-zol™-96 MagBead RNA** meets the demands of scientists requiring high-quality RNA for sensitive analytical methods like miRNA profiling, RNA-seq, and viral detection.

AUTOMATED RNA ISOLATION FROM ZYMO RESEARCH

Application Note

TECAN. ZYMO RESEARCH

EZ-96 DNA Methylation™ MagPrep Series

Catalog Nos. D5040-D5047

High-throughput, automated, magnetic bead-based bisulfite conversion of DNA with the Tecan Freedom EVO® for methylation analysis.

Introduction

The ability to detect and quantify DNA methylation efficiently and accurately has become essential for the study of cancer, gene expression, genetic diseases, and many other important aspects of biology. To date, a number of methods have been developed to detect/quantify DNA methylation including: high-performance capillary electrophoresis and methylation-sensitive arbitrarily primed PCR. However, the most common techniques used today still rely on bisulfite conversion.

Treating DNA with bisulfite chemically modifies non-methylated cytosine into uracil, methylated cytosine remains unchanged. Once converted, the methylation profile of the DNA can be determined using the desired downstream application. For single locus analysis, the region of interest is generally amplified following bisulfite conversion (i.e., bisulfite PCR) and then sequenced. However, recent advances in methylation detection allow the investigation of genome-wide methylation patterns, technologies include array-based methods, Pyrosequencing®, reduced representation bisulfite sequencing (RRBS), and whole genome bisulfite sequencing.

To this point all bisulfite conversion products have been dependent on manual manipulation of spin plates and columns or been of limited throughput. By adapting the clean-up of bisulfite converted DNA to a magnetic bead based procedure and coupling it to the Freedom EVO® platform, Zymo Research has opened the door to high-throughput bisulfite conversion of samples for methylation analysis.

AUTOMATED BISULFITE CONVERSION FROM ZYMO RESEARCH

Application Note

TECAN. ZYMO RESEARCH

Zyppy™-96 Plasmid MagBead Miniprep

Catalog Nos. D4100, D4101, & D4102

High-throughput, automated, magnetic bead-based purification of high quality, endotoxin-free DNA *directly* from culture.

The **Zyppy™-96 Plasmid MagBead Miniprep** is the fastest and simplest high-throughput method available for automated isolation of plasmid DNA from *E. coli*. It is the only fully automated method available and requires no centrifugation or pelleting of cells common to all other conventional procedures. The kit features a modified alkaline lysis system that allows for the direct lysis of *E.coli* in the growth medium. With the pellet-free procedure you can grow, lyse, and process samples in the same plate.

Automation Equipment

- Tecan Freedom EVO®
- Freedom EVOware®
- 8 channel Liquid Handling Arm (LiHa), configured for Disposable Tips (DiTis)
- Robotic Manipulation Arm (RoMa)
- Te-Shake™ Shaker
- 96-well Magnetic Stand

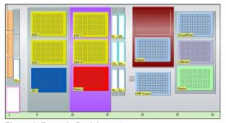
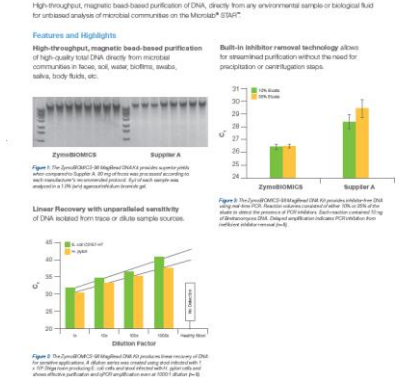


Figure 1. Example Deck Layout

AUTOMATED PLASMID ISOLATION FROM ZYMO RESEARCH

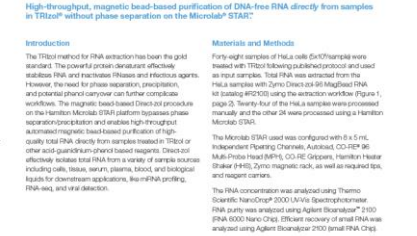
HAMILTON

Automation of the ZymoBIOMICS™-96 MagBead DNA Kit



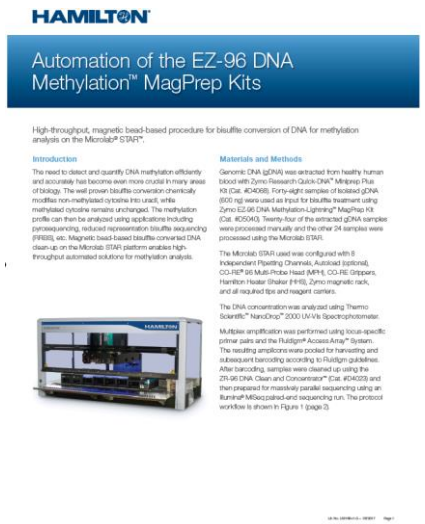
HAMILTON

Automation of the Direct-zol™-96 MagBead RNA



HAMILTON

Automation of the EZ-96 DNA Methylation™ MagPrep Kits



HAMILTON

Automation of the Zyppy™-96 Plasmid MagBead Miniprep

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Customer Testimonials

"We are just so appreciative of all of your help in getting us **set up with the script, accommodating all of our requests** for customizing it to our LIMS needs, and everything else you have done for us."

B.R.

"Thank you for **taking the time to go over the different protocols**. Thank you very much for the data package, scripts, and sample kit."

R.M.

"These are very helpful suggestions. [The automation support team] has been extremely helpful and provided me with **excellent customer service, which I really appreciate**."

S.C.

"It was a **pleasure meeting all of you and putting a face to a name** after all this time. I look forward to our continued partnership."

L.M.

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Magnetic Bead Kits & Success Stories

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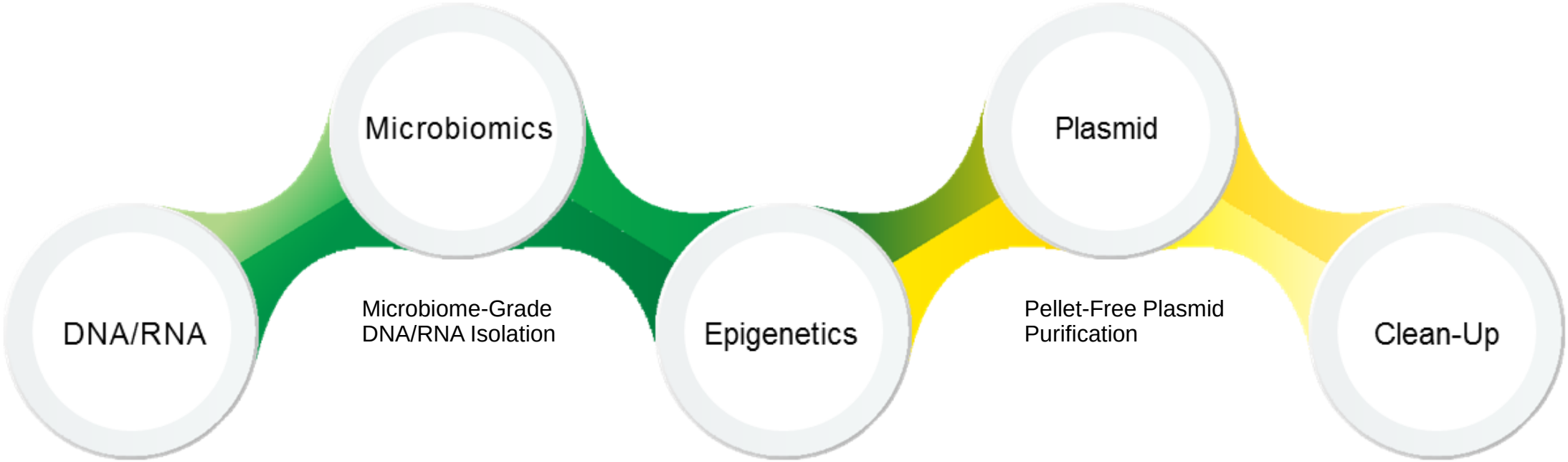
Unique Sample Prep Technologies



DNA and/or RNA from any Sample

Viral & Pathogen DNA/RNA Extraction

RNA from any Sample in TRIzol®

Easy DNA Bisulfite Conversion

DNA/RNA Clean-Up and Size Selection

ZYMO RESEARCH

Success Story: Nucleic Acids from Urine

Application:

Urine Diagnostic Lab: Match urine to sample provided to prevent urine substitutions

Needs

1. Extract total DNA/RNA (including cell-free) from buccal swabs and urine on the KingFisher Flex
2. Difficult to automate the extraction: high processing volumes and low biomass samples
3. Tested other commercially available kits with little to no success

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Success Story: Nucleic Acids from Urine

Solution:

1. Custom protocol that transforms large volumes into small pellets sizes suitable for 96-well.
2. Designed a custom built-in RNase treatment (based on customers request).
3. Helped analyze and interpret results for customer (no experience working in genomics), and achieved validation of their new product service.

Evaluated the *Quick*-DNA/RNA MagBead –
Best extraction of total nucleic acids

ZYMO RESEARCH

Success Story: Genomic DNA

Application:

Extract genomic DNA from bacterial samples (E. coli) using the Quick-DNA MagBead Plus

Needs

1. Implement workflow on Tecan Freedom EVO 200 workstation using 96-well head
2. Reduce to smaller processing volumes (miniaturizing the reaction)

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Success Story: Genomic DNA

Solution:

1. Provided customized script based upon customer's worktable/deck layout of instrument
2. Validated using less volumes in-house for customer's specific application needs
3. Optimized liquid classes to improve mixing speeds to get full resuspension of magnetic beads. Decreased drying time to improve elution efficiency
4. Improved yields from 7 ng/ul to 50 ng/ul

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Success Story: Microbiomics

Application:

Extract mouse cecum tissue and stool DNA using the ZymoBIOMICS DNA MagBead for downstream 16S rRNA sequencing

Needs

1. Validate workflow on Eppendorf EpMotion 5075 TMX instrument and software
2. Concerns about cross contamination
3. Require comparable yields to Promega Maxwell Tissue DNA kit.

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Success Story: Microbiomics

Solution:

1. Used checker-board plate design to validate no cross contamination occurred. Implemented controls by using the ZymoBIOMICS Microbial Community Standard

2. Optimized magnetic bead mixing aspiration speed and supernatant dispense volume parameters

3. Yields improved from 0.5-6 ng/ul to 26-30 ng/ul
   Zymo achieved amazing quality in comparison.
   Zymo: A260/280: 1.81, A260/230: 2.14
   Promega: A260/280: 1.65, A260/230: 0.963

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Success Story: Epigenetics/Methylation

Application:

Analyzing DNA methylation markers in cell-free DNA from plasma using the EZ DNA Methylation Lightning kit

Needs

1. Using the KingFisher Duo Prime (12-pin magnetic head version)
2. Transitioning from spin column format to magnetic bead chemistry to scale up for high-throughput processing
3. Small elution volumes for maximum yield

ZYMO RESEARCH

Success Story: Epigenetics/Methylation

Solution:

1. Provided initial KingFisher Duo script to get customer's workflow rapidly functioning
2. Optimized binding mixing speed, lowered drying time, and improved elution mixing. This accommodates the usage of small volumes as magnetic bead and liquid contact is maximized
3. Improved overall recovery from 66% to complete theoretical 100% rate.

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Success Story: Plasmid Prep

Application:

Extract plasmid DNA using the Zyppy Plasmid MagBead – uses direct lysis with no extra centrifugation/pelleting steps

Needs

1. Validate chemistry on Hamilton VANTAGE instrument and Instinct V software
2. Decided to hire Hamilton Field Application Specialist to implement this workflow
3. Yield needs to be comparable to manual methods: 35 ng/ul.

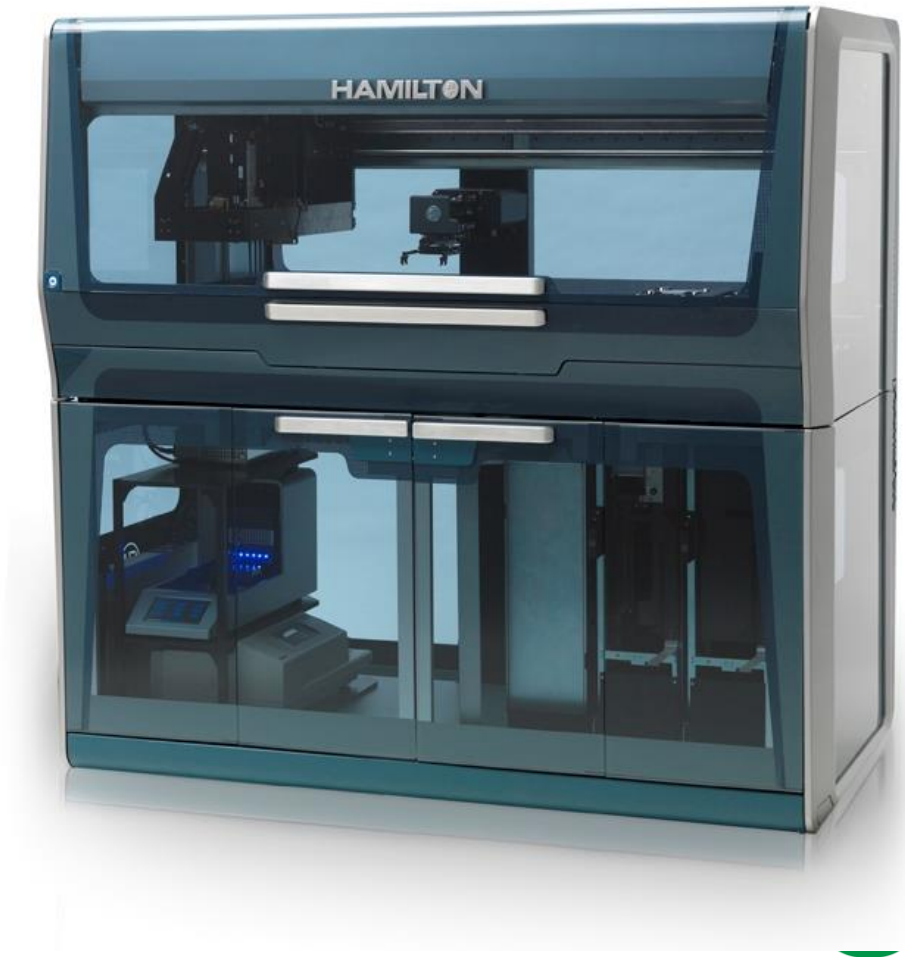
ZYMO RESEARCH

Success Story: Plasmid Prep

Solution:

1. Advised Field Application Specialist on critical steps (Ex. Alkaline Lysis, Neutralization) and specific mixing speeds, incubation times, temperature parameters, magnetic bead pelleting to translate into programming script steps.

2. Solved a problem that was ongoing for a while in 1 week. Increased plasmid DNA yield from 5 ng/ul to 40-50 ng/ul and resulted in satisfied customer.



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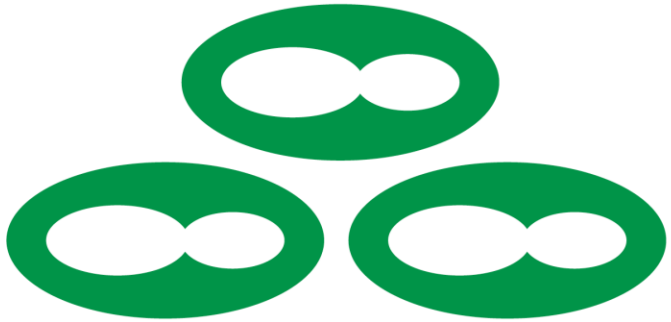

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