

**REFERENCES**

1. Sampath TK, et al. (5 August 1990). J. Biol. Chem. 265 (22): 13198
2. Chen D, et al. (December 2004). Growth Factors 22 (4): 233
3. Marie PJ, et al. (2002). Histol. Histopathol. 17 (3): 877

## Porcine BMP-2 Immunoassay

Catalog Number: SEKP-0024

For the quantitative determination of Porcine BMP-2 concentrations in cell culture supernates, serum, and plasma.

For research use only. Not for use in diagnostic procedures.

**MANUFACTURED AND DISTRIBUTED BY:**

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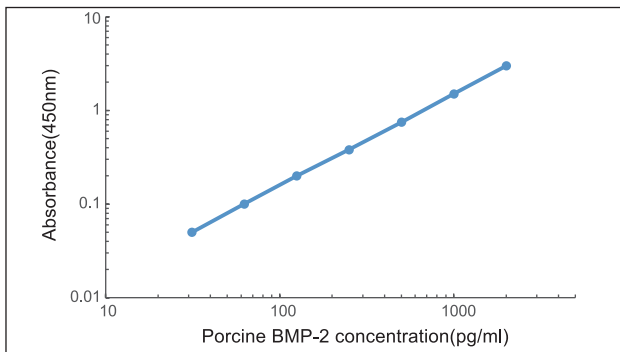
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### Recovery of BMP-2 in two matrices

Sample Type	Average % of Expected Range (%)	Range (%)
Citrate plasma	91	83-101
Cell culture supernatants	104	94-103

**LINEARITY:**To assess the linearity of the assay, three samples were spiked with high concentrations of BMP-2 in various matrices and diluted with the appropriate Sample Diluent to produce samples with values within the dynamic range of the assay. (The plasma samples were initially diluted 1:1)

Dilution ratio	Recovery(%)	Citrate plasma	Cell culture supernatants
1:2	Average% of Expected	93	105
	Range(%)	86-101	97-114
1:4	Average% of Expected	95	110
	Range(%)	87-103	102-118



Representative standard curve for BMP-2 ELISA.

### Performance Characteristics

**SENSITIVITY:** The minimum detectable dose was 10 pg/mL.

**SPECIFICITY:** This assay recognizes both natural and recombinant Porcine BMP-2. The factors listed below were prepared at 10ng/ml in Standard /sample Diluent and assayed for cross-reactivity and no significant cross-reactivity or interference was observed.

ApoAI, BMP1, BMP5, BMP7, HGF, HSP27, IL-1 $\beta$ , IL-1RA, IL-2, IL-2R, IL-5, IL-6, IL-6R, IL-8, IL-10, IL-12, IL-13, IL-15, IL-17C, IL-23, IFN $\gamma$ , MMP-2, MMP-9, PDGF-AA, PDGFBB, PDGF-AB, TGF $\beta$ 1, TGF $\beta$ 2, TGF $\beta$ 3, TLR1, TLR2, TLR3, TNF- $\alpha$ , TNF RI, TNF RII.

**REPEATABILITY:** The coefficient of variation of both intra-assay and inter-assay were less than 10%.

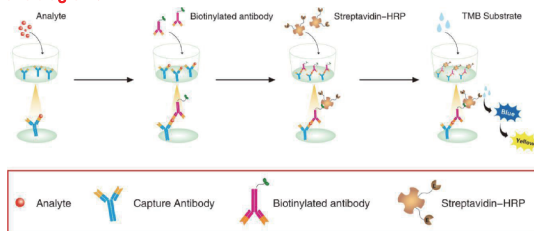
**RECOVERY:** The recovery of BMP-2 spiked to three different levels in four samples throughout the range of the assay in various matrices was evaluated.

### BACKGROUND

Bone morphogenetic protein 2 (BMP-2) belongs to the TGF- $\beta$  superfamily of proteins. BMP-2 has been shown to interact with BMPR1A. Like other bone morphogenetic proteins BMP-2 plays an important role in the development of bone and cartilage. It is involved in the hedgehog pathway, TGF beta signaling pathway, and in cytokine-cytokine receptor interaction. It is also involved in cardiac cell differentiation and epithelial to mesenchymal transition. BMP-2 and BMP-7 are osteo-inductive BMPs: they have been demonstrated to potentially induce osteoblast differentiation in a variety of cell types.

### PRINCIPLE OF THE ASSAY

This assay employs the quantitative sandwich enzyme immunoassay technique. A monoclonal antibody specific for BMP-2 has been pre-coated onto a microplate. Standards and samples are pipetted into the wells and any BMP-2 present is captured by the coated antibody after incubation. Following extensive washing, a biotin-conjugate antibody specific for BMP-2 is added to detect the captured BMP-2 protein in sample. For signal development, horseradish peroxidase (HRP)-conjugated Streptavidin is added, followed by tetramethyl-benzidine (TMB) reagent. Following a wash to remove any unbound combination, and enzyme conjugate is added to the wells. Solution containing sulfuric acid is used to stop color development and the color intensity which is proportional to the quantity of bound protein is measurable at 450nm.

**Schematic diagram:****TECHNICAL HINTS AND LIMITATIONS**

1. This Solarbio ELISA should not be used beyond the expiration data on the kit label.
2. To avoid cross-contamination, use a fresh reagent reservoir and pipette tips for each step.
3. To ensure accurate results, some details, such as technique, plasticware and water sources should be emphasized.
4. A thorough and consistent wash technique is essential for proper assay performance.
5. A standard curve should be generated for each set of samples assayed.
6. It is recommended that all standards and samples be assayed in duplicate.
7. Avoid microbial contamination of reagents and buffers. Buffers containing protein should be made under aseptic conditions and be prepared fresh daily.
8. In order to ensure the accuracy of the results, the standard curve should be made every time.

**PRECAUTIONS**

The Stop Solution suggested for use with this kit is an acid solution. Wear protective gloves, clothing, eye, and face protection. Wash hands thoroughly after handling.

**CALCULATION OF RESULTS**

1. The standard curve is used to determine the amount of specimens.
2. First, average the duplicate readings for each standard, control, and sample. All O.D. values are subtracted by the mean value of blank control before result interpretation.
3. Construct a standard curve by reducing the data using computer software capable of generating a four parameter logistic (4-PL) curve-fit. As an alternative, construct a standard curve by plotting the mean absorbance for each standard on the y-axis against the concentration on the x-axis and draw a best fit curve through the points on the graph.
4. The data may be linearized by plotting the log of the BMP-2 concentrations versus the log of the O.D. and the best fit line can be determined by regression analysis. This procedure will produce an adequate but less precise fit of the data. If samples have been diluted, the concentration read from the standard curve must be multiplied by the dilution factor.
5. This standard curve is provided for demonstration only. A standard curve should be generated for each set of samples assayed.

Typical data using the BMP-2 ELISA

Std (pg/mL)	O.D.1	O.D.2	Average	Corrected
0	0.015	0.019	0.017	---
31.25	0.104	0.108	0.106	0.089
62.5	0.209	0.207	0.208	0.191
125	0.415	0.423	0.419	0.402
250	0.736	0.751	0.743	0.726
500	1.213	1.234	1.223	1.206
1000	1.997	1.974	1.985	1.968
2000	2.688	2.664	2.676	2.659

## DESCRIPTION

Biotin-Conjugate solution with the Biotin-Conjugate antibody Diluent in a clean plastic tube.

**\*The working solution should be used within one day after dilution.**

5. **Working solution of Streptavidin-HRP(120µL)** - Centrifuge for 1 min at 6000 x g to bring down the material prior to open the vial. The vial contains 120µL HRP Conjugate sufficient for a 96-well plate. Make a 1:100 dilution in Reagent Diluent. If the entire 96-well plate is used, add 100µL of HRP Conjugate to 10 mL of Streptavidin-HRP Diluent to make working dilution of HRP Conjugate and mix thoroughly prior to the assay. The rest of undiluted HRP Conjugate can be stored at 4°C for up to 6 months. DO NOT FREEZE.

**\*The working solution should be used within one day after dilution.**

## ASSAY PROCEDURE

Prepare all reagents and standards as directed. Wash the plate 3 times before assay.



Add 100µl standard or samples to each well, shaking with Micro-oscillator (100r/min) to incubate 60 minutes at room temperature(25±2°C).



Aspirate and wash 4 times

Add 100µl working solution of Biotin-Conjugate anti-Porcine BMP-2 antibody to each well, shaking with Micro-oscillator (100r/min) to incubate 60 minutes at room temperature(25±2°C).



Aspirate and wash 4 times

Add 100µl working solution of Streptavidin-HRP to each well, shaking with Micro-oscillator (100r/min) to incubate 20 minutes at room temperature (25±2°C).



Aspirate and wash 5 times

Add 100µl Substrate solution to each well, incubate 5-20 minutes (depending on signal) at room temperature(25±2°C).Protect from light.



Add 50µl Stop solution to each well. Read at 450nm within 5 minutes.

## DESCRIPTION

### KIT COMPONENTS & STORAGE CONDITIONS

PART	SIZE	STORAGE OF OPENED/ RECONSTITUTED MATERIAL
<b>Microwell Plate - antibody coated 96-well Microplate (8 wells ×12 strips)</b>	1 plate	Return unused wells to the foil pouch containing the desiccant pack. Reseal along entire edge of the zip-seal. May be stored for up to 1 month at 2 – 8 C**
<b>Standard - lyophilized, 4000 pg/ml upon reconstitution</b>	2 vials	Aliquot and Store at -20°C** for six months
<b>lyophilized Biotin-Conjugated antibody</b>	1 vial	Store at 2-8°C ***for six months
<b>Concentrated Streptavidin-HRP</b>	1 vial	Store at 2-8°C ***for six months
<b>Standard /sample Diluent</b>	1 bottle	Store at 2-8°C ***for six months
<b>Biotin-Conjugate antibody Diluent</b>	1 bottle	Store at 2-8°C ***for six months
<b>Streptavidin-HRP Diluent</b>	1 bottle	Store at 2-8°C ***for six months
<b>20 x Wash Buffer Concentrate</b>	1 bottle	Store at 2-8°C ***for six months
<b>Substrate Solution</b>	1 bottle	Store at 2-8°C ***for six months
<b>Stop Solution</b>	1 bottle	Store at 2-8°C ***for six months
<b>Plate Cover Seals</b>	4 pieces	

\*\*Provided this is within the expiration date of the kit.

**OTHER SUPPLIES REQUIRED BUT NOT SUPPLIED**

1. Microplate reader capable of measuring absorbance at 450 nm.
2. Pipettes and pipette tips.
3. Deionized or distilled water.
4. Squir bottle, manifold dispenser, or automated microplate washer.
5. 500 mL graduated cylinder.

**SPECIMEN COLLECTION & STORAGE**

**Cell Culture Supernates** - Centrifuge cell culture media at 1000×g to remove debris. Assay immediately or aliquot and store samples at  $\leq -20^{\circ}\text{C}$ . Avoid repeated freeze-thaw cycles.

**Serum** - Use a serum separator tube (SST) and allow samples to clot for 2 hours at room temperature or overnight at 2-8°C. Centrifuge at approximately for 15 minutes at 1000×g. Assay immediately or aliquot and store samples at  $\leq -20^{\circ}\text{C}$ . Avoid repeated freeze-thaw cycles.

**Plasma** - Collect plasma using EDTA, heparin, or citrate as an anticoagulant. Centrifuge for 15 minutes at 1000×g within 30 minutes of collection. Assay immediately or aliquot and store samples at  $\leq -20^{\circ}\text{C}$ .

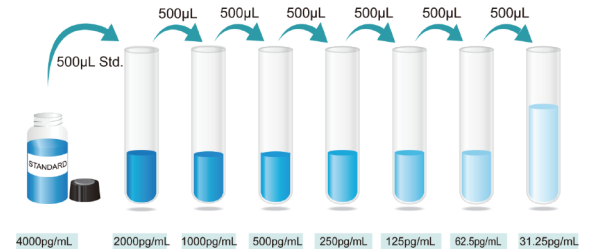
Avoid repeated freeze-thaw cycles.

**Note:** It is recommended to conduct a pre-test before the formal experiment to determine the dilution ratio

**REAGENTS PREPARATION**

1. **Temperature returning** - Bring all kit components and specimen to room temperature (20-25°C) before use.
2. **Wash Buffer** - Dilute 30mL of 20x Wash Buffer Concentrate with 570mL of deionized or distilled water to prepare 600mL of Wash Buffer. If crystals have formed in the concentrate Wash Buffer, warm to room temperature and mix gently until the crystals have completely dissolved.
3. **Standard/Sample(2 vials)** - Porcine BMP-2 Standard has a total of 2 vials. Each vial contains the standard sufficient for generating a standard curve. Reconstitute the Standard with 1.0mL of **Standard /Sample**

**Diluent.** This reconstitution produces a stock solution of 4000pg/mL. Allow the standard to sit for a minimum of 15 minutes with gentle agitation prior to making dilutions. Pipette 500 $\mu\text{L}$  of **Standard /Sample Diluent** into 2000pg/ml tube and the remaining tubes. Use the stock solution of 4000pg/mL to produce a 2-fold dilution series (below). Mix each tube thoroughly(vortex 20 sec for each of dilution step) and change pipette tips between each transfer. The 2000pg/mL standard serves as the high standard. The **Standard /Sample Diluent** serves as the zero standard (0 pg/mL).

**Preparation of Porcine BMP-2 standard dilutions**

**\*If you do not run out of re-melting standard, store it at  $-20^{\circ}\text{C}$ . Diluted standard shall not be reused.**

4. **Working solution of Biotin-Conjugate anti-Porcine BMP-2 antibody(1 vials)** - The lyophilized Detection Antibody should be stored at 4°C to  $-20^{\circ}\text{C}$  in a manual defrost freezer for up to 6 months, if not used immediately. Centrifuge for 1 min at 6000 x g to bring down the material prior to open the vial. The vial contains sufficient Detection Antibody for a 96-well plate. Add 110 $\mu\text{L}$  of sterile Biotin-Conjugate antibody Diluent to each vial and vortex 30 sec to obtain the stock solution. If the entire 96-well plate is used, take 50 $\mu\text{L}$  of detection antibody stock solution into 10 mL of Biotin-Conjugate antibody Diluent to make working dilution of Detection Antibody and mix thoroughly prior to the assay. If the partial antibody is used. Make a 1:200 dilution of the concentrated