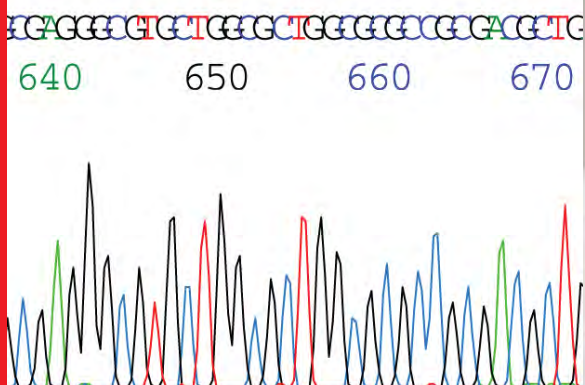
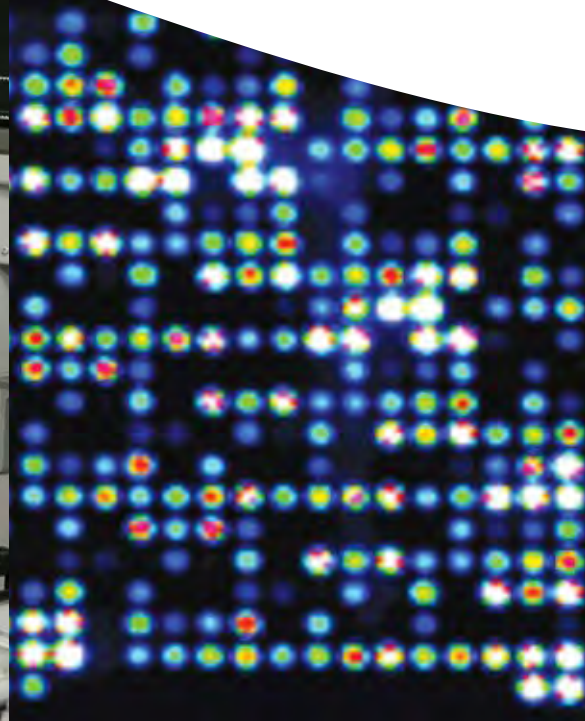




*Agencourt® SPRI® Technology with  
Beckman Coulter Automation*

## **SOLID PHASE REVERSIBLE IMMOBILIZATION**

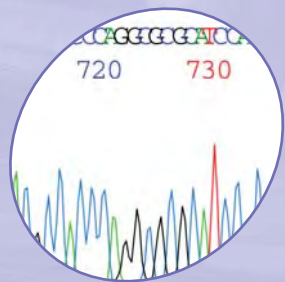
HIGH PERFORMANCE NUCLEIC ACID ISOLATION AND PURIFICATION





# SOLID PHASE REVERSIBLE IMMOBILIZATION

HIGH PERFORMANCE NUCLEIC ACID ISOLATION AND PURIFICATION



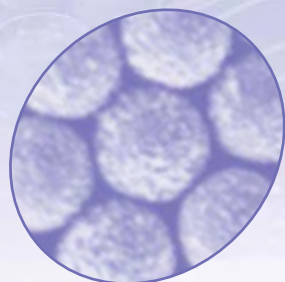
## What Agencourt SPRI Is

Solid Phase Reversible Immobilization (SPRI®) is a patented, magnetic bead-based high performance nucleic acid purification technology invented at the Whitehead Institute (*Hawkins, et al. Nucleic Acids Res. 1995; 23:22*). SPRI is used by many pharmaceutical, biotechnology, academic and government organizations performing life science research.



## How Agencourt SPRI Works

Targeted nucleic acids are immobilized onto paramagnetic microparticles using specific buffer conditions. The paramagnetic particles adhere to the walls of the vessel while sample contaminants are easily removed. There is no need for centrifugation or filtration thus creating a streamlined and scalable format optimized on the Beckman Coulter Biomek® FX, NX, and 3000 workstations including the ArrayPlex application.



## Why Agencourt SPRI Works

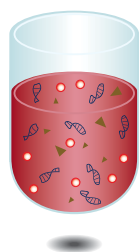
The bead's high uniformity imparts reproducible performance characteristics. The production process utilizes very small particles of fully formed magnetite that are layered onto the polystyrene core particle. As a result, the beads retain little residual magnetism when not subjected to a magnetic field, which prevents clumping and falling out of solution. Their 40% iron content gives the beads a very quick magnetic response time so that they are easily and effectively separated from solution in a tube or microplate. The functionalized polymer coating and small bead size give them a high non-specific binding capacity for nucleic acids.



## What Agencourt SPRI Can Do For You

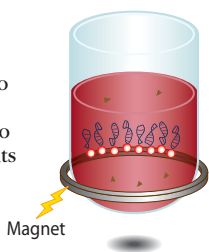
Your time is precious. Your budget is limited. Agencourt SPRI technology can automate your sample preparation needs for almost any nucleic acid purification. Automating Agencourt SPRI technology delivers performance and value like no other nucleic acid purification technology. From saving thousands of dollars in operational budget costs for sequencing labs to streamlining workflow processes for gene expression customers, SPRI technology fits where you need it.

**Agencourt SPRI Methodology:** A typical SPRI protocol is fast and easy, involving only a few simple steps.



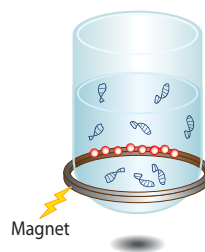
### Step 1: Nucleic acid immobilization

SPRI beads are directly added to sample reactions. Nucleic acids are selectively immobilized onto SPRI beads, leaving contaminants in solution.



### Step 2: Contaminant removal

A magnetic field is used to pull the microparticles out of solution. Contaminants are aspirated and microparticles are thoroughly washed, yielding high quality nucleic acids.



### Step 3: Nucleic acid elution

Purified nucleic acids are easily eluted from the microparticles under aqueous conditions, which provides maximum flexibility for downstream applications.

# SOLID PHASE REVERSIBLE IMMOBILIZATION

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## Software Automation Methods

Beckman Coulter offers a suite of automation methods designed for Agencourt SPRI-based reagents. SPRI is ideal for automation because it does not require centrifugation or vacuum filtration, both of which necessitate manual intervention.

All methods are supplied with supporting documentation and are compatible with Windows NT, 2000 and XP operating systems, depending on instrumentation manufacturer requirements. Automation methods are currently available for the Beckman Coulter Biomek FX and NX workstations in select 96-well, 384-well, Span 8 automation configurations, and the Biomek 3000.



## Intuitive Application Specific User-Interface

Agencourt software methods were created with a Windows-based graphical interface allowing users to easily personalize methods.

### Flexible easy-to-use features such as:

- Pre-programmed conditions for optimal processing
- All purification variables on a single dialog box
- Ability to change parameters with the click of a button
- Recollection of conditions from the previous run
- Incubation timer with expire button and countdown display
- Speed optimized for maximized throughput
- Use of disposable tips and tip wash-station to reduce consumable costs
- Optional PerkinElmer PlateStak integration



Adjust parameters such as reaction volume with the click of a button.

Application		Kit	Biomek Automation				Plates per Hour	
			FX	NX	FX/NX Span 8	3000	96-well	384-well
DNA Sequencing	Single Step Plasmid Purification	Agencourt SprintPrep®	✓	✓				up to 8
		(with PlateStak <sup>1</sup> )	✓	✓				up to 8
	Low and High Copy Plasmid Purification	Agencourt CosMCPrep®	✓	✓			up to 18	
		Agencourt CleanSEQ®	✓	✓	✓	✓	12	12
	Dye-Terminator Removal	(with PlateStak)	✓	✓			12	12
		Buccal Cell gDNA Isolation						
Gene Expression	gDNA from Whole Blood/Serum	Agencourt Genfind™	✓				0.5	
		Agencourt AMPure®	✓	✓	✓	✓	12	12
	PCR Clean-up and Purification	(with PlateStak)	✓	✓			12	12
		Agencourt RNAPrep™	✓	✓	✓	✓	2.5	
	Total RNA Isolation from Cells	Agencourt RNAClean™	✓	✓	✓	✓	up to 4	
		Post cDNA Purification and Post IVT RNA Purification						
SNP Genotyping	Buccal Cell gDNA Isolation	Agencourt Orapure™						
		Agencourt Genfind™	✓				0.5	
	PCR Clean-up and Purification	Agencourt AMPure®	✓	✓	✓	✓	12	12
		(with PlateStak)	✓	✓			12	12



# SOLID PHASE REVERSIBLE IMMOBILIZATION

HIGH PERFORMANCE NUCLEIC ACID ISOLATION AND PURIFICATION

## Drug Discovery and Development

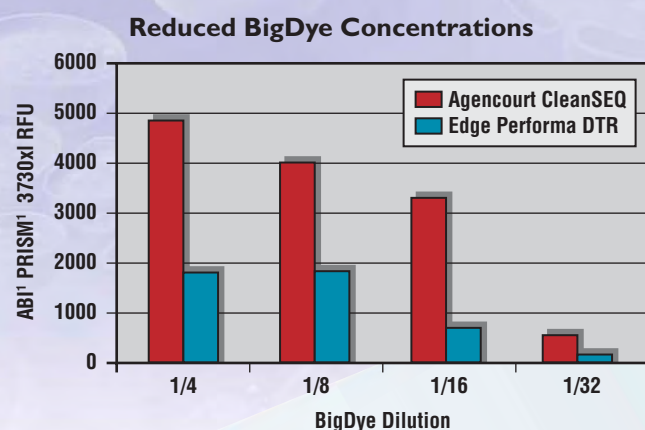
Beckman Coulter's Agencourt chemistry not only fits into individual research lab processes, but also the drug discovery and development pipeline. From target identification to clinical development, Agencourt chemistry coupled with the Beckman Coulter automation product line is a top-notch solution for a variety of applications, enhancing the productivity, results, and economics of your research.

### Downstream Application: DNA Sequencing

Boost your productivity, quality of base calls, and dye terminator utilization with a fully automatic clean-up protocol.

#### Recommended Products:

Agencourt CleanSEQ for post-sequencing reaction clean-up, Agencourt AMPure for isolation of gDNA from PCR\* products.



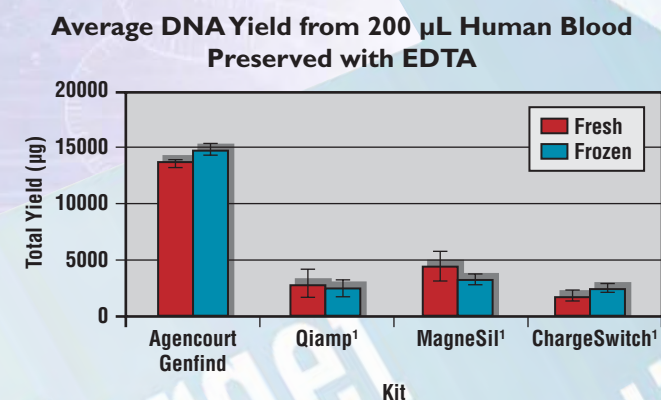
3  $\mu$ L of amplified PCR\* product: TP53\_exon 5 was run in a 20  $\mu$ L sequencing reaction and purified with Agencourt CleanSEQ and Edge Biosystem's Performa DTR<sup>1</sup>.

### Downstream Application: SNP Genotyping

Increase your gDNA isolation recovery with a fully automated protocol, and get more experiments from your precious samples.

#### Recommended Products:

Agencourt AMPure for isolation of gDNA from PCR products, Agencourt Genfind for isolation of gDNA from whole or frozen blood and/or serum.



Comparison of gDNA yields from 200  $\mu$ L of fresh human blood preserved with EDTA using Agencourt Genfind and competitor kits. Results shown are the average and standard deviation from three preparations. All isolations were performed according to manufacturers' protocol. DNA was quantified using the Quant-iT<sup>®</sup> PicoGreen<sup>®</sup> ds DNA Assay kit (Invitrogen).

### Downstream Application:

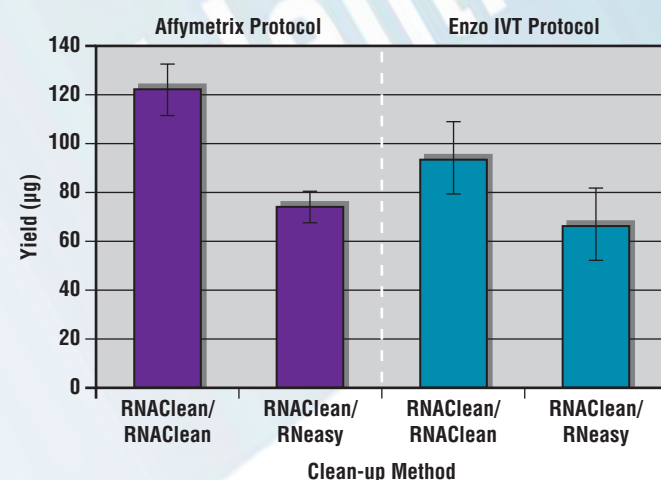
#### Gene Expression via Microarray

With an automated platform that performs cDNA and IVT clean-up, as well as RNA isolation from tissues and cells, you can enhance your productivity and RNA recovery, especially when your sample is scarce.

This system is so effective that Gene Logic recommends it (see case study, next page) and Affymetrix endorses Agencourt chemistry for sample preparation on the GeneChip Array Station.

#### Recommended Products:

Agencourt RNAClean for cDNA and IVT clean-up, Agencourt RNAPrep for isolation of total RNA from cells.



**Comparison of cRNA Purification Methods.\*\***  
Agencourt RNAClean is effective in two popular methods for producing cRNA for microarray analysis. Five micrograms of rat brain RNA was used in cRNA labeling kits from Affymetrix and Enzo<sup>1</sup>. IVT incubation time was 8 hours.  
Key: cDNA clean-up method/cRNA clean-up method.

\* The PCR process is covered by patents owned by Roche Molecular Systems, Inc., and F. Hoffman-La Roche, Ltd.  
\*\* Testing performed by Gene Logic, Inc.

# SOLID PHASE REVERSIBLE IMMOBILIZATION

HIGH PERFORMANCE NUCLEIC ACID ISOLATION AND PURIFICATION

## Case Study: Gene Logic

Gene Logic<sup>1</sup>, based in Gaithersburg, Maryland, is one of the world's largest Affymetrix<sup>1</sup> users. They perform gene expression research and provide the resulting data for their pharmaceutical clients, therefore they demand the highest data quality.

### Problems Identified

Historically, Gene Logic has used PLG tubes for clean-up of cDNA reactions and RNeasy<sup>1</sup> for clean-up of IVT reactions which resulted in the following issues:

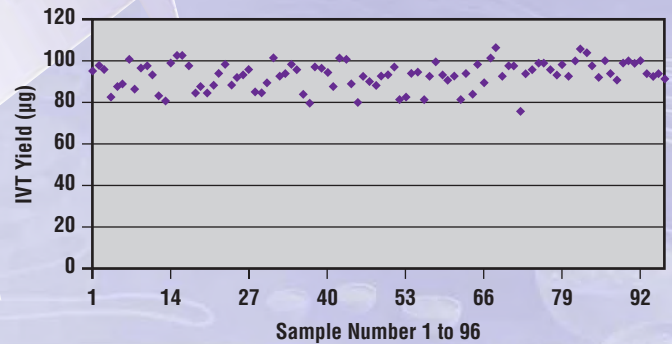
- Single tube formats are very labor intensive, resulting in slow throughput
- QIAGEN RNeasy contains caustic chemicals requiring technicians to work under a hood
- Results varied due to precipitation step with PLG
- Process was not automation-friendly or scalable without additional costs and resources

### Solution Implemented

Agencourt RNAClean improved upon this process. By using Agencourt RNAClean and automation, single tubes were eliminated in favor of a 96-well format. Results were less variable, technicians did not need the use of a fume hood, yields were increased, and costs were decreased, all while maintaining consistent or higher quality downstream data.

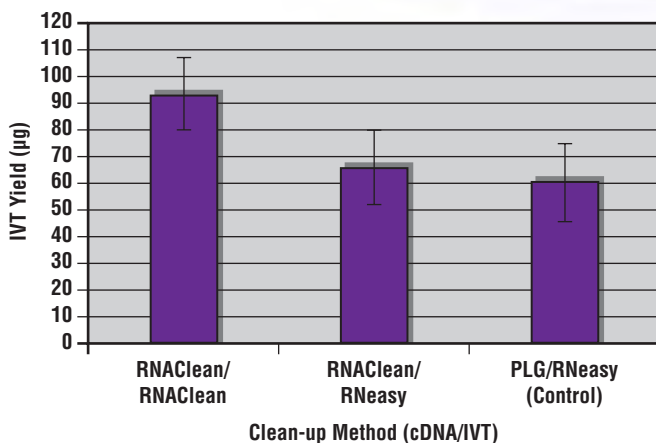


### Reproducibility - Human Spleen RNA 2 µg Input



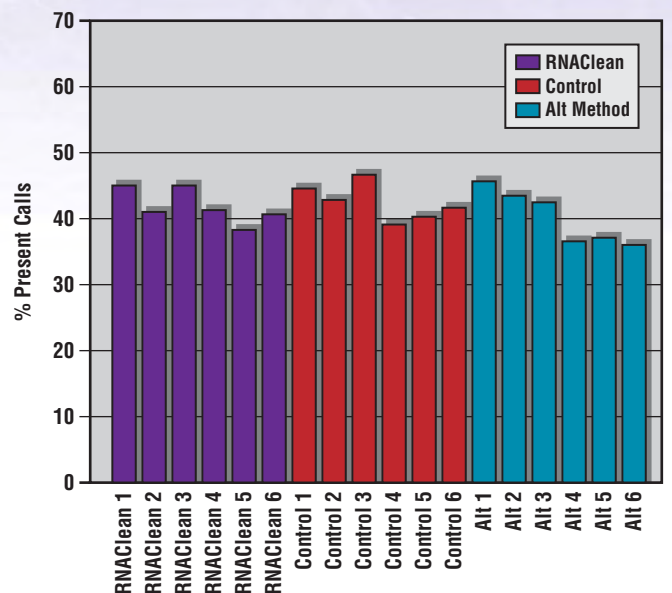
By using the Agencourt RNAClean kit, reproducibility and high yield are demonstrated in a 96-well format with 2 µg of human spleen RNA per well.

### IVT Yields From Different Clean-up Methods



IVT yields are greater when using Agencourt RNAClean for both cDNA and IVT reactions as compared to other methods.

### Present Calls



Downstream data remains unaffected as the Present Calls are constant among the clean-up methods.



# SOLID PHASE REVERSIBLE IMMOBILIZATION

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## *Reduce bottlenecks with a high-throughput, low-cost solution.*

*"Agencourt CleanSEQ has allowed us to completely automate our sequencing reaction clean-up step to produce very high quality Phred scores compared to our previous clean-up method. As a result, we streamlined the clean-up procedure and saved valuable time on analysis, all of which helped reduce the overall costs of the project."*

**MARGARET ROBERTSON, ERNEST GALLO CLINIC & RESEARCH CENTER**

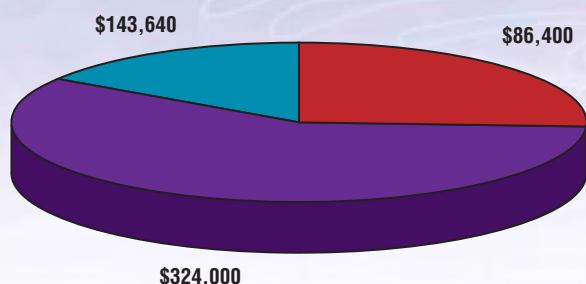


## *How Agencourt SPRI Can Save Money*

A typical sequencing lab annual budget before and after using Agencourt CleanSEQ is shown below. The overall operating cost can be substantially reduced by using Agencourt CleanSEQ. The first pie shows 200,000 reactions per year, with a dye-terminator volume of 4  $\mu$ L/reaction and a reagent cost of \$0.60/reaction resulting in a \$554,040 annual budget cost. The second pie shows the same number of reactions with the same labor cost. However, by incorporating Agencourt CleanSEQ and a Beckman Coulter Biomek FX, the resulting package brings the annual operating budget down to \$412,993 – a savings of \$141,047!\*

**Estimated Current Annual Expenditure**

4  $\mu$ l "Big Dye"™ per Reaction

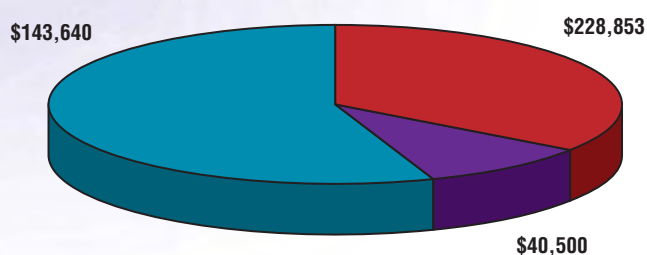


■ Total Dye Terminator Cost ■ Total Reagent Cost ■ Labor Cost

**Before - Total Expenditure = \$554,040**

**Year One Annual Expenditure Using Agencourt CleanSEQ Kit**

0.5  $\mu$ l "Big Dye"™ per Reaction



■ Total Dye Terminator Cost ■ Total Reagent and Robotics Cost ■ Labor Cost

**After - Total Expenditure = \$412,993**

\*Assumptions: Labor is assumed constant at 35% of overall reagent cost. This will vary from lab to lab and may decrease due to the automation component of the technology. In this example, dye-terminator cost is \$4.50/reaction.



## *Intuitive methods, improved signal, reduced turnaround time.*

*"My lab easily incorporated Agencourt CleanSEQ into our protocols using the automation methods, without prior robotics experience. The improved signal strength allowed us to cut our sequencing reagent costs and to dramatically speed up data return."*

**DAVID REYNOLDS, DIRECTOR DNA SEQUENCING, GENOTYPING, AND AFFYMETRIX FACILITIES  
ALBERT EINSTEIN COLLEGE OF MEDICINE**

## DNA Purification

### Agencourt® CleanSEQ®

Dye Terminator Removal



### Agencourt AMPure®

PCR Clean-up and Purification



### Agencourt SprintPrep®

Single Step Plasmid Purification



### Agencourt CosMCPrep®

Low and High Copy Plasmid Purification



### Agencourt Orapure™

Buccal Cell gDNA Isolation



### Agencourt Genfind™

gDNA from Whole Blood and Serum



## RNA Purification

### Agencourt RNAPrep™

Total RNA Isolation from Cells



### Agencourt RNAClean®

Post cDNA Purification and Post ivt RNA Purification



<sup>1</sup> All trademarks are the property of their respective owners.



Innovate Automate  
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