

BioAim Scientific Inc

Mouse GLP-1 EasyTest™ Competitive ELISA Kit

Cat.No: 2020015

Instruction Manual (Last revised Sept 20, 2015)

For research use only

TABLE OF CONTENTS

I. INTRODUCTION.....	3
II. PRINCIPLE.....	4
III. MATERIALS SUPPLIED.....	5
IV. STORAGE.....	5
V. ADDITIONAL MATERILS REQUIRED.....	5
VI. PRECAUTIONS.....	6
VII. SAMPLE PREPARATION.....	6
VIII. REAGENT PREPARATION.....	8
IX. ASSAY PROCEDURE.....	9
X. CALCULATION OF RESULTS.....	10
XI. PERFORMANCE OF CHARACTERISTICS.....	11
XII. REFERENCES.....	12
XIII. TROUBLESHOOTING.....	13
XIV. ASSAY DIAGRAM.....	14

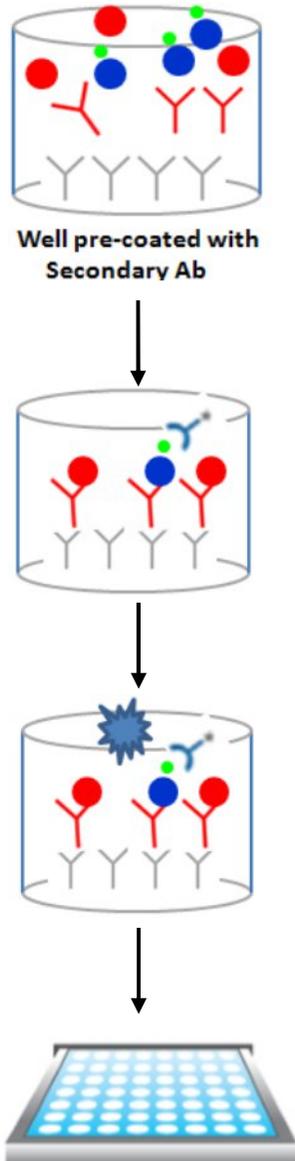
I. INTRODUCTION

Glucagon-like peptide-1 (GLP-1) is an incretin derived from the transcription product of the proglucagon gene. The major source of GLP-1 in the body is the intestinal L cell that secretes GLP-1 as a gut hormone. The biologically active forms of GLP-1 are: GLP-1-(7-37) and GLP-1-(7-36) NH₂. Those peptides result from selective cleavage of the proglucagon molecule.

GLP-1 secretion by ileal L cells is dependent on the presence of nutrients in the lumen of the small intestine. The secretagogues (agents that cause or stimulate secretion) of this hormone include major nutrients like carbohydrate, protein and lipid. Once in the circulation, GLP-1 has a half-life of less than 2 minutes, due to rapid degradation by the enzyme dipeptidyl peptidase-4. It is a potent antihyperglycemic hormone, inducing glucose-dependent stimulation of insulin secretion while suppressing glucagon secretion. Such glucose-dependent action is particularly attractive because, when the plasma glucose concentration is in the normal fasting range, GLP-1 no longer stimulates insulin to cause hypoglycemia. GLP-1 appears to restore the glucose sensitivity of pancreatic β -cells, with the mechanism possibly involving the increased expression of GLUT2 and glucokinase. GLP-1 is also known to inhibit pancreatic β -cell apoptosis and stimulate the proliferation and differentiation of insulin-secreting β -cells. In addition, GLP-1 inhibits gastric secretion and motility. This delays and protracts carbohydrate absorption and contributes to a satiating effect.

The BioAim Mouse GLP-1 EasyTest[™] Competitive ELISA kit can quantitatively measure GLP-1 in Mouse serum or plasma. Other matrices, such as urine and tissue, may be suitable but have not been validated. It is a simple and rapid technology for the quantitation of antigen in a range of sample matrices. The whole process takes 2 hours with high accuracy and precision.

II. PRINCIPLE



1. Microplate was pre-coated with secondary Ab;
2. Add Anti-GLP-1 Ab first, then sample/Standard and biotinylated peptide;
3. Incubate 1.0 h at room temperature.

1. Wash;
2. Add Streptavidin-HRP;
3. Incubate 45min at room temperature.

1. Wash;
2. Add TMB substrate;
3. Incubate 15 min at room temperature.

1. Add stop solution;
2. Read plate at 450nm.

 = Anti-rabbit IgG
 = Primary antibody
 = Sample/standard peptide

 = Biotinylated peptide
 = Streptavidin-HRP
 = TMB substrate

III. MATERIALS SUPPLIED

1. Mouse GLP-1 Microplate: 96 wells (12 strips x 8 wells) coated with secondary antibody.
2. Anti-GLP-1 antibody: 6µl/vial, 2 vials.
3. Standard GLP-1 peptide: 10µl/vial, 2 vials.
4. Biotinylated GLP-1 peptide: 10µl/vial, 2 vials.
5. HRP-Streptavidin concentrate: 30 µl 400x concentrated HRP-conjugated Streptavidin.
6. 5x Assay Diluent: 1vial, 15 ml.
7. 20x Wash Buffer Concentrate: 1 Vial, 25 ml.
8. TMB Substrate: 12 ml.
9. Stop Solution: 8 ml of 0.2 M sulfuric acid.
10. User Manual.
11. Plate sealer: 2 pieces.

IV. STORAGE

1. The kit can be stored for up to 6 months at 2° to 8°C from the date of shipment.
2. Standard can be stored at -20 °C or -80 °C. Use freshly prepared standard within 12 hours (stored at 2~8°C).
3. Opened Microplate Wells or reagents may be store for up to 1 month at 2 to 8°C. Return unused strip to the pouch containing desiccant pack, reseal along entire edge and keep in 2~8°C.
4. Avoid repeated freeze-thaw cycles.

V. ADDITIONAL MATERIALS REQUIRED

1. Distilled or deionized water.
2. Precision pipettes, with disposable plastic tips.
3. Beakers, flasks, cylinders necessary for preparation of reagents.
4. Microplate washing device (multichannel pipette or automated microplate washer).

5. Microplate shaker.
6. Microplate reader capable of reading at 450 nm.
7. Materials used for sample preparation.

VI. PRECAUTIONS

1. All reagents must be at room temperature (18°C to 25°C) before running assay.
2. Do not mix or substitute reagents with those from other lots or other sources.
3. Do not use kit reagents beyond expiration date on label.
4. Do not expose kit reagents to strong light during storage or incubation.
5. Use disposable pipette tips for each transfer to avoid microbial contamination or cross contamination of reagents.
6. Improper or insufficient washing at any stage of the procedure will result in either false positive or false negative results.
7. Avoid contact of stop solution with skin or eyes. If contact occurs, immediately flush area with copious amounts of water.
8. Do not use TMB substrate solution if it has begun to turn blue.
9. Do not expose bleach to work area during actual test procedure because of potential interference with enzyme activity.

VII. SAMPLE PREPARATION

In general, samples can be assayed with no prior purification. However, many plasma components can cause interference with the assay. Therefore purification is necessary for accurate measurement. The protocol shown is one such purification method. However, you may choose a different protocol based on your own requirements and expertise.

Protocol for 100 mg columns. Adjust volumes accordingly if using 200 mg columns.

Materials

100 or 200 mg C18 Sep-Pak columns (e.g. Waters #WAT023590 or WAT054945)

Column activation: Methanol

Column washing: Ultrapure water

Elution: 98% Acetone (98ml of acetone added to 2ml water)

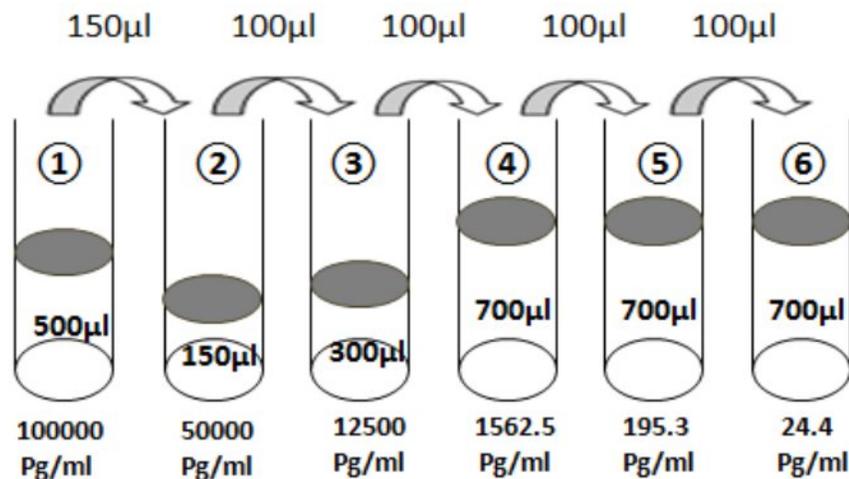
Vacuum centrifuge or nitrogen gas

Suggested Protocol

1. Aliquot an equal amount of each plasma sample into clean test tubes (0.5ml is recommended).
2. Equilibrate a Sep-Pak column by washing with 0.5 ml Methanol once followed by 1 ml Ultrapure water 3 times. Don't allow the cartridge to dry.
3. Load plasma sample and let it through the column by gravity flow.
4. Wash column 2 times with 1 ml Ultrapure water and discard the wash.
5. Elute peptide slowly using two applications of 1ml 98% Acetone in water.
6. Dry the samples by vacuum centrifugation or under a gentle stream of nitrogen.
7. Add 500 μ l 1x assay buffer to re-suspend the pellet at 1 X concentration and perform the assay. If the peptide value does not fall within the range of detection, dilute or concentrate the sample accordingly.

VIII. REAGENT PREPARATION

1. Bring all reagents and samples to room temperature (18~25°C) before use.
2. **Assay diluent**
Dilute the concentrated assay diluent 1:5 with distilled water (e.g. 10ml plus 40ml).
3. **Wash buffer**
Dilute the concentrated wash buffer 1:20 with distilled water (e.g. 20ml plus 380ml).
4. **Anti-GLP-1 antibody**
Briefly centrifuge the vial before use. Add 1494 μ l 1x assay diluent to the vial. Pipette up and down to mix thoroughly. A vial can be used for around 60 wells.
5. **Standard GLP-1 peptide**
 - a. Briefly spin the standard vial before use. Add 490 μ l 1x Assay Diluent to prepare a 100 ng/ml standard solution. Gently vortex to mix. This is standard #1.
 - b. Label 5 tubes #2 through #6. Pipette 150 μ l 1x assay diluent into tube #2, pipette 300 μ l 1x assay buffer into tube #3. Pipette 700 μ l 1x assay diluent into tubes #4 through #6.
 - c. Take 150 μ l from standard #1 and add to tube #2. Mix thoroughly. Add 100 μ l from tube #2 to tube #3. Mix thoroughly. Continue this for tubes #4 through #6.



The concentrations of GLP-1 in the tubes are labeled above. Diluted standards should be used within 60 minutes of preparation.

6. Biotinylated GLP-1 peptide

Briefly centrifuge the vial before use. Add 1490 μ l of 1x assay diluent to make the final concentration enough for 60 wells.

7. Streptavidin-HRP

The HRP-Streptavidin concentrate should be diluted 400- fold with 1x assay diluent. Do not store diluted Streptavidin-HRP.

IX. ASSAY PROCEDURE

1. All reagents must be brought to room temperature (18-25°C) prior to use. Place the required number of microwells in the holder. It is recommended that all samples, standards, and blanks be run in duplicate.
2. Pipette 25 μ l of anti-GLP-1 antibody into all wells.
3. Pipette 75 μ l of 1x assay diluent into the blank wells.
4. Pipette 50 μ l of 1x assay diluent into the Bo (0 ng/ml standard) wells.
5. Pipette 50 μ l of Standards #1 through #6 or from #6 to #1 (in reverse order of serial dilution) to the appropriate wells.
6. Pipette 50 μ l of samples to the appropriate wells.
7. Pipette 25 μ l of biotinylated peptide into each well except the Blank wells.
8. Seal the plate. Incubate for 1.0 hour at room temperature with gentle shaking.
9. Empty the contents of the wells and wash by adding 300 μ l of wash buffer to every well. Repeat 3 more times for a total of 4 washes. After the final wash, empty or aspirate the wells and firmly tap the plate on a lint free paper towel to remove any remaining wash buffer.
10. Pipette 100 μ l of diluted streptavidin-HRP solution to each well.

11. Seal the plate. Incubate for 45 min at room temperature with gentle shaking.
12. Wash plate as above (Step 9).
13. Pipette 100 μ l of TMB Substrate Solution into each well. Incubate plate for 15 minutes at room temperature in the dark with gentle shaking.
14. Add 50 μ l of stop solution to each well.
15. Read absorbance at 450nm within 30 minutes of stopping reaction. If wavelength correction is available, subtract the optical density readings at 570nm from readings at 450nm.

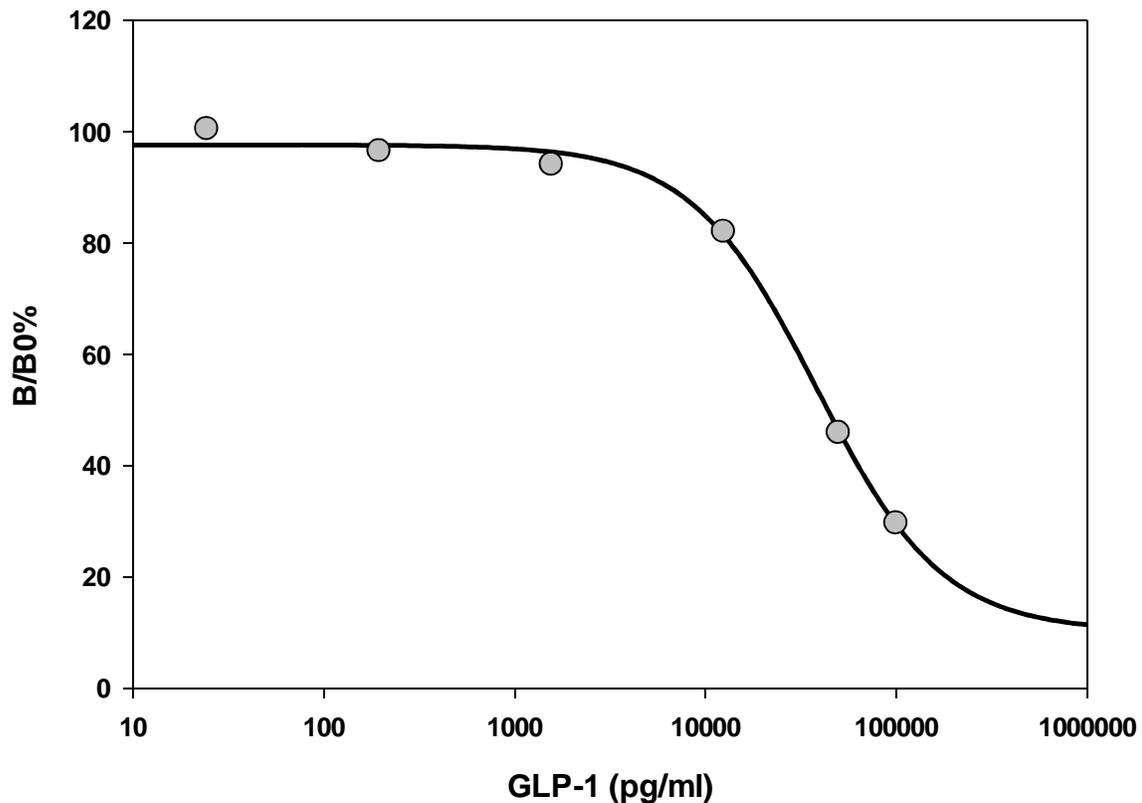
X. CALCULATION OF RESULTS

1. Calculate the average absorbance values for each set of duplicate standards, samples and controls. Subtract the average blank well optical density.
2. Plot the standard curve using SigmaPlot software (or other software which can perform four-parameter logistic regression models), with standard concentration on the x-axis and percentage of absorbance (see calculation below) on the y-axis. Draw the best-fit curve through the standard points.

$$\text{Percentage absorbance} = (B - \text{blank OD}) / (B_0 - \text{blank OD}) * 100$$

Where B = OD of sample or standard and B₀ = OD of zero Standard, total binding.

3. A representative standard curve is shown below. This standard curve is for demonstration only. A standard curve must be run with each assay by operator.



XI. PERFORMANCE

A. Sensitivity

The minimum detectable dose of GLP-1 was determined to be 90pg/ml. This is defined as two standard deviations above the mean optical density of 20 replicates of the zero standards.

B. Specificity

No cross-reactivity was identified with the following peptides: GLP-2, Glucagon, CGRP, VIP, Insulin, secretin and Resistin.

C. Reproducibility

Intra-Assay CV%: <10%

Inter-Assay CV%: <15%

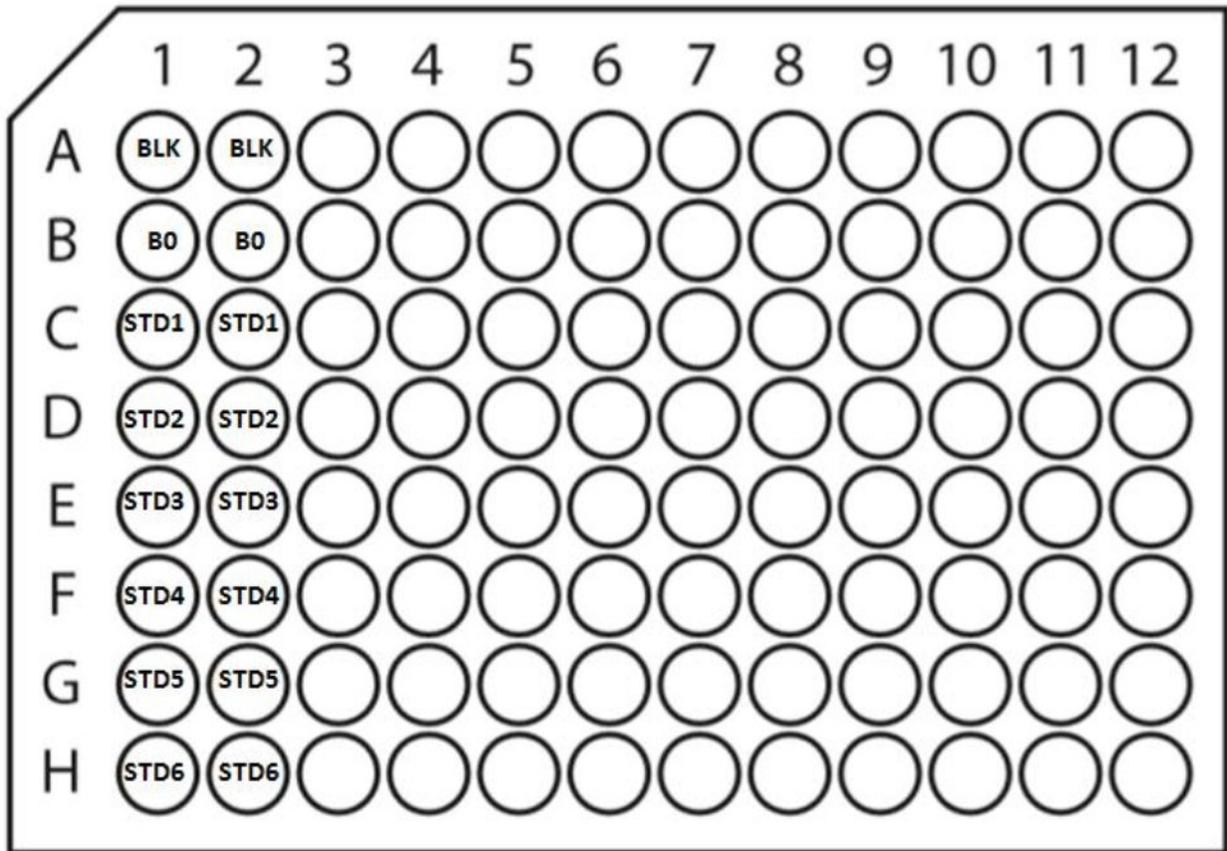
XII. REFERENCES

1. Toft-Nielsen MB, Madsbad S, Holst JJ (August 2001). *The Journal of Clinical Endocrinology and Metabolism* 86 (8): 3853–60.
2. Meier JJ, Weyhe D, Michaely M et al. (March 2004). *Critical Care Medicine* 32 (3): 848–51.
3. Presswala L, Shubrook J (April 2015). *The Journal of family practice* 64 (4): 214–20.
4. Nannipieri M, Baldi S, Mari A et al. (November 2013). *The Journal of Clinical Endocrinology and Metabolism* 98 (11): 4391–9.
5. Mabileau G, Mieczkowska A, Irwin N, et al. (October 2013). *The Journal of Endocrinology* 219 (1): 59–68.

XIII.TROUBLESHOOTING

Problem	Cause	Solution
1.Poor standard curve	1. Inaccurate pipetting 2. Improper standard dilution	1. check pipettes; 2. Ensure briefly spin the vial of standard, take the right amount to dilution.
2. Low signal	1. Too brief incubation time 2. Inadequate reagent volumes or improper dilution	1. ensure adequate incubation time; 2. Check pipettes and ensure corrected preparation.
3. Large CV	Inaccurate pipetting	1. Check pipettes; 2. Accurately perform each step.
4.High background	1. Plate is insufficiently washed; 2. Wash buffer contamination	1.Follow the manual correctly; if using a plate washer, check that all ports are working functionally; 2. Prepare fresh buffer.
5. Low sensitivity	1.EIA kit improper storage 2. Stop solution	1. Follow the manual to store each component correctly; 2. Add enough stop solution to each well.

XIV. ASSAY DIAGRAM



Bioaim Scientific Inc

Unit 6, 27 Casebridge Court
Scarborough, ON, M1B 4Y4
Canada
Tel: 416-286-6868
www.bioaimscientific.com