BioVendor Group

ENG

Instructions for use:

HUMAN ADIPOCYTE FABP ELISA

Catalogue number:

RD191036200R

European Union:

IVD CE

Rest of the world:

For research use only!

BioVendor R&D

BioVendor – Laboratorní medicína a.s.
Karásek 1767/1, 621 00 Brno, Czech Republic
+420 549 124 185
info@biovendor.com
sales@biovendor.com
www.biovendor.com

CONTENT

1. INTENDED USE 3
2. STORAGE, EXPIRATION 3
3. INTRODUCTION 4
4. TEST PRINCIPLE 4
5. PRECAUTIONS 5
6. TECHNICAL HINTS 5
7. REAGENT SUPPLIED 6
8. MATERIAL REQUIRED BUT NOT SUPPLIED 6
9. PREPARATION OF REAGENTS 7
10. PREPARATION OF SAMPLES 9
11. ASSAY PROCEDURE 10
12. CALCULATIONS 12
13. PERFORMANCE CHARACTERISTICS 13
14. DEFINITION OF THE STANDARD 18
15. PRELIMINARY POPULATION AND CLINICAL DATA 18
16. METHOD COMPARISON 19
17. TROUBLESHOOTING AND FAQS 19
18. REFERENCES 20
19. EXPLANATION OF SYMBOLS 23
20. ASSAY PROCEDURE - SUMMARY 24

HISTORY OF CHANGES

Previous version	Current Version
ENG.006.A	ENG.007.A
”History of changes” added.	
Chapter 9: A sentence “Centrifuge liquid containing microtube vials before opening“ added.	

1. INTENDED USE

The RD191036200R Human Adipocyte FABP ELISA is a sandwich enzyme immunoassay for the quantitative measurement of human AFABP.

Features

- **European Union: for in vitro diagnostic use**
- **Rest of the world: for research use only!**
- The total assay time is less than 3.5 hours
- The kit measures total AFABP 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
- Patent Application Number: DE 10 2005 034 788.6

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

Protein definition:

Protein name:	**Adipocyte FABP (AFABP)**
Synonyms:	Fatty acid-binding protein, adipocyte (A-FABP) Adipocyte lipid-binding protein (ALBP)
Gene name:	FABP4
Swissprot:	P15090
NCBI / Protein:	P15090

Adipocyte fatty acid binding protein AFABP is a 15 kDa member of the intracellular fatty acid binding protein (FABP) family, which is known for the ability to bind fatty acids and related compounds (bile acids or retinoids) in an internal cavity. AFABP is expressed in a differentiation-dependent fashion in adipocytes and is a critical gene in the regulation of the biological function of these cells. In mice, targeted mutations in FABP4 (mouse gene is also called aP2 and its relevant protein P2 adipocyte protein or 3T3-L1 lipid binding protein) provide significant protection from hyperinsulinemia and insulin resistance in the context of both dietary and genetic obesity. Adipocytes obtained from AFABP-deficient mice also have reduced efficiency of lipolysis in vitro and in vivo, and these mice exhibited moderately improved systemic dyslipidemia. Recent studies also demonstrated AFABP expression in human macrophages upon differentiation and activation. In these cells, AFABP modulates inflammatory responses and cholesterol ester accumulation, and total or macrophage-specific AFABP deficiency confers dramatic protection against atherosclerosis in the apoE-/- mice. These results indicate a central role for AFABP in the development of major components of the metabolic syndrome through its distinct actions in adipocytes and macrophages.
Besides being active within the cell, AFABP is also released into bloodstream and acts as a humoral factor to regulate glucose, lipid metabolism, energy homeostasis and inflammation. Circulating AFABP is elevated in obese individuals and correlates positively with the features of the metabolic syndrome. Elevated plasma levels of AFABP can serve as a marker for several obesity-related metabolic abnormalities, endothelial dysfunction, hypertension, atherosclerosis, and coronary heart disease. Its serum level is directly proportionate with adiposity measures (BMI, fat percentage, and waist circumference). AFABP may be promising link between metabolic syndrome and atherosclerosis and a new biomarker for predicting the development of type II diabetes mellitus.

Areas of investigation:
Energy metabolism and body weight regulation

4. TEST PRINCIPLE

In the BioVendor Human AFABP ELISA, standards, quality controls and samples are incubated in microplate wells pre-coated with polyclonal anti-human AFABP antibody. After 60 minutes incubation and washing, biotin labelled polyclonal anti-human AFABP antibody is added and incubated for 60 minutes with captured AFABP. After another washing, streptavidin-HRP conjugate is added. After 30 minutes incubation 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 AFABP. 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. (100x)	concentrated	0.13 ml
Streptavidin-HRP Conjugate	ready to use	13 ml
Master Standard	lyophilized	1 vial
Quality Control HIGH	lyophilized	1 vial
Quality Control LOW	lyophilized	1 vial
Biotin-Ab Diluent	ready to use	13 ml
Dilution Buffer	ready to use	2 x 13 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 10-1000 µl with disposable tips
- Multichannel pipette to deliver 100 µl with disposable tips
- Absorbent material (e.g. paper towels) for blotting the microtitrate plate after washing
- Vortex mixer
- Orbital microplate shaker capable of approximately 300 rpm
- Microplate washer (optional). [Manual washing is possible but not preferable.]
- Microplate reader with 450 ± 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.

Centrifuge liquid containing microtube vials before opening.

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 desicant and seal carefully. Remaining Microtiter Strips are stable 3 months 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 AFABP 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 human AFABP in the stock solution is **25 ng/ml**.
Prepare set of standards using Dilution Buffer as follows:

Volume of Standard	Dilution Buffer	Concentration
Stock	-	25 ng/ml
200 µl of stock	300 µl	10 ng/ml
250 µl of 10 ng/ml	250 µl	5 ng/ml
250 µl of 5 ng/ml	250 µl	2.5 ng/ml
200 µl of 2.5 ng/ml	300 µl	1 ng/ml
250 µl of 1 ng/ml	250 µl	0.5 ng/ml

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

Stability and storage:
Standard stock solution (25 ng/ml) should be aliquoted and frozen at –20°C for 3 months. Avoid repeated freeze/thaw cycles.
Do not store the diluted Standard solutions.

Quality Controls HIGH, LOW

Refer to the Certificate of Analysis for current volume of distilled water needed for reconstitution and for current Quality Control concentration!!!

Reconstitute each Quality Control (HIGH and LOW) with distilled water just prior to the assay. Let it dissolve at least 15 minutes with occasional gentle shaking (not to foam).
Dilute reconstituted Quality Controls 10x with Dilution Buffer, e.g. 20 µl of Quality Control + 180 µl of Dilution Buffer when assaying samples in singlets, or preferably 30 µl of Quality Control + 270 µl of Dilution Buffer for duplicates.

Stability and storage:
The reconstituted Quality Controls must be used immediately or stored frozen at -20°C for 3 months. Avoid repeated freeze/thaw cycles.
Do not store the diluted 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. (100x)

Prepare the working Biotin Labelled Antibody solution by adding 1 part Biotin Labelled Antibody Concentrate (100x) with 99 parts Biotin-Ab Diluent. Example: 10 µl of Biotin Labelled Antibody Concentrate (100x) + 990 µl of Biotin-Ab Diluent for 1 strip (8 wells).

Stability and storage:
Opened Biotin Labelled Antibody Concentrate (100x) 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 AFABP in serum and plasma (EDTA, citrate, heparin) samples.

Samples should be assayed immediately after collection or should be stored frozen. 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.

Dilute serum or plasma samples 10x with Dilution Buffer just prior to the assay, e.g. 20 µl of sample + 180 µl of Dilution Buffer for singlets, or preferably 30 µl of sample + 270 µl of Dilution Buffer for duplicates. **Mix well** (not to foam). Vortex is recommended.

Stability and storage:
Samples should be stored at -20°, or preferably at -70°C for long-term storage. Avoid repeated freeze/ thaw cycles.
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 AFABP.

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 room temperature (ca. 25°C) for **1 hour**, shaking at ca. 300 rpm on an orbital microplate shaker.
3. Wash the wells 5-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 into each well.
5. Incubate the plate at room temperature (ca. 25°C) for **1 hour**, shaking at ca. 300 rpm on an orbital microplate shaker.
6. Wash the wells 5-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 room temperature (ca. 25°C) for **30 minutes**, shaking at ca. 300 rpm on an orbital microplate shaker.
9. Wash the wells 5-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 using 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 the microplate reader is not capable of reading absorbance greater than the absorbance of the highest standard, perform a second reading at 405 nm. A new standard curve, constructed using the values measured at 405 nm, is used to determine AFABP concentration of off-scale samples. The readings at 405 nm should not replace the on-scale readings at 450 nm.

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

	strip 1+2	strip 3+4	strip 5+6	strip 7+8	strip 9+10	strip 11+12
A	**Standard 25**	**QC HIGH**	Sample 8	Sample 16	Sample 24	Sample 32
B	**Standard 10**	Sample 1	Sample 9	Sample 17	Sample 25	Sample 33
C	**Standard 5**	Sample 2	Sample 10	Sample 18	Sample 26	Sample 34
D	**Standard 2.5**	Sample 3	Sample 11	Sample 19	Sample 27	Sample 35
E	**Standard 1**	Sample 4	Sample 12	Sample 20	Sample 28	Sample 36
F	**Standard 0.5**	Sample 5	Sample 13	Sample 21	Sample 29	Sample 37
G	**Blank**	Sample 6	Sample 14	Sample 22	Sample 30	Sample 38
H	**QC LOW**	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 log of the known concentration (X) of Standards, using the four-parameter algorithm. Results are reported as concentration of AFABP 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 and Quality Controls calculated from the standard curve must be multiplied by their respective dilution factor, because samples and Quality Controls have been diluted prior to the assay. e.g. 1.57 ng/ml (from standard curve) x 10 (dilution factor) = 15.7 ng/ml.

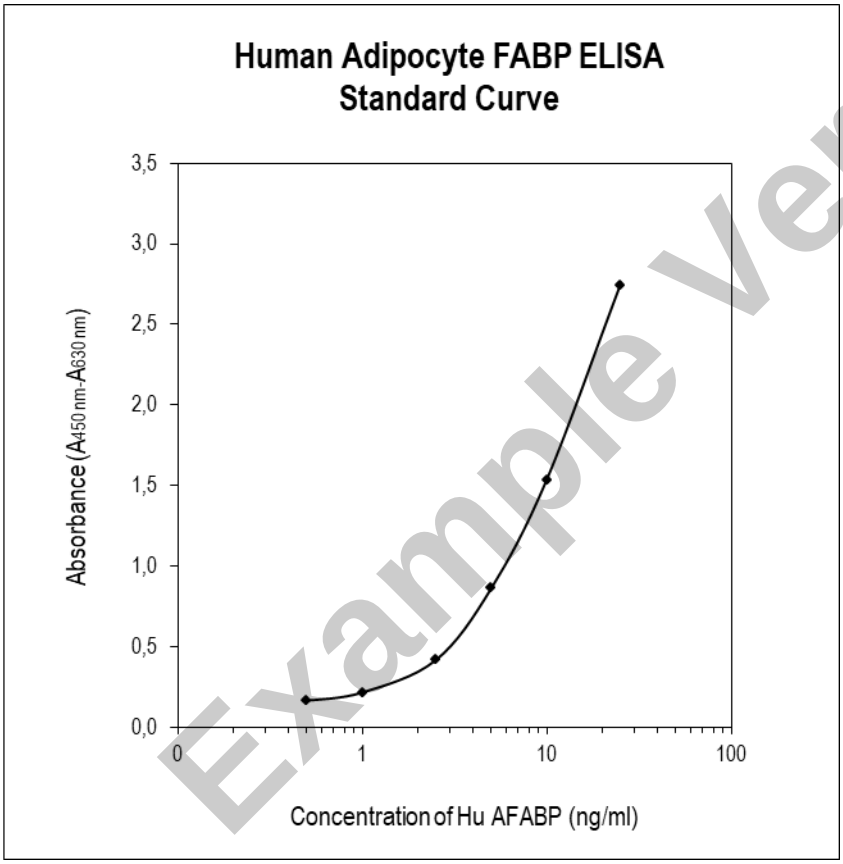


Figure 2: Typical Standard Curve for Human Adipocyte FABP ELISA.

13. PERFORMANCE CHARACTERISTICS

Typical analytical data of BioVendor Human Adipocyte FABP 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: $A_{blank} + 3xSD_{blank}$) is calculated from the real AFABP values in wells and is 0.08 ng/ml.
*Dilution Buffer is pipetted into blank wells.

Limit of assay

Samples with absorbances exceeding the absorbance of the highest standard should be measured again with higher dilution. The final concentration of samples calculated from the standard curve must be multiplied by the respective dilution factor.

Specificity

The antibodies used in this ELISA are specific for human AFABP.

Sera of several mammalian species were measured in the assay. See results below.
For details please contact us at info@biovendor.com.

Mammalian serum sample	Observed crossreactivity
Bovine	no
Cat	no
Dog	yes
Goat	no
Hamster	no
Horse	no
Monkey	yes
Mouse	yes
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	9.08	0.21	2.3
2	22.75	0.62	2.7

Inter-assay (Run-to-Run) (n=6)

Sample	Mean (ng/ml)	SD (ng/ml)	CV (%)
1	31.88	1.74	5.5
2	53.13	1.24	2.3

Spiking Recovery

Serum samples were spiked with different amounts of human AFABP and assayed.

Sample	Observed (ng/ml)	Expected (ng/ml)	Recovery O/E (%)
1	18.63	-	-
	31.87	28.63	111.3
	45.31	43.63	103.9
	69.43	68.63	101.2
2	23.44	-	-
	35.95	33.44	107.5
	52.55	48.44	108.5
	69.84	73.44	95.1

Linearity

Serum samples were serially diluted with Dilution Buffer and assayed.

Sample	Dilution	Observed (ng/ml)	Expected (ng/ml)	Recovery O/E (%)
1	-	59.50	-	-
	2x	29.90	29.75	100.5
	4x	14.41	14.87	96.8
	8x	7.57	7.44	101.7
2	-	52.62	-	-
	2x	26.37	26.31	100.2
	4x	13.01	13.15	98.9
	8x	6.77	6.58	102.9

Effect of sample matrix

Citrate, heparin and EDTA 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	6.87	6.05	4.86	6.41
2	13.51	12.18	10.93	12.16
3	14.94	13.28	11.71	9.74
4	12.67	12.04	11.30	12.55
5	20.33	14.53	13.82	17.72
6	10.46	9.43	8.94	9.68
7	16.09	14.21	12.30	12.36
8	13.94	12.30	11.90	13.94
9	14.31	12.90	10.30	13.80
10	7.55	6.92	6.64	7.42
Mean (ng/ml)	**13.07**	**11.38**	**10.33**	**11.58**
Mean Plasma/Serum (%)	**-**	**87.1**	**79.1**	**88.6**
Coefficient of determination R^2	**-**	**0.91**	**0.84**	**0.91**

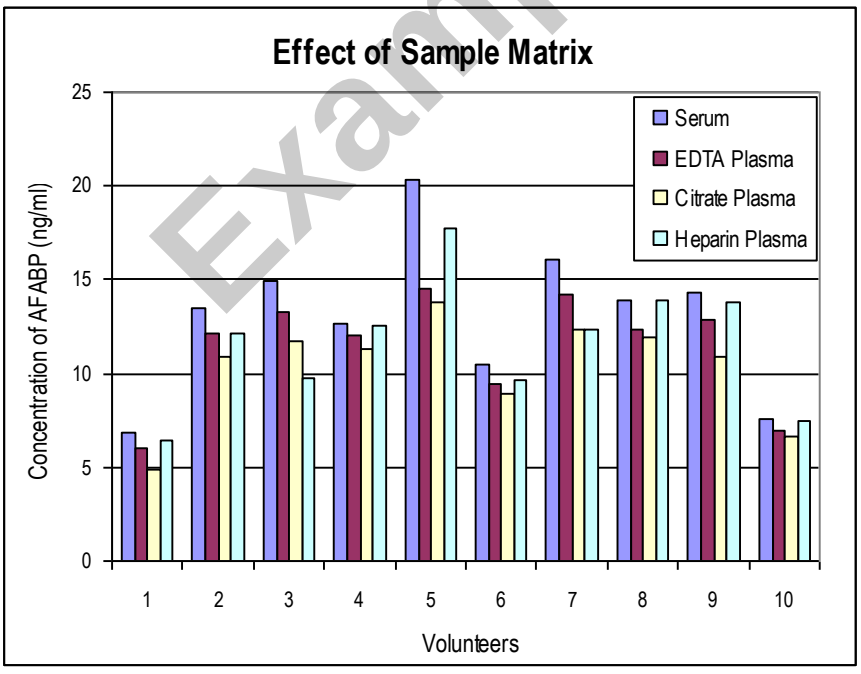


Figure 3: AFABP levels measured using Human Adipocyte FABP ELISA from 10 individuals using serum, EDTA, citrate and heparin plasma, respectively.

Stability of samples stored at 2-8°C

Samples should be stored at –20°C. However, no decline in concentration of AFABP was observed in serum and plasma samples after 7 days when stored at 2-8°C. To avoid microbial contamination, samples were treated with ε-aminocaproic acid and thimerosal, resulting in the final concentration of 0.03% and 0.05%, respectively.

Sample	Incubation Temp, Period	Serum (ng/ml)	Plasma (ng/ml)		
			EDTA	Citrate	Heparin
1	-20°C	14.01	13.22	12.10	14.35
	2-8°C, 1 day	13.93	12.75	10.88	13.48
	2-8°C, 7 days	14.05	12.98	11.12	13.44
2	-20°C	5.40	3.96	3.84	5.67
	2-8°C, 1 day	5.78	4.54	3.72	5.35
	2-8°C, 7 days	5.18	4.47	3.24	4.31
3	-20°C	14.07	11.49	11.66	14.03
	2-8°C, 1 day	14.21	11.68	11.49	12.63
	2-8°C, 7 days	13.56	11.59	11.43	12.73

Effect of Freezing/Thawing

No decline was observed in concentration of human AFABP 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	13.72	12.45	11.83	13.23
	3x	12.96	12.71	10.22	13.27
	5x	11.71	12.06	11.57	12.37
2	1x	18.87	16.00	15.35	17.77
	3x	18.91	18.55	14.96	17.50
	5x	19.57	16.59	14.67	15.79
3	1x	13.59	9.43	9.68	10.95
	3x	11.71	10.37	8.22	11.09
	5x	11.67	10.62	10.78	10.86

14. DEFINITION OF THE STANDARD

The recombinant protein is used as the standard in this assay. The recombinant AFABP is a 14.7 kDa protein containing 132 amino acid residues. Master Standard used in this kit contains 25 ng of AFABP measured by BCA method.

15. PRELIMINARY POPULATION AND CLINICAL DATA

The following results were obtained when serum samples from 154 unselected donors (88 men + 66 women) 21-65 years old were assayed with the BioVendor Human Adipocyte FABP ELISA in our laboratory.

Age dependent distribution of AFABP

Sex	Age (years)	n	AFABP (ng/ml)				
			Mean	Median	SD	Min	Max
Men	21-29	16	12.19	11.19	5.49	4.18	22.47
	30-39	25	17.58	16.23	9.79	4.89	46.06
	40-49	31	16.60	14.69	8.65	2.30	42.96
	50-65	16	19.09	18.15	9.12	6.75	44.05
Women	21-29	12	14.32	12.33	5.42	8.25	24.23
	30-39	26	21.44	18.89	10.28	6.88	48.65
	40-49	20	22.21	20.66	7.95	7.13	38.18
	50-61	8	34.71	35.18	13.32	17.89	53.64

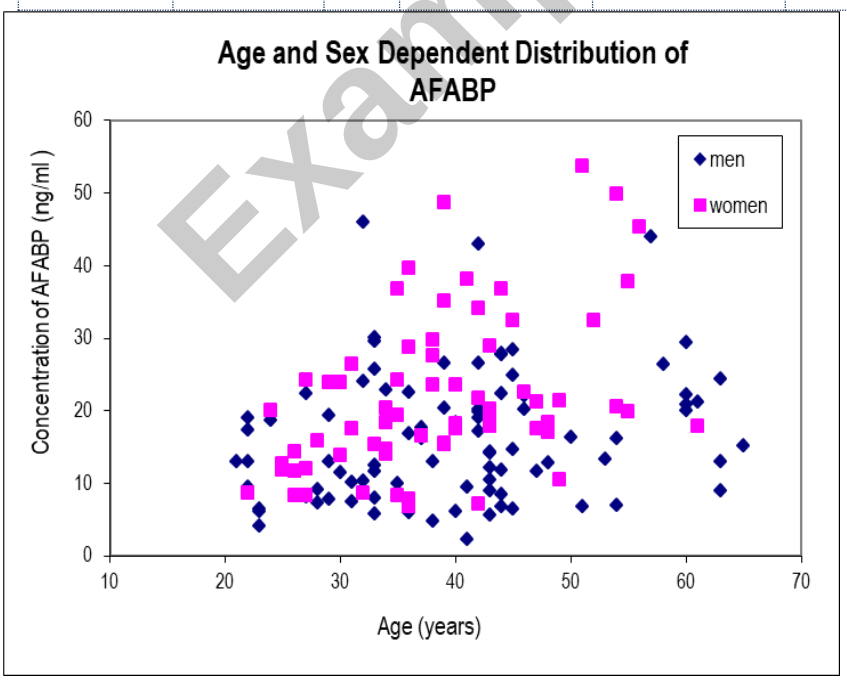


Figure 4: Human AFABP concentration plotted against donor age and sex.

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 samples in the assay. Each laboratory should establish its own normal and pathological references ranges for AFABP levels with the assay.

16. METHOD COMPARISON

The BioVendor Human AFABP ELISA was not compared to the other commercial immunoassays.

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 30°C

High coefficient of variation (CV)

Possible explanation:
- Improper or inadequate washing
- Improper mixing Standards, Quality Controls or samples

18. REFERENCES

References to AFABP:

- Baran A, Świderska M, Bacharewicz-Szczerbicka J, Myśliwiec H, Flisiak I: Serum Fatty Acid-Binding Protein 4 is Increased in Patients with Psoriasis. Lipids 52(1):51-60. (2017)
- El husseny MW, Mamdouh M, Shaban S, Ibrahim Abushouk A, Zaki MM, Ahmed OM, Abdel-Daim MM: Adipokines: Potential Therapeutic Targets for Vascular Dysfunction in Type II Diabetes Mellitus and Obesity. J Diabetes Res. (2017)
- Shu L, Hoo RL, Wu X, Pan Y, Lee IP, Cheong LY, Bornstein SR, Rong X, Guo J, Xu A:
- A-FABP mediates adaptive thermogenesis by promoting intracellular activation of thyroid hormones in brown adipocytes. Nat Commun, 27;8:14147 (2017)
- Sovova E, Sova M, Zapletalova J, Stejskal D, Sovova M, Kaletova M, Svobodova G, Kuca I, Janak M, Kaminek M: Possitive correlation between adipocyte fatty acid-binding protein and epicardial fat in patients with a family history of cardiovascular disease. Biomed Pap Med Fac Univ Palacky Olomouc Czech Repub;161(2):174-178 (2017)
- Li JC, Wu DA, Hou JS, Subeq YM, Chen HD, Hsu BG: High Serum Adipocyte Fatty Acid Binding Protein Is Associated with Metabolic Syndrome in Patients with Type 2 Diabetes. J Diabetes Res. (2016)
- Li M, Jiang L, Zhang H, Wang D, Zhang M, Zhang L: Clinical significance of elevated serum A-FABP and free fatty acid in neonates with hypoxic ischemic brain damage. Exp Ther Med.;12(2):746-752 (2016)
- Niu G, Li J, Wang H, Ren Y, Bai J: Associations of A-FABP with Anthropometric and Metabolic Indices and Inflammatory Cytokines in Obese Patients with Newly Diagnosed Type 2 Diabetes. Biomed Res Int. (2016)
- Kotulak T, Drapalova J, Lips M, Lacinova Z, Kramar P, Riha H, Netuka I, Maly J, Blaha J, Lindner J, Svacina S, Mraz M, Haluzik M: Cardiac surgery increases serum concentrations of adipocyte fatty acid-binding protein and its mRNA expression in circulating monocytes but not in adipose tissue. Physiol Res. 2014;63(1):83-94
- Makowski L, Brittingham KC, Reynolds JM, Suttles J and Hotamisligil GS: The Fatty Acid-binding Protein, aP2, Coordinates Macrophage Cholesterol Trafficking and Inflammatory Activity. J Biol Chem; 280(13): 12888-12895 (2005)
- Maeda K, Cao H, Kono K, Gorgun CZ, Furuhashi M, Uysal KT, Cao Q, AtsumiG, Malone H, Krishnan B, Minokoshi Y, Kahn BB, Parker RA and Hotamisligil GS: Adipocyte/macrophage fatty acid binding proteins control integrated metabolic responses in obesity and diabetes. Cell Metabolism; 1(2): 107-119 (2005)
- Boord JB, Maeda K, Makowski L, Babaev VR, Fazio S, Linton MF, Hotamisligil GS: Combined adipocyte-macrophage fatty acid-binding protein deficiency improves metabolism, atherosclerosis, and survival in apolipoprotein E-deficient mice. Circulation; 110(11): 1492-1498 (2004)
- Lehmann F, Haile S, Axen E, Medina C, Uppenberg J, Svensson S, Lundback T, Rondahl L, Barf T: Discovery of inhibitors of human adipocyte fatty acid-binding protein, a potential type 2 diabetes target. Bioorg Med Chem Lett; 14(17): 4445-4448 (2004)
- Damcott CM, Moffett SP, Feingold E, Barmada MM, Marshall JA, Hamman RF, Ferrell RE: Genetic variation in fatty acid-binding protein-4 and peroxisome proliferator-activated receptor gamma interactively influence insulin sensitivity and body composition in males. Metabolism; 53(3): 303-9 (2004)
- Jenkins-Kruchten AE, Bennaars-Eiden A, Ross JR, Shen WJ, Kraemer FB, Bernlohr DA: Fatty acid-binding protein-hormone-sensitive lipase interaction. Fatty acid dependence on binding.J Biol Chem; 278(48): 47636-47643 (2003)

- Hertzel AV, Bennaars-Eiden A, Bernlohr DA: Increased lipolysis in transgenic animals overexpressing the epithelial fatty acid binding protein in adipose cells. J Lipid Res; 43(12): 2105-2111 (2002)
- Fu Y, Luo N, Lopes-Virella MF, Garvey WT: The adipocyte lipid binding protein (ALBP/aP2) gene facilitates foam cell formation in human THP-1 macrophages. Atherosclerosis; 165(2): 259-269 (2002)
- Fisher RM, Hoffstedt J, Hotamisligil GS, Thorne A, Ryden M: Effects of obesity and weight loss on the expression of proteins involved in fatty acid metabolism in human adipose tissue. Int J Obes Relat Metab Disord; 26(10): 1379-1385 (2002)
- Boord JB, Maeda K, Makowski L, Babaev VR, Fazio S, Linton MF, Hotamisligil GS: Adipocyte fatty acid-binding protein, aP2, alters late atherosclerotic lesion formation in severe hypercholesterolemia. Arterioscler Thromb Vasc Biol; 22(10): 1686-1691(2002)
- Scheja L, Makowski L, Uysal KT, Wiesbrock SM, Shimshek DR, Meyers DS, Morgan M, Parker RA, Hotamisligil GS: Altered insulin secretion associated with reduced lipolytic efficiency in aP2-/- mice. Diabetes; 48(10): 1987-1994 (1999)

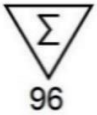
References to this product:

- Kotulak T, Drapalova J, Lips M, Lacinova Z, Kramar P, Riha H, Netuka I, Maly J, Blaha J, Lindner J, Svacina S, Mraz M, Haluzik M: Cardiac surgery increases serum concentrations of adipocyte fatty acid-binding protein and its mRNA expression in circulating monocytes but not in adipose tissue. Physiol Res. 2014;63(1):83-94
- von Eynatten M, Breitling LP, Roos M, Baumann M, Rothenbacher D, Brenner H: Circulating adipocyte fatty acid-binding protein levels and cardiovascular morbidity and mortality in patients with coronary heart disease: a 10-year prospective study. Arterioscler Thromb Vasc Biol, 32(9):2327-35 (2012)
- Bao Y, Lu Z, Zhou M, Li H, Wang Y, Gao M, Wei M, Jia W: Serum levels of adipocyte fatty acid-binding protein are associated with the severity of coronary artery disease in Chinese women. PLoS One, 28;6(4) (2011)
- Corripio R, Gónzalez-Clemente JM, Pérez-Sánchez J, Näf S, Gallart L, Nosàs R, Vendrell J and Caixàs A: Weight loss in prepubertal obese children is associated with a decrease in adipocyte fatty-acid-binding protein without changes in lipocalin-2: a 2-year longitudinal study. Eur J Endocrinol, 163 887-893 (2010)
- Haluzíková D, Dostálová I, Kaválková P, Roubícek T, Mráz M, Papezová H, Haluzík M: Serum concentrations of adipocyte fatty acid binding protein in patients with anorexia nervosa. Physiol Res, 58(4):577-81 (2009)
- Choi KM, Kim TN, Yoo HJ, Lee KW, Cho GJ, Hwang TG, Baik SH, Choi DS, Kim SM: Effect of exercise training on A-FABP, lipocalin-2 and RBP4 levels in obese women. Clin Endocrinol, 70(4):569-74 (2009)
- Milner KL, van der Poorten D, Xu A, Bugianesi E, Kench JG, Lam KS, Chisholm DJ, George J. Adipocyte fatty acid binding protein levels relate to inflammation and fibrosis in nonalcoholic fatty liver disease. Hepatology; 49(6):1926-34 (2009)
- Yeung DC, Xu A, Tso AW, Chow WS, Wat nm, Fong CH, Tam S, Sham PC, Lam KS. Circulating levels of adipocyte and epidermal fatty acid-binding proteins in relation to nephropathy staging and macrovascular complications in type 2 diabetic patients. Diabetes Care; 32(1):132-4 (2009)
- Stejskal D, Karpisek M, Bronsky J. Serum adipocyte-fatty acid binding protein discriminates patients with permanent and temporary body weight loss. J Clin Lab Anal; 22(5):380-2 (2008)
- Karpisek M, Stejskal D, Kotolova H, Kollar P, Janoutova G, Ochmanova R, Cizek L, Horakova D, Yahia RB, Lichnovska R, Janout V. Treatment with atorvastatin reduces serum

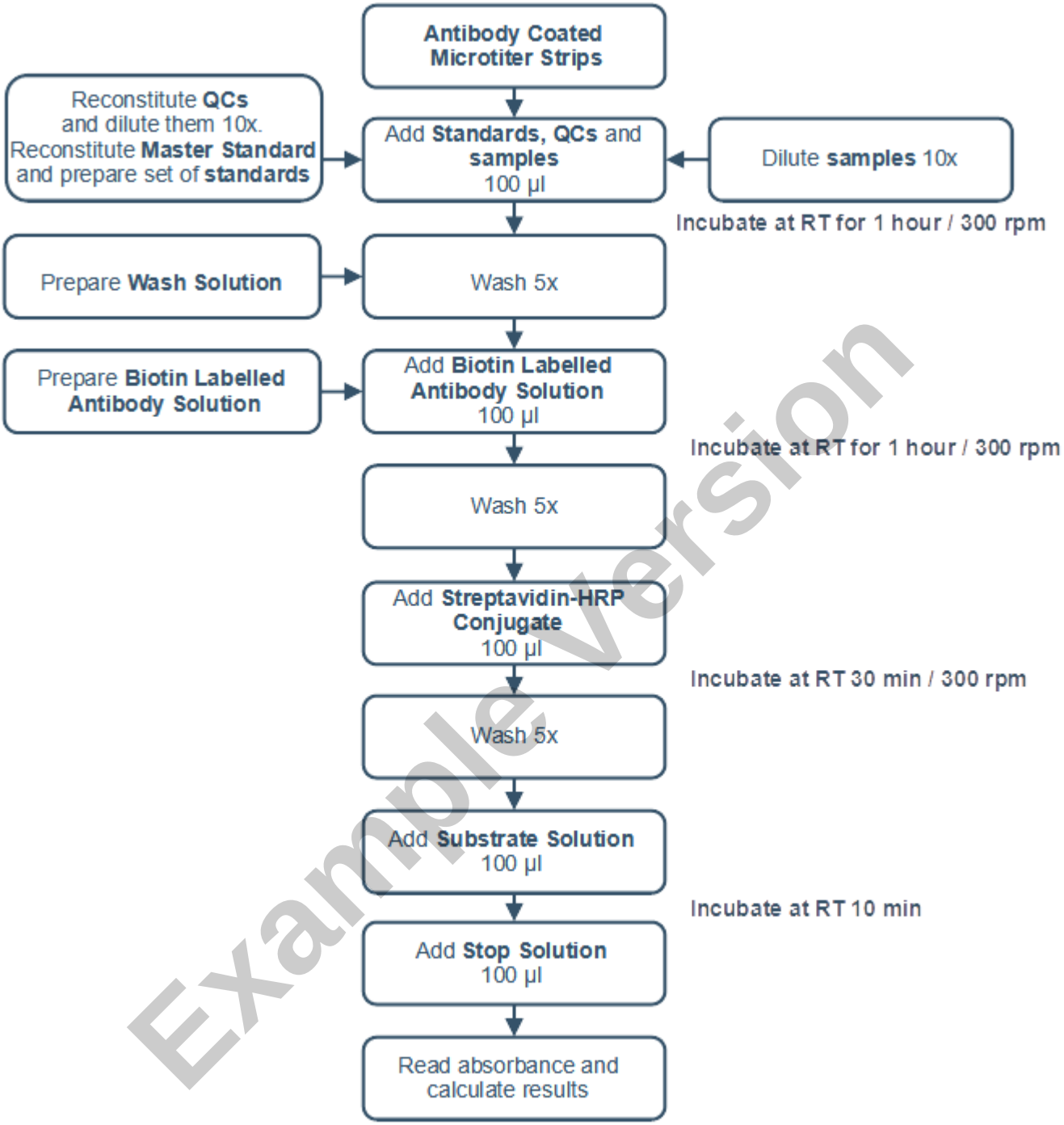
adipocyte-fatty acid binding protein value in patients with hyperlipidaemia. Eur J Clin Invest; 37(8):637-42 (2007)
- Tso AW, Xu A, Sham PC, Wat nm, Wang Y, Fong CH, Cheung BM, Janus ED, Lam KS.
- Serum adipocyte fatty acid binding protein as a new biomarker predicting the development of type 2 diabetes: a 10-year prospective study in a Chinese cohort. Diabetes Care; 30(10):2667-72 (2007)
- Yeung DC, Xu A, Cheung CW, Wat nm, Yau MH, Fong CH, Chau MT, Lam KS. Serum
- adipocyte fatty acid-binding protein levels were independently associated with carotid atherosclerosis. Arterioscler Thromb Vasc Biol; 27(8):1796-802 (2007)
- Xu A, Tso AW, Cheung BM, Wang Y, Wat nm, Fong CH, Yeung DC, Janus ED, Sham PC, Lam KS: Circulating adipocyte-fatty acid binding protein levels predict the development of the metabolic syndrome: a 5-year prospective study. Circulation; 115(12): 1537-1543 (2007)
- Bronsky J, Karpisek M, Bronska E, Pechova M, Jancikova B, Kotolova H, Stejskal D, Prusa R, Nevoral J: Adiponectin, adipocyte fatty acid binding protein, and epidermal fatty acid binding protein: Proteins newly identified in human breast milk. Clin Chem; 52(9): 1763-1770 (2006)
- von Eynatten M, Schneider JG, Allolio B: Adipocyte fatty acid binding protein (A-FABP) ist ein neuer Serum-Marker für Adipositas, Insulinresistenz und Metabolisches Syndrom. Diabetologie. 1: S23-S172 (2006)
- Xu A, Wang Y, Xu JY, Stejskal D, Tam S, Zhang J, Wat nm, Wong WK, Lam KS: Adipocyte fatty acid–binding protein is a plasma biomarker closely associated with obesity and metabolic syndrome. Clin Chem; 52(3): 405-413 (2006)
- Stejskal D and Karpisek M: Adipocyte fatty acid binding protein (A-FABP) in Caucasian population: a new marker of metabolic syndrome? Eur J Clin Invest; 36(9): 621-625 (2006)

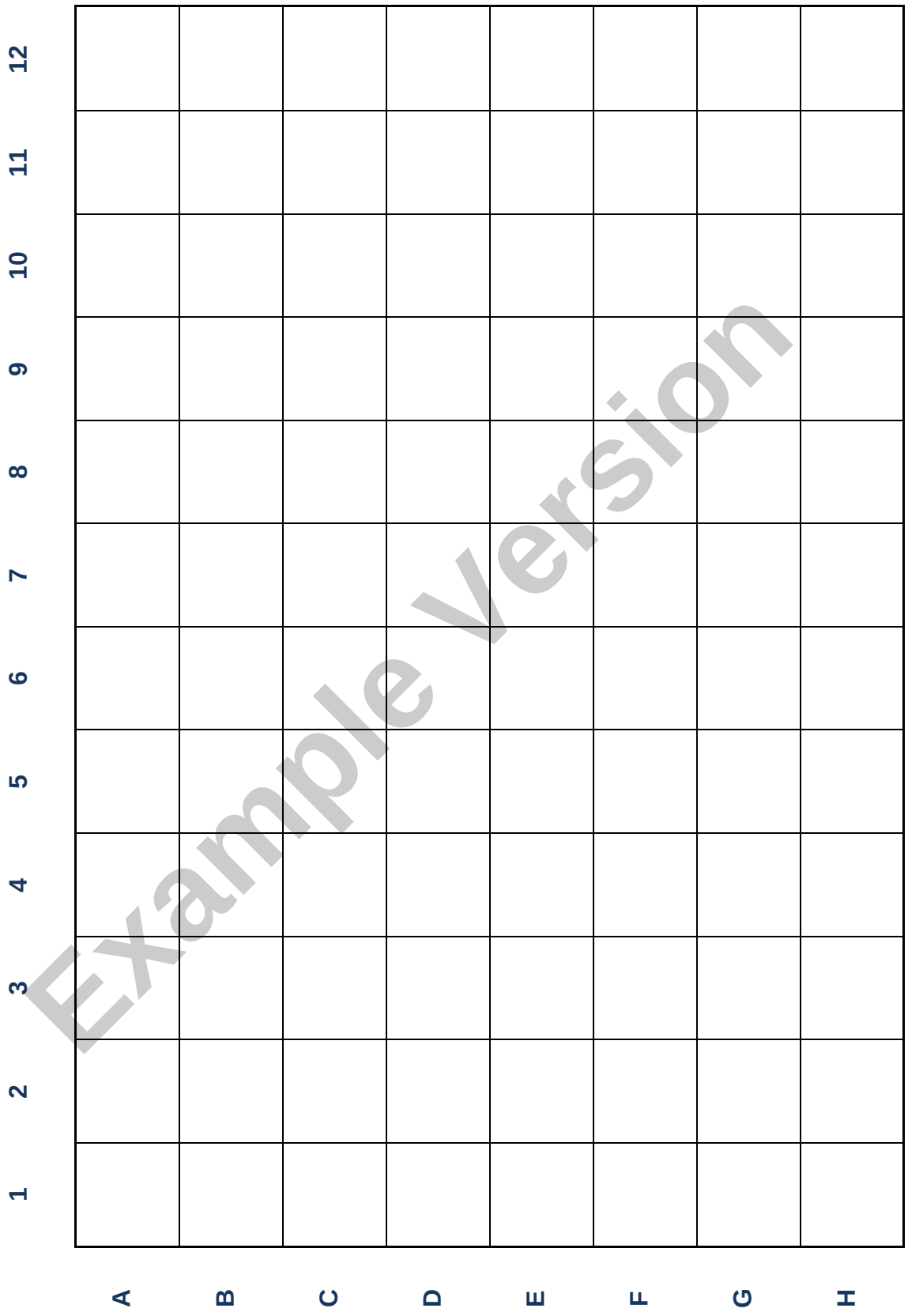
For more references on this product see our web pages at www.biovendor.com.

19. EXPLANATION OF SYMBOLS

REF	Catalogue number
LOT	Batch code
	Caution
	Use by date
	Temperature limit
	Manufacturer
	Read electronic instructions for use - eIFU
	The content is sufficient for 96 tests
	Biological risks
IVD	In vitro diagnostic medical device
CE	CE marking of conformity

20. ASSAY PROCEDURE - SUMMARY





BioVendor – Laboratorní medicína a.s.
Karásek 1767/1, 621 00 Brno, Czech Republic
+420 549 124 185
info@biovendor.com
sales@biovendor.com
www.biovendor.com

Date of last revision: 15.02.2023