

ENG

Instructions for Use:  
**HUMAN OMENTIN-1 ELISA**

Catalogue number:  
**RD191100200R**

**For research use only!**

 **BioVendor**  
**R&D**<sup>®</sup>



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## HISTORY OF CHANGES

Previous version	Current version
ENG.004.A	ENG.005.A
History of changes added.	
A symbol indicating the manufacturer added.	

## 1. INTENDED USE

The RD191100200R Human Omentin-1 ELISA is a sandwich enzyme immunoassay for the quantitative measurement of human omentin-1.

### Features

- **It is intended for research use only**
- The total assay time is less than 3.5 hours
- The kit measures omentin-1 in serum and plasma (EDTA, citrate, heparin)
- Assay format is 96 wells
- Quality Controls are human serum based
- Standard is recombinant protein based
- Components of the kit are provided ready to use, concentrated or lyophilized

## 2. STORAGE, EXPIRATION

Store the complete kit at 2-8°C. Under these conditions, the kit is stable until the expiration date (see label on the box).

For stability of opened reagents see Chapter 9.

## 3. INTRODUCTION

Omentin (intelectin-1, intestinal lactoferrin receptor, endothelial lectin HL-1, galactofuranose-binding lectin) is newly identified secretory protein that is highly and selectively expressed in visceral adipose tissue relative to subcutaneous adipose tissue (adipokine). The mature omentin is secretory glycoprotein consisting of 295 amino acids and 1-linked oligosaccharides, and its basic structural unit is a 120-kDa homotrimer in which 40-kDa polypeptides are bridged by disulfide bonds. Omentin has been identified in other tissue at lower expression levels such as Paneth cells, endothelial cells, and visceral adipose stromal-vascular cells.

A homolog of omentin has been identified that shares 83% amino acid identity with omentin and was referred to as omentin 2. The two omentin genes, omentin 1 and omentin 2, are localized adjacent to each other in chromosomal region, which has been previously linked to type 2 diabetes in several populations.

To determine the impact of obesity-dependent insulin resistance on the regulation of two omentin isoforms, gene expression and plasma levels were measured in lean, overweight, and obese subjects. Omentin-1 was shown to be the major circulating isoform in human plasma. Lean subjects had significantly higher omentin-1 plasma levels than obese and overweight subjects. In addition, higher plasma omentin-1 levels were detected in women compared with men. Plasma omentin-1 levels were inversely correlated with BMI, waist circumference, leptin levels, and insulin resistance as measured by homeostasis model assessment and positively correlated with

adiponectin and HDL levels. In summary, decreased omentin-1 levels are associated with increasing obesity and insulin resistance.

An independent experiment reported that the addition of recombinant omentin-1 in vitro did not affect basal glucose uptake but did enhance insulin-stimulated glucose uptake in both subcutaneous and omental human adipocytes. Omentin-1 increased Akt phosphorylation in the absence and presence of insulin and may regulate insulin action.

A recent study of women with the polycystic ovary syndrome (PCOS) found significantly reduced omentin-1 mRNA expression and protein levels in adipose tissue in overweight PCOS women. In addition, significantly lower plasma omentin-1 levels were detected in these women.

#### **Areas of investigation:**

Type 2 diabetes

Obesity

Insulin resistance

Metabolic syndrome

## **4. TEST PRINCIPLE**

In the BioVendor Human Omentin-1 ELISA, standards, quality controls and samples are incubated at 37°C in microplate wells pre-coated with polyclonal anti-human omentin-1 antibody. After 120 minutes incubation and washing, biotin labelled polyclonal anti-human omentin-1 antibody is added and incubated at 37°C with captured omentin-1 for 30 minutes. After another washing, streptavidin-HRP conjugate is added. After 30 minutes incubation at 37°C and the last washing step, the remaining conjugate is allowed to react with the substrate solution (TMB). The reaction is stopped by addition of acidic solution and absorbance of the resulting yellow product is measured. The absorbance is proportional to the concentration of omentin-1. A standard curve is constructed by plotting absorbance values against concentrations of standards, and concentrations of unknown samples are determined using this standard curve.

## **5. PRECAUTIONS**

- **For professional use only**
- Wear gloves and laboratory coats when handling immunodiagnostic materials
- Do not drink, eat or smoke in the areas where immunodiagnostic materials are being handled
- This kit contains components of human origin. These materials were found non-reactive for HBsAg, HCV antibody and for HIV 1/2 antigen and antibody. However, these materials should be handled as potentially infectious, as no test can guarantee the complete absence of infectious agents
- This kit contains components of animal origin. These materials should be handled as potentially infectious
- Avoid contact with the acidic Stop Solution and Substrate Solution, which contains hydrogen peroxide and tetramethylbenzidine (TMB). Wear gloves and eye and clothing protection when handling these reagents. Stop and/or Substrate Solutions may cause skin/eyes irritation. In case of contact with the Stop Solution and the Substrate Solution wash skin/eyes thoroughly with water and seek medical attention, when necessary
- The materials must not be pipetted by mouth

## 6. TECHNICAL HINTS

- Reagents with different lot numbers should not be mixed
- Use thoroughly clean glassware
- Use deionized (distilled) water, stored in clean containers
- Avoid any contamination among samples and reagents. For this purpose, disposable tips should be used for each sample and reagent
- Substrate Solution should remain colourless until added to the plate. Keep Substrate Solution protected from light
- Stop Solution should remain colourless until added to the plate. The colour developed in the wells will turn from blue to yellow immediately after the addition of the Stop Solution. Wells that are green in colour indicate that the Stop Solution has not mixed thoroughly with the Substrate Solution
- Dispose of consumable materials and unused contents in accordance with applicable national regulatory requirements

## 7. REAGENT SUPPLIED

Kit Components	State	Quantity
Antibody Coated Microtiter Strips	ready to use	96 wells
Biotin Labelled Antibody Conc. (50x)	concentrated	0.28 ml
Streptavidin-HRP Conjugate	ready to use	13 ml
Master Standard	lyophilized	2 vials
Quality Control HIGH	lyophilized	2 vials
Quality Control LOW	lyophilized	2 vials
Biotin-Ab Diluent	ready to use	13 ml
Dilution Buffer	ready to use	20 ml
Wash Solution Conc. (10x)	concentrated	100 ml
Substrate Solution	ready to use	13 ml
Stop Solution	ready to use	13 ml

## 8. MATERIAL REQUIRED BUT NOT SUPPLIED

- Deionized (distilled) water
- Test tubes for diluting samples
- Glassware (graduated cylinder and bottle) for Wash Solution (Dilution Buffer)
- Precision pipettes to deliver 5-1000 µl with disposable tips
- Multichannel pipette to deliver 100 µl with disposable tips
- Absorbent material (e.g. paper towels) for blotting the microtiter plate after washing
- Vortex mixer
- 37°C Incubator
- Microplate washer (optional). [Manual washing is possible but not preferable.]
- Microplate reader with  $450 \pm 10$  nm filter, preferably with reference wavelength 630 nm (alternatively another one from the interval 550-650 nm)
- Software package facilitating data generation and analysis (optional)

## 9. PREPARATION OF REAGENTS

**All reagents need to be brought to room temperature prior to use. Always prepare only the appropriate quantity of reagents for your test. Do not use components after the expiration date marked on their label.**

### Assay reagents supplied ready to use:

#### Antibody Coated Microtiter Strips

##### Stability and storage:

Return the unused strips to the provided aluminium zip-sealed bag with desiccant and seal carefully. Remaining Microtiter Strips are stable 3 months when stored at 2-8°C and protected from the moisture.

#### Streptavidin-HRP Conjugate

#### Biotin-Ab Diluent

#### Dilution Buffer

#### Substrate Solution

#### Stop Solution

##### Stability and storage:

Opened reagents are stable 3 months when stored at 2-8°C.

## Assay reagents supplied concentrated or lyophilized:

### Human Omentin-1 Master Standard

**Refer to the Certificate of Analysis for current volume of Dilution Buffer needed for reconstitution of Standard!!!**

Reconstitute the lyophilized Master Standard with Dilution Buffer just prior to the assay. Let it dissolve at least 15 minutes with occasional gentle shaking (not to foam). The resulting concentration of the omentin-1 in the stock solution is **64 ng/ml**.

Prepare set of standards using Dilution Buffer as follows:

Volume of Standard	Dilution Buffer	Concentration
Stock	-	64 ng/ml
250 ml of stock	250 $\mu$ l	32 ng/ml
250 ml of 32 ng/ml	250 $\mu$ l	16 ng/ml
250 ml of 16 ng/ml	250 $\mu$ l	8 ng/ml
250 ml of 8 ng/ml	250 $\mu$ l	4 ng/ml
250 ml of 4 ng/ml	250 $\mu$ l	2 ng/ml

**Prepared Standards are ready to use, do not dilute them.**

Stability and storage:

**Do not store the Standard stock solution and set of standards.**

### Quality Controls HIGH, LOW

**Refer to the Certificate of Analysis for current volume of Dilution Buffer needed for reconstitution and for current Quality Control concentration!!!**

Reconstitute each Quality Control (HIGH and LOW) with Dilution Buffer just prior to the assay. Let it dissolve at least 15 minutes with occasional gentle shaking (not to foam).

**Reconstituted Quality Controls are ready to use, do not dilute them.**

Stability and storage:

Do not store the reconstituted Quality Controls.

Note:

Concentration of analyte in Quality Controls need not be anyhow associated with normal and/or pathological concentrations in serum or another body fluid. Quality Controls serve just for control that the kit works in accordance with IFU and CoA and that ELISA test was carried out properly.

### **Biotin Labelled Antibody Conc. (50x)**

Prepare the working Biotin Labelled Antibody solution by adding 1 part Biotin Labelled Antibody Concentrate (50x) with 49 parts Biotin-Ab Diluent. Example: 20 µl of Biotin Labelled Antibody Concentrate (50x) + 980 µl of Biotin-Ab Diluent for 1 strip (8 wells).

#### Stability and storage:

Opened Biotin Labelled Antibody Concentrate (50x) is stable 3 months when stored at 2-8°C.

**Do not store the diluted Biotin Labelled Antibody solution.**

### **Wash Solution Conc. (10x)**

Dilute Wash Solution Concentrate (10x) ten-fold in distilled water to prepare a 1x working solution. Example: 100 ml of Wash Solution Concentrate (10x) + 900 ml of distilled water for use of all 96-wells.

#### Stability and storage:

The diluted Wash Solution is stable 1 month when stored at 2-8°C. Opened Wash Solution Concentrate (10x) is stable 3 months when stored at 2-8°C.

## **10. PREPARATION OF SAMPLES**

The kit measures human omentin-1 in serum and plasma (EDTA, citrate, heparin).

Samples should be assayed immediately after collection or should be stored at -20°C. Mix thoroughly thawed samples just prior to the assay and avoid repeated freeze/thaw cycles, which may cause erroneous results. Avoid using hemolyzed or lipemic samples.

### **Preparation of serum or plasma samples:**

Dilute samples just prior to performing the assay 40x with Dilution Buffer, e.g. 6 µl of sample + 234 µl of Dilution Buffer for singlets or duplicates.

**Mix well** (not to foam). Vortex is recommended.

#### Stability and storage:

Serum and plasma samples should be stored at -20°C, or preferably at -70°C for long-term storage.

**Do not store the diluted samples.**

See Chapter 13 for stability of serum and plasma samples when stored at 2-8°C, effect of freezing/thawing and effect of sample matrix (serum/plasma) on the concentration of human omentin-1.

Note: It is recommended to use a precision pipette and a careful technique to perform the dilution in order to get precise results.



## 11. ASSAY PROCEDURE

1. Pipet **100 µl** of diluted Standards, Quality Controls, Dilution Buffer (=Blank) and samples, preferably in duplicates, into the appropriate wells. See *Figure 1* for example of work sheet.
2. Incubate the plate at **37°C** for **2 hours** without shaking.
3. Wash the wells 3-times with Wash Solution (0.35 ml per well). After final wash, invert and tap the plate strongly against paper towel.
4. Add **100 µl** of Biotin Labelled Antibody solution into each well.
5. Incubate the plate at **37°C** for **30 minutes** without shaking.
6. Wash the wells 3-times with Wash Solution (0.35 ml per well). After final wash, invert and tap the plate strongly against paper towel.
7. Add **100 µl** of Streptavidin-HRP Conjugate into each well.
8. Incubate the plate at **37°C** for **30 minutes** without shaking.
9. Wash the wells 3-times with Wash Solution (0.35 ml per well). After final wash, invert and tap the plate strongly against paper towel.
10. Add **100 µl** of Substrate Solution into each well. Avoid exposing the microtiter plate to direct sunlight. Covering the plate with e.g. aluminium foil is recommended.
11. Incubate the plate for **10 minutes** at room temperature. The incubation time may be extended [up to 20 minutes] if the reaction temperature is below than 20°C. Do not shake the plate during the incubation.
12. Stop the colour development by adding **100 µl** of Stop Solution.
13. Determine the absorbance of each well on a microplate reader set to 450 nm, preferably with the reference wavelength set to 630 nm (acceptable range: 550 - 650 nm). Subtract readings at 630 nm (550 - 650 nm) from the readings at 450 nm. **The absorbance should be read within 5 minutes following step 12.**

Note 1: If some samples and standard/s have absorbances above the upper limit of your microplate reader, perform a second reading at 405 nm. A new standard curve, constructed using the values measured at 405 nm, is used to determine omentin-1 concentration of off-scale standards and samples. The readings at 405 nm should not replace the readings for samples that were “in range” at 450 nm.

Note 2: Manual washing: Aspirate wells and pipet 0.35 ml Wash Solution into each well. Aspirate wells and repeat twice. After final wash, invert and tap the plate strongly against paper towel. Make certain that Wash Solution has been removed entirely.

	<b>strip 1+2</b>	<b>strip 3+4</b>	<b>strip 5+6</b>	<b>strip 7+8</b>	<b>strip 9+10</b>	<b>strip 11+12</b>
<b>A</b>	<b>Standard 64</b>	<b>Blank</b>	Sample 8	Sample 16	Sample 24	Sample 32
<b>B</b>	<b>Standard 32</b>	Sample 1	Sample 9	Sample 17	Sample 25	Sample 33
<b>C</b>	<b>Standard 16</b>	Sample 2	Sample 10	Sample 18	Sample 26	Sample 34
<b>D</b>	<b>Standard 8</b>	Sample 3	Sample 11	Sample 19	Sample 27	Sample 35
<b>E</b>	<b>Standard 4</b>	Sample 4	Sample 12	Sample 20	Sample 28	Sample 36
<b>F</b>	<b>Standard 2</b>	Sample 5	Sample 13	Sample 21	Sample 29	Sample 37
<b>G</b>	<b>QC HIGH</b>	Sample 6	Sample 14	Sample 22	Sample 30	Sample 38
<b>H</b>	<b>QC LOW</b>	Sample 7	Sample 15	Sample 23	Sample 31	Sample 39

Figure 1: Example of a work sheet.

## 12. CALCULATIONS

Most microplate readers perform automatic calculations of analyte concentration. The Standard curve is constructed by plotting the mean absorbance (Y) of Standards against the known concentration (X) of Standards in logarithmic scale, using the four-parameter algorithm. Results are reported as concentration of omentin-1 ng/ml in samples.

Alternatively, the *logit log* function can be used to linearize the standard curve, i.e. *logit* of the mean absorbance (Y) is plotted against log of the known concentration (X) of Standards.

**The measured concentration of samples calculated from the standard curve must be multiplied by their respective dilution factor, because samples have been diluted prior to the assay, e.g. 10 ng/ml (from standard curve) x 40 (dilution factor) = 400 ng/ml.**

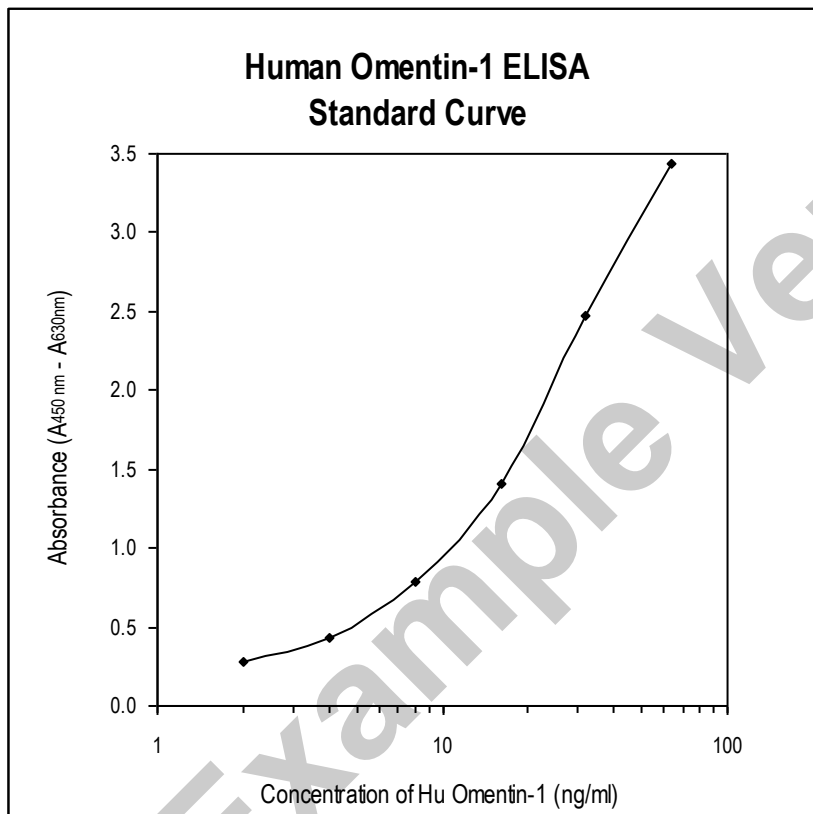


Figure 2: Typical Standard Curve for Human Omentin-1 ELISA.

### 13. PERFORMANCE CHARACTERISTICS

Typical analytical data of BioVendor Human Omentin-1 ELISA are presented in this chapter.

#### Sensitivity

Limit of Detection (LOD) (defined as concentration of analyte giving absorbance higher than mean absorbance of blank\* plus three standard deviations of the absorbance of blank:  $A_{\text{blank}} + 3xSD_{\text{blank}}$ ) is calculated from the real human omentin-1 values in wells and is 0.5 ng/ml.

\*Dilution Buffer is pipetted into blank wells.

#### Limit of assay

Results exceeding omentin-1 level of 64 ng/ml should be repeated with more diluted samples. Dilution factor needs to be taken into consideration in calculating the omentin-1 concentration.

#### Specificity

The antibodies used in this ELISA are specific for human omentin-1. Sera of several mammalian species were measured in the assay. See results below. For details please contact us at [info@biovendor.com](mailto:info@biovendor.com).

Mammalian serum sample	Observed crossreactivity
Bovine	no
Cat	no
Dog	no
Goat	no
Hamster	no
Horse	no
Monkey	yes
Mouse	no
Pig	no
Rabbit	no
Rat	no
Sheep	no

Presented results are multiplied by respective dilution factor.

### Precision

Intra-assay (Within-Run) (n=8)

Sample	Mean (ng/ml)	SD (ng/ml)	CV (%)
1	322	13.6	4.1
2	478	15.2	3.2

Inter-assay (Run-to-Run) (n=8)

Sample	Mean (ng/ml)	SD (ng/ml)	CV (%)
1	409	19.8	4.8
2	480	21.0	4.4

### Spiking Recovery

Serum samples were spiked with different amounts of omentin-1 and assayed.

Sample	Observed (ng/ml)	Expected (ng/ml)	Recovery O/E (%)
1	301	-	-
	888	941	94.4
	583	621	93.9
	425	461	92.2
2	158	-	-
	772	798	96.7
	455	478	95.2
	306	318	96.2

### Linearity

Serum samples were serially diluted with Dilution Buffer and assayed.

Sample	Dilution	Observed (ng/ml)	Expected (ng/ml)	Recovery O/E (%)
1	-	644	-	-
	2x	321	322	99.7
	4x	167	161	103.7
	8x	83	81	102.5
2	-	394	-	-
	2x	208	197	105.6
	4x	109	98	111.2
	8x	50	49	102.0

## Effect of sample matrix

EDTA, citrate and heparin plasmas were compared to respective serum samples from the same 10 individuals.

Results are shown below:

Volunteer No.	Serum (ng/ml)	Plasma (ng/ml)		
		EDTA	Citrate	Heparin
1	462	416	404	473
2	641	549	507	666
3	381	348	316	422
4	480	475	422	489
5	440	371	339	429
6	357	227	300	356
7	484	286	373	499
8	475	482	449	529
9	624	661	593	640
10	514	450	437	507
<b>Mean (ng/ml)</b>	<b>486</b>	<b>426</b>	<b>414</b>	<b>501</b>
<b>Mean Plasma/Serum (%)</b>	-	<b>87.6</b>	<b>85.2</b>	<b>103.1</b>
<b>Coefficient of determination R<sup>2</sup></b>	-	<b>0.72</b>	<b>0.86</b>	<b>0.95</b>

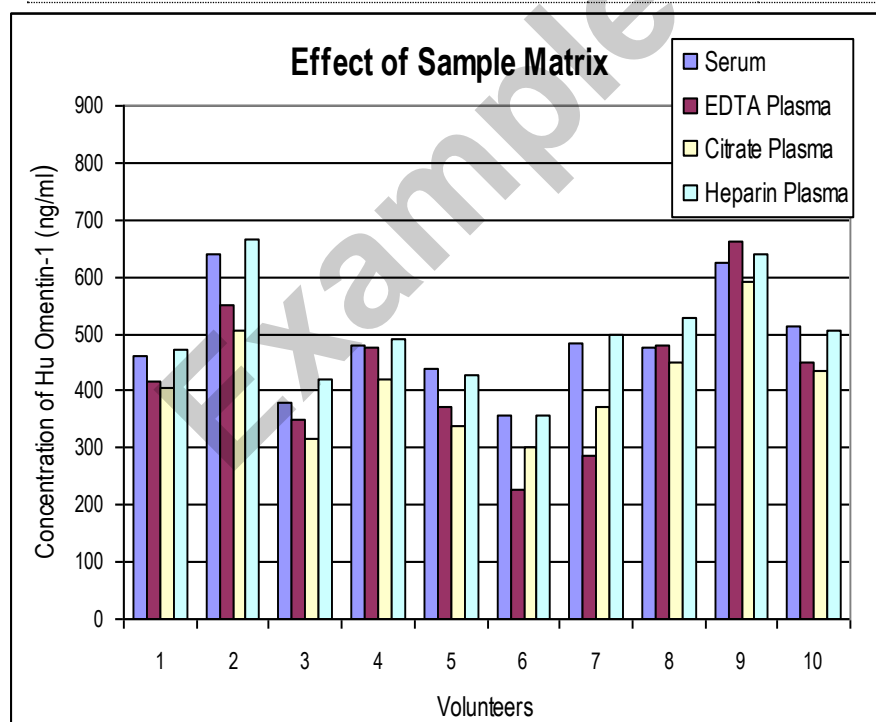


Figure 3: Omentin-1 levels measured using Human Omentin-1 ELISA from 10 individuals using serum, EDTA, citrate and heparin plasma, respectively.

### Stability of samples stored at 2-8°C

Samples should be stored at -20°C. However, no decline in concentration of omentin-1 was observed in serum and plasma samples after 7 days when stored at 2-8°C. To avoid microbial contamination, samples were treated with  $\epsilon$ -aminocaproic acid and sodium azide, resulting in the final concentration of 0.03% and 0.1%, respectively.

Sample	Incubation Temp, Period	Serum (ng/ml)	Plasma (ng/ml)		
			EDTA	Citrate	Heparin
1	-20°C	532	428	524	612
	2-8°C, 1 day	544	420	480	584
	2-8°C, 7 days	536	364	544	584
2	-20°C	599	438	592	644
	2-8°C, 1 day	604	448	544	649
	2-8°C, 7 days	600	368	597	668
3	-20°C	880	608	776	916
	2-8°C, 1 day	921	604	776	912
	2-8°C, 7 days	864	536	780	908

### Effect of Freezing/Thawing

No decline was observed in concentration of human omentin-1 in serum and plasma samples after repeated (5x) freeze/thaw cycles. However it is recommended to avoid unnecessary repeated freezing/thawing of the samples.

Sample	Number of f/t cycles	Serum (ng/ml)	Plasma (ng/ml)		
			EDTA	Citrate	Heparin
1	1x	440	436	440	526
	3x	439	401	439	451
	5x	452	412	452	446
2	1x	510	525	510	580
	3x	519	515	519	593
	5x	522	568	522	581
3	1x	447	360	447	497
	3x	434	245	434	444
	5x	419	302	419	448

## 14. DEFINITION OF THE STANDARD

The recombinant human omentin-1 is used as the Standard. The recombinant human omentin-1 (AA 19 – 298), produced in *E.coli*, is 32.7 kDa protein containing 280 amino acid residues of the human omentin-1 and 14 extra AA.

## 15. PRELIMINARY POPULATION AND CLINICAL DATA

The following results were obtained when serum samples from 100 unselected donors (50 men + 50 women) 15-82 years old were assayed with the Biovendor Human Omentin-1 ELISA in our laboratory.

### Age dependent distribution of omentin-1

Sex	Age (years)	n	Mean	SD	Min.	Max.
			Omentin-1 ng/ml			
Men	18-29	16	433	165	200	960
	30-39	13	480	125	252	712
	40-49	11	481	157	272	784
	50-64	10	562	189	318	1 000
Women	15-29	12	421	131	242	764
	30-37	10	385	81	236	560
	40-48	13	396	103	220	600
	50-82	15	534	280	221	1 399

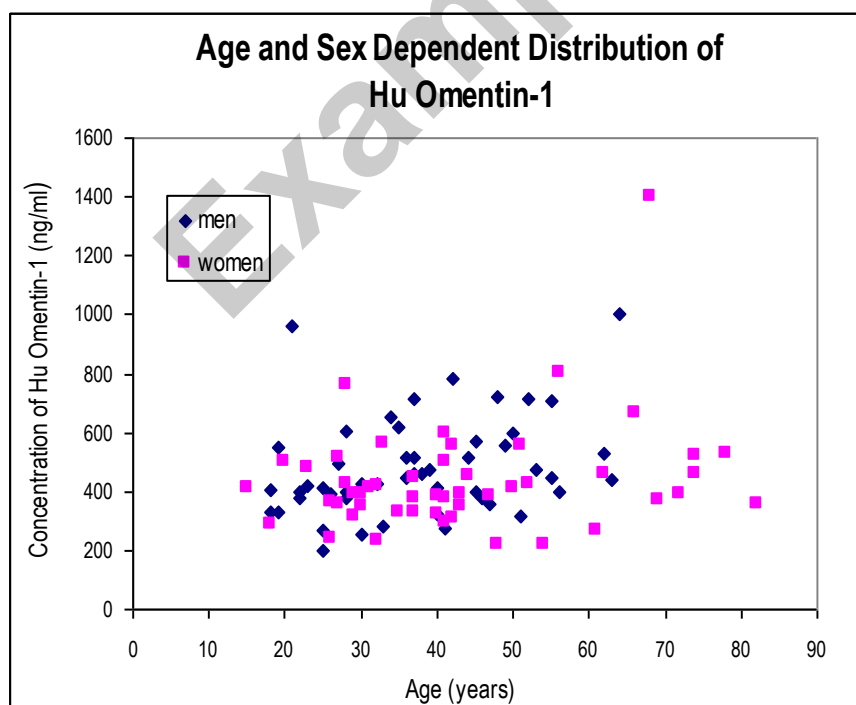


Figure 4: Omentin-1 concentration plotted against donor age.



## Reference range

The data quoted in these instructions should be used for guidance only. It is recommended that each laboratory include its own panel of control sample in the assay. Each laboratory should establish its own normal and pathological references ranges for omentin-1 levels with the assay.

## 16. METHOD COMPARISON

BioVendor Human Omentin-1 ELISA was not compared to any other commercial immunoassay.

## 17. TROUBLESHOOTING AND FAQs

### Weak signal in all wells

Possible explanations:

- Omission of a reagent or a step
- Improper preparation or storage of a reagent
- Assay performed before reagents were allowed to come to room temperature
- Improper wavelength when reading absorbance

### High signal and background in all wells

Possible explanations:

- Improper or inadequate washing
- Overdeveloping; incubation time with Substrate Solution should be decreased before addition of Stop Solution
- Incubation temperature over 40°C

### High coefficient of variation (CV)

Possible explanation:

- Improper or inadequate washing
- Improper mixing Standards, Quality Controls or samples





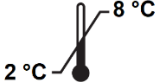




## 18. REFERENCES

### References to human omentin-1:

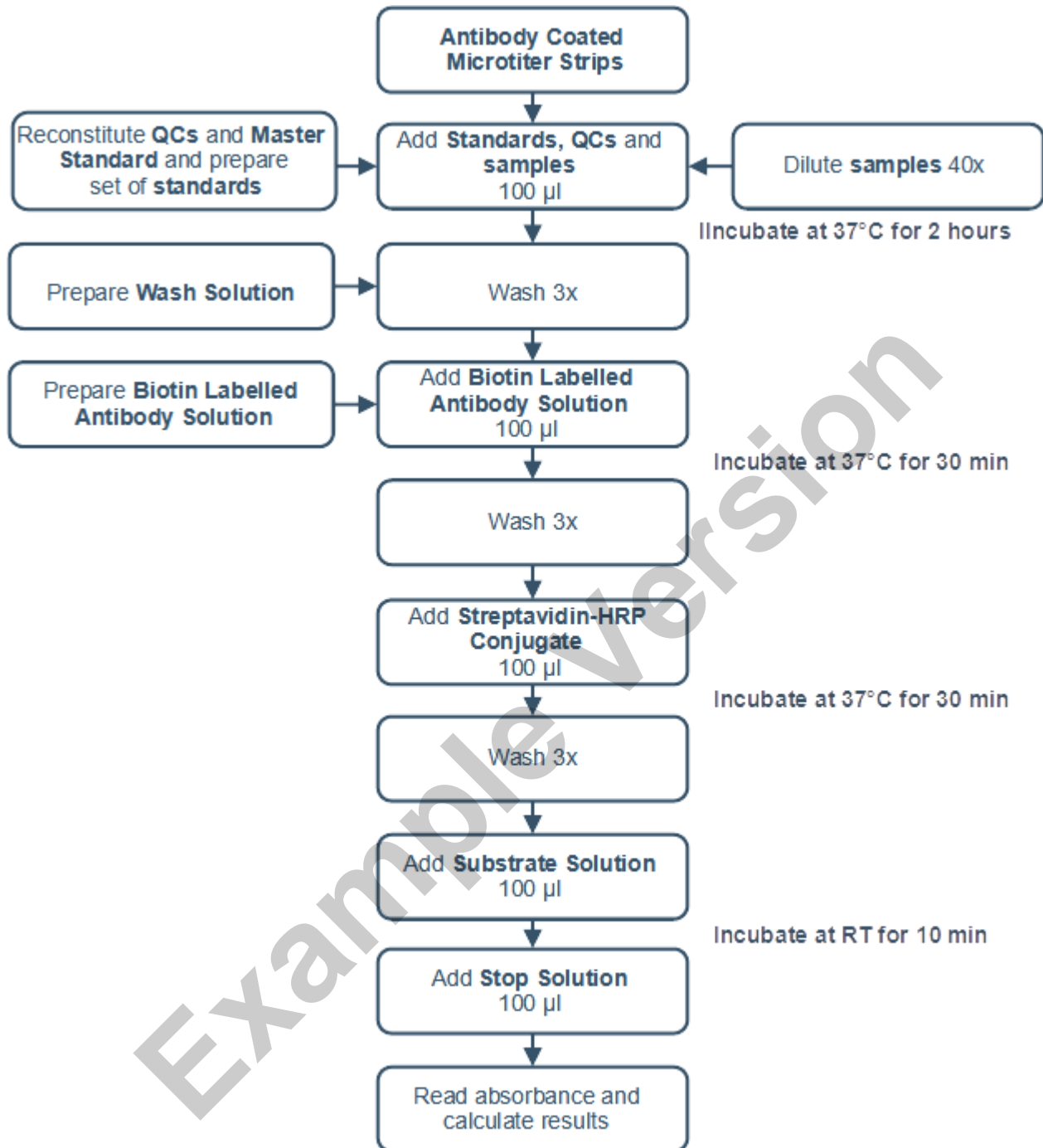
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For more references on this product see our web pages at [www.biovendor.com](http://www.biovendor.com).

## 19. EXPLANATION OF SYMBOLS

	Catalogue number
	Batch code
	Caution
	Use by date
	Temperature limit
	Manufacturer
 <p data-bbox="260 1184 467 1216">www.biovendor.com</p>	Read electronic instructions for use - eIFU
	The content is sufficient for 96 tests
	Biological risks

## 20. ASSAY PROCEDURE - SUMMARY



1								
2								
3								
4								
5								
6								
7								
8								
9								
10								
11								
12								
	A	B	C	D	E	F	G	H

Example Version



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