Urocortin 2 (Mouse) EIA

For the quantitative determination of Urocortin 2 in mouse plasma and serum

For Research Use Only. Not For Use In Diagnostic Procedures.

Catalog Number:	48-UR2MS-E01
Size:	96 wells
Version:	ALPCO 8/21/08

ALPCO Diagnostics

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I. Introduction

Urocortin 2 (Ucn 2), also known as stresscopin-related peptide, is a novel predicted neuropeptide related to corticotropin-releasing factor (CRF). The peptide consisting of 38 amino acid residues was first demonstrated to be expressed centrally and to bind selectively to type 2 CRF receptor (CRFR2)[1)]. In the rodent, Ucn 2 transcripts were shown to be expressed in the discrete regions of the central nervous system including stress-related cell groups in the hypothalamus and brainstem[1)]. More recently, the expression of Ucn 2 transcripts was detected in the olfactory bulb, pituitary, cortex, hypothalamus, and spinal cord[2)]. Ucn 2 mRNA was also found to be expressed widely in a variety of peripheral tissues, most highly in the skin and skeletal muscle tissues[3)]. Ucn 2-like immunoreactivity was detected by RIA in acid extracts of mouse brain, muscle, and skin[3)]. Immunohistochemically Ucn 2 was found in both skin epidermis and adnexal structures and in the skeletal muscle myocytes[3)]. Ucn 2 gene transcription was stimulated in the hypothalamus and brainstem by glucocorticoid administration to the mouse and inhibited by removal of glucocorticoids by adrenalectomy, suggesting a putative link between the CRFR1 and CRFR2 pathways[2)]. On the other hand, in the rat a stressor-specific regulation of Ucn 2 mRNA expression in the hypothalamic paraventricular nucleus was demonstrated, which raised the possibility of a modulary role of Ucn 2 mRNA in stress-induced alteration of anterior and posterior pituitary function, depending on the type of stress[4)]. Administration of dexamethasone to the mouse resulted in a decrease of Ucn 2 mRNA levels in the back skin region. Adrenalectomy significantly increased Ucn 2 mRNA levels in the skin, and the levels were reduced back to normal levels after corticoid replacement [3)].

CRFR2 is found in cardiomyocytes and in endothelial and smooth muscle cells of the systemic vasculature. Ucn 2 is expressed in the mouse cardiomyocytes. In the mouse, Ucn 2 treatment augmented heart rate, exhibited potent inotropic and lusitropic actions on the left ventricle, and induced a downward shift of the diastolic pressure-volume relation[5)]. Ucn 2 also reduced systemic arterial pressure, associated with a lowering of systemic arterial elastance and systemic vascular resistance. The effects of Ucn 2 were specific to CRFR2 function and independent of beta-adrenergic receptors. These experiments demonstrated the potent cardiovascular physiologic actions of Ucn 2 in the both wild-type and cardiomyopathic mice and support a potential beneficial use of Ucn 2 in congestive heart failure treatment[5)]. The use of Ucn 2 was also proposed to treat ischemic heart disease because of its potent cardioprotective effect in the mouse heart and its minimal impact on the hypothalamic stress axis[6)].

Administration of Ucn 2 to the mouse prevented the loss of skeletal muscle mass resulting from disuse due to casting, corticosteroid treatment, and nerve damage. In addition, Ucn 2 treatment prevented the loss of skeletal muscle force and myocyte cross-sectional area that accompanied muscle mass losses resulting from disuse due to casting. In normal muscles of the mouse, Ucn 2 increased skeletal muscle mass and force. It was thus proposed that Ucn 2 might find utility in the treatment of skeletal muscle wasting diseases including age-related muscle loss or sarcopenia[7)].

Mouse urocortin 2 (Ucn 2) is a new peptide predicted from mouse cDNA sequence and its physiologic and pathophysiologic significance has not yet been fully elucidated. However, the experimental data presented to date provided evidence for the important physiologic roles of Ucn 2 and urge the necessity of further investigation of the peptide from various points of view.

We succeeded in the development of the mouse urocortin 2 EIA kit which is highly specific for mouse Ucn 2 with almost no crossreaction to Ucn 1 (mouse, rat), Ucn 3 (mouse), ACTH (mouse, rat) and CRF (mouse, rat, human). The kit can be used for measurement of Ucn 2 in mouse plasma or serum with high sensitivity. It will be a specifically useful tool for Ucn 2 research.

Mouse Urocortin 2 EIA Kit

- The assay kit can measure mouse urocortin 2 within the range of 0.82-200 ng/mL.
- The assay is completed within 16-18 hr. + 3 hr.
- With one assay kit, 41 samples can be measured in duplicate.
- Test sample: Mouse plasma & serum
  Sample volume: 20 µL
- The 96-well plate of this kit consists of 12 8-well strips, so that the user can separate the strips if need be.
- Precision and reproducibility
  Intra-assay CV (%)
  Mouse plasma 2.51-5.25 Mouse serum 6.71-9.01
  Inter-assay CV (%)
  Mouse plasma 4.70-8.28 Mouse serum 6.36-11.12
- Stability and Storage
  Store all of the components at 2-8℃.
  The kit is stable under these conditions for 18 months from the date of manufacturing.
  The expiry date is stated on the package.

Contents

1) Antibody coated plate
2) Standard
3) Labeled antigen
4) SA-HRP solution
5) Substrate buffer
6) OPD tablet
7) Stop solution
8) Buffer solution
9) Wash solution (concentrated)
10) Adhesive foil

II. Characteristics

This EIA kit is used for quantitative determination of urocortin 2 in mouse plasma & serum samples. The kit is characterized by its sensitive quantification and high specificity. In addition, it has no influence by other components in samples. Mouse urocortin 2 standard is a highly purified synthetic product.

< Specificity >

The EIA kit has high specificity to mouse urocortin 2 and shows no cross reactivity with urocortin 1 (mouse, rat), urocortin 3 (mouse), ACTH (mouse, rat) or CRF (mouse, rat, human).

< Test Principle >

This EIA kit for the determination of mouse urocortin 2 in samples is based on a competitive enzyme immunoassay using the combination of a highly specific antibody to mouse urocortin 2 and a biotin-avidin affinity system. Standards, samples, and labeled antigen are added to the wells of the plate coated with rabbit anti mouse urocortin 2 antibodies for a competitive immunoreaction. After incubation and plate washing, horse radish peroxidase (HRP) labeled streptavidin (SA) is added to form HRP labeled streptavidin-biotinylated antigen-antibody complexes on the surface of the wells. Finally, HRP enzyme activity is determined by o-Phenylenediamine dihydrochloride (OPD) and the concentration of mouse urocortin 2 is calculated.

III. Composition

Component	Form	Quantity	Main Ingredient
1. Antibody coated plate	Microtiter plate	1 plate (96 wells)	Rabbit anti mouse urocortin 2 antibody
2. Standard	lyophilized	1 vial	Synthetic mouse urocortin 2 (200ng/vial)
3. Labeled antigen	lyophilized	1 vial	Biotinylated mouse urocortin 2
4. SA-HRP solution	liquid	1 bottle (12 mL)	HRP labeled streptoavidin
5. Substrate buffer	liquid	1 bottle (24 mL)	0.015% Hydrogen peroxide
6. OPD tablet	tablet	2 tablets	o-Phenylenediamine dihydrochloride
7. Stop solution	liquid	1 bottle (12 mL)	1 M H_2SO_4
8. Buffer solution	liquid	1 bottle (15 mL)	Phosphate buffer
9. Wash solution (Concentrated)	liquid	1 bottle (50 mL)	Concentrated saline
10. Adhesive foil		3 sheets	

IV. Method

< Equipment required >

1) Photometer for microtiter plate (Plate reader) which can read extinction 2.5 at 492 nm

2) Microtiter plate shaker

3) Washing device for microtiter plate and dispenser with aspiration system

4) Micropipettes, multi-channel pipettes for 8 wells or 12 wells and their tips

5) Test tubes for preparation of standard solution

6) Graduated cylinder (1,000 mL)

7) Distilled water or deionized water

< Preparatory work >

1) Preparation of Standard solution:
Reconstitute the mouse urocortin 2 standard with 1 mL of buffer solution, which affords 200 ng/mL standard solution. The reconstituted standard solution (0.1mL) is diluted with 0.2 mL of buffer solution that yields 66.7ng/mL standard solution. Repeat the dilution procedure to make each standard solution of 22.2, 7.41, 2.47, 0.82 ng/mL. The Buffer solution itself is used as the 0 ng/mL standard.

2) Preparation of Labeled antigen:
Reconstitute labeled antigen with 6 mL of distilled water.

3) Preparation of Substrate solution:
Resolve one OPD tablet with 11 mL of substrate buffer. It should be prepared immediately before use.

4) Preparation of Wash solution:
Dilute 50 mL of washing solution (concentrated) to 1000 mL with distilled or deionized water.

5) Other reagents are ready for use.

< Procedure >

1. Before start assay, bring all the reagents and samples to room temperature (20 ~ 30℃).

2. Add 0.35mL/well of Wash solution into the wells and aspirate the Wash solution in the wells. Repeat this washing procedure further twice (total 3 times). Finally, invert the plate and tap it onto an absorbent surface, such as paper toweling, to ensure that most of the residual Wash solution is blotted away.

3. Fill 25μL of Buffer solution into the wells first, then introduce 20μL of each of Standard solutions (0, 0.82, 2.47, 7.41, 22.2, 66.7, 200 ng/mL) or samples and finally add 50μL of Labeled antigen into the wells. The total pipetting time of standard solutions and samples for a whole plate should not exceed 30 min.

4. Cover the plate with adhesive foil and incubate it at 4ºC overnight for 16 ~ 18 hours. (Plate shaker not needed for this step.)

5. After incubation, move the plate back to room temperature keeping for about 40 minutes and take off the adhesive foil, aspirate and wash the wells four times with approximately 0.35 mL/well of Wash solution. Finally, invert the plate and tap it onto an absorbent surface, such as paper toweling, to ensure that most of the residual Wash solution is blotted away.

6. Pipette 100μL of SA-HRP solution into each of the wells.

7. Cover the plate with adhesive foil and incubate it at room temperature (20 ~ 30ºC) for 2 hours. During the incubation, the plate should be shaken with a plate shaker.

8. Resolve OPD tablet with 11 mL of Substrate buffer. It should be prepared immediately before use.

9. Take off the adhesive foil, aspirate and wash the wells four times with approximately 0.35 mL/well of Wash solution. Finally, invert the plate and tap it onto an absorbent surface, such as paper toweling, to ensure that most of the residual Wash solution is blotted away.

10. Add 100μL of Substrate solution to each of the wells, cover the plate with adhesive foil, and incubate for 20 minutes at room temperature.

11. Add 100μL of Stop solution into each of the wells to stop the color reaction.

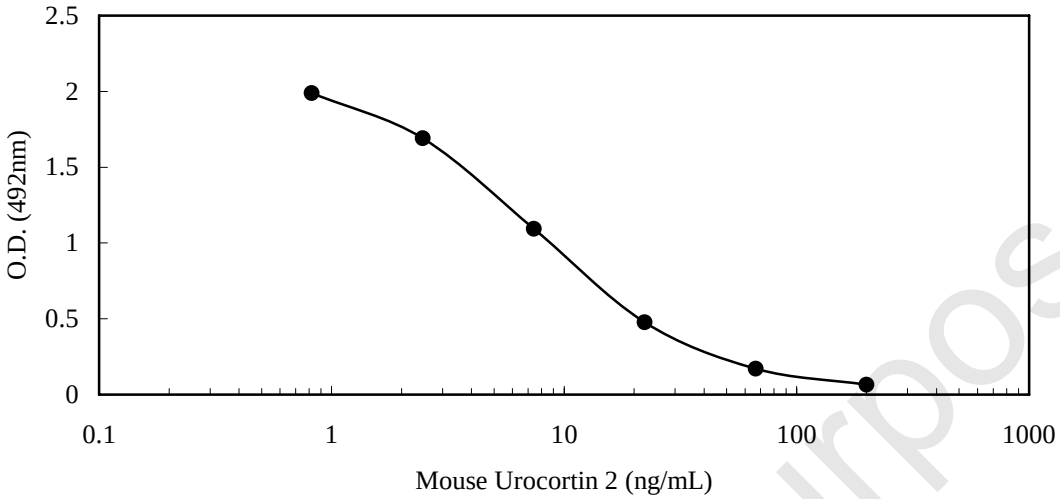
12. Read the optical absorbance of the solution in the wells at 492 nm. Calculate mean absorbance values of wells containing standards and plot a standard curve on semilogarithmic graph paper (abscissa: concentration of standard; ordinate: absorbance values). Use the average absorbance of each sample to determine the corresponding value by simple interpolation from this standard curve.

V. Notes

1. EDTA-2Na additive blood collection tube is recommended for the plasma collection. Serum and plasma samples must be used as soon as possible after collection. If the samples are tested later, they should be divided into test tubes in small amounts and frozen at or below -30°C. Avoid repeated freezing and thawing of samples.
2. Standard and Labeled antigen solutions should be prepared immediately before use. The plate's 8-well strips can be divided and used at different times. In such cases, the remaining reconstituted reagents (Standard and Labeled antigen) should be stored at -30°C.
3. The total pipetting time of Standard solutions and samples for a whole plate should not exceed 30 min.
4. During storage of Wash solution (concentrated) at 2-8°C, precipitates may be observed, however they will be dissolved when the concentrate is diluted. Diluted Wash solution is stable for 6 months at 2-8°C.
5. Pipetting operations may affect the precision of the assay, pipette Standard solutions or samples precisely into each well of plate. In addition, using clean test tubes or vessels in assay and use new tip for each Standard or sample to avoid cross contamination.
6. When a sample's value exceeds 200 ng/mL, the sample needs to be diluted with Buffer solution so the concentration lies within the range of the standard curve.
7. During incubations at room temperature, except for the color reaction incubation, the test plate should be shaken gently by plate shaker to promote the immunoreaction.
8. Perform all the determinations in duplicate.
9. Read the optical absorbance of the reaction solution in the wells as soon as possible after stopping the color reaction.
10. To quantitate accurately, always run a standard curve when testing samples.
11. Protect reagents from strong light (e.g. direct sunlight) during storage and assay.
12. Satisfactory performance of the test is guaranteed only when reagents are used from combination packs with identical lot numbers.

VI. Performance Characteristics

Typical standard curve



Analytical recovery

<Mouse Plasma A>

Added Mouse Urocortin 2 (ng/mL)	Observed (ng/mL)	Expected (ng/mL)	Recovery (%)
0.0	1.58	-	-
1.0	2.92	2.58	113.18
5.0	7.36	6.58	111.85
30.0	35.82	31.58	113.43
50.0	59.92	51.58	116.17

<Mouse Plasma B>

Added Mouse Urocortin 2 (ng/mL)	Observed (ng/mL)	Expected (ng/mL)	Recovery (%)
0.0	1.72	-	-
1.0	2.71	2.72	99.63
5.0	6.73	6.72	100.15
30.0	35.99	31.72	113.46
50.0	60.79	51.72	117.54

<Mouse Plasma C>

Added Mouse Urocortin 2 (ng/mL)	Observed (ng/mL)	Expected (ng/mL)	Recovery (%)
0.0	1.67	-	-
1.0	2.64	2.67	98.88
5.0	7.07	6.67	106.00
30.0	30.89	31.67	97.54
50.0	55.80	51.67	107.99

<Mouse Plasma D>

Added Mouse Urocortin 2 (ng/mL)	Observed (ng/mL)	Expected (ng/mL)	Recovery (%)
0.0	1.30	-	-
1.0	2.62	2.30	113.91
5.0	7.11	6.30	112.86
30.0	32.96	31.30	105.30
50.0	49.97	51.30	97.41

<Mouse Serum A>

Added Mouse Urocortin 2 (ng/mL)	Observed (ng/mL)	Expected (ng/mL)	Recovery (%)
0.0	2.69	-	-
1.0	4.02	3.69	108.94
5.0	8.57	7.69	111.44
30.0	38.24	32.69	116.98
50.0	70.07	52.69	132.99

<Mouse Serum B>

Added Mouse Urocortin 2 (ng/mL)	Observed (ng/mL)	Expected (ng/mL)	Recovery (%)
0.0	2.66	-	-
1.0	3.91	3.66	106.83
5.0	8.78	7.66	114.62
30.0	44.14	32.66	135.15
50.0	78.51	52.66	149.09

<Mouse Serum C>

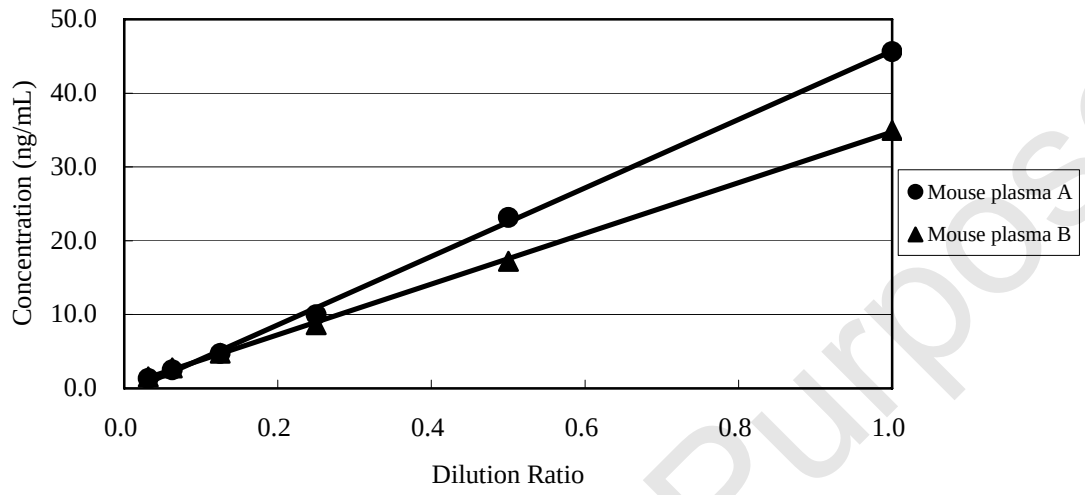
Added Mouse Urocortin 2 (ng/mL)	Observed (ng/mL)	Expected (ng/mL)	Recovery (%)
0.0	2.96	-	-
1.0	4.14	3.96	104.55
5.0	9.12	7.96	114.57
30.0	43.45	32.96	131.83
50.0	78.94	52.96	149.06

<Mouse Serum D>

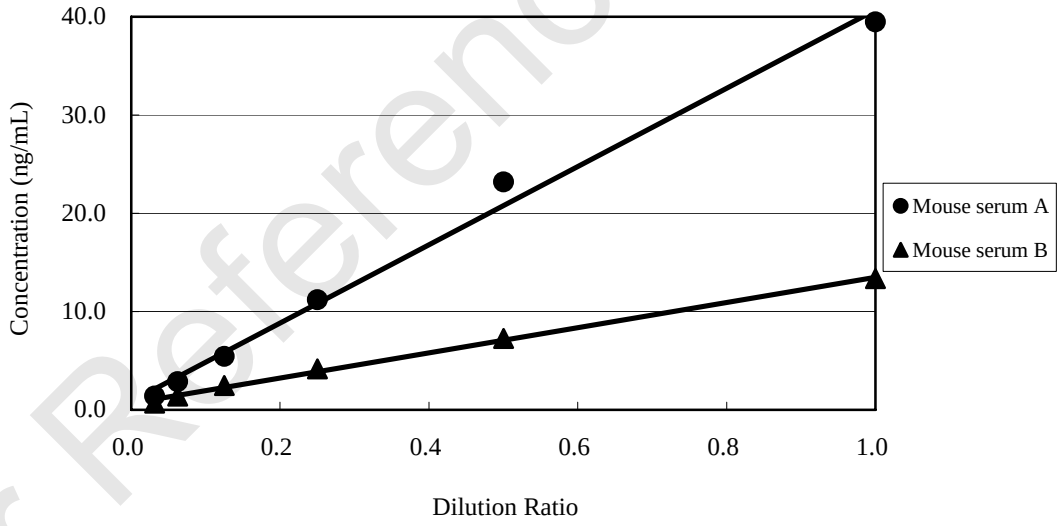
Added Mouse Urocortin 2 (ng/mL)	Observed (ng/mL)	Expected (ng/mL)	Recovery (%)
0.0	2.51	-	-
1.0	3.59	3.51	102.28
5.0	8.48	7.51	112.92
30.0	38.72	32.51	119.10
50.0	71.82	52.51	136.77

< Dilution test >

< Mouse plasma >



< Mouse serum >



<Crossreactivity>

Related peptides	Crossreactivity (%)
Urocortin 2 (mouse)	100
Urocortin 1 (mouse, rat)	0
Urocortin 3 (mouse)	0
ACTH (mouse, rat)	0.61
CRF (mouse, rat, human)	0

<Precision and reproducibility>

Test Sample	Intra-assay CV(%)	Inter-assay CV(%)
Mouse Plasma	2.51-5.25	4.70-8.28
Mouse Serum	6.71-9.01	6.36-11.12

Assay range
0.82 ~ 200 ng/mL

VII. Stability and Storage

< Storage > Store all of the components at 2-8℃.

< Shelf life > This kit is stable under these conditions for 18 months from the date of manufacturing. The expiry date is stated on the package.

< Package > 96 tests per one kit including standards

VIII. References

1. Reyes TM. (2001) Urocortin II: a member of the corticotropin-releasing factor (CRF) neuropeptide family that is selectively bound by type 2 CRF receptors. *Proc Natl Acad Sci USA.* **98**, 2843-2848
2. Chen A. (2003) Glucocorticoids regulate the expression of the mouse urocortin II gene: a putative connection between the corticotropin-releasing factor receptor pathways. *Mol Endocrinol.*,**17,** 1622-1639
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4. Tanaka Y. (2003) Effect of stress and adrenalectomy on urocortin II mRNA expression in the hypothalamic paraventricular nucleus of the rat. *Neuroendocrinology.*, **78,** 1-11
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7. Hinkle RT. (2003) Urocortin II treatment reduces skeletal muscle mass and function loss during atrophy and increases nonatrophying skeletal muscle mass and function. *Endocrinology.*, **144,** 4939-4946