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A Geno Technology, Inc. (USA) brand name

# GST Elution Buffer

(Cat. #786-541)



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## INTRODUCTION

The GST Elution Buffer is designed for the elution of GST tagged proteins from glutathione resin. The buffer is supplied as a Binding/Wash Buffer for the binding of proteins to the resin and washing away unbound. For elution, reduced glutathione is supplied in a dry format to preserve the reduced form.

## ITEMS SUPPLIED

Part #	Description	Size
108G	Glutathione, Reduced	2 x 154mg
198G	GST Binding/Wash Buffer	100ml

## STORAGE CONDITIONS

The components are shipped at ambient temperature. Store based on individual components labels. After adding glutathione to the buffer, store solution at 4°C. Components are stable for 1 year if stored correctly.

## ADDITIONAL ITEMS REQUIRED

- Glutathione resin (Cat. # 786-311)

## PROTOCOL

1. To prepare the elution buffer, add both vials of reduced glutathione to the Binding/Wash Buffer and stir or shake until completely dissolved. The final buffer is (5mM glutathione, 50mM Tris.HCl (pH8.0)).

**NOTE:** Alternatively, prepare the amount of elution buffer required by adding 30.8mg glutathione for every 10ml Binding/Wash Buffer

## APPENDIX: GST PROTEIN PURIFICATION PROTOCOL

### IMPORTANT INFORMATION

- *Sample preparation:* Refer to manufacturer's protocols for optimal conditions for growth, induction and lysis of recombinant GST-tagged clones.
- The purity and yield of the recombinant fusion protein is dependent of the protein's confirmation, solubility and expression levels. We recommend optimizing and performing small scale preparations to estimate expression and solubility levels.
- The amount of resin to use for a given crude lysate is dependent on the expression level of the GST protein and factors present in the lysate and lysis buffer that may affect binding. As a general guideline 50-200mg total protein lysate per ml of resin should be used.

### ADDITIONAL ITEMS REQUIRED

#### **Binding/Wash & Elution Buffers**

- Binding/ Wash Buffer: 1X TBS or 1X PBS
- Elution Buffer: Binding / Wash Buffer with 5mM reduced glutathione (G-Biosciences Cat. # 786-588)

#### **Regeneration Buffers**

- RB1: 100mM Tris, 500mM NaCl, 0.1% SDS pH8.5
- RB2: 100mM sodium acetate, 500mM NaCl, 0.1% SDS, pH4.5

### PREPARATION BEFORE USE

*Sample preparation:* Refer to manufacturer's protocols for optimal conditions for growth, induction and lysis of recombinant GST-tagged clones.

### PROTOCOL

1. The table below is a guideline for the amount of resin and bacterial culture volumes that should be used. The actual amounts of GST fusion proteins obtained is highly variable and dependent of the fusion protein, host cell and culture conditions.

<b>Protein yield</b>	<b>100mg</b>	<b>10mg</b>	<b>1mg</b>	<b>100µg</b>
Culture Volume	25L	2.5L	250ml	25ml
Sonicate Volume	1.25L	125ml	12.5ml	1.25ml
Volume 50% Glutathione Resin	25ml	2.5ml	250µl	25µl
Elution Volume	12.5ml	1.25ml	125µl	12.5µl

2. The resin solution is supplied as 50% slurry and to make equilibrated 50% slurry, gentle shake the bottle to re-suspend the resin. Now, aliquot 1.33ml glutathione

resin per 2ml 50% slurry required and sediment the gel by centrifugation at 500x g for 5 minutes.

3. Carefully decant the supernatant and then wash the resin with 10ml of cold 1X PBS per 1.33ml original glutathione resin.
4. Sediment the gel by centrifugation at 500xg for 5 minutes and carefully decant off the supernatant.
5. For each 1.33mls of original glutathione resin, add 1ml of 1 X PBS to make 50% slurry.

**NOTE:** *Glutathione resin equilibrated in 1X PBS can be stored for 1 month at 4 °C.*

6. Add 2ml of 50% slurry of glutathione resin to each 100ml of bacterial sonicate.
7. Incubate with gentle agitation at room temperature for 30 minutes.

**NOTE:** *The resin can now be packed into disposable columns for easy washing and elution.*

8. Centrifuge at 500xg for 5 minutes and remove the supernatant.
9. Wash the resin with 5 volumes 1X PBS (1 volume is the starting amount of 50% glutathione resin).
10. Centrifuge at 500xg for 5 minutes and remove the supernatant. Repeat steps 9 and 10 twice.

**NOTE:** *If desired, the fusion proteins may be cleaved while still bound to the gel with either thrombin or Factor Xa to free the protein of interest from the GST tag (see appendix). If not, proceed to next step for elution.*

11. Add 1ml elution buffer for each 2ml of starting 50% slurry.
12. Mix gently and incubate at room temperature to liberate the GST tagged protein.
13. Centrifuge at 500xg for 5 minutes and transfer the supernatant to a clean tube.
14. Repeat elution steps twice more, test the three fractions (analyzed by SDS-PAGE) and pool the enriched fractions.

## RESIN REGENERATION

The resin/columns can be regenerated up to 5 times without loss of performance. To prevent cross-contamination use 1 column or resin for each specific protein being purified.

1. Wash resin with 10 bed volumes of RB1.
2. Wash resin with 10 bed volumes of distilled water.
3. Wash resin with 10 bed volumes of RB2.
4. Wash resin with 10 bed volumes of distilled water.
5. Store resin at 4°C in 20% ethanol.

## APPENDIX: THROMBIN CLEAVAGE

**NOTE:** *Samples should be removed throughout the digestion and analyzed by SDS-PAGE to estimate yield, purity and extent of digestion. The time, temperature and amount of thrombin required, varies for each GST tagged protein. Optimal conditions should be determined in a pilot experiment.*

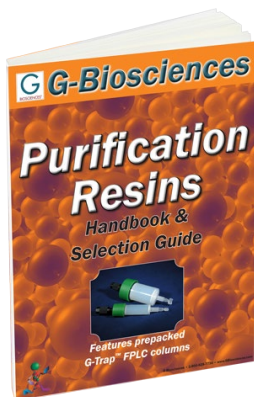
1. To elute the protein from the GST tag and agarose bead, add 10 $\mu$ l of thrombin (10 units) per mg GST tagged protein.
2. Mix gently and incubate at room temperature for 2-16 hours.
3. Once digestion is complete, GST can be removed by extensive dialysis against ~2000 volumes of 1X PBS, followed by purification on Glutathione Resin. The protein of interest will be in the flow-through.

## TROUBLESHOOTING

Issue	Possible Cause	Suggested Solution
<b>Low Protein Yield</b>	Poor expression of soluble protein	Optimize bacterial expression and growth conditions. Check expression by SDS-PAGE to confirm expression.
	Protein insoluble and enters inclusion bodies	Try to limit inclusion body formation for inducing protein expression for shorter time periods or by performing inductions at 30°C.  If inclusion bodies still form, follow the additional protocol for Inclusion Body Solubilization, using our Inclusion Body Solubilization (IBS) Buffer (Cat. # 786-183)
	The GST tag may not bind column	Supplement the lysis buffer with 5mM DTT before extraction may improve binding.  Check the sequence of the construct to ensure the tag is in frame with the protein of interest. Test for presence of the His tag by Western blotting and probing with a $\alpha$ -His antibody
<b>Protein Degradation</b>	Protein is degraded by bacterial proteases	Use a protease inhibitor cocktail that does not use metal chelators. We recommend <i>Recom</i> ProteaseARREST™ (Cat. # 786-376), a protease inhibitor cocktail specific designed for purifying recombinant proteins from bacteria.
<b>Poor Protein Purity</b>	Poor column washing	Wash the column more than twice or try increasing the imidazole concentration.
	GST protein interacting with other proteins	Supplement the lysis buffer with 5mM DTT before extraction to help reduce non-specific interactions.

<b>Slow Column Flow</b>	Column overloaded or particulates added to column	Ensure the bacterial lysate is completely clear before adding resin, if necessary centrifuge the lysate a second time
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## RELATED PRODUCTS



<https://info2.gbiosciences.com/purification-resins-handbook>

For other related products, visit our website at [www.GBiosciences.com](http://www.GBiosciences.com) or contact us.

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