BioVendor Group

ENG

Instructions for Use:

HUMAN HEART FABP (FABP3) ELISA

Catalogue number:

RHK401R

For research use only!

BioVendor R&D

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CONTENT

HISTORY OF CHANGES

Previous version	Current version
	ENG.001.A
New edition	

1. INTENDED USE

The human H-FABP ELISA kit is to be used for the *in vitro* quantitative determination of human H-FABP in serum or plasma samples. This kit is intended for laboratory research use only and is not for use in diagnostic or therapeutic procedures.
The kit is presented in a two assay format. The normal format takes about 1¼ hours. The rapid format takes about 45 minutes.
The analysis should be performed by trained laboratory professionals.

2. INTRODUCTION

Fatty acid-binding proteins (FABPs) are a class of cytoplasmic proteins that bind long chain fatty acids. FABPs are small intracellular proteins (~13-14 kDa) with a high degree of tissue specificity. They are abundantly present in various cell types and play an important role in the intracellular utilization of fatty acids, transport and metabolism. There are at least nine distinct types of FABP, each showing a specific pattern of tissue expression. Due to its small size, FABP leaks rapidly out of ischemically damaged necrotic cells leading to a rise in serum levels. Ischemically damaged tissues are characterized histologically by absence (or low presence) of FABP facilitating recognition of such areas.
Following acute myocardial infarction (AMI) the small protein H-FABP is rapidly released into the circulation. H-FABP is derived from the human *FABP3* gene. Significantly elevated serum/plasma concentrations are found within 3 h after AMI which generally return to normal values within 12 to 24 h. These features make H-FABP a useful research tool for the early assessment or exclusion of AMI, and for the monitoring of a recurrent infarction. Constitutive H-FABP released from the heart after AMI is quantitatively recovered in serum/plasma. Thus assessment of H-FABP is also a very effective tool for the estimation of the infarct size. The human H-FABP kit can also be used for measurement of brain-type FABP, a marker for brain injury detection and for measurement of muscle-type cytosolic fatty acid binding protein (FABPc) in skeletal muscle.
In serum/plasma of healthy individuals approximately 1.6 ng/ml of H-FABP is present. H-FABP shows a slight increase with age.

3. KIT FEATURES

- Working time of 1¼ hours (normal) or ¾ hour (rapid).
- Minimum concentration which can be measured is 102 pg/ml.
- Measurable concentration range of 102 to 25,000 pg/ml.
- Working volume of 100 µl/well.

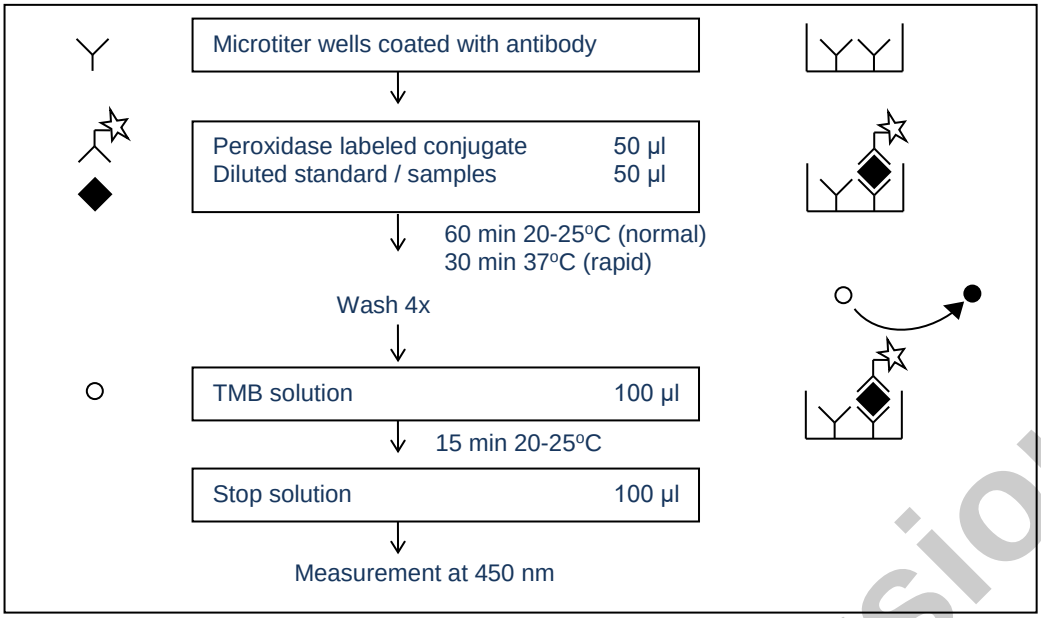
Cross-reactivity
Potential cross-reacting proteins detected in the human H-FABP ELISA:

Cross reactant	Reactivity
Human I-FABP	Negative
Human L-FABP	Negative
Rabbit H-FABP	Negative
Bovine H-FABP	Average
Dog H-FABP	Average
Goat H-FABP	Average
Horse H-FABP	Average
Mouse H-FABP	Average
Pig H-FABP	Average
Rat H-FABP	Average
Salmon H-FABP	Average
Sheep H-FABP	Average
Swine H-FABP	Average

Table 1

Cross-reactivity for other proteins/peptides has not been tested.

4. TEST PRINCIPLE



- The human H-FABP ELISA is a ready-to-use solid-phase enzyme-linked immunosorbent assay based on the sandwich principle with a working time of 1¼ (normal) or ¾ (rapid) hours.
- The efficient format of a plates with twelve disposable 8-well strips allows free choice of batch size for the assay.
- Samples and standards are incubated together with peroxidase-conjugated second antibody in microtiter wells coated with antibodies recognizing human H-FABP.
- During incubation human H-FABP is captured by the solid bound antibody. The secondary antibodies will bind to the captured human H-FABP.
- The peroxidase-conjugated second antibody will react with the substrate, tetramethylbenzidine (TMB).
- The enzyme reaction is stopped by the addition of oxalic acid.
- The absorbance at 450 nm is measured with a spectrophotometer. A standard curve is obtained by plotting the absorbance (linear) versus the corresponding concentrations of the human H-FABP standards (log).
- The human H-FABP concentration of samples, which are run concurrently with the standards, can be determined from the standard curve.

5. TECHNICAL HINTS

- User should be trained and familiar with ELISA assays and test procedure.
- If you are not familiar with the ELISA technique it is recommended to perform a pilot assay prior to evaluation of your samples. Perform the assay with a standard curve only following the instructions.
- Improper or insufficient washing at any stage of the procedure will result in either false positive or false negative results. Completely empty wells before dispensing wash buffer, fill with wash buffer as indicated for each cycle and do not allow wells to sit uncovered or dry for extended periods.
- Since exact conditions may vary from assay to assay, a standard curve must be established for every run. Samples should be referred to the standard curve prepared on the same plate.
- Do not mix reagents from different batches, or other reagents and strips. Remainders should not be mixed with contents of freshly opened vials.
- Each time the kit is used, fresh dilutions of standard, sample, Conjugate and buffers should be made.
- Caps and vials are not interchangeable. Caps should be replaced on the corresponding vials.
- To avoid cross-contaminations, change pipette tips between reagent additions of each standard, between sample additions, and between reagent additions. Also, use separate reservoirs for each reagent.
- The waste disposal should be performed according to your laboratory regulations.

6. REAGENT SUPPLIED

Kit component	Quantity	Color code
Wash buffer 20x	1 vial (60 ml)	Colorless
Dilution Buffer 10x	1 vial (15 ml)	Green
Standard	2 vials, lyophilized	White
Conjugate, peroxidase-labeled	1 vial, 1 ml lyophilized	Blue
TMB substrate	1 vial (11 ml)	Brown
Stop solution	1 vial (22 ml)	Red
12 Microtiter strips, pre-coated	1 plate	

Table 2

- Upon receipt, store individual components at 2 - 8°C. Do not freeze.
- Do not use components beyond the expiration date printed on the kit label.
- The standard and conjugate are stable in lyophilized form until the expiration date indicated on the kit label, if stored at 2 - 8°C.
- The exact amount of the standard is indicated on the label of the vial and the Certificate of Analysis.
- The standard is single use. After reconstitution the standard cannot be stored for repeated use
- Once reconstituted the conjugate is stable for 1 month if stored at 2 - 8°C.
- Upon receipt, foil pouch around the plate should be vacuum-sealed and unpunctured. Any irregularities to aforementioned conditions may influence plate performance in the assay.
- Return unused strips immediately to the foil pouch containing the desiccant pack and reseal along the entire edge of the zip-seal. Quality guaranteed for 1 month if stored at 2-8°C.

7. MATERIALS REQUIRED BUT NOT PROVIDED

- Calibrated micropipettes and disposable tips.
- Distilled or de-ionized water.
- Plate washer: automatic or manual.
- Polypropylene tubes.
- Calibrated ELISA plate reader capable of measuring absorbance at 450 nm.
- Adhesive covers can be ordered separately. Please contact your local distributor.

8. WARNINGS AND PRECAUTIONS

- For research use only, not for diagnostic or therapeutic use.
- This kit should only be used by qualified laboratory staff.
- Do not under any circumstances add sodium azide as preservative to any of the components.
- Do not use kit components beyond the expiration date.
- Do not mix reagents from different kits and lots. The reagents have been standardized as a unit for a given lot. Use only the reagents supplied by manufacturer.
- The assay has been optimized for the indicated standard range. Do not change the standard range.
- Open vials carefully: vials are under vacuum.
- Do not ingest any of the kit components.
- Kit reagents contain 2-chloroacetamide as a preservative. 2-Chloroacetamide is harmful in contact with skin and toxic if swallowed. In case of accident or if you feel unwell, seek medical advice immediately.
- The TMB substrate is light sensitive, keep away from bright light. The solution should be colorless until use.
- The stop solution contains 2% oxalic acid and can cause irritation or burns to respiratory system, skin and eyes. Direct contact with skin and eyes should be strictly avoided. If contact occurs, rinse immediately with plenty of water and seek medical advice.
- Incubation times, incubation temperature and pipetting volumes other than those specified may give erroneous results.
- Do not reuse microwells or pour reagents back into their bottles once dispensed.
- Handle all biological samples as potentially hazardous and capable of transmitting diseases.
- Hemolyzed, hyperlipemic, heat-treated or contaminated samples may give erroneous results.
- Use polypropylene tubes for preparation of standard and samples. Do not use polystyrene tubes or sample plates.

9. PREPARATION OF REAGENTS

Allow all the reagents to equilibrate to room temperature (20 – 25°C) prior to use. Return to proper storage conditions immediately after use.

Wash buffer

Prepare wash buffer by mixing 60 ml of 20x wash buffer with 1140 ml of distilled or de-ionized water, which is enough for 1 x 96 tests. Where less volume is required, prepare the desired volume of wash buffer by diluting 1 part of the 20x wash buffer with 19 parts of distilled or de-ionized water.

Dilution buffer

Prepare dilution buffer by mixing 15 ml of the 10x dilution buffer with 135 ml of distilled or de-ionized water, which is sufficient for 2 x 96 tests. In case less volume is required, prepare the desired volume of dilution buffer by diluting 1 part of the 10x dilution buffer with 9 parts of distilled or de-ionized water. Concentrated dilution buffer may contain crystals. In case the crystals do not disappear at room temperature within 1 hour, concentrated dilution buffer can be warmed up to 37°C. Do not shake the solution.

Standard solution

The standard is reconstituted by pipetting the amount of dilution buffer mentioned on the CoA in the standard vial. Use the standard vial as Tube 1 in Figure 1. Prepare each human H-FABP standard in polypropylene tubes by serial dilution of the reconstituted standard with dilution buffer as shown in Figure 1*.

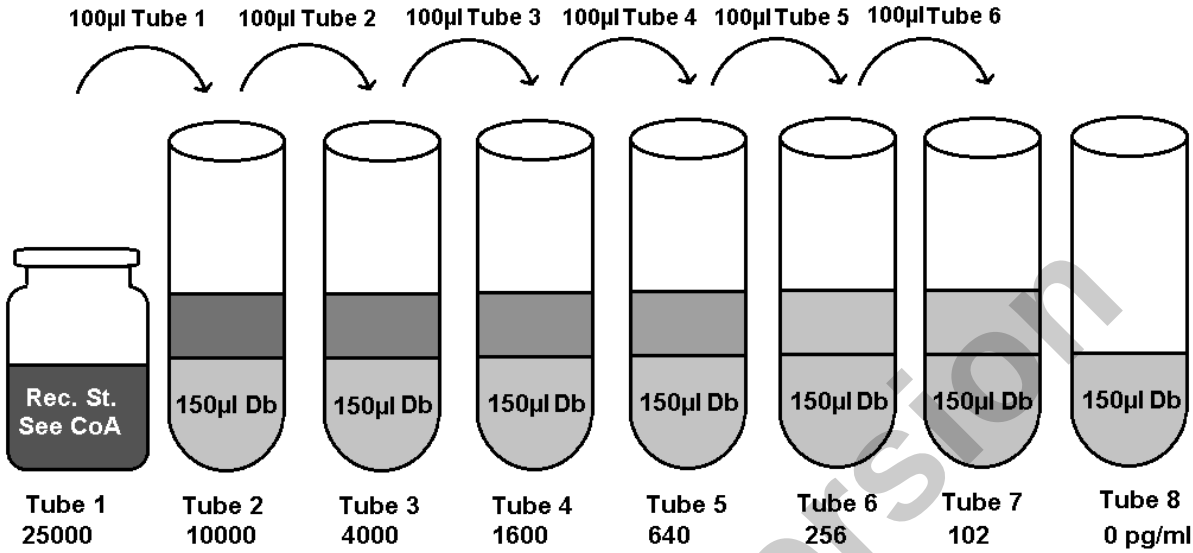


Figure 1

*) CoA: Certificate of Analysis, Rec. St.: Reconstituted Standard, Db: Dilution buffer

Conjugate solution

The conjugate is reconstituted by pipetting 1 ml distilled or de-ionized water. Dilute the reconstituted 1 ml conjugate with 5 ml dilution buffer, which is sufficient for 1 x 96 tests. In case less volume is required, prepare the desired volume of conjugate by diluting 1 part of the reconstituted conjugate with 5 parts of dilution buffer.

10. PREPARATION OF SAMPLES

Collection and handling

Serum or plasma

Collect blood using normal aseptic techniques. If serum is used, separate serum from blood after clotting at room temperature within 1 hour by centrifugation (1500xg at 4°C for 15 min). Transfer the serum to a fresh polypropylene tube.
If plasma is used, separate plasma from blood within 20 minutes after blood sampling by centrifugation (1500xg at 4°C for 15 min). Transfer the plasma to a fresh polypropylene tube.
Most reliable results are obtained if heparin or EDTA plasma is used.

Storage

Store samples below -20°C, preferably at -70°C in polypropylene tubes. Storage at -20°C can affect recovery of human H-FABP. Use samples within 24 hours after thawing. Avoid multiple freeze-thaw cycles which may cause loss of human H-FABP activity and give erroneous results. Do not use hemolyzed, hyperlipemic, heat-treated or contaminated samples.

Before performing the assay, samples should be brought to room temperature (18 – 25°C) and mixed gently. Prepare all samples (controls and test samples) prior to starting the assay procedure. Avoid foaming.

Dilution procedures

Serum or plasma samples

Human H-FABP can be measured accurately if serum or plasma samples are diluted at least 5x with supplied dilution buffer in polypropylene tubes.
Most reliable results are obtained if heparin or EDTA plasma is used.

Remark regarding recommended sample dilution

The mentioned dilution for samples is a minimum dilution and should be used as a guideline. The recovery of human H-FABP from an undiluted sample is not 100% and may vary from sample to sample. When testing less diluted samples it is advisable to run recovery experiments to determine the influence of the matrix on the detection of human H-FABP.
Do not use polystyrene tubes or sample plates for preparation or dilution of the samples.

Guideline for dilution of samples

Please see table 3 for recommended sample dilutions. Volumes are based on a total volume of at least 230 µl of diluted sample, which is sufficient for one sample in duplicate in the ELISA. For dilution of samples we recommend to use at least 10 µl of sample.

	Dilution	Pre-dilution	Amount of sample or pre-dilution required	Amount of dilution buffer required
1.	10x	Not necessary	25 µl (sample)	225 µl
2.	20x	Not necessary	15 µl (sample)	285 µl
3.	50x	Not necessary	10 µl (sample)	490 µl
4.	100x	Not necessary	10 µl (sample)	990 µl
5.	500x	Recommended: 10x (see nr.1)	10 µl (pre-dilution)	490 µl
6.	1000x	Recommended: 10x (see nr.1)	10 µl (pre-dilution)	990 µl
7.	2000x	Recommended: 20x (see nr.2)	10 µl (pre-dilution)	990 µl
8.	5000x	Recommended: 50x (see nr.3)	10 µl (pre-dilution)	990 µl

Table 3

11. ASSAY PROCEDURE

Bring all reagents to room temperature (20 - 25°C) before use.

1. Determine the number of test wells required, put the necessary microwell strips into the supplied frame, and fill out the data collection sheet. Return the unused strips to the storage bag with desiccant, seal and store at 2 - 8°C.
2. Add 50 µl of diluted peroxidase-conjugated second antibody to each well. Do not touch the side or bottom of the wells.
3. Transfer 50 µl in duplicate of standard, samples, or controls into appropriate wells. Do not touch the side or bottom of the wells.
4. Cover to the tray. Tap the tray to eliminate any air bubbles. Be careful not to splash liquid onto the cover.
5. Incubate the strips or plate for 60 minutes at room temperature for normal format or 30 mintutes at 37°C for rapid format.
6. Wash the plates 4 times with wash buffer using a plate washer or as follows*:
   a. Carefully remove the cover, avoid splashing.
   b. Empty the plate by inverting plate and shaking contents out over the sink, keep inverted and tap dry on a thick layer of tissues.
   c. Add 200 µl of wash buffer to each well, wait 20 seconds, empty the plate as described in 6b.
   d. Repeat the washing procedure 6b/6c three times.
   e. Empty the plate and gently tap on thick layer of tissues.
7. Add 100 µl of TMB substrate to each well. Do not touch the side or bottom of the wells.
8. Cover the tray and incubate the tray for 15 minutes at room temperature. It is advised to control the reaction on the plate regularly. In case of strong development the TMB reaction can be stopped sooner. Avoid exposing the microwell strips to direct sunlight. Covering the plate with aluminium foil is recommended.
9. Stop the reaction by adding 100 µl of stop solution with the same sequence and timing as used in step 7. Mix solutions in the wells thoroughly by gently swirling the plate. Gently tap the tray to eliminate any air bubbles trapped in the wells.
10. Read the plate within 30 minutes after addition of stop solution at 450 nm using a plate reader, following the instructions provided by the instrument's manufacturer.

*) In case plate washer is used, please note: use of a plate washer can result in higher background and decrease in sensitivity. We advise validation of the plate washer with the manual procedure.

Make sure the plate washer is used as specified for the manual method.

12. CALCULATIONS

- Calculate the mean absorbance for each set of duplicate standards, control and samples.
- If individual absorbance values differ by more than 15% from the corresponding mean value, the result is considered suspect and the sample should be retested.
- The mean absorbance of the zero standard should be less than 0.3.
- Create a standard curve using computer software capable of generating a good curve fit. The mean absorbance for each standard concentration is plotted on the vertical (Y) axis versus the corresponding concentration on the horizontal (X) axis (logarithmic scale).
- If samples have been diluted, the concentration read from the standard curve must be multiplied by the dilution factor.
- Samples that give a mean absorbance above the absorbance for the highest standard concentration are out of range of the assay. These samples should be retested at a higher dilution.

13. QUALITY CONTROL

The Certificate of Analysis is lot-specific and is to be used to verify results obtained by your laboratory. The absorption values provided on the Certificate of Analysis are to be used as a guideline only. The results obtained by your laboratory may differ.
This assay is designed to eliminate interference by soluble receptors, binding proteins, and other factors present in biological samples. Until all factors have been tested in the BioVendor immunoassay, the possibility of interference cannot be excluded.
For optimal performance of this kit, it is advised to work according to good laboratory practice.

14. TROUBLESHOOTING

Warranty claims and complaints in respect of deficiencies must be logged before expiry date of the product. A written complaint containing lot number of the product and experimental data should sent to info@biovendor.com.
Suggestions summarized below in **Chyba! Nenalezen zdroj odkazů.**4 can be used as a guideline in the case of unexpected assay results.

Low absorbance	High absorbance	Poor duplicates	All wells positive	All wells negative	Possible cause
•	•		•	•	Kit materials or reagents are contaminated or expired
•					Incorrect reagents used
•		•	•		Lyophilized reagents are not properly reconstituted
•	•	•	•	•	Incorrect dilutions or pipetting errors
•		•			Improper plastics used for preparation of standard and/or samples
•	•				Improper incubation times or temperature
		•			Especially in case of 37°C incubation: plates are not incubated uniformly
•					Assay performed before reagents were brought to room temperature
•	•	•	•	•	Procedure not followed correctly
				•	Omission of a reagent or a step
		•			Poor mixing of samples
	•		•		Low purity of water
	•	•			Strips were kept dry for too long during/after washing
	•	•	•		Inefficient washing
	•	•			Cross-contamination from other samples or positive control
		•	•		TMB solution is not clear or colorless
•	•				Wrong filter in the microtiter reader
	•	•			Airbubbles
		•			Imprecise sealing of the plate after use

Low absorbance	High absorbance	Poor duplicates	All wells positive	All wells negative	Possible cause
•					Wrong storage conditions
•					Lamp in microplate reader is not functioning optimally

Table 4

15. REFERENCES

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4. Pelsers, M et al; Detection of brain injury by fatty acid-binding proteins. Clin chem lab med 2005, *43*: 802
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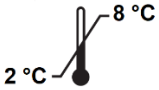
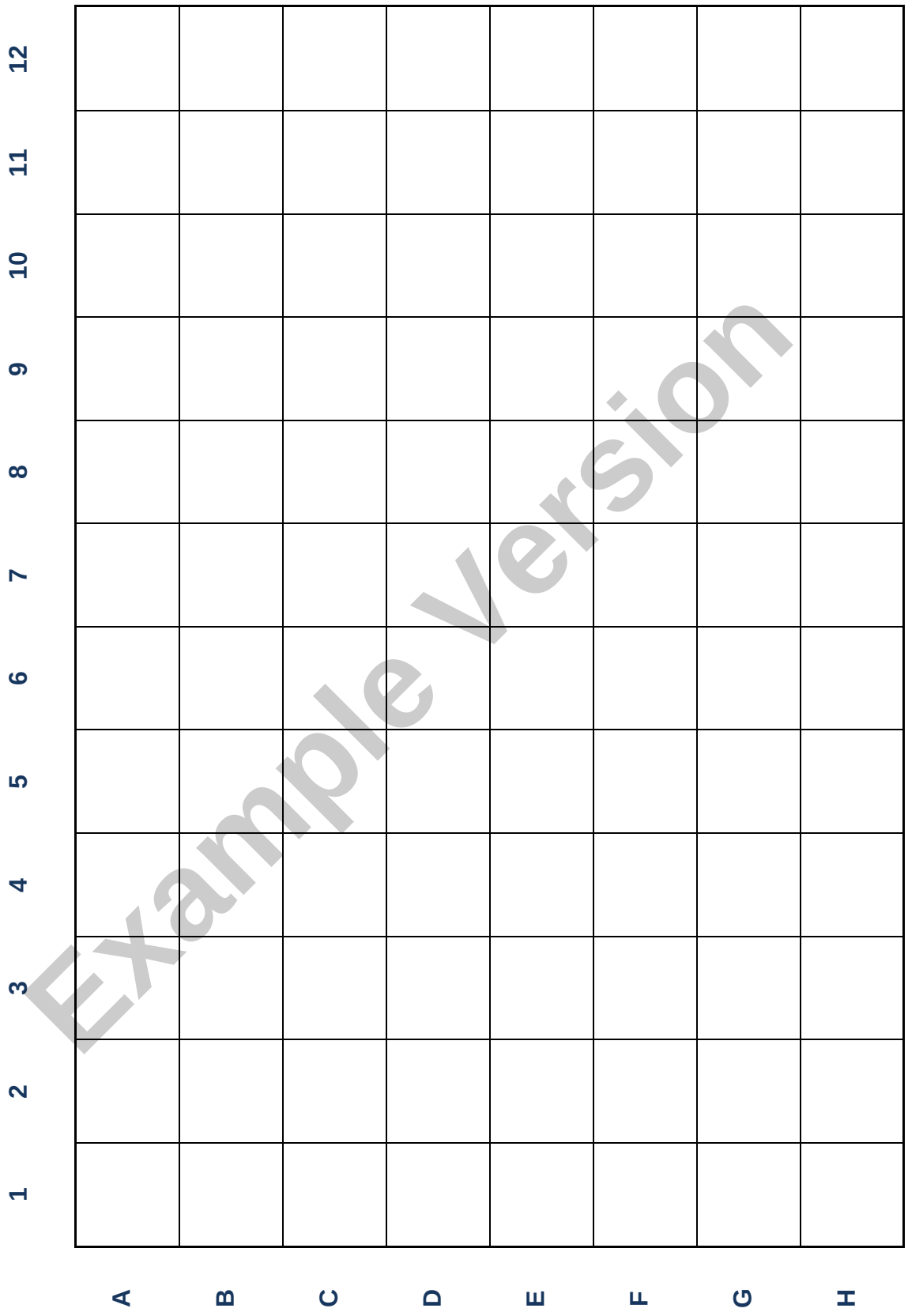
8. Gami, B et al; Utility of Heart-type Fatty Acid Binding Protein as a new biochemical marker for the early diagnosis of acute coronary syndrome. J Clin Diagn Res 2015, *9: 1*
9. Naganathar, S et al; Admission biomarkers of trauma-induced secondary cardiac injury predict adverse cardiac events and are associated with plasma catecholamine levels. J Trauma Acute Care Surg 2015, *79: 71*

16.EXPLANATION OF SYMBOLS

	Catalogue number
	Batch code
	Caution
	Use by date
	Temperature limit
	Manufacturer
	Read electronic instructions for use - eIFU
	The content is sufficient for 96 tests
	Biological risks



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