

2009 - 2010

Product Catalog

# the Nature of Proteins



Expression Products

Cell Culture Media

Specialty Proteins

Protein Refolding Reagents

Enzyme Assays



Athena Enzyme Systems™  
[www.athenaes.com](http://www.athenaes.com)

Simple Solutions for Complex Proteins

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# the Nature of Proteins

AthenaES™ 2009 - 2010 Product Catalog



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Simple Solutions for Complex Proteins

# The Nature of Proteins

Proteins are ubiquitous in nature,  
a basic element of all life.

• Athena Enzyme Systems™ core directive is the study of the nature of proteins, their unique properties, and how they can be utilized to promote quality of life. Many of our products expedite the understanding of protein functionality, and aid in the production of difficult-to-express proteins. The contracts we engage in, in addition to our internal research, concentrate on expressing difficult-to-produce proteins that have the potential to provide groundbreaking medicinal benefits. We are constantly striving through both our product lines and contract research, to enable researchers to improve their methods of protein discovery and production. The nature of proteins fascinates us: their wide range of applications and functions, and more importantly, their role in advancing the future of biotechnology.

• As a subsidiary of Athena Environmental Sciences, Inc., we are ever conscious of the impact our activities have and take great care to ensure that our manufacturing processes are precise, consistent, and environmentally friendly. We realize that concentrating on the advancement of humanity would be fruitless without considering the well-being of the environment as well.



**Athena Enzyme Systems™**

a division of Athena Environmental Sciences, Inc.



Expression Products



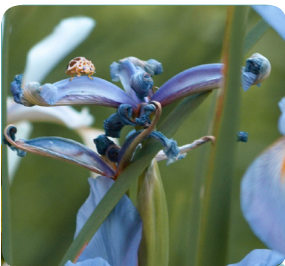
Enzyme Assays



Specialty Proteins



Cell Culture Products



Protein Refolding

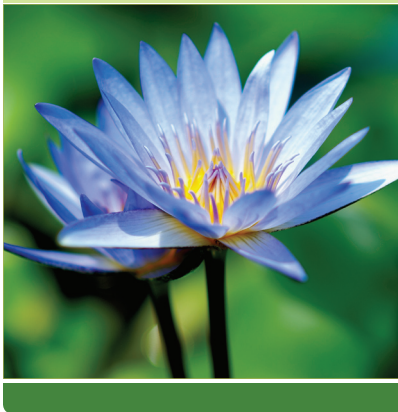
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## New Products from AthenaES™

### New Expression Products



#### ACES™ YebF Protein Export Kit

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Utilizing the revolutionary YebF protein to chaperone other proteins through the inner and outer membranes of *E. coli* cells, the YebF Protein Export Kit permits the secretion of target proteins directly into the culture medium.

#### ACES™ Signal Sequence Kit

p. 34

The Signal Sequence Kit provides six expression vectors that utilize either the Sec, SRP, or TAT protein secretion pathways to determine the best path and vector to translocate a target protein into the periplasm of *E. coli*.

#### ACES™ Promoter Selection Kit

p. 34

By titrating promoter activity, expression levels can be fine-tuned to meet specific target protein production levels including accumulation and amounts of soluble protein.

#### ACES™ Accessory Products

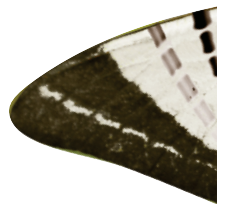
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The ACES™ product line offers several supplemental products to fully encompass the expression process. Available are bulk reagents, plasmids, primers, inducers, and secretion enhancers from the individual kits, as well as individual strain stabs and a Rapid Transformation Kit.

#### Prime-olate™ Expression Broth Series and Kit

p. 34

The release of AthenaES™ Atholate™, an Animal-Product-Free casein hydrolysate replacement for use in the preparation of bacteriological media, spurred the redevelopment of Athena's proprietary Animal-Product-Free Prime™ expression broths to further enhance their utility. The original formulations are still available and the newest versions containing Atholate™ are listed under the trade names of Prime-olate™ broths. An optimization kit containing the Prime-olate™ trio (Turbo Prime-olate™, Superior Prime-olate™, and Power Prime-olate™) is also available.



## New Cell Culture Products



### Custom SILAC Media

p. 34

AthenaES™ now offers custom tissue culture media for use in SILAC (Stable Isotope Labeling with Amino Acids in Cell Culture) experiments, such as DMEM, RPMI, and EMEM omission media. The culture media can be tailored to be deficient in any requested amino acid such as L-arginine, L-lysine, L-leucine, etc. The media can be made with any specialty research specifications.

## Down the Pipeline

### ACES™ YebF Specialized Vectors

Athena is currently developing second generation vectors to work in conjunction with the YebF protein in order to take advantage of its unique secretion properties.

### New Specialty Proteins

Using the YebF's unique export property, Athena is exploring the protein's utility in expressing a range of difficult-to-produce proteins on a commercial scale.





## Expression Products

Athena's proprietary Expression Media are world renowned for their reliability and superior performance in the production of recombinant proteins. The newest additions are the ACES™ (AthenaES™ Complete Expression System) Kits, a revolutionary series of kits that introduce new expression technologies to fully encompass the entire expression process from building the plasmid vector to recovery of purified product. Athena also offers the *Prime*™ and *Prime-olate*™ Broths, unique Animal-Product-Free media.



Animal-Product-Free Broths  
and Kits Available

[www.athenaes.com/Expression.htm](http://www.athenaes.com/Expression.htm)

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## Athena's Animal-Product-Free Media:

AthenaES™ is committed to providing the highest-quality research reagents. For our line of animal-product-free media, this includes insuring comparable (if not superior) performance to standard media, in addition to complying with stringent animal-free manufacturing requirements. Each of our animal-product-free media receive a seal of APF Certification™ after going through rigid quality control testing. To make it easier for laboratories looking for animal-free products in our catalog, we have placed an indicator next to all products in this catalog that are either animal-product-free, or that have an APF alternative available.

In addition there is an index below of all the APF Certified™ products below. For questions about AthenaES™ Animal-Product-Free media or quotes on bulk packaging, contact us at [media@athenaes.com](mailto:media@athenaes.com)

APF Expression Product	Catalog No.	Page No.
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APF LB Broth (Lennox)	0132	10
APF LB Broth (Miller)	0133	10
Turbo Prime Broth™ (powder)	0110	11
Turbo Prime Broth™ (liquid)	0120	11
Turbo Prime-olate™ (powder)	0160	11
Turbo Prime-olate™ (liquid)	0170	11
Superior Prime Broth™ (powder)	0111	12
Superior Prime Broth™ (liquid)	0121	12
Superior Prime-olate™ (powder)	0161	12
Superior Prime-olate™ (liquid)	0171	12
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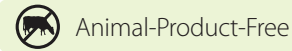
## Media Optimization Kit™

The Media Optimization Kit™, *Animal-Product-Free* Media Optimization Kit™ and new *Prime-olate™* APF Media Optimization Kit™ enable researchers to determine the best media formulation that yields the highest amount of target protein. Since the production of a given recombinant protein can vary significantly depending on the type of medium employed, the MOK™'s provide four proprietary expression broths,

as well as Glucose M9Y, and LB Miller Broth. The APF kit contains APF Certified™ versions of Athena's proprietary expression media, and the *Prime-olate™* Kit contains the new *Prime-olate™* expression series, formulated with Athena's casein hydrolysate replacement, Atholate™. Each dry powder kit contains enough mix to prepare 1 liter of each of the six media. The ready-to-use liquid kits contain 100 mL of each medium.



Available in liquid or dry-powder.

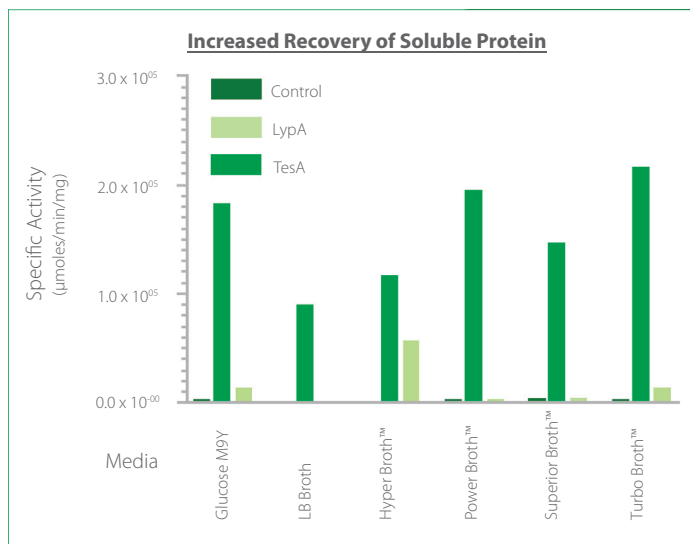


Animal-Product-Free

★ Available with NEW *Prime-olate™* Formulations

Kit Components		
Standard Media Optimization Kit™	APF Media Optimization Kit™	<i>Prime-olate™</i> Media Optimization Kit
Superior Broth™	Superior <i>Prime</i> Broth™	Superior <i>Prime-olate™</i>
Turbo Broth™	Turbo <i>Prime</i> Broth™	Turbo <i>Prime-olate™</i>
Power Broth™	Power <i>Prime</i> Broth™	Power <i>Prime-olate™</i>
Hyper Broth™	Hyper Broth™	Hyper Broth™
LB Broth (Miller)	LB Broth (Miller)	APF LB Broth (Miller)
Glucose M9Y	Glucose M9Y	Glucose M9Y
Applications Manual	Applications Manual	Applications Manual

Media Optimization Kit™	Powder	1 kit	0100
APF Media Optimization Kit™	Powder	1 kit	0100-APF
Liquid Media Optimization Kit™	Liquid (ready-to-use)	1 kit	0128
Liquid APF Media Optimization Kit™	Liquid (ready-to-use)	1 kit	0129
<i>Prime-olate™</i> APF Media Optimization Kit™	Powder	1 kit	0169
Liquid <i>Prime-olate™</i> APF Media Optimization Kit™	Liquid (ready-to-use)	1 kit	0179



The graph to the left shows the results of a typical experiment using the standard Media Optimization Kit™. The experiment tests the specific activity of LypA and TesA in the soluble fraction of cell-free extracts after 3 hours induction with IPTG. LypA accumulates as inclusion bodies in most media, but can be recovered in the soluble fraction by selecting the right formulation. The graph shows the highest expression of TesA to be in Turbo Broth™ and Power Broth™ and the highest expression of LypA to be in Hyper Broth™.

To read the complete Animal-Product-Free Technical Brief, visit [www.athenaes.com/tech\\_brief\\_animal\\_free.php](http://www.athenaes.com/tech_brief_animal_free.php)

On the web:

[www.athenaes.com/MediaOptimizationKit.php](http://www.athenaes.com/MediaOptimizationKit.php)




## LB Broth & Animal-Product-Free LB Broth

Athena offers three variations of the basic nutrient-rich LB Broth media (Miller, Lennox, and Luria) as well as their *APF Certified™* equivalents made using Athena's proprietary blended plant protein hydrolysate: Atholate™. The formulations each provide an abundance of peptides and peptones, vitamins and trace elements, and differ only in sodium chloride content and whether

they were made with casein hydrolysate or Atholate™. The differences allow the researcher to select which formula will provide the ideal osmotic conditions for their particular bacterial strain and desired culture conditions. Each LB Broth and *APF* LB Broth can be custom ordered in bulk.

Available in liquid or dry-powder.



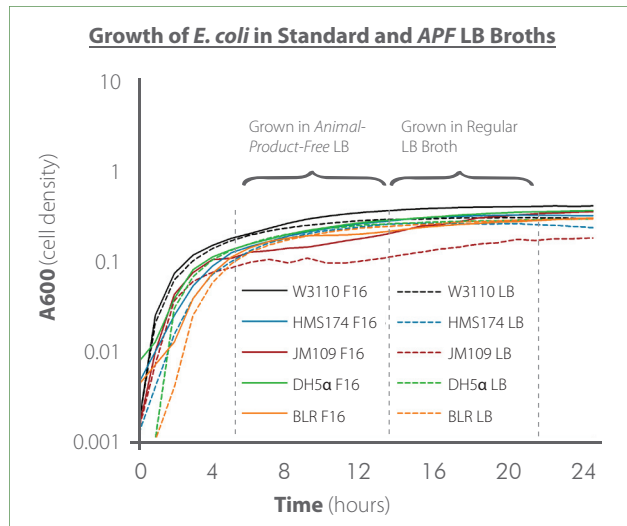
 Animal-Product-Free

★ *APF* LB Broth Formulations made with Atholate™ (See page 16)

Ingredient	Formulas (g/L)		
	Luria	Lennox	Miller
Casein Hydrolysate / Atholate™	15	15	15
Yeast Extract	5	5	5
NaCl	0.5	5	10

LB Broth (Luria)	Powder	500g	0101
LB Broth (Lennox)	Powder	500g	0102
LB Broth (Miller)	Powder	500g	0103
LB Broth (Lennox)	Liquid (ready-to-use)	5 x 500mL	0113
LB Broth (Miller)	Liquid (ready-to-use)	5 x 500mL	0114
LB Broth (Miller)	Powder	1L Single-use-Packets (Box of 10)	0130
<i>APF</i> LB Broth (Luria)	Powder	500g	0131
<i>APF</i> LB Broth (Luria)	Powder	1L Single-use-Packets (Box of 10)	0131-S
<i>APF</i> LB Broth (Luria)	Liquid (ready-to-use)	5 x 500mL	0174
<i>APF</i> LB Broth (Lennox)	Powder	500g	0132
<i>APF</i> LB Broth (Lennox)	Powder	1L Single-use-Packets (Box of 10)	0132-S
<i>APF</i> LB Broth (Lennox)	Liquid (ready-to-use)	5 x 500mL	0175
<i>APF</i> LB Broth (Miller)	Powder	500g	0133
<i>APF</i> LB Broth (Miller)	Powder	1L Single-use-Packets (Box of 10)	0133-S
<i>APF</i> LB Broth (Miller)	Liquid (ready-to-use)	5 x 500mL	0173



The growth curves to the left show the growth of wild type and four commonly used strains of *E. coli* in standard LB Broth (dotted lines) and Athena's *Animal-Product-Free* LB Broth (solid lines). The cultures for each strain were inoculated from an overnight culture grown in standard LB (Miller). The strains cultured in the *Animal-Product-Free* LB Broth had comparable growth to cultures of standard LB Broth.

To read the complete *Animal-Product-Free* Technical Brief, visit [www.athenaes.com/tech\\_brief\\_animal\\_free.php](http://www.athenaes.com/tech_brief_animal_free.php)

On the web:

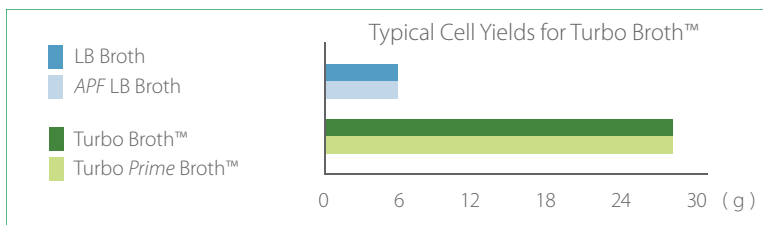
[www.athenaes.com/LBBroth.php](http://www.athenaes.com/LBBroth.php)



## Turbo Broth™ & Turbo Prime Broth™

Turbo Broth™, Turbo Prime Broth™ and the new Turbo Prime-olate™ are proprietary media formulations used for the cultivation of recombinant strains of *E. coli*. Both Turbo Prime™ and Turbo Prime-olate™ are APF Certified™. Turbo Prime-olate™ is made with Atholate™, Athena's proprietary blended plant protein hydrolysate. The media improve the yield of recombinant proteins and typically produce cell yields 4 to 5 times higher than that of LB Broth in shake


flask cultures depending on the strain. They have higher plasmid copy numbers than LB, which can enhance expression. Each medium uses glycerol for a carbon source and has a rich nutrient base of amino acids, vitamins, inorganic minerals and trace minerals. The media are buffered at pH 7.2 ± 0.2 with potassium phosphate to prevent a change in pH and provide a source of phosphate. These media are ideal as the base for fermentation cultures.



Available in liquid or dry-powder.



- Cell yields up to 5 times higher than that of LB Broth
- High plasmid copy numbers
- Rich nutrient base
- Ideal as fermentation culture base

 Animal-Product-Free

★ APF Prime-olate™ Formulations made with Atholate™ (See page 16)

Turbo Broth™	Powder	500g	0104
Turbo Broth™	Powder	1L Single-use-Packet (box of 10)	0104-S
Turbo Prime Broth™	Powder	500g	0110
Turbo Prime Broth™	Powder	1L Single-use-Packet (box of 10)	0110-S
Turbo Broth™	Liquid (ready-to-use)	5 x 500mL	0115
Turbo Prime Broth™	Liquid (ready-to-use)	5 x 500mL	0120
Turbo Prime-olate™	Powder	500g	0160
Turbo Prime-olate™	Powder	1L Single-use-Packets (Box of 10)	0160-S
Turbo Prime-olate™	Liquid (ready-to-use)	5 x 500mL	0170

On the web:

[www.athenaes.com/TurboBroth.php](http://www.athenaes.com/TurboBroth.php)

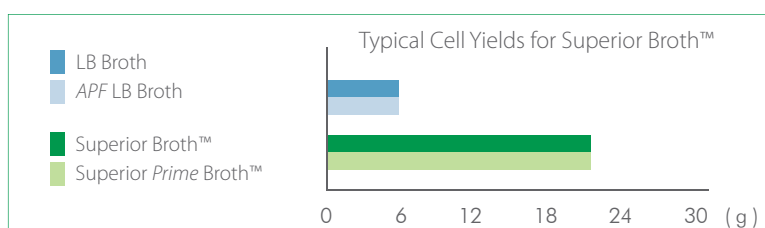




## Superior Broth™ & Superior Prime Broth™

Superior Broth™, Superior Prime Broth™ and new Superior Prime-olate™, are proprietary media formulations developed by AthenaES™ for improved expression of recombinant proteins in *E. coli*. The formulations are complex, supplying a nitrogen source, vitamins, and moderate glucose levels. The media are buffered at pH 7.2 ± 0.2 to prevent acidification of the medium during metabolism of the glu-


cose. Expression of recombinant proteins should be induced at cell densities twice that of LB Broth. Cell yields are typically about 3 to 4 times that of LB Broth. Superior Broth™ shows the highest plasmid copy numbers among the AthenaES™ family of media. This medium is an excellent choice for large-scale plasmid preparations. Biomass yields will depend on the process and the strain employed.



Available in liquid or dry-powder.



- Cell yields up to 4 times higher than that of LB Broth
- High plasmid copy numbers
- Ideal for large-scale plasmid preparation

 Animal-Product-Free

★ APF Prime-olate™ Formulations made with Atholate™ (See page 16)

Expression Media

Superior Broth™	Powder	500g	0105
Superior Broth™	Powder	1L Single-use-Packet (box of 10)	0105-S
Superior Prime Broth™	Powder	500g	0111
Superior Prime Broth™	Powder	1L Single-use-Packet (box of 10)	0111-S
Superior Broth™	Liquid (ready-to-use)	5 x 500mL	0116
Superior Prime Broth™	Liquid (ready-to-use)	5 x 500mL	0121
Superior Prime-olate™	Powder	500g	0161
Superior Prime-olate™	Powder	1L Single-use-Packet (box of 10)	0161-S
Superior Prime-olate™	Liquid (ready-to-use)	5 x 500mL	0171

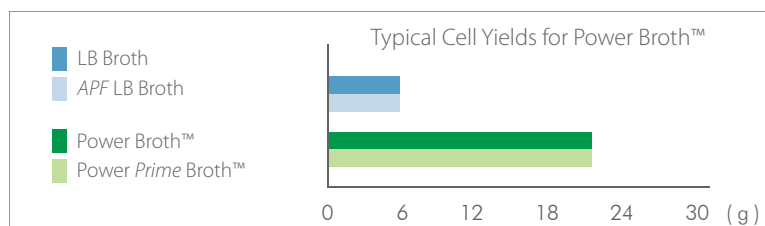
On the web:

[www.athenaes.com/SuperiorBroth.php](http://www.athenaes.com/SuperiorBroth.php)

## Power Broth™ & Power Prime Broth™

Power Broth™, Power Prime Broth™, and Power Prime-olate™ are proprietary media formulations developed by AthenaES™ for improved expression of recombinant proteins in *E. coli*. These media are composed of a complex, rich mixture of amino acids, vitamins, and a carbon source at higher levels than Terrific Broth. The media are buffered at pH 6.8 ± 0.2. Power Prime™ and Power Prime-olate™ are APF Certified™. For expression of recombinant proteins, induction should be done


at cell densities three times that of LB Broth. Cell yields are typically 3 to 4 times that of LB Broth in shake flask cultures depending on the characteristics of the strain. Several reports suggest that Power Broth™ and Power Prime Broth™ can increase the amount of soluble protein accumulated for otherwise insoluble proteins. This medium is a favorable base for fermentation cultures. Biomass yields will depend on the process and the strain employed.



Available in liquid or dry-powder.



- Cell yields up to 4 times higher than that of LB Broth
- Rich nutrient base
- Favorable base for Fermentation Cultures

 Animal-Product-Free

★ APF Prime-olate™ Formulations made with Atholate™ (See page 16)

Power Broth™	Powder	500g	0106
Power Broth™	Powder	1L Single-use-Packet (box of 10)	0106-S
Power Prime Broth™	Powder	500g	0112
Power Prime Broth™	Powder	1L Single-use-Packet (box of 10)	0112-S
Power Broth™	Liquid (ready-to-use)	5 x 500mL	0117
Power Prime Broth™	Liquid (ready-to-use)	5 x 500mL	0122
Power Prime-olate™	Powder	500g	0162
Power Prime-olate™	Powder	1L Single-use-Packet (box of 10)	0162-S
Power Prime-olate™	Liquid (ready-to-use)	5 x 500mL	0172

On the web:

[www.athenaes.com/PowerBroth.php](http://www.athenaes.com/PowerBroth.php)

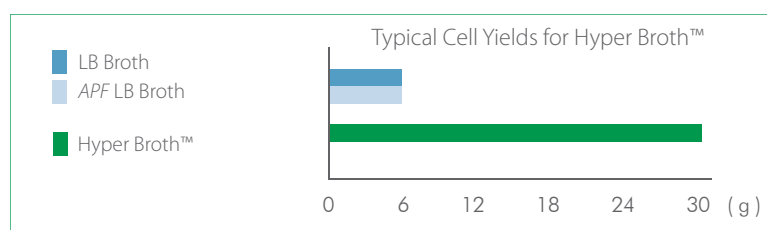




## Hyper Broth™

Hyper Broth™ is an APF Certified™ proprietary media formulation developed by AthenaES™ for improved expression of recombinant proteins in *E. coli*. The medium is a complex, rich formulation which supplies amino acids, vitamins, and glucose at high levels. This medium yields the highest level of biomass of all AthenaES™ media. The medium is buffered at pH 7.3 ± 0.2 and has the highest buffering capacity of Athena's Expression Media, which permits high glucose levels. For expression of recombi-

nant proteins, induction should be done at cell densities three times that of LB Broth. Cell yields are typically 5 times that of LB Broth depending on the strain. Plasmid copy numbers are significantly higher than they are for LB Broth. This medium is suitable as the base for fermentation cultures and is excellent for feed-batch applications. Biomass yields will depend on the process and the strain employed. Hyper Broth™ powder is supplied with a separate Glucose Nutrient Mix.



Hyper Broth™	Powder	500g	0107
Hyper Broth™	Powder	1L Single-use-Packet (box of 10)	0107-5
Hyper Broth™	Liquid (ready-to-use)	5 x 500mL	0118

## Glucose M9Y

Glucose M9Y is an APF Certified™ minimal media formulation supplemented with yeast extract for the cultivation of *E. coli*. It is based on M9 salts with a pH of 6.9 ± 0.2 and employs glucose as the carbon source<sup>1</sup>. Buffering is provided by a sodium-potassium phosphate system. Ammonium chloride provides a nitrogen source. Yeast extract is added to improve the protein production capacity of the medium and to permit cultiva-

tion of auxotrophic strains by supplying a source of amino acids, vitamins and minerals. Our formulation differs from the traditional formulation of Glucose M9, which employs casamino acids. Our experience has shown that yeast extract typically gives higher yields of recombinant proteins than casamino acids. Glucose M9Y powder is supplied with a separate Glucose Nutrient Mix.

Glucose M9Y	Powder	500g	0108
Glucose M9Y	Powder	1L Single-use-Packet (box of 10)	0108-5
Glucose M9Y	Liquid (ready-to-use)	5 x 500mL	0119

<sup>1</sup> Anderson, E. H. 1946. Growth requirement of virus-resistant mutants of *Escherichia coli* strain B. Proc. Natl. Acad. Sci. USA 32:120-128.

Available in liquid or dry-powder.



- Cell yields up to 5 times higher than that of LB Broth
- Supplied with Glucose Nutrient Mix
- Ideal as fermentation culture base

Animal-Product-Free

On the web:  
[www.athenaes.com/HyperBroth.php](http://www.athenaes.com/HyperBroth.php)

Available in liquid or dry-powder.



Animal-Product-Free

On the web:  
[www.athenaes.com/GlucoseM9Y.php](http://www.athenaes.com/GlucoseM9Y.php)

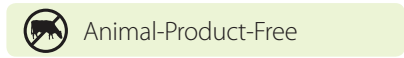
## Glucose Nutrient Mix

Glucose Nutrient Mix is an *APF Certified™* medium supplement used for enhancing the expression of proteins when using Athena's Hyper Broth™ or Glucose M9Y. The powder blend consists of glucose as a carbon source and is

supplemented with calcium chloride and magnesium sulfate. Glucose Nutrient Mix comes supplied with both media, but can now be purchased separately in individual packets.



Available in dry-powder packets.



Glucose Nutrient Mix	Powder	150g	0109
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On the web:

[www.athenaes.com/GlucoseNutrientMix.php](http://www.athenaes.com/GlucoseNutrientMix.php)

## Augmedium™

Augmedium™ is a medium additive which conditions cells prior to induction during a recombinant protein expression protocol. This pre-induction conditioner increases the level of chaperone proteins which can improve the fraction of product that accumulates as soluble protein. Augmedium™ is specifically intended

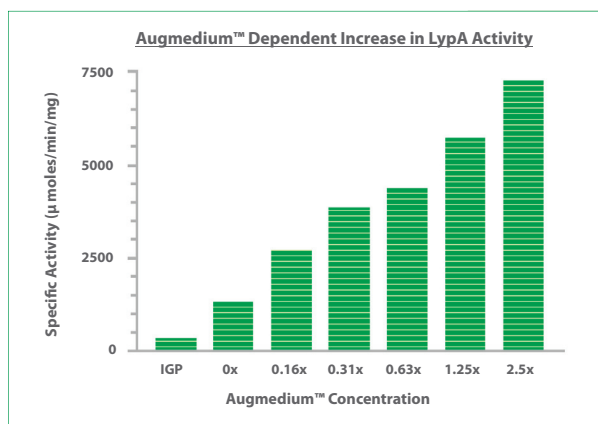
for use with strains in which the target protein accumulates as an inclusion body or as an insoluble aggregate. Augmedium™ is supplied as a powder for preparation of 50x concentrated stock solutions. It is available in 100 mL and 500 mL amounts.



Available in 100 mL and 500 mL stocks.

- Medium Additive
- Dramatically Increases Level of Expression
- Increases Fraction of Soluble Protein

Augmedium™	Powder	100mL Stock	0123
Augmedium™	Powder	500mL Stock	0124



The graph on the left shows the level of expression of LypA with increasing levels of Augmedium™. The amount of activity of LypA directly correlates with the concentration of Augmedium™ and shows a significant increase of LypA accumulation. IGP is the isogenic parent strain.

To read the complete Augmedium™ Case Studies Technical Brief, visit [www.athenaes.com/tech\\_brief\\_augmedium.php](http://www.athenaes.com/tech_brief_augmedium.php)

On the web:

[www.athenaes.com/Augmedium.php](http://www.athenaes.com/Augmedium.php)





## LB Booster™

LB Booster™ is a medium additive that increases the level of production of recombinant proteins. Particularly suitable for improving the productivity of LB Broth, LB Booster™ can increase biomass levels by a factor of up to 5 in any medium formulation. In addition, the supplement provides essential nutri-

ents selected for their ability to increase the relative level of recombinant protein accumulation. LB Booster™ is supplied as a powder and as a ready-to-use 20x concentrate. LB Booster™ is a proprietary blend of fructose and nutrient supplements.

Available in liquid or dry-powder.



- Increase Biomass Levels by 5 X
- Fructose and Nutrient Blend

LB Booster™	Powder for 100mL stock	1 packet	0125
LB Booster™	Powder for 500mL stock	1 packet	0126
LB Booster™	20x Liquid (ready-to-use)	500mL	0127

On the web:

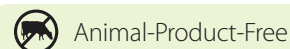
[www.athenaes.com/LBbooster.php](http://www.athenaes.com/LBbooster.php)

## Atholate™

Atholate™ is an APF Certified™ proprietary blend of plant protein hydrolysates for use in the preparation of microbiological media. Atholate™ was developed as an Animal-Product-Free alternative to casein hydrolysate in common expression media such as LB Broth. It is designed to out-

perform standard casein hydrolysate while maintaining the same nutritional characteristics. Athena's newest expression broths, the Prime-olate™ series, feature Atholate™ as a key component. Atholate™ is available in bulk quantities.

Available in bulk dry-powder.



Animal-Product-Free

### ★ The New Prime-olate™ expression media series

Turbo Prime-olate™	p. 11
Superior Prime-olate™	p. 12
Power Prime-olate™	p. 13

Atholate™	Powder	500g	0134
Atholate™	Powder	1kg	0134-1
Atholate™	Powder	2.5kg	0134-2.5
Atholate™	Powder	10kg	0134-10

On the web:

[www.athenaes.com/Atholate.php](http://www.athenaes.com/Atholate.php)

## PERK™: Protein Expression Rescue Kit

The Protein Expression Rescue Kit™ is intended to help maximize the amount of soluble protein produced during expression of recombinant proteins in *E. coli*. This comprehensive kit includes samples of Athena's proprietary Expression Media including Turbo Broth™, Superior Broth™, Power Broth™, Hyper Broth™ and two reference media, Glucose M9Y and LB (Miller) Broth. The Expression Media are specially designed to increase the production of recombinant proteins.

The kit also includes Athena's proprietary medium additives: LB\*Booster™ and Augmedium™. LB\*Booster™ is designed to increase the biomass production of any expression medium up to 5-fold. Augmedium™ is a medium pre-conditioner that induces the expression of chaperone proteins in advance of expression of the target recombinant protein. This can increase the amount of soluble protein accumulated.

Available in dry-powder.



- Maximize Soluble Protein
- Dramatic Expression Results
- Includes Media Additive and Pre-conditioner to Advance Expression

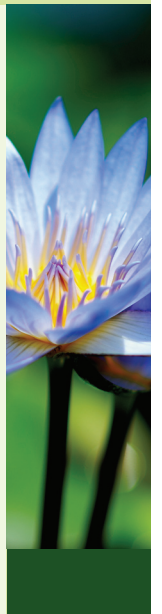
### Kit Components

Superior Broth™	Glucose M9Y
Turbo Broth™	Glucose Nutrient Mix™
Power Broth™	LB Booster™
Hyper Broth™	Augmedium™
LB Broth (Miller)	Application Manual

PERK™ Protein Expression Rescue Kit	Powder	1 kit	0135
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On the web:

[www.athenaes.com/PERK.php](http://www.athenaes.com/PERK.php)



Expression Media



## ExpressMax™ Media and Screening Kit

Athena's ExpressMax™ series are fermentation media for the production of recombinant proteins. The basal salts are inorganic nutrients optimized to give the highest possible growth rate of *E. coli* and production of recombinant proteins. The screening kit is intended to aid in formulation development by supplying the basal salts along with the carbon (glucose) and nitrogen sources (yeast extract,

soy protein hydrolysate and Atholate™) which can be combined in different combinations to identify the composition that gives the highest production of the target protein. ExpressMax™ medium is also available pre-formulated for ease of use. These formulations have been designed by Athena's scientists for maximum production of recombinant proteins.

### Kit Components

- ExpressMax™ Basal Salts
- ExpressMax™ Yeast Extract
- ExpressMax™ Soy Protein Hydrolysate
- Atholate™
- Glucose Nutrient Mix
- Application Manual with ExpressMax™ Formulations Guide

ExpressMax™ Screening Kit	Powder	1 Kit	0136
ExpressMax™ Formula 1	Powder	500g	0137
ExpressMax™ Formula 1	Powder	500g	0138
ExpressMax™ Formula 1	Powder	500g	0139
ExpressMax™ Formula 1	Powder	500g	0140
ExpressMax™ Formula 1	Powder	500g	0141
ExpressMax™ Formula 1	Powder	500g	0142
ExpressMax™ Formula 1	Powder	500g	0143
ExpressMax™ Formula 1	Powder	500g	0144
Basal Salts	Powder	500g	0145
Yeast Extract	Powder	500g	0146
Soy Protein Hydrolysate	Powder	500g	0147
Glucose Nutrient Mix	Powder	500g	0109
Atholate™	Powder	500g	0134

*Bulk quantities available upon request.*

Available in dry-powder.



- Fermentation Media
- Dramatic Expression Results
- Provides Basal Salts, Media, Nitrogen and Carbon Sources

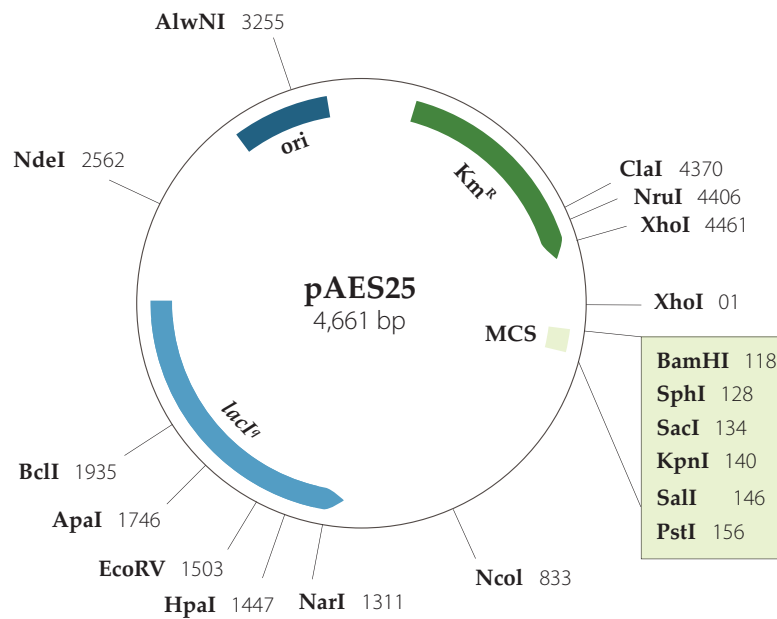
On the web:

[www.athenaes.com/ExpressMax.php](http://www.athenaes.com/ExpressMax.php)

## ACES™ Promoter Selection Kit

The ACES™ (AthenaES™ Complete Expression System) Promoter Selection Kit applies the principle that the overall expression rate can determine not only the total accumulation level, but also the

amount of soluble protein that is made. By titring the promoter activity, one can fine-tune the expression level to meet the specific needs of target protein production levels.



Available in dry-powder.



- Unique Promoter Plasmid
- Contains Competent Cells
- Contains Primers, Supplements, and Media for a complete system

- ▶ **ori** pBR322 origin
- ▶ **Km<sup>R</sup>** kanamycin resistance
- ▶ **lacI<sup>q</sup>** lac repressor
- ▶ **MCS** Multiple Cloning Site

Kit Components			
<b>Plasmids</b>		<b>Strain</b>	
pAES25	10µg	JM109 Competent Cells	2 x 200µL
<b>Primers</b>		<b>Medium Supplements</b>	
Primer A	250pmoles	Augmedium™	25mL
Primer B	250pmoles	Inducer Solution A	1mL
<b>Media and Other Components</b>			
Turbo Broth™	1L	Superior Broth™	1L
Power Broth™	1L	Hyper Broth™	1L
Glucose M9Y	1L	LB Miller Broth	1L
Glucose Nutrient Mix	21g	Application Manual	

ACES™ Promoter Selection Kit		1 kit	0148-1
pAES25	plasmid	10µg	0149-25

On the web:

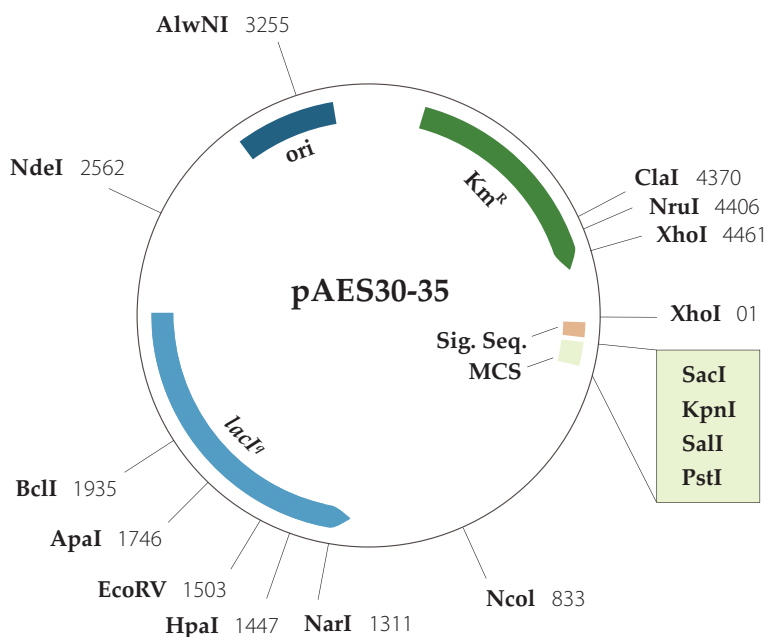
[www.athenaes.com/ACES\\_promoter\\_kit.php](http://www.athenaes.com/ACES_promoter_kit.php)



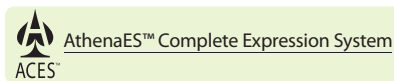
## ACES™ Signal Sequence Kit

The ACES™ (AthenaES™ Complete Expression System) Signal Sequence Kit provides a set of six expression vectors each with a different signal sequence for protein export to the periplasmic space of *E. coli* using either the SEC, SRP or TAT protein secretion pathway. Since the use

of a post-translational or co-translational export mechanism is protein-specific and cannot be known *a priori*, this kit allows for the selection of the translocation pathway best suited for a given recombinant protein.



Kit Components			
<b>Plasmids</b>			
pAES30	10µg	pAES33	10µg
pAES31	10µg	pAES34	10µg
pAES32	10µg	pAES35	10µg
<b>Strain</b>			
JM109 Competent Cells	2 x 200µL		
<b>Medium Supplements</b>			
Augmedium™	25mL	Secretion Enhancer Solution A	60mL
Inducer Solution A	1mL	Secretion Enhancer Solution B	60mL
Inducer Solution B	100mL		
<b>Media and Other Components</b>			
Turbo Broth™	1L	Superior Broth™	1L
Power Broth™	1L	Hyper Broth™	1L
Glucose M9Y	1L	LB Miller Broth	1L
Glucose Nutrient Mix	21g	Application Manual	



Available in dry-powder.



- Six Signal Sequence Plasmids
- Contains Competent Cells
- Contains Supplements and Media for a complete system

- ▶ **ori** pBR322 origin
- ▶ **Km<sup>R</sup>** kanamycin resistance
- ▶ **lacI<sup>R</sup>** lac repressor
- ▶ **MCS** Multiple Cloning Site
- ▶ **Sig. Seq.** Signal Sequence Location

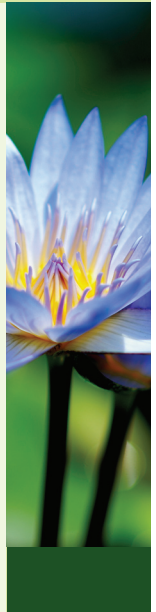
### ▶ Signal Sequences on Following Page

★ This product is supported by patented technology. You must become a Registered User and agree to a Non-Commercial Use License or a Commercial Evaluation License in order to purchase or use this product.

On the web:

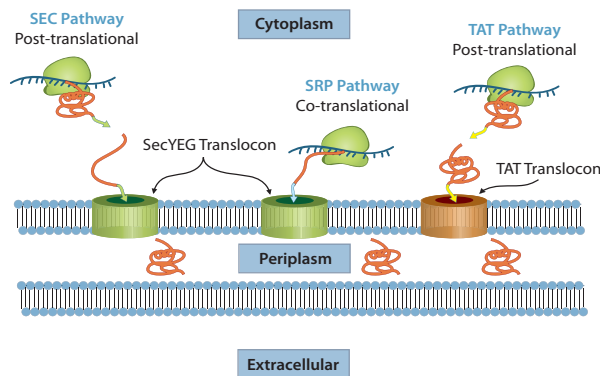
[www.athenaes.com/ACES\\_signal\\_kit.php](http://www.athenaes.com/ACES_signal_kit.php)





pAES30	SRP	4,715 bp	AAAAAGATTGGCTGGCGCTGGCTGGTTAGTTTTAGCGTTTAGCGCATCGGCG
pAES31	Sec	4,721 bp	AAAAAGACAGCTATCGGATTGCAGTGGCACTGGCTGGTTTCGCTACCGTAGCGCAGGCG
pAES32	Sec	4,721 bp	AAACAAAGCACTATTGCACTGGCACTCTTACCGTTACTGTTTACCCTGTGACAAAAGCG
pAES33	TAT	4,753 bp	TCACTCAGTCGGCGTCAGTTCATTACGGCATCGGGATTGCACCTTGTGCAGGCGCTGTTCCACTGAAGGCCAGCGCAGCAGATCTACTAGT
pAES34	TAT	4,789 bp	ACAATAACGATCTTTTCAGGCATCAGCTGGCGTTTTCTGGCACAACTGGCGGCTTAACCGTCGCCGGTATGCTGGGTCCGCATTGT-TAACGCCGACGTGCGACGGCAGCAGATCTACTAGT
pAES35	SRP	4,712 bp	CGCGTACTGCTATTTTACTTCTTTCCCTTTTCATGTTGCCGGCATTTCG

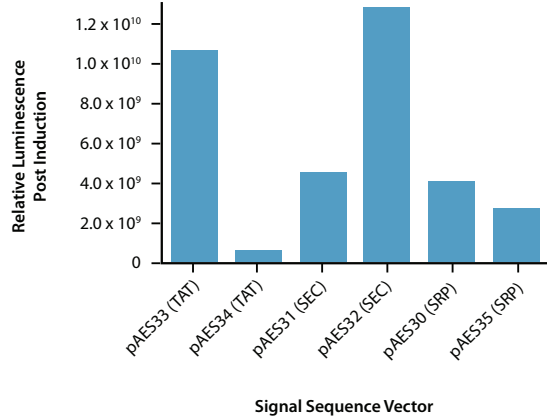
**Protein Secretion Pathways**



The diagram on the left shows the Type II secretion pathways of *E. coli*: Sec Pathway, SRP Pathway, and TAT pathway. Each pathway employs a different mechanism for translocation. As not all proteins will be translocated equally well by any one export mechanism, The ACES Signal Sequence Kit™ provides six different vectors that each utilize different pathways to secrete the protein from the cytoplasm to the periplasm.

The graph to the lower left shows the results of an experiment using the ACES Signal Sequence Kit™ to express a streptavidin-*Gaussia* luciferase hybrid protein (SA-Luc). The proteins were inserted downstream of the six signal sequences. Luciferase activity was significantly higher when either the TAT or Sec was used, but significantly lower when the alternative TAT or Sec or the two SRP signal sequences were used.

**Luminescent Activity After Induction**



To read the complete ACES Signal Sequence and YebF™ Technical Brief, visit [www.athenaes.com/tech\\_brief\\_ACESyebf.php](http://www.athenaes.com/tech_brief_ACESyebf.php)

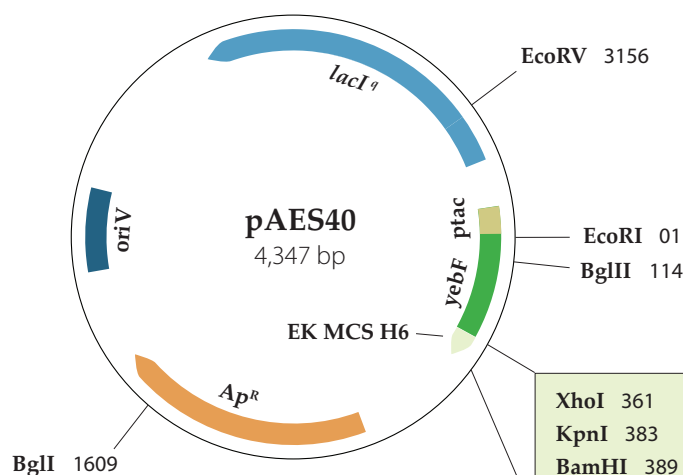
Expression Media

ACES™ Signal Sequence Kit		1 kit	0148-2
pAES30	plasmid	10µg	0149-30
pAES31	plasmid	10µg	0149-31
pAES32	plasmid	10µg	0149-32
pAES33	plasmid	10µg	0149-33
pAES34	plasmid	10µg	0149-34
pAES35	plasmid	10µg	0149-35

## ACES™ YebF Protein Export Kit

The ACES™ (AthenaES™ Complete Expression System) YebF Protein Export Kit makes use of the YebF protein to transport other proteins through the inner and outer membranes of *E. coli* cells. YebF is an extracellular protein that effectively transports both small and large prokaryotic and eukaryotic

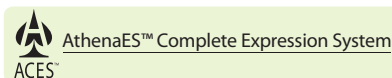
proteins to the extracellular medium in active form. This permits the secretion of target proteins into the culture medium, simplifying downstream purification as well as allowing for the expression of toxic proteins and proteins that do not fold correctly in the *E. coli* cytoplasm.



Blue - C-terminal amino acids of YebF  
Orange - Enterokinase cleavage site

XhoI	EK Site	KpnI	BamHI	XbaI	SalI	PstI
CTC GAG	GAC GAT GAC GAT AAG	GGT ACC GGA TCC TCT AGA GTC GAC CTG CAG				
SmaI	NcoI	NotI	SacI	6xHis		Stop
CCC GGG CCA TGG GCG GCC GCA GAG CTC CAC CAC CAC CAC CAC TAA						

XhoI	361
KpnI	383
BamHI	389
XbaI	395
SalI	401
PstI	407
SmaI	413
NcoI	419
NotI	425
SacI	434



Available in dry-powder.



- Revolutionary YebF Protein
- Contains Competent Cells
- Contains Primers, Supplements, and Media for a complete system

- ▶ oriV ColE1 origin of replication
- ▶ Ap<sup>R</sup> ampicillin resistance
- ▶ lacI<sup>q</sup> lac repressor
- ▶ ptac tac promoter
- ▶ EK Enterokinase Site
- ▶ MCS Multiple Cloning Site
- ▶ H6 6x His Tag

★ This product is supported by patented technology. You must become a Registered User and agree to a Non-Commercial Use License or a Commercial Evaluation License in order to purchase or use this product.

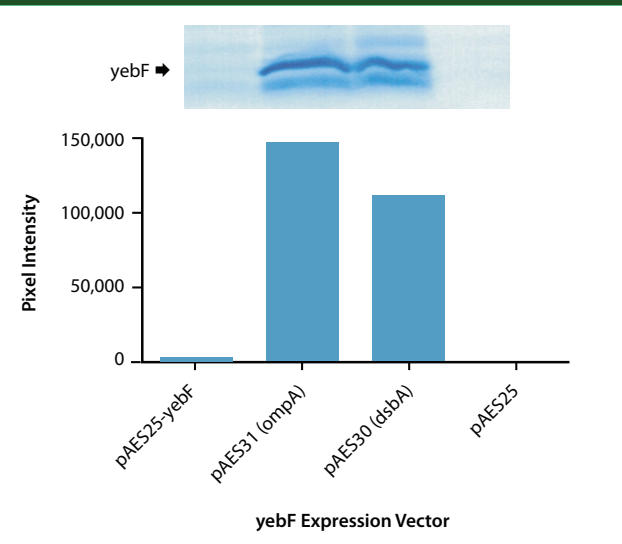
### Kit Components

Plasmids		Antibodies	
pAES40	10µg	Anti-YebF Antisera	0.5mL
Strain			
JM109 Competent Cells	2 x 200µL		
Medium Supplements			
Augmedium™	25mL	Secretion Enhancer Solution A	60mL
Inducer Solution A	1mL	Secretion Enhancer Solution B	60mL
Inducer Solution B	100mL		
Media and Other Components			
Turbo Broth™	1L	Superior Broth™	1L
Power Broth™	1L	Hyper Broth™	1L
Glucose M9Y	1L	LB Miller Broth	1L
Glucose Nutrient Mix	21g	Application Manual	

ACES™ YebF Protein Export Kit		1 kit	0148-3
pAES40	plasmid	10µg	0149-40

Expression Media

**The Expression of YebF Using Different Signal Sequences**



The portion of an SDS-PAGE gel and its corresponding graph to the left show the relative level of YebF accumulation. These data suggest that not only is YebF suitable for directing the translocation of recombinant proteins to the culture medium, but that by applying alternative signal sequences (which direct the proteins to the different export pathways) a significant increase in protein accumulation can be achieved.

To read the complete ACES Signal Sequence and YebF™ Technical Brief, visit [www.athenaes.com/tech\\_brief\\_ACESyebf.php](http://www.athenaes.com/tech_brief_ACESyebf.php)

On the web:

[www.athenaes.com/ACES\\_yebf\\_kit.php](http://www.athenaes.com/ACES_yebf_kit.php)

**ACES™ Accessory Products**

ACES™ Primer A	Liquid (ready-to-use)	250pmoles	0150-1
ACES™ Primer B	Liquid (ready-to-use)	250pmoles	0150-2
JM109 Competent Cells	Strain	2 x 200µL	0151-JM109-C
JM109	Strain	stab	0151-JM109
HB101	Strain	stab	0151-HB101
HMS174	Strain	stab	0151-HMS174
BLR	Strain	stab	0151-AG1
Inducer Solution A	Liquid (ready-to-use)	1mL	0152-1
Inducer Solution A	Liquid (ready-to-use)	5 x 1mL	0152-5
Inducer Solution B	Liquid (ready-to-use)	500mL	0153
Secretion Enhancer Solution A	Liquid (ready-to-use)	500mL	0154
Secretion Enhancer Solution B	Liquid (ready-to-use)	500mL	0155
Anti-YebF Antesera	Antibodies	0.5mL	0313-1

**Rapid Transformation Kit**

The Rapid Transformation Kit provides a quick and easy protocol for the transformation of plasmid DNA into any bacterial strain of choice without needing to purchase or prepare competent cells according to lengthy hexaminecobalt chloride/DMSO or calcium chloride pro-

cedures. The kit comes with three different strain stabs that can be customized from Athena's strain bank to the needs of the researcher. It includes SOC medium and 2x TSS to assist in cell reconditioning and to expedite the transformation process.

Available in dry-powder.

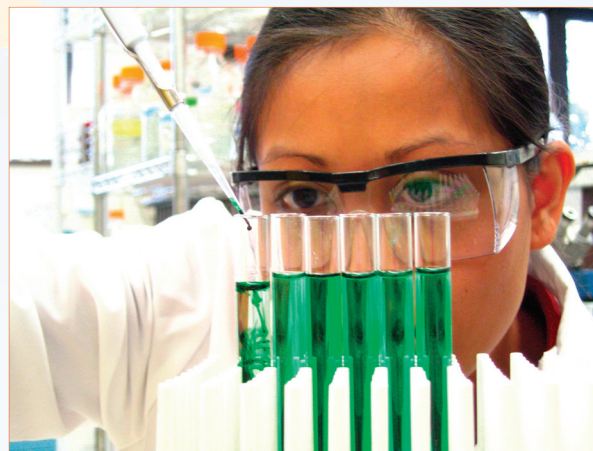


Rapid Transformation Kit		1 kit	0156
2x TSS	Liquid (ready-to-use)	5 x 1mL	0157

Expression Media

## Enzyme Assays

Athena's Enzyme Assays are specially designed for the detection of protease activity. Athena's PDQ™ series, which includes a colorimetric and fluorescent assay kit, provide researchers with a simple to use yet highly sensitive assay. Detection of protease activity to picogram quantities is possible. Each kit is supplied with a trypsin control for generating standard curves (BAEE equivalent units).



Accurate protease detection of as little as sub-nanogram quantities.



## Product Index

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PDQ™ Protease Assay	0201	26
PDQ™ Fluorescent Protease Assay	0202	27

## PDQ™ Protease Assay

The PDQ™ Protease Assay is a unique colorimetric assay used to detect protease activity in aqueous samples. The proprietary substrate responds to a wide range of proteases including serine, metallo, aspartate and cysteine proteases such as collagenase, proteinase K, papain, pepsin, bromelain, ficin, trypsin and chymotrypsin. PDQ™ can be used with just a few simple steps to measure protease activity and requires no centrifugation. The substrate

is a cross-linked matrix containing protein substrate and a dye-protein conjugate. Protease activity is detected spectrophotometrically with increasing optical density proportional to increasing enzyme activity and can detect nanogram quantities. Each kit is supplied with a trypsin solution for generating standard curves (BAEE equivalent units). PDQ™ is supplied in 48 ready-to-use plastic vials.

Available as Ready-to-use.



- Few, Simple Steps
- No Centrifugation Necessary
- Detection of Nanogram Quantities

### Product Specifications

**Unit Size:** 48 vials of 200µL of pre-made matrix

**Control:** Trypsin

**Storage:** 4°C

**Stability at 4°C:** 3 months

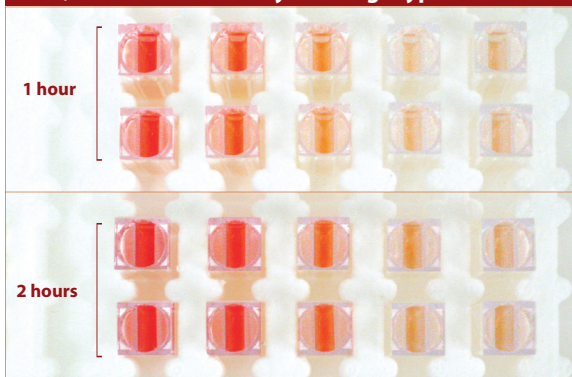
PDQ™ Protease Assay

Sol-gel, (ready-to-use)

48 Vials, 1 Kit

0201

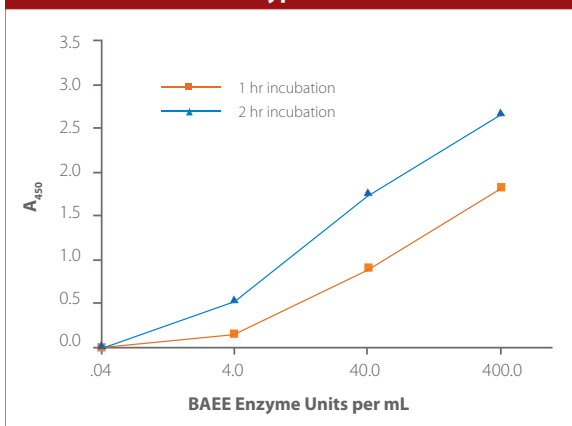
### PDQ™ Colorimetric Analysis Using Trypsin



The image on the left shows the results of a PDQ™ colorimetric analysis using incremental dilutions of trypsin after 1 hour and 2 hour incubation times. The increased absorption corresponds directly to the amount of protease activity. The final samples can be read spectrophotometrically in disposable cuvettes to create a standard curve. Samples of unknown protease activity are treated similarly and can be compared against the trypsin standard curve to determine activity.

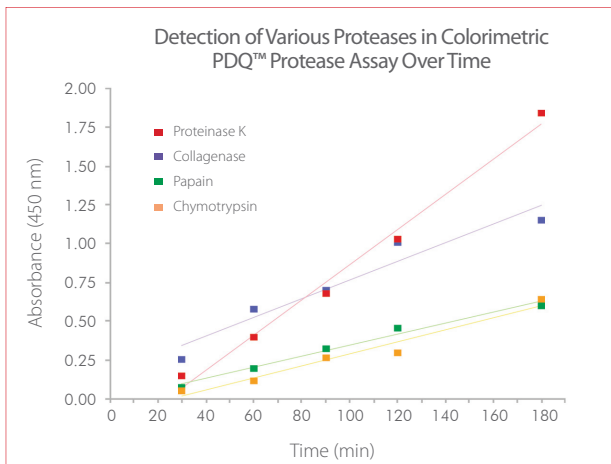
The graph on the bottom-left shows the absorbance levels of PDQ™ Colorimetric Assay as a function of enzyme level. The diagram shows the incremental dilutions of trypsin in 10mM Tris-Cl using 400, 40, 4.0, and 0.4 BAEE Units/mL of protease activity, with a control "blank" which contains the Tris buffer alone.

### Calibration Curve for Trypsin



To read the complete PDQ™: One-step Protease Assay Technical Brief, visit [www.athenaes.com/tech\\_brief\\_protease.php](http://www.athenaes.com/tech_brief_protease.php)





The graph on the left shows the time-course degradation of the PDQ™ Protease Assay substrate by papain, chymotrypsin, proteinase K, and collagenase. Duplicate reactions were incubated at 37°C and 0.2 N NaOH was added to the vials to stop the reaction at the indicated times. The absorbance at 450nm was measured by transferring the reaction mixture to spectrophotometric cuvettes. The results of this experiment show the increased absorption over time due to proteolytic degradation of the substrate, and the ability of the assay to detect a wide range of proteases.

On the web:

[www.athenaes.com/PDQProteaseAssay.php](http://www.athenaes.com/PDQProteaseAssay.php)

## PDQ™ Fluorescent Protease Assay

The PDQ™ Fluorescent Protease Assay employs the same protease lattice matrix as the Colorimetric PDQ™ Protease Assay™. Fluorescein Isothiocyanate (FITC) is incorporated into the substrate as an indicator of enzymatic digestion of the substrate, allowing for detection of sub-nanogram quantities of protease activity in aqueous samples. The fluorescent-based substrate responds to the same broad spectrum of proteases as

the Colorimetric PDQ™ Assay (serine, metallo, aspartate and cysteine proteases such as collagenase, proteinase K, papain, pepsin, bromelin, ficin, trypsin and chymotrypsin). Protease activity is detected fluorophotometrically with increasing fluorescence proportional to increasing enzyme activity. Each kit is supplied with a trypsin control for generating standard curves (BAEE equivalent units).

Available as Ready-to-use.



- Few, Simple Steps
- No Centrifugation Necessary
- Sub-Nanogram Detection

### Product Specifications

**Unit Size:** 48 vials of 200µL of pre-made matrix

**Control:** Trypsin

**Storage:** 4°C

**Stability at 4°C:** 3 months

PDQ™ Fluorescent Protease Assay

Sol-gel, (ready-to-use)

48 Vials, 1 Kit

0202

On the web:

[www.athenaes.com/PDQFluorescentAssay.php](http://www.athenaes.com/PDQFluorescentAssay.php)



## Specialty Proteins

Athena offers a variety of specialty proteins for uses ranging from protein labeling, protein expression, microscopy and immunoassays to atomic-force extension calibration. Our product line includes unique bacterial esterases and lipases, green fluorescent proteins and luciferases, and the trademarked I270™ AFM Reference Protein.



Brightest Green Fluorescent Proteins and Luciferases available.

[www.athenaes.com/SpecialtyProteins.htm](http://www.athenaes.com/SpecialtyProteins.htm)





## Product Index

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I270™ AFM Reference Protein	0304	30
LypA	0305	31
TesA	0306	31
VlpA	0307	31
Avitag™-biotinylated <i>Gaussia</i> luciferase	0308	32
<i>Renilla mullerei</i> luciferase	0309	33
<i>Renilla reniformis</i> GFP	0310	33
<i>Ptilosarcus</i> GFP	0311	34
Coelenterazine	0312	35



## I270™ AFM Reference Protein

I270™ is a unique recombinant polyprotein used for the calibration of and as a reference for force extension experiments using atomic force microscopes. It is supplied in a ready-to-use solution. The protein is composed of eight repeats of

the Ig 27 domain of human titin. Single molecule measurements give up to eight saw-tooth force-extension curves with the specifications below. The protein has durable elasticity that allows for repeated unfolding and refolding.

Product Specifications	
Parameter	Value
Distance between peaks	24.1 ± 0.34nm
Force Peaks	204 ± 26pN
Persistence Length	0.30 ± 0.07nm
Contour Length (per domain)	28.4 ± 0.3nm

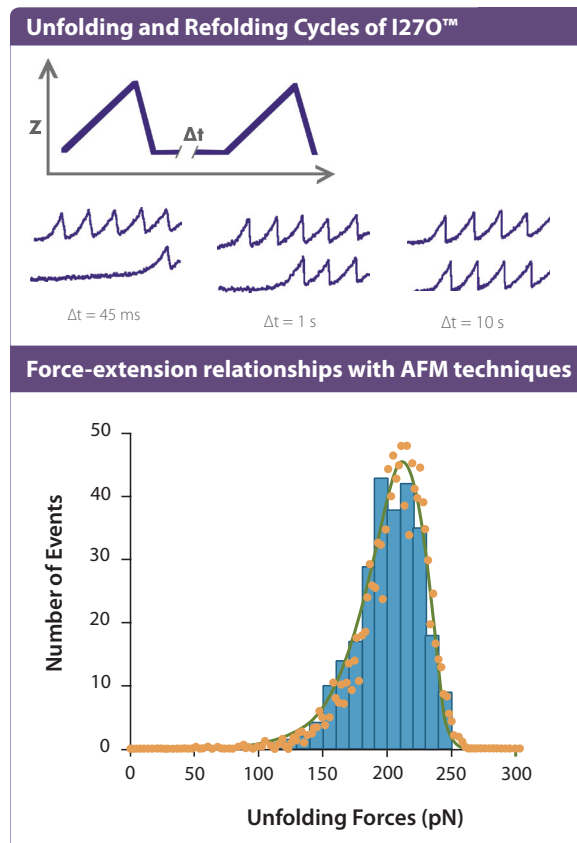
Available as Ready-to-use.

- Reference for force extension experiments
- 8 saw-tooth extension curves
- Unique durable elasticity

I270™ AFM Reference Protein	Liquid (ready-to-use)	100µg	0304
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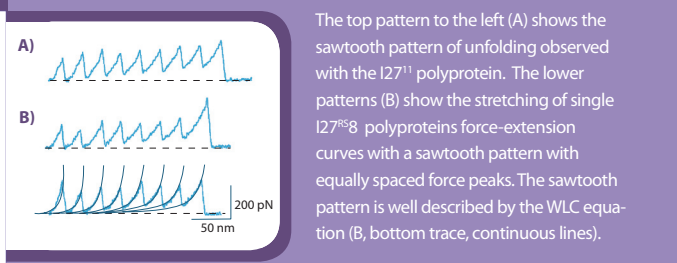
Specialty Proteins

### I270™ as a Reference Protein in Force Extension Measurements



The graphs to the left demonstrate the unfolding and refolding cycles of an I27<sup>ns</sup>8 protein probed with a double-pulse protocol. The protein is first stretched to count the number of domains that unfold, N-total, (a-c, top traces), and then it is relaxed to its initial length. A second extension after a delay, Δt, measures the number of refolded domains, N-refolded (a-c, bottom traces).

The lower graph to the left is an unfolding force frequency histogram for I27<sup>ns</sup>8. The filled circles correspond to a Monte Carlo simulation of the mean unfolding forces (n=1,000) of eight domains placed in series using an unfolding rate constant,  $ku^0$ , of  $3.3 \times 10^{-4}s^{-1}$ , an unfolding distance, Δxu, of 0.25nm and a  $V = 0.6nm/ms$ .



The top pattern to the left (A) shows the sawtooth pattern of unfolding observed with the I27<sup>11</sup> polyprotein. The lower patterns (B) show the stretching of single I27<sup>ns</sup>8 polyproteins force-extension curves with a sawtooth pattern with equally spaced force peaks. The sawtooth pattern is well described by the WLC equation (B, bottom trace, continuous lines).

To read the complete I27<sup>ns</sup>8 Protein as a Reference for Force Extension Technical Brief, visit [www.athenaes.com/tech\\_brief\\_I270\\_protein.php](http://www.athenaes.com/tech_brief_I270_protein.php)

On the web:

[www.athenaes.com/I270AFMReferenceProtein.php](http://www.athenaes.com/I270AFMReferenceProtein.php)

## Bacterial Esterases

Cold-tolerant bacterial esterases and lipases have the unusual property of a flexible structure which allows these enzymes to accommodate a broad range of substrates and to be more solvent tolerant. These properties coupled with the stereoselectivity of enzymes, make esterases and lipases ideal catalysts for the chemical modification of pharmacophore molecules. Employing an array of techniques to identify esterase/lipase ac-

tivity for industrial processes, an in-house microbial collection of psychrophilic microbes was used to screen for specific esterase/lipase activities. Two marine bacteria yielded esterase/lipase genes encoding LypA (*V. cholera*) and VlpA (arctic-derived *Vibrio sp.*). These enzymes have broad spectrum substrate activity and VlpA exhibits tolerance to solvents by retaining its catalytic activity in buffer-solvent mixtures.

Available as Ready-to-use.



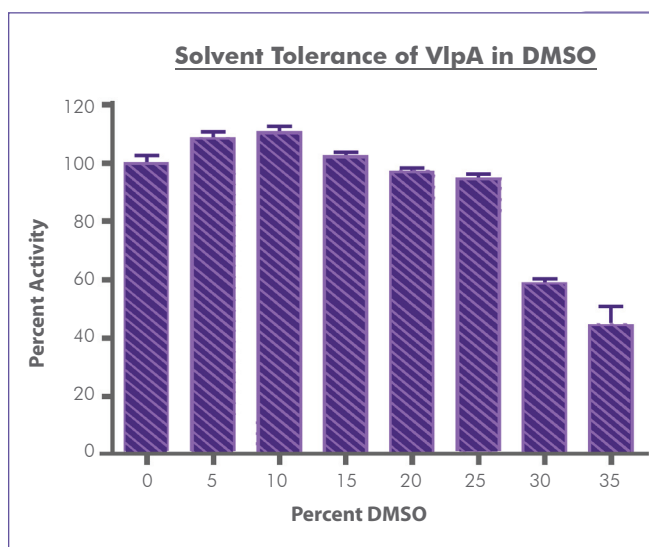
- Broad spectrum of substrate activity
- Flexible solvent tolerant structure
- Stereoselective

### Product Specifications

Enzyme	EC Classification	Source	Special Properties
TesA	EC 3.1.1.5	thioesterase from <i>E. coli</i>	Mesophilic, Substrates: diacyl glycerides, acyl-thioesters, and r-nitrophenyl esters
LypA	EC 3.1.1.5	lysophospholipase L2 from <i>Vibrio cholera</i>	Mesophilic, Substrates: diacyl glycerides and r-nitrophenyl esters, poor thioesterase activity
VlpA	EC 3.1.1.3	lipase from a marine <i>Vibrio sp.</i>	Psychrophilic, Substrates: broad activity with short and long chain acryl esters, solvent tolerant

LypA	Enzyme Solution	100 Units	0305-1
LypA	Enzyme Solution	500 Units	0305-5
TesA	Enzyme Solution	100 Units	0306-1
TesA	Enzyme Solution	500 Units	0306-5
VlpA	Enzyme Solution	100 Units	0307-1
VlpA	Enzyme Solution	500 Units	0307-5



The graph to the left shows the solvent tolerance of VlpA in di-methyl-sulfoxide (DMSO). VlpA (2 Units) was reacted with 100 µmoles p-nitrophenyl butyrate in 50 mM Tris-Cl pH 9.0 in the presence of different amounts of DMSO. The initial reaction rates were measured and the percent activity relative to the "no solvent" control calculated. VlpA exhibits tolerance to the solvent by retaining its catalytic activity in buffer-solvent mixtures.

To read the complete PDQ™: One-step Protease Assay Technical Brief, visit [www.athenaes.com/tech\\_brief\\_protease.php](http://www.athenaes.com/tech_brief_protease.php)

On the web:

[www.athenaes.com/BacterialEsterases.php](http://www.athenaes.com/BacterialEsterases.php)

## Avitag™-biotinylated *Gaussia* Luciferase

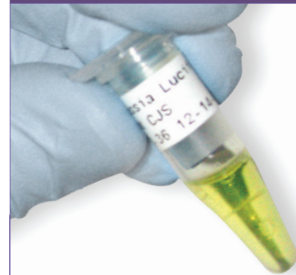
*Gaussia* luciferase is a luminescent protein with quantum yields higher than the luciferases from *Renilla sp.* and is up to 1,000 times brighter than firefly luciferase. It is ATP-independent, requiring only coelenterazine and O<sub>2</sub> as substrates.

*Gaussia*'s high quantum yields make it particularly useful in immunoassays. It is supplied pre-biotinylated for direct use in streptavidin/avidin based immunoassays.

### Product Specifications

Protein Analysis		Amino Acids % Frequency	
Length	185 aa	Charged (RKHYCDE)	33.51
Molecular Weight	18,999	Acidic (DE)	12.97
Molar Extinction Coefficient	8,290	Basic (KR)	12.97
Isoelectric Point	6.88	Polar (NCQSTY)	21.08
Charge at pH 7	-0.15	Hydrophobic (AILFWV)	35.68
		C Cys	5.95 (11)

Available as Ready-to-use.

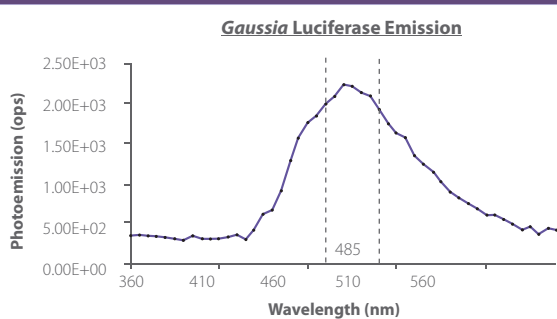


- ATP-Independent
- Stereoselective
- Smallest luciferase to date
- Sodium tolerant

Avitag™-biotinylated <i>Gaussia</i> luciferase 2x	1mg	0308-1
Avitag™-biotinylated <i>Gaussia</i> luciferase 2x	250µg	0308-2

Specialty Proteins

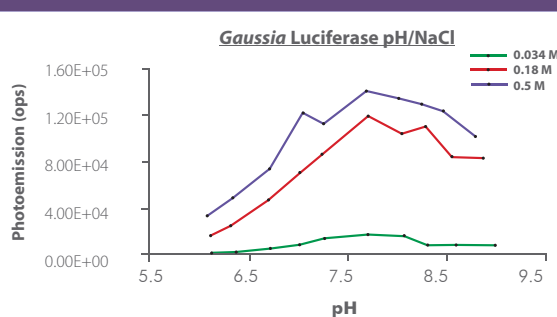
### Gaussia Luciferase's Spectral Emission



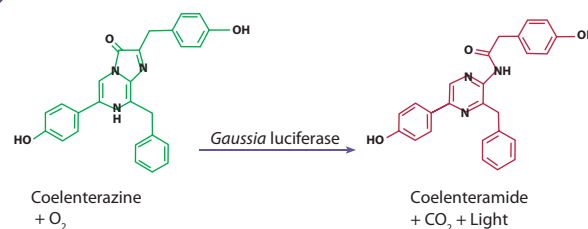
The graph on the top left shows the emission spectrum for *Gaussia* luciferase ( $\lambda_{max} = 485\text{nm}$ ). The lower graph shows the effects of salt concentration and pH on light emission of *Gaussia* luciferase.

The diagram below depicts the oxidation of coelenterazine by *Gaussia* luciferase to yield light. Coelenterazine-utilizing luciferases, such as *Gaussia* luciferase, do not require accessory high-energy molecules such as ATP for their signal. *Gaussia* luciferase is the brightest of all luciferase enzymes, which makes it superior to other luminescent proteins in assays requiring very low detection limits.

### Gaussia Luciferase's Salt Tolerance



To view the complete *Gaussia* Luciferase Datasheet, visit [www.athenaes.com/datasheet\\_gaussia.php](http://www.athenaes.com/datasheet_gaussia.php)



On the web:

[www.athenaes.com/GaussiaLuciferase.php](http://www.athenaes.com/GaussiaLuciferase.php)



## Renilla mullerei Luciferase & Renilla reniformis GFP

*Renilla mullerei* and *Renilla reniformis* are species of soft coral made up of colonies of polyps that emit green fluorescence. The green fluorescent protein obtained from this organism exhibits nearly sym-

metrical excitation and emission peaks. Recombinant *Renilla reniformis* GFP has the same level of fluorescence as the native protein.

Available as Ready-to-use.



### Renilla mullerei luciferase Product Specifications

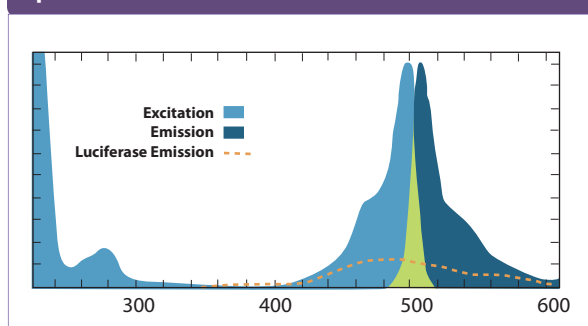
Protein Analysis		Amino Acids % Frequency	
Length	238 aa	Charged (RKHYCDE)	30.67
Molecular Weight	27,120	Acidic (DE)	10.92
Molar Extinction Coefficient	23,970	Basic (KR)	10.08
Isoelectric Point	6.34	Polar (NCQSTY)	27.31
Charge at pH 7	-1.72	Hydrophobic (AILFWW)	31.93
		C Cys	1.26 (3)

### Renilla reniformis GFP Product Specifications

Protein Analysis		Amino Acids % Frequency	
Length	233 aa	Charged (RKHYCDE)	30.47
Molecular Weight	25,990	Acidic (DE)	11.59
Molar Extinction Coefficient	15,840	Basic (KR)	10.3
Isoelectric Point	6.19	Polar (NCQSTY)	25.75
Charge at pH 7	-2.61	Hydrophobic (AILFWW)	32.62
		C Cys	0.43 (1)

<i>Renilla mullerei</i> luciferase	1 mg	0309-1
<i>Renilla mullerei</i> luciferase	250µg	0309-2
<i>Renilla reniformis</i> Green Fluorescent Protein	1 mg	0310-1
<i>Renilla reniformis</i> Green Fluorescent Protein	250µg	0310-2

### Spectral Emission of Renilla reniformis GFP

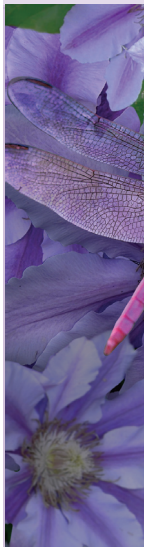


The graph to the left shows the emission spectrum for *Renilla reniformis* green fluorescent protein. Excitation and emission peaks are almost symmetrical with a relatively small Stokes shift.

To view the complete *Renilla reniformis* Green Fluorescent Protein Datasheet, visit [www.athenaes.com/datasheet\\_renillaGFP.php](http://www.athenaes.com/datasheet_renillaGFP.php)

On the web:

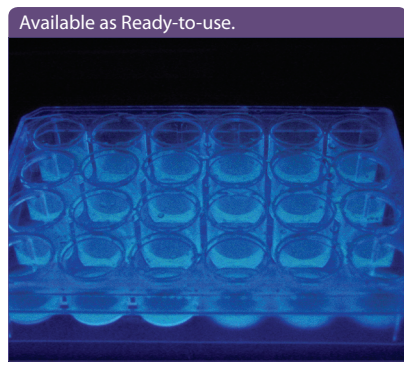
[www.athenaes.com/RenillaLuciferase.php](http://www.athenaes.com/RenillaLuciferase.php)



## Ptilosarcus Green Fluorescent Protein

*Ptilosarcus gurneyi* (orange sea pen, sea feather) is a species of soft coral that emits a strong green fluorescence when disturbed. The green fluorescent protein obtained from this organism exhibits nearly symmetrical excitation and emis-

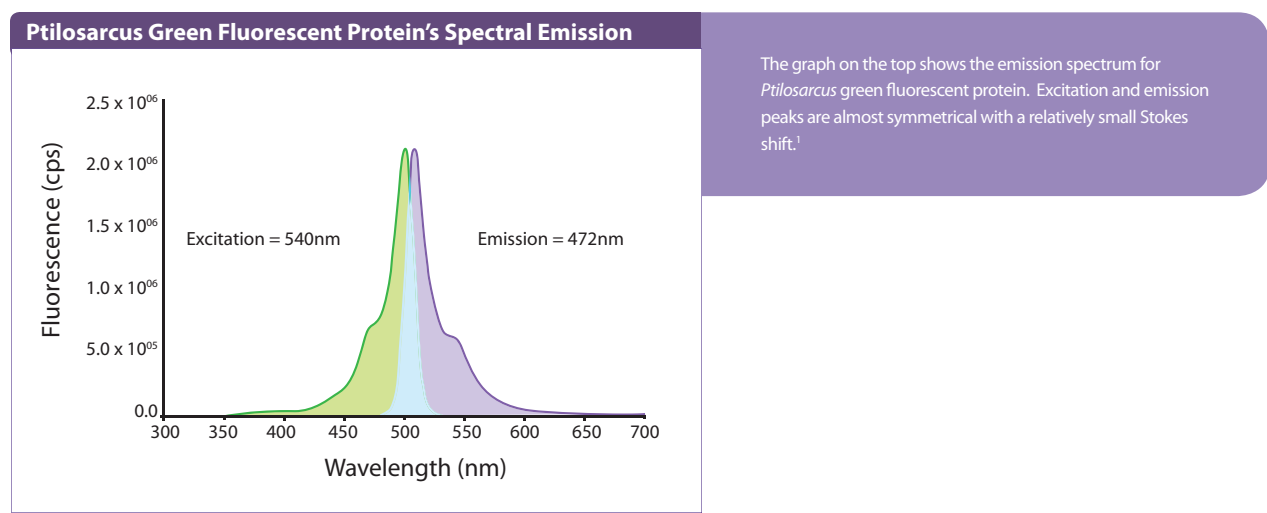
sion peaks. This is in contrast to the more commonly employed green fluorescent protein from *Aequorea victoria* which has two wavelengths at which excitation occurs and a broader emission spectra.



Product Specifications		Amino Acids % Frequency	
Protein Analysis			
Length	238 aa	Charged (RKHYCDE)	31.51
Molecular Weight	27,045	Acidic (DE)	12.18
Molar Extinction Coefficient	22,450	Basic (KR)	10.08
Isoelectric Point	5.92	Polar (NCQSTY)	24.37
Charge at pH 7	-4.52	Hydrophobic (AILFWV)	33.19
		C Cys	0.42 (1)

<i>Ptilosarcus</i> Green Fluorescent Protein	1mg	0311-1
<i>Ptilosarcus</i> Green Fluorescent Protein	250µg	0311-2

Specialty Proteins



## Coelenterazine

Coelenterazine is a substrate used for bioluminescent reactions with enzymes such as *Renilla luciferase* and *Gaussia luciferase*. The enzymes catalyze the oxidation decarboxylation of coelenterazine to produce light and coelenteramide. It has been used for bioluminescence

applications such as calcium detection in live cells, reporter gene assays, ELISA, bioluminescence resonance energy transfer (BRET) in protein interaction studies, superoxide anion detection, and high throughput drug screening.

### Product Specifications

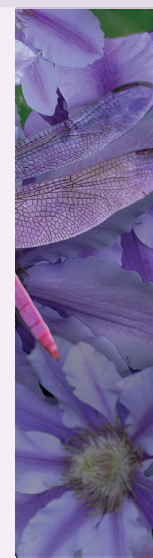
<b>Dry Storage</b>	-20°C in the dark
<b>Liquid Storage</b>	-80°C, Stable for 1-3 weeks
<b>Stability</b>	Unstable in DMSO, DMF, Dimethylacetamide, and N-methylpyrrolidone
<b>Molecular Weight</b>	423.48 g/mol
<b>Molecular Formula</b>	$C_{26}H_{121}N_3O_3$

Available as Ready-to-use.



★★ Coelenterazine is sold as a supplement to *Gaussia* Luciferase and *Renilla Mulleri* Luciferase.

Coelenterazine	1mg	0312
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## Cell Culture Products

Athena's line of cell culture products includes a series of proprietary serum-free tissue culture media in addition to several supplementary products for enhancing cell growth, rinsing cells, and cell storage. All of Athena's serum-free media have simplified and defined compositions and can be used to propagate a wide variety of mammalian cell lines.



Easy and ready-to-use liquid media for superior tissue cell culture results.

[www.athenaes.com/CellCulture.htm](http://www.athenaes.com/CellCulture.htm)



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## Athena's Serum-Free Media

Many of Athena's Cell Culture Products are Serum-Free Media developed for use in mammalian tissue culture research. Athena provides an array of serum-free media in addition to several supplementary products to aid in the growth and preservation of mammalian cell lines.

The above symbol indicates our serum-free products. Viral, bacterial, and fungal contamination of serum is common and presents serious safety hazards for manufacturers of biopharmaceuticals. The use of serum-free media significantly reduces the possibility of this potential contamination.

- **Broad-spectrum Utility**
- **Simplified and Defined Composition**
- **Reduced Range and Level of Contaminants**
- **Elimination of Potential Sources of Infectious Agents**
- **Cost Efficient**
- **High Availability**

## Custom Culture Media

Athena offers custom cell culture media, such as DMEM, RPMI, and EMEM for all research needs including SILAC (stable isotope labeling with amino acids in cell culture) experiments and animal-product-free applications. We can tailor the culture media formulation to your specifications, such as without specific amino acids like L-arginine and L-lysine. Media can be ordered to any requirements necessary for a particular research experiment. Small batch requests are welcome. Athena fills custom order volumes as small as 5L.

► [www.athenaes.com/custom\\_tissue.php](http://www.athenaes.com/custom_tissue.php)





## BRFF-BMZERO™

BRFF-BMZERO™ is a complete serum-free medium comprised of essential amino acids, vitamins, inorganic salts, trace elements and growth factors designed for culturing human breast cell lines. BMZERO™ was developed and has been extensively used for

establishing new epithelial cell lines from explants of human breast tissue and to grow immortalized normal breast cell lines. Optimal attached monolayer cell growth can be achieved when used in conjunction with FNC Coating Mix®. *See page 42.*

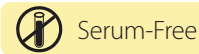
### Product Specifications

<b>Storage:</b>	Store at -80°C, supplied frozen
<b>Stability at 4 °C:</b>	4 - 6 weeks
<b>pH:</b>	7.3 ± 2
<b>Osmolality:</b>	270 - 300mOsM

BRFF-BMZERO™	Liquid (ready-to-use)	500mL	0401
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On the web:

[www.athenaes.com/BRFF-BMZERO.php](http://www.athenaes.com/BRFF-BMZERO.php)



Available as Ready-to-use.



- Designed to grow human breast cells
- Complete serum-free medium
- Antibiotic-free

## BRFF-EPM2™

BRFF-EPM2™ is a complete serum-free medium comprised of essential amino acids, vitamins, inorganic salts, trace elements and growth factors optimized for culturing human esophageal epithelial cell lines. EPM2™ has been used for culturing epithelial cells from explant

cultures of human skin as well as for culturing a number of human cancer cell lines. Optimal attached monolayer cell growth can be achieved when used in conjunction with FNC Coating Mix®. *See page 42.*

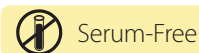
### Product Specifications

<b>Storage:</b>	Store at -80°C, supplied frozen
<b>Stability at 4 °C:</b>	4 - 6 weeks
<b>pH:</b>	7.3 ± 2
<b>Osmolality:</b>	270 - 300mOsM

BRFF-EPM2™	Liquid (ready-to-use)	500mL	0402
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On the web:

[www.athenaes.com/BRFF-EPM2.php](http://www.athenaes.com/BRFF-EPM2.php)



Available as Ready-to-use.



- Optimized for human esophageal epithelial cells
- Complete serum-free medium
- Antibiotic-free



## BRFF-HPC1™

BRFF-HPC1™ is a complete serum-free medium comprised of essential amino acids, vitamins, inorganic salts, trace elements, growth factors and dihydrotestosterone, designed for establishing new cell lines from human prostate tissue. HPC1™ was developed and has

been extensively used for establishing and maintaining epithelial cell lines from both benign prostatic hyperplasia and prostatic carcinoma. Optimal attached monolayer cell growth can be achieved when used in conjunction with FNC Coating Mix®. *See page 42.*

### Product Specifications

<b>Storage:</b>	Store at -80°C, supplied frozen
<b>Stability at 4°C:</b>	4 - 6 weeks
<b>pH:</b>	7.3 ± 2
<b>Osmolality:</b>	270 - 300mOsM

BRFF-HPC1™	Liquid (ready-to-use)	500mL	0403
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Serum-Free

Available as Ready-to-use.



- Designed to grow human prostate cells
- Complete serum-free medium
- Antibiotic-free

On the web:

[www.athenaes.com/BRFF-HPC1.php](http://www.athenaes.com/BRFF-HPC1.php)

## BRFF-P4-8F™

BRFF-P4-8F™ is a complete serum-free medium comprised of essential amino acids, vitamins, inorganic salts, trace elements and growth factors designed for culturing immortalized normal prostatic cell lines such as 267-B1.1

P4-8F™ supports the growth of certain established human prostatic cancer cell lines such as PC-3. Optimal attached monolayer cell growth can be achieved when used in conjunction with FNC Coating Mix®. *See page 42.*

### Product Specifications

<b>Storage:</b>	Store at -80°C, supplied frozen
<b>Stability at 4°C:</b>	4 - 6 weeks
<b>pH:</b>	7.3 ± 2
<b>Osmolality:</b>	270 - 300mOsM

BRFF-P4-8F™	Liquid (ready-to-use)	500mL	0404
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Serum-Free

Available as Ready-to-use.



- Designed to grow human prostatic cancer cell lines
- Complete serum-free medium

On the web:

[www.athenaes.com/BRFF-P4-8F.php](http://www.athenaes.com/BRFF-P4-8F.php)

## PET™: Cell Dissociation Formula

PET™ is a superior cell dissociation reagent specially formulated for use under “Cold Trypsin” conditions. The unique blend of polyvinylpyrrolidone, EGTA, and trypsin in a HBS base allows the trypsin to retain enzymatic activity under cool temperatures, un-

like standard trypsin which requires a temperature of 37°C. When used to detach monolayer cultures of epithelial cells from the growth substratum, this reagent yields more viable cells from monolayers grown in serum-free medium than traditional trypsin formulas.

### Product Specifications

<b>Storage:</b>	Store at -80°C, supplied frozen
<b>Stability at 4 °C:</b>	4 - 6 weeks
<b>pH:</b>	7.3 ± 2
<b>Osmolality:</b>	270 - 300mOsM

PET™	Liquid (ready-to-use)	100mL	0405
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On the web:

[www.athenaes.com/PET.php](http://www.athenaes.com/PET.php)

## Freezing Media Pair™

Athena’s Freezing Media Pair™ are a dual-cryopreservation system used to safely store suspensions of viable cells detached from monolayer cultures using the “cold trypsin” method with Athena’s cell dissociation media, PET™. The pair of solutions thoroughly preserve cells

which provides superior cell viability upon reconstitution. This Freezing Media Pair™ has been used extensively to cryopreserve a variety of human cell lines grown in serum-free media, including breast and prostate cancer cell lines.

### Product Specifications

<b>Storage:</b>	Store at -80°C, supplied frozen
<b>Stability at 4 °C:</b>	4 - 6 weeks
<b>pH:</b>	7.8 ± 2 (for a 1:1 mixture of Solution A and Solution B)

Freezing Media Pair™	Liquid (ready-to-use)	50mL	0406
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On the web:

[www.athenaes.com/FreezingMediaPair.php](http://www.athenaes.com/FreezingMediaPair.php)

Available as Ready-to-use.

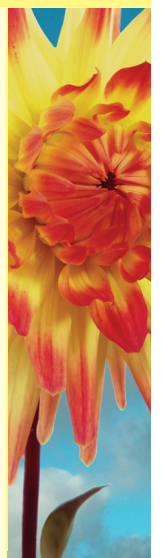


- Specially-formulated “Cold Trypsin” Reagent
- Yields more viable cells than traditional trypsin

Available as Ready-to-use.



- Dual-cryopreservation system
- Allows for superior cell viability





## FNC Coating Mix®

FNC Coating Mix® is a specially formulated serum-free tissue culture reagent containing fibronectin, collagen and albumin that is used to enhance the attachment of adherent cells to plastic flasks or microplates. The unique formula creates an extracellular matrix that dramatically increases the rate of cell attachment to any plastic substratum. The matrix accelerates monolayer formation, especially when fastidious

cell types such as human prostate and breast epithelial cells are being propagated. Mammalian cell cultures will attach and grow more effectively on FNC-coated plastic surfaces when cultured in the appropriate serum-free medium. AthenaES™ offers several different serum-free media that when used in conjunction with FNC Coating Mix®, increase the growth of cell cultures dramatically.

Available as Ready-to-use.



- Dramatically Increases Attachment of cells
- Creates Unique Extracellular Matrix

### Product Specifications

<b>Storage:</b>	Store at 4°C, shipped on blue ice
<b>Stability at 4°C:</b>	6 - 12 months
<b>pH:</b>	7.3 ± 2
<b>Osmolality:</b>	270 - 300mOsM

FNC Coating Mix®	Liquid (ready-to-use)	50mL	0407
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### Effect of FNC Coating Mix™ on Monolayer Cell Cultures



□ Dense monolayer of prostate cancer cells (BRFF-55T) grown in HPC1™ after application of FNC Coating Mix™ to the culture flask.



□ Sporadic cell growth of prostate cancer cells (BRFF-55T) grown in HPC1™ without FNC Coating Mix™ application.

The photographs to the left show the difference in monolayer development with and without FNC Coating Mix®. BRFF-55T prostate cancer cells were grown in HPC1™ medium at the same seed concentration for 3 days at 37°C, 5% CO<sub>2</sub>. The flask shown on the left was pre-coated with FNC Coating Mix™ whereas the flask on the right was not pre-treated. Through image analysis, there was approximately 85% greater monolayer development in the flask coated with FNC than in the non-treated flask.

To view the complete FNC Coating Mix™ Datasheet, visit [www.athenaes.com/datasheet\\_fnccoatingmix.php](http://www.athenaes.com/datasheet_fnccoatingmix.php)

On the web:

[www.athenaes.com/FNCCoatingMix.php](http://www.athenaes.com/FNCCoatingMix.php)



## Hepes Buffered Saline

Hepes Buffered Saline is available with or without Phenol Red. It is an isotonic saline buffered with Hepes, for use in rinsing cell monolayers prior to cell dissociation using PET™ (see page 41) or washing harvested cells.

### Product Specifications

<b>Storage:</b>	Store at 4°C, supplied frozen
<b>Stability at 4°C:</b>	12 - 24 months
<b>pH:</b>	7.3 ± 2
<b>Osmolality:</b>	270 - 300mOsM

HBS with Phenol Red	Liquid (ready-to-use)	500mL	0408
HBS without Phenol Red	Liquid (ready-to-use)	500mL	0409

Available as Ready-to-use.



- Available with or without Phenol Red
- Ideal for rinsing cell monolayers prior to cell dissociation

On the web:

[www.athenaes.com/HepesBufferedSaline.php](http://www.athenaes.com/HepesBufferedSaline.php)

## DMEM / F12 Serum-Free Medium

DMEM/F12 is a serum-free medium formulation for general use. This formulation is a 1:1 blend of DMEM and Ham's F12 media supplied complete and ready

to use with L-glutamine, Hepes, BPE and EGF for culturing a wide range of cell types. DMEM/F12 does not contain phenol red or antibiotics.

### Product Specifications

<b>Storage:</b>	Store at -80°C, supplied frozen
<b>Stability at 4°C:</b>	4 - 6 weeks
<b>pH:</b>	7.3 ± 2
<b>Osmolality:</b>	270 - 300mOsM

DMEM / F12 SFM	Liquid (ready-to-use)	500mL	0410
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 Serum-Free

Available as Ready-to-use.



On the web:

[www.athenaes.com/DMEM.php](http://www.athenaes.com/DMEM.php)





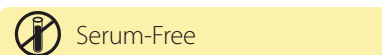
## IMDM Serum-Free Medium

Iscove's Modified Dulbecco's Medium (IMDM) is a standard serum-free medium. It is supplemented with bovine pituitary extract and epidermal growth factor and contains L-glutamine and HEPES but no phenol red or antibiotics.

### Product Specifications

<b>Storage:</b>	Store at -80°C, supplied frozen
<b>Stability at 4°C:</b>	4 - 6 weeks
<b>pH:</b>	7.3 ± 2
<b>Osmolality:</b>	270 - 300mOsM

IMDM SFM	Liquid (ready-to-use)	500mL	0411
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Available as Ready-to-use.



On the web:

[www.athenaes.com/IMDM.php](http://www.athenaes.com/IMDM.php)

## Bovine Pituitary Extract

Athena's Bovine Pituitary Extract is prepared from BSE-free animals. The extracts are prepared from pituitaries harvested from animals in the United States. The pituitaries were obtained only from USDA-inspected facilities where the animals receive pre- and post-mor-

tem inspection and were found to be free of contagious diseases including foot-and-mouth disease, rinderpest, and contagious bovine pleuropneumonia. There are no known cases of bovine spongiform encephalopathy (BSE) in the herds from which the pituitaries were obtained.

### Product Specifications

<b>Storage:</b>	Store at -80°C, supplied frozen
<b>Stability at 4°C:</b>	Not Recommended
<b>Protein Concentration:</b>	9 - 20mg/mL by Bradford Assay

Bovine Pituitary Extract	Liquid (ready-to-use)	100mg	0413
Bovine Pituitary Extract	Liquid (ready-to-use)	250mg	0414

Available as Ready-to-use.



- Produced from certified disease-free animals


On the web:

[www.athenaes.com/BovinePituitaryExtract.php](http://www.athenaes.com/BovinePituitaryExtract.php)

## SFM Screening Kit™

The SFM Screening Kit™ is intended for researchers seeking to identify the most appropriate serum-free media formulation for a specific cell type. The kit contains a 100mL sample of each of five serum-free media including proprietary formulations BRFF-BMZERO™, BRFF-EPM2™, BRFF-

P4-8F™ as well as standard media DMEM/ F12, and IMDM. The kit also includes a 25mL sample of FNC Coating Mix® for optimum cell attachment in adherent cell cultures. Each of the media is complete and ready-to-use.

 Serum-Free

Available as Ready-to-use.

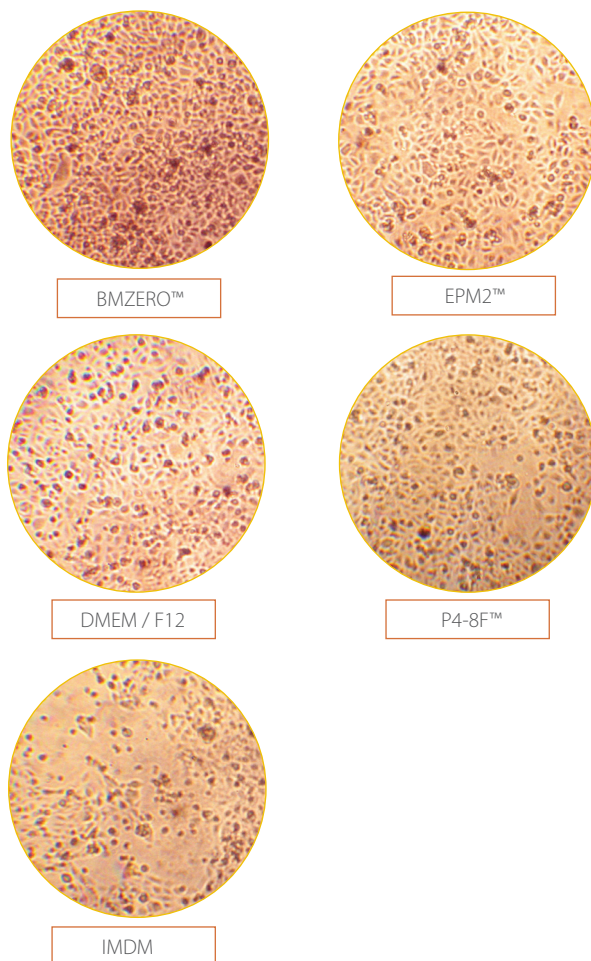


- Samples of 5 Cell Culture Media
- Includes FNC Coating Mix®

Kit Components	
BRFF-BMZERO™	DMEM / F12 SFM
BRFF-EPM2™	IMDM SFM
BRFF-P4-8F™	FNC Coating Mix®

SFM Screening Kit™	Liquid (ready-to-use)	1 kit	0415
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### 24 Hour Cell Growth Results from SFM Screening Kit™



The cell photographs to the left are of a SFM Screening Kit™ experiment to determine the optimum serum-free media for the production of the prostate cancer cell line 267-B1. The cultures were seeded with  $2 \times 10^6$  cells/mL into each of 5 25cm<sup>2</sup> tissue culture flasks pre-coated with FNC Coating Mix® and containing the following media: BMZERO™, EPM2™, P4-8F™, DMEM / F12 and IMDM. The cells were grown for 24 hours at 37°C at 5% CO<sub>2</sub>. The photographs (20x magnification) show the difference in cell growth between the different media. The cells in the BMZERO™ media yielded more rapid monolayer development than the other media, with the least growth in IMDM. These results demonstrate that BMZERO™ is the optimum medium for the growth of 267-B1 cells.

To view the complete Case for Serum-Free Media Technical Brief, visit [www.athenaes.com/tech\\_brief\\_serum\\_free.php](http://www.athenaes.com/tech_brief_serum_free.php)

On the web:  
[www.athenaes.com/SFMScreeningKit.php](http://www.athenaes.com/SFMScreeningKit.php)





## Protein Refolding Reagents

AthenaES™ offers a variety of protein refolding reagents that include cyclodextrins, detergents, and specially formulated refolding buffers.

Athena's QuickFold™ Protein Refolding Kit offers a simple and rapid means of identifying optimal refolding conditions. It employs a comprehensive matrix design, making it easy for researchers to screen a variety of possible refolding conditions quickly.



Protein Refolding Buffers,  
Cyclodextrins and Detergents.

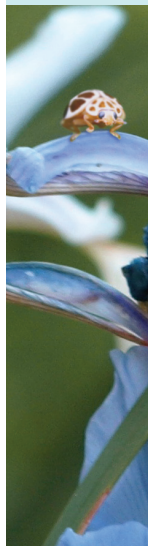


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100mM Tween 80	0604	49
100mM CTAB	0605	49
100mM POE(10)L	0606	49
100mM TTAB	0607	49
100mM Zwittergent 3-14	0608	49
100mM $\beta$ -cyclodextrin	0609	49
100mM methyl- $\beta$ -cyclodextrin	0610	49
50mM $\alpha$ -cyclodextrin	0611	49





## QuickFold™ Protein Refolding Kit & Buffers

The QuickFold™ Protein Refolding Kit is a screening kit that enables researchers to pinpoint the critical factors for refolding their protein in as little as 1 hour. Unlike many traditional kits, the QuickFold™ Kit employs a fractional factorial matrix design that allows the researcher to screen a specific protein in 15 different buffers quickly and easily. Researchers are able to examine a wider range of conditions all in a single experiment, simplifying the process of identifying

the best buffer composition and method for the refolding of a given protein. The QuickFold™ Kit comes with enough buffer for 10 refolding experiments, as well as supplemental Dithiothreitol and a Glutathione Redox System. Each buffer is available for individual purchase and is supplemented with the necessary Glutathione Redox System and/or DTT. Individual Buffers come in 500mL and 1L amounts.

Available as Ready-to-use.



- Protein Refolding in as Little as an Hour
- Fractional Factorial Matrix Design
- Simple, Single-step Screening Technique

### Kit Components

Buffers 1 - 15

DTT

Glutathione, reduced

Glutathione, oxidized

QuickFold™ Protein Refolding Kit	Liquid (ready-to-use)	1 kit	0600
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Individual Refolding Buffers		500 mL	1 L
QuickFold™ Protein Refolding Buffer 1	Liquid (ready-to-use)	0612-1	0613-1
QuickFold™ Protein Refolding Buffer 2	Liquid (ready-to-use)	0612-2	0613-2
QuickFold™ Protein Refolding Buffer 3	Liquid (ready-to-use)	0612-3	0613-3
QuickFold™ Protein Refolding Buffer 4	Liquid (ready-to-use)	0612-4	0613-4
QuickFold™ Protein Refolding Buffer 5	Liquid (ready-to-use)	0612-5	0613-5
QuickFold™ Protein Refolding Buffer 6	Liquid (ready-to-use)	0612-6	0613-6
QuickFold™ Protein Refolding Buffer 7	Liquid (ready-to-use)	0612-7	0613-7
QuickFold™ Protein Refolding Buffer 8	Liquid (ready-to-use)	0612-8	0613-8
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QuickFold™ Protein Refolding Buffer 12	Liquid (ready-to-use)	0612-12	0613-12
QuickFold™ Protein Refolding Buffer 13	Liquid (ready-to-use)	0612-13	0613-13
QuickFold™ Protein Refolding Buffer 14	Liquid (ready-to-use)	0612-14	0613-14
QuickFold™ Protein Refolding Buffer 15	Liquid (ready-to-use)	0612-15	0613-15

On the web:

[www.athenaes.com/QuickFoldProteinRefoldingKit.php](http://www.athenaes.com/QuickFoldProteinRefoldingKit.php)



## Detergent Screening Kit & Individual Detergents

Detergents have been shown to aid in the protein refolding process both of native and recombinant proteins. Detergents are usually used as a step in the protein refolding process, often in conjunction with cyclodextrins. The detergent binds to the protein in the dilution stage to form a detergent-protein complex which prevents aggregation of the protein. A binding agent, such as cyclo-

dextrin, can then be used to strip away the detergent from the protein, allowing it to properly refold. Athena's Detergent Screening Kit provides researchers with 6 common detergents (10mL each) for determining the optimum detergent for a given protein refolding scenario. Individual detergents can also be purchased in 100mL quantities.

Kit Components	
100 mM Triton-X	100 mM POE(10)L
100 mM Tween 80	100 mM TTAB
100 mM CTAB	100 mM Zwittergent 3-14

Detergent Screening Kit	Liquid (ready-to-use)	1 kit	0601
100 mM Triton-X	Liquid (ready-to-use)	100 mL	0603
100 mM Tween 80	Liquid (ready-to-use)	100 mL	0604
100 mM CTAB	Liquid (ready-to-use)	100 mL	0605
100 mM POE(10)L	Liquid (ready-to-use)	100 mL	0606
100 mM TTAB	Liquid (ready-to-use)	100 mL	0607
100 mM Zwittergent 3-14	Liquid (ready-to-use)	100 mL	0608

## Cyclodextrin Screening Kit & Individual Cyclodextrins

Cyclodextrins' unique molecular structure greatly promotes protein refolding. Cyclodextrins can suppress protein aggregation, protect against degradation and loss of protein function. They also bind well to detergents (aggregation suppressors), which allows for easy separation of the detergent from the protein, encouraging proper refolding. Different cyclodextrins act and respond differently

to different protein structures. Because of this, AthenaES™ provides 3 of the most common cyclodextrins in a simple screening kit so that the ideal conditions for refolding a given protein can be found quickly and easily. The Cyclodextrin Screening Kit can be particularly useful when paired with the Detergent Screening Kit. Individual cyclodextrins are also available for purchase.

Kit Components	
100 mM β-cyclodextrin	50 mM α-cyclodextrin
100 mM methyl-β-cyclodextrin	

Cyclodextrin Screening Kit	Liquid (ready-to-use)	1 kit	0602
100 mM β-cyclodextrin	Liquid (ready-to-use)	100 mL	0609
100 mM methyl-β-cyclodextrin	Liquid (ready-to-use)	100 mL	0610
50 mM α-cyclodextrin	Liquid (ready-to-use)	100 mL	0611

Available as Ready-to-use.



● Includes 6 Detergents for Comprehensive Testing

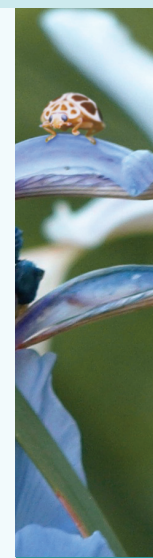
On the web:  
[www.athenaes.com/DetergentScreeningKit.php](http://www.athenaes.com/DetergentScreeningKit.php)

Available as Ready-to-use.



● Includes 3 Cyclodextrins for Comprehensive Testing

On the web:  
[www.athenaes.com/CyclodextrinScreeningKit.php](http://www.athenaes.com/CyclodextrinScreeningKit.php)





## Contract Services

AthenaEST™ offers a variety of services that range from specialized projects in research and development, to the manufacture of customized media formulations. Whatever the project, we take great care to fulfill the client's specific needs. Our facilities are adaptable to accommodate small or large projects.



Protein expression and  
contract manufacturing

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## Custom Manufacturing Services

### Cell Culture Media

Athena offers an array of custom cell culture formulations including generic media such as RPMI, DMEM, and EMEM as well as our proprietary cell culture media with custom alterations. We can tailor formulations to include or exclude select amino acids like L-arginine, L-lysine, or L-leucine or contain a high or low level

of glucose. Orders can be made to fit any research requirements, including SILAC (stable isotope labeling with amino acids in cell culture) experiments and animal-product-free applications. Bulk or small-batch orders are available with a minimum purchase of 5L.

### Dry Powder Manufacturing

Athena provides GMP compliant specialty manufacturing services for dry powder media including generic formulations and custom blends. Bulk capacities are available for up to 750kg per lot or, for laboratories in need of small production runs, we can

prepare batches as small as 0.5kg. Our dry powder process reduces raw materials to a uniform particle size and blend, providing for rapidly dissolving, homogeneous powder mixtures.

### OEM and Private Labeling

OEM and private labeling services are available for generic or customer-defined media formulations. AthenaES™ provides custom media production and packaging to support high throughput screening

activities. Athena's proprietary media as well as generic or in-house special formulations can be produced to the customer's specifications.

### Media Classes Produced

- Complex and defined bacterial
- Fungal including yeast bases and dropouts
- Plant Culture
- Insect cell culture
- Mammalian tissue and cell culture

[www.athenaes.com/ManufacturingServices.php](http://www.athenaes.com/ManufacturingServices.php)



- Formulation Design and Testing
- Quality Control Test Design, Development, and Validation
- Pre-launch Pilot Production
- Commercial-scale Manufacturing
- Small-scale Batches
- SILAC Media Formulation

## Custom Contract Services

### Protein Expression

Athena specializes in optimizing recombinant protein expression systems to maximize yield and purity. We concentrate on expressing difficult-to-produce proteins that have the potential to provide ground-breaking benefits. Our capabilities and support meet the needs of industry, academic, and government researchers from small-scale technical

and commercial feasibility studies to final product manufacturing. With the advent of Athena's ACES™ (AthenaES™ Complete Expression System) and the use of the revolutionary YebF protein, we can tackle a wide range of proteins that may be unable to be expressed under normal conditions.

### Biocatalyst Development

Athena's biocatalyst development employs an array of techniques to identify and optimize biocatalytic activity for industrial processes. AthenaES™ can screen a wide range of microbes for specific enzymatic activity, determine the source of an enzyme and optimize the enzyme activity for substrate specificity.

### Recombinant Microbial Systems

- Proprietary ACES™ Expression Systems
- Standard *Escherichia coli* and *Bacillus subtilis* expression strains and vectors
- *Saccharomyces cerevisiae*, *Kluyveromyces lactis*, and *Pichia pastoris* yeast systems

### Levels of Service

- Comprehensive Service - provides expert research for production and purification of recombinant and native proteins, from subcloning to producing finished product
- Expression Service - provides production and purification of proteins from 10 to 500 mg where protein expression has been demonstrated but the process is not yet optimized
- Production Service - for those who need gram quantities of a highly characterized protein
- Optimization Service - for clients with very low levels of expression or insoluble protein accumulation

### Broad Scope Services:

- Technology transfer, feasibility, and product prototyping
- Design, development, and manufacture of products



[www.athenaes.com/ProteinExpression.php](http://www.athenaes.com/ProteinExpression.php)

- Gene Cloning and Expression Vector Construction
- Cell Line Engineering and Media Optimization
- Purification Process Development
- Quality Control Test Development and Validation
- Product Characterization for Identity, Purity, and Potency
- Finished Product Formulation and
- Stability Analysis
- Bench- and Pilot-scale Production



Contract Services





## How to Order

Athena Enzyme Systems™ products can be purchased through our online secure shopping cart via a purchase order or credit card, or by calling us at 1-888-892-8408. For added convenience, customers have the option to purchase through a local branch from our vast global distribution network.

## Ordering Information

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## Ordering Information

Mode	
Telephone	1-888-892-8408
Fax	410-455-1155
Email	sales@athenaes.com
Website	www.athenaes.com
Distributors	see page 65



### When Ordering By Phone, Please Provide:

- Institution name and Customer Service Account
- Purchase Order Number and/or Credit Card Number
- Catalog Numbers or Names of Products and Quantity
- Billing and Shipping Address
- Contact Name and Telephone Number

We accept Visa and Master Card



### Online Ordering

- Order Using Purchase Order or Credit Card
- Easy Access to Account History
- Catalog Numbers or Names of Products and Quantity

## Safe Guidelines for Use of Products

The products in the AthenaES™ product inventory are for Research Use Only unless purchased under a GMP compliant supply contract, and are not to be used for any other purposes including, but not limited to, unauthorized commercial purposes, therapeutic purposes, investigational use, in foods, drugs, devices or cosmetics of any kind, or for consumption by or use in connection with or administration or application to humans or animals. They are intended for research and laboratory purposes and are to be handled by qualified persons.

The products are generally recognized as safe. Nevertheless, some of the ingredients can be irritants if inhaled or if they come in contact with the skin, eyes, nose or throat. The small particle size of the material makes dry powder media prone to producing airborne dust. It is recommended that the user take precautions when handling the products. Wearing a laboratory coat, goggles or other eye protection, dust mask and gloves is advised.



## Terms and Conditions

### Payment Information

Invoices are due net 30 days from the date of shipment, unless other arrangements are made in advance of the purchase. Payment is due in US dollars. A late charge will be applied to all invoices which are more than 30 days past due. The late fee will be calculated at the rate of 2% per month of the invoice price.

AthenaES™ (Athena Environmental Sciences, Inc.) accepts payment by credit card or purchase order number online or by phone. Online orders placed with credit cards will be charged when the order is processed.

Orders with credit cards that are denied will not be processed further. Order processing will resume upon receipt of a valid credit card number provided by the customer.

### Shipping Conditions

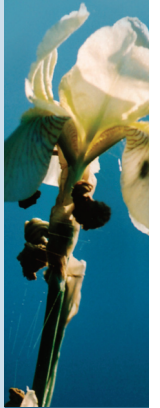
Shipping charges are prepaid and added to the invoice. Shipping is via FedEx or UPS unless otherwise requested. Shipping charges include but are not limited to the estimated shipping cost charged by either FedEx or UPS, handling fees, and ice fees should the product purchased require special shipping conditions.

### Taxes and Other Charges

Any use tax, sales tax, excise tax, duty, inspection or testing fee, or any other tax, fee or charge imposed by any governmental authority, on or measured by the transaction between us shall be paid by the purchaser in addition to the prices quoted or invoiced. If AthenaES™ is required to pay any such tax, fee or charge, the purchaser shall reimburse AthenaES™ or provide an exemption certificate or other document acceptable to the authority imposing the tax, fee or charge.

### Exclusive Terms of Sale

AthenaES™ does not agree to and is not bound by any other terms or conditions unless those terms and conditions have been expressly agreed to in writing by a duly authorized officer of AthenaES™. Prices are subject to change without notice.







## Warranty

AthenaES™ warrants that the products will meet the specifications stated on the product label. AthenaES™ agrees to replace the product free of charge if the product does not conform to the specifications. Notice for replacement must be given within 60 days of opening the product. Unused product must be returned at purchaser's expense to receive a replacement or credit. In consideration of the above promises by AthenaES™, the buyer agrees to and accepts the following conditions: That this warranty is in lieu of all other warranties, expressed or implied; That all warranties of merchantability or of fitness for a particular purpose are hereby excluded or waived; That the buyer's sole remedy shall be to obtain replacement of the product free of charge from AthenaES™; and That this remedy is in lieu of all other remedies or claims for damages, consequential or otherwise, which the buyer may have against AthenaES™.

## Product Usage

Except as otherwise agreed in writing by our authorized representative, the purchase of goods only conveys to you the non-transferable right for only you to use the quantity of goods and components of goods purchased in compliance with the applicable license restrictions or the below listed regulations. Unless otherwise authorized, no right to resell the goods, or any portion of them, is conveyed hereunder.

The products in our catalog are intended for research use only unless purchased under a GMP compliant supply contract, and are not to be used for any other purposes including, but not limited to, unauthorized commercial purposes, therapeutic purposes, investigational use, in foods, drugs, devices or cosmetics of any kind, or for consumption by or use in connection with or administration or application to humans or animals. They are intended for research and laboratory purposes and are to be handled by qualified persons.

You acknowledge that products received from us are subject to U.S. export control laws and regulations. You represent and warrant to us that you will not, directly or indirectly, (1) sell, export, reexport, transfer, divert, or otherwise dispose of any products or technology (including products derived from or based on such technology) received from us to any destination, entity, or person prohibited by the laws or regulations of the United States, or (2) use the product for any use prohibited by the laws or regulations of the United States and/or your local jurisdiction, without obtaining prior authorization from the competent government authorities as required by those laws and regulations.

## Licensing Restrictions

Athena offers several products that have licensing restrictions attached to them. The ACES™ Signal Sequence and YebF Protein Export Systems are based on discoveries made by scientists at the University of Alberta and Athena Environmental Sciences, Inc. (AthenaES™) and are covered by U.S. and International Patents and Patent Applications. These include US S/N 11/203,168, US 6,022,952 and US 6,335,178 and all related international filings. AthenaES™ holds the exclusive license to the YebF technology, a non-exclusive license to Tat protein secretion pathway and retains ownership of the vectors and reagents of the ACES™ expression kits.

Customers wishing to purchase these products and/or the individual plasmids in the above named systems, need to agree to the licensing terms of the products. This requires the end-user become a Registered User and, if a commercial user, sign the licensing agreement.

Currently the only products that carry licensing restrictions are the following: 0148-2 - ACES™ Signal Sequence Kit, 0148-3 - ACES™ YebF Protein Export Kit, 0149-30-35 - the ACES™ pAES30 series vectors, and 0149-40 - pAES40 vector.



## Distribution Network Locations

### North American Locations

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www.moleculardimensions.com

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P.O. Bag 1150  
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www.biolynx.ca

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F: (01)-89-50-145-14  
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www.alexis-e.biz

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www.funakoshi.co.jp

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F: (02) 922 2370  
chunyang@hanmail.net  
www.alexis-e.biz

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**Middle Eastern Locations**

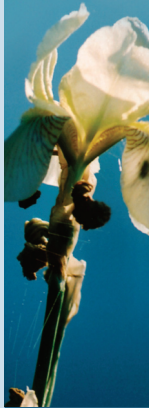
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leurer@bioconsult.co.il  
www.bioconsult.co.il

For complete listing of our distribution network and all of their outposts, please visit [www.athenaes.com/Distributors.htm](http://www.athenaes.com/Distributors.htm)

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0100	Media Optimization Kit™	1 Kit	9
0100-APF	APF Media Optimization Kit™	1 Kit	9
0101	LB Broth (Luria)	500 g	10
0102	LB Broth (Lennox)	500 g	10
0103	LB Broth (Miller)	500 g	10
0104	Turbo Broth™	500 g	11
0104-S	Turbo Broth™	1L Single (x10)	11
0105	Superior Broth™	500 g	12
0105-S	Superior Broth™	1L Single (x10)	12
0106	Power Broth™	500 g	13
0106-S	Power Broth™	1L Single (x10)	13
0107	Hyper Broth™	500 g	14
0107-S	Hyper Broth™	1L Single (x10)	14
0108	Glucose M9Y	500 g	14
0108-S	Glucose M9Y	1L Single (x10)	14
0109	Glucose Nutrient Mix	500 g	15
0110	Turbo Prime Broth™	1L Single (x10)	11
0110-S	Turbo Prime Broth™	500 g	11
0111	Superior Prime Broth™	1L Single (x10)	12
0111-S	Superior Prime Broth™	500 g	12
0112	Power Prime Broth™	1L Single (x10)	13
0112-S	Power Prime Broth™	500 g	13
0113	LB Broth (Lennox) Liquid	5 x 500 mL	10
0114	LB Broth (Miller) Liquid	5 x 500 mL	10
0115	Turbo Broth™ Liquid	5 x 500 mL	11
0116	Superior Broth™ Liquid	5 x 500 mL	12
0117	Power Broth™ Liquid	5 x 500 mL	13
0118	Hyper Broth™ Liquid	5 x 500 mL	14
0119	Glucose M9Y Liquid	5 x 500 mL	14
0120	Turbo Prime Broth™ Liquid	5 x 500 mL	11
0121	Superior Prime Broth™ Liquid	5 x 500 mL	12
0122	Power Prime Broth™ Liquid	5 x 500 mL	13
0123	Augmedium™	100 mL Stock	15
0124	Augmedium™	500 mL Stock	15
0125	LB Booster™	100 mL Stock	16
0126	LB Booster™	500 mL Stock	16
0127	LB Booster™ Liquid	20 x 500 mL	16
0128	Liquid Media Optimization Kit™	1 Kit	9
0129	Liquid APF Media Optimization Kit™	1 Kit	9
0130	LB Broth (Miller)	1L Singles (x 10)	10
0131	APF LB Broth (Luria)	500 g	10
0131-S	APF LB Broth (Luria)	1L Singles (x 10)	10
0132	APF LB Broth (Lennox)	500 g	10
0132-S	APF LB Broth (Lennox)	1L Singles (x 10)	10





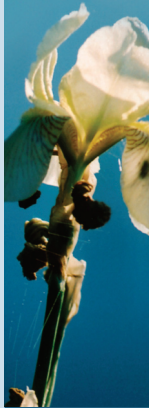
Catalog No.	Expression Products	Amount	Page No.
0133	APF LB Broth (Miller)	500 g	10
0133-S	APF LB Broth (Miller)	1L Singles (x 10)	10
0134	Atholate™	500 g	16
0134-1	Atholate™	1 kg	16
0134-2.5	Atholate™	2.5 kg	16
0134-10	Atholate™	10 kg	16
0135	PERK™ Protein Expression Rescue Kit	1 Kit	17
0136	ExpressMax™ Screening Kit	1 Kit	18
0137	ExpressMax™ Formula 1	500 g	18
0138	ExpressMax™ Formula 2	500 g	18
0139	ExpressMax™ Formula 3	500 g	18
0140	ExpressMax™ Formula 4	500 g	18
0141	ExpressMax™ Formula 5	500 g	18
0142	ExpressMax™ Formula 6	500 g	18
0143	ExpressMax™ Formula 7	500 g	18
0144	ExpressMax™ Formula 8	500 g	18
0145	Basal Salts	500 g	18
0146	Yeast Extract	500 g	18
0147	Soy Protein Hydrolysate	500 g	18
0148-1	ACES™ Promoter Selection Kit	1 Kit	19
0148-2	ACES™ Signal Sequence Kit	1 Kit	20
0148-3	ACES™ YebF Protein Export Kit	1 Kit	22
0149-25	ACES™ pAES25	10 µg	19
0149-30	ACES™ pAES30	10 µg	20
0149-31	ACES™ pAES31	10 µg	20
0149-32	ACES™ pAES32	10 µg	20
0149-33	ACES™ pAES33	10 µg	20
0149-34	ACES™ pAES34	10 µg	20
0149-35	ACES™ pAES35	10 µg	20
0149-40	ACES™ pAES40	10 µg	22
0150-1	ACES™ Primer A	250 pmoles	23
0150-2	ACES™ Primer B	250 pmoles	23
0151-JM109-C	JM109 Competent Cells	2 x 200 µL	23
0151-JM109	JM109 Stab	stab	23
0151-HB101	HB101 Stab	stab	23
0151-HMS174	HMS174 Stab	stab	23
0151-BLR	BLR Stab	stab	23
0151-AG1	AG1 Stab	stab	23
0152-1	ACES™ Inducer Solution A	1 mL	23
0152-5	ACES™ Inducer Solution A	5 x 1 mL	23
0153	ACES™ Inducer Solution B	500 mL	23
0154	ACES™ Secretion Enhancer Solution A	500 mL	23
0155	ACES™ Secretion Enhancer Solution B	500 mL	23
0156	Rapid Transformation Kit	1 Kit	23
0157	2x TSS	5 x 1 mL	23

Catalog No.	Expression Products	Amount	Page No.
0160	Turbo Prime-olate™	500 g	11
0160-S	Turbo Prime-olate™	1L Singles (x 10)	11
0161	Superior Prime-olate™	500 g	12
0161-S	Superior Prime-olate™	1L Singles (x 10)	12
0162	Power Prime-olate™	500 g	13
0162-S	Power Prime-olate™	1L Singles (x 10)	13
0169	MOK Prime-olate™ Powder	1 Kit	9
0170	Turbo Prime-olate™	5 x 500 mL	11
0171	Superior Prime-olate™	5 x 500 mL	12
0172	Power Prime-olate™	5 x 500 mL	13
0173	APF LB Broth (Miller) Liquid	5 x 500 mL	10
0174	APF LB Broth (Luria) Liquid	5 x 500 mL	10
0175	APF LB Broth (Lennox) Liquid	5 x 500 mL	10
0179	MOK Prime-olate™ Liquid	1 Kit	9

Catalog No.	Enzyme Assays	Amount	Page No.
0201	PDQ™ Protease Assay	48 Vials, 1 Kit	26
0202	PDQ™ Fluorescent Protease Assay	48 Vials, 1 Kit	27

Catalog No.	Specialty Proteins	Amount	Page No.
0304	I270™ AFM Reference Protein	100 µg	30
0305-1	LypA	100 Units	31
0305-5	LypA	500 Units	31
0306-1	TesA	100 Units	31
0306-5	TesA	500 Units	31
0307-1	VlpA	100 Units	31
0307-5	VlpA	500 Units	31
0308-1	Avitag™-biotinylated <i>Gaussia</i> luciferase 2x	1 mg	32
0308-2	Avitag™-biotinylated <i>Gaussia</i> luciferase 2x	250 µg	32
0309-1	<i>Renilla mullerei</i> luciferase	1 mg	33
0309-2	<i>Renilla mullerei</i> luciferase	250 µg	33
0310-1	<i>Renilla reniformis</i> Green Fluorescent Protein	1 mg	33
0310-2	<i>Renilla reniformis</i> Green Fluorescent Protein	250 µg	33
0311-1	Ptilosarcus Green Fluorescent Protein	1 mg	34
0311-2	Ptilosarcus Green Fluorescent Protein	250 µg	34
0312	Coelenterazine	1 mg	35
0313	Anti-YebF Antesera	0.5 mL	23

Catalog No.	Cell Culture Products	Amount	Page No.
0401	BRFF-BMZERO™	500 mL	39
0402	BRFF-EPM2™	500 mL	39
0403	BRFF-HPC1™	500 mL	40
0404	BRFF-P4-8F™	500 mL	40





Catalog No.	Cell Culture Products	Amount	Page No.
0405	PET™	100 mL	41
0406	Freezing Media Pair™	50 mL	41
0407	FNC Coating Mix®	50 mL	42
0408	HBS with Phenol Red	500 mL	43
0409	HBS without Phenol Red	500 mL	43
0410	DMEM / F12 SFM	500 mL	43
0411	IMDM SFM	500 mL	44
0413	Bovine Pituitary Extract	100 mg	44
0414	Bovine Pituitary Extract	250 mg	44
0415	SFM Screening Kit™	1 Kit	45

Catalog No.	Protein Refolding Reagents	Amount	Page No.
0600	QuickFold™ Protein Refolding Kit	1 Kit	48
0601	Detergent Screening Kit	1 Kit	49
0602	Cyclodextrin Screening Kit	1 Kit	49
0603	100 mM Triton-X	100 mL	49
0604	100 mM Tween 80	100 mL	49
0605	100 mM CTAB	100 mL	49
0606	100 mM POE (10) L	100 mL	49
0607	100 mM TTAB	100 mL	49
0608	100 mM Zwittergent 3-14	100 mL	49
0609	100 mM β-cyclodextrin	100 mL	49
0610	100 mM methyl-β-cyclodextrin	100 mL	49
0611	100 mM α-cyclodextrin	100 mL	49
0612-1	Protein Refolding Buffer 1	500 mL	48
0612-2	Protein Refolding Buffer 2	500 mL	48
0612-3	Protein Refolding Buffer 3	500 mL	48
0612-4	Protein Refolding Buffer 4	500 mL	48
0612-5	Protein Refolding Buffer 5	500 mL	48
0612-6	Protein Refolding Buffer 6	500 mL	48
0612-7	Protein Refolding Buffer 7	500 mL	48
0612-8	Protein Refolding Buffer 8	500 mL	48
0612-9	Protein Refolding Buffer 9	500 mL	48
0612-10	Protein Refolding Buffer 10	500 mL	48
0612-11	Protein Refolding Buffer 11	500 mL	48
0612-12	Protein Refolding Buffer 12	500 mL	48
0612-13	Protein Refolding Buffer 13	500 mL	48
0612-14	Protein Refolding Buffer 14	500 mL	48
0612-15	Protein Refolding Buffer 15	500 mL	48
0613-1	Protein Refolding Buffer 1	1 L	48
0613-2	Protein Refolding Buffer 2	1 L	48
0613-3	Protein Refolding Buffer 3	1 L	48
0613-4	Protein Refolding Buffer 4	1 L	48
0613-5	Protein Refolding Buffer 5	1 L	48



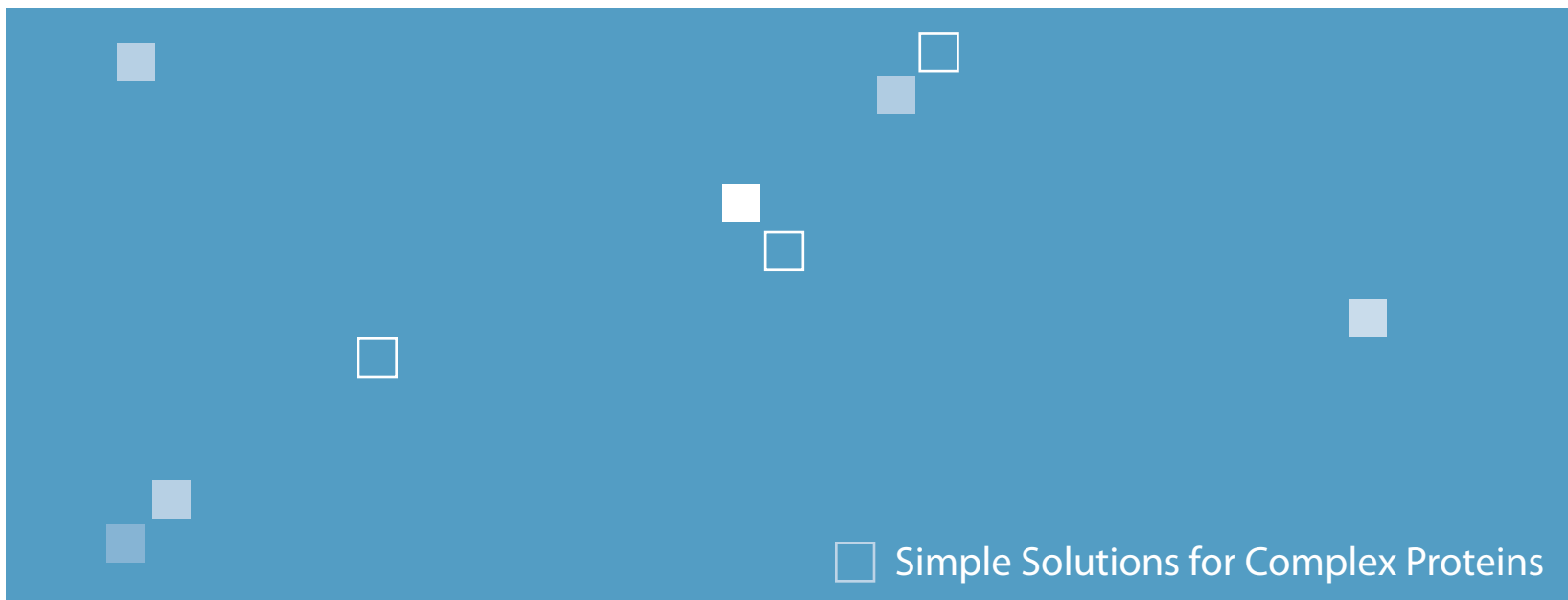
Catalog No.	Protein Refolding Reagents	Amount	Page No.
0613-6	Protein Refolding Buffer 6	1 L	48
0613-7	Protein Refolding Buffer 7	1 L	48
0613-8	Protein Refolding Buffer 8	1 L	48
0613-9	Protein Refolding Buffer 9	1 L	48
0613-10	Protein Refolding Buffer 10	1 L	48
0613-11	Protein Refolding Buffer 11	1 L	48
0613-12	Protein Refolding Buffer 12	1 L	48
0613-13	Protein Refolding Buffer 13	1 L	48
0613-14	Protein Refolding Buffer 14	1 L	48
0613-15	Protein Refolding Buffer 15	1 L	48



Ordering Information

# the Nature of **Proteins**

AthenaES™ 2009 - 2010 Product Catalog



□ Simple Solutions for Complex Proteins



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