Human YKL-40 (CHI3L1) ELISA kit

Enzyme-linked Immunosorbent Assay for quantitative detection of human YKL-40

Catalog Numbers BMS2322 and BMS2322TEN

Pub. No. MAN0018419 **Rev.** A.0 (30)

WARNING! Read the Safety Data Sheets (SDSs) and follow the handling instructions. Wear appropriate protective eyewear, clothing, and gloves. Safety Data Sheets (SDSs) are available from **thermofisher.com/support**.

Product description

The Human YKL-40 (CHI3L1) ELISA Kit is an enzyme-linked immunosorbent assay for the quantitative detection of human YKL-40.

Human YKL-40, also known as CHI3L1 or cartilage glycoprotein 39 (GP-39) is a glycoprotein secreted by articular chondrocytes, synoviocytes and macrophages. Serum and synovial fluid YKL-40 levels are elevated in inflammatory diseases and correlate with the degree of joint destruction in rheumatoid arthritis. YKL-40 is expressed in articular chondrocytes and synovial cells, as well as in liver, but is undetectable in muscle tissues, lung, pancreas, mononuclear cells and fibroblasts. YKL-40 is a candidate autoantigen in rheumatoid arthritis and is important in the capacity of cells to respond to and cope with changes in their environment.

For literature update refer to our website.

Principles of the test

An anti-human YKL-40 coating antibody is adsorbed onto microwells.

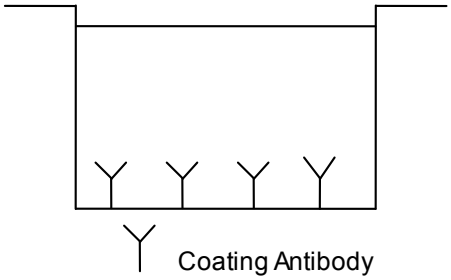

Fig. 1 Coated microwell

Human YKL-40 present in the sample or standard binds to antibodies absorbed to the microwells.

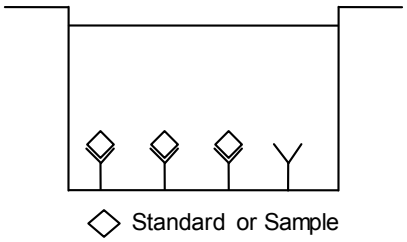

Fig. 2 First incubation

Following incubation unbound biological components are removed during a wash step and biotin-conjugated anti-human YKL-40 antibody is added and binds to human YKL-40 captured by the first antibody.

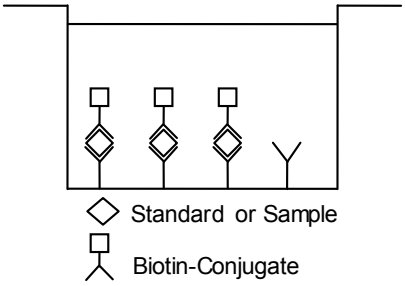

Fig. 3 Second incubation

Following incubation unbound biotin-conjugated anti-human YKL-40 antibody is removed during a wash step. Streptavidin-HRP is added and binds to the biotin-conjugated anti-human YKL-40 antibody.

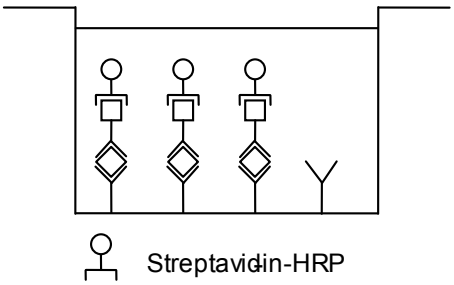

Fig. 4 Third incubation

Following incubation unbound Streptavidin-HRP is removed during a wash step, and substrate solution reactive with HRP is added to the wells.

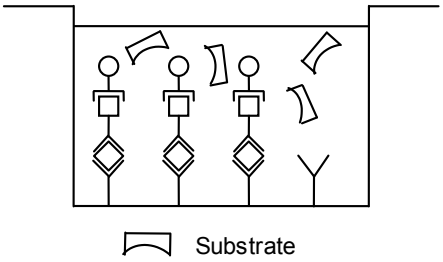

Fig. 5 Fourth incubation

A colored product is formed in proportion to the amount of human YKL-40 present in the sample or standard. The reaction is terminated by addition of acid and absorbance is measured at 450 nm. A standard curve is prepared from 7 human YKL-40 standard dilutions and human YKL-40 sample concentration determined.

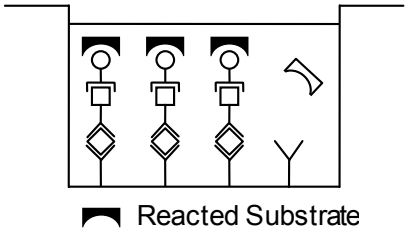

Fig. 6 Stop reaction

Reagents provided

Reagents for human YKL-40 ELISA BMS2322 (96 tests)

1 aluminum pouch with a Microwell Plate (12 strips with 8 wells each) coated with polyclonal antibody to human YKL-40

1 vial (70 µL) Biotin-Conjugate anti-human YKL-40 polyclonal antibody

1 vial (150 µL) Streptavidin-HRP

2 vials human YKL-40 Standard, 10 ng/mL upon dilution

1 vial (5 mL) Assay Buffer Concentrate 20x (PBS with 1% Tween™ 20, 10% BSA)

1 bottle (50 mL) Wash Buffer Concentrate 20x (PBS with 1% Tween™ 20)

1 vial (15 mL) Substrate Solution (tetramethyl-benzidine)

1 vial (15 mL) Stop Solution (1M Phosphoric acid)

6 Adhesive Films

Reagents for human YKL-40 ELISA BMS2322TEN (10x96 tests)

10 aluminum pouches with a Microwell Plate (12 strips with 8 wells each) coated with polyclonal antibody to human YKL-40

10 vials (70 µL) Biotin-Conjugate anti-human YKL-40 polyclonal antibody

10 vials (150 µL) Streptavidin-HRP

10 vials human YKL-40 Standard, 10 ng/mL upon dilution

5 vials (5 mL) Assay Buffer Concentrate 20x (PBS with 1% Tween™ 20, 10% BSA)

5 bottles (50 mL) Wash Buffer Concentrate 20x (PBS with 1% Tween™ 20)

10 vials (15 mL) Substrate Solution (tetramethyl-benzidine)

1 bottle (100 mL) Stop Solution (1M Phosphoric acid)

30 Adhesive Films

Storage instructions – ELISA kit

Store kit reagents between 2° and 8°C. Immediately after use remaining reagents should be returned to cold storage (2° to 8°C). Expiry of the kit and reagents is stated on labels.

Expiry of the kit components can only be guaranteed if the components are stored properly, and if, in case of repeated use of one component, this reagent is not contaminated by the first handling.

Sample collection and storage instructions

Cell culture supernatant, serum and plasma (EDTA, citrate, heparin) were tested with this assay. Other biological samples might be suitable for use in the assay. Remove serum or plasma from the clot or cells as soon as possible after clotting and separation. Samples containing a visible precipitate must be clarified prior to use in the assay. Do not use grossly hemolyzed or lipemic samples.

Samples should be aliquoted and must be stored frozen at –20°C to avoid loss of bioactive human YKL-40. If samples are to be run within 24 hours, they may be stored at 2–8°C (refer to "Sample stability" on page 6). Avoid repeated freeze-thaw cycles. Prior to assay, the frozen sample should be brought to room temperature slowly and mixed gently.

Materials required but not provided

- 5 mL and 10 mL graduated pipettes
- 5 µL to 1000 µL adjustable single channel micropipettes with disposable tips
- 50 µL to 300 µL adjustable multichannel micropipette with disposable tips
- Multichannel micropipette reservoir
- Beakers, flasks, cylinders necessary for preparation of reagents
- Device for delivery of wash solution (multichannel wash bottle or automatic wash system)
- Microwell strip reader capable of reading at 450 nm (620 nm as optional reference wave length)
- Glass-distilled or deionized water
- Statistical calculator with program to perform regression analysis

Precautions for use

- All chemicals should be considered as potentially hazardous. We therefore recommend that this product is handled only by those persons who have been trained in laboratory techniques and that it is used in accordance with the principles of good laboratory practice. Wear suitable protective clothing such as laboratory overalls, safety glasses, and gloves. Care should be taken to avoid contact with skin or eyes. In the case of contact with skin or eyes wash immediately with water. See material safety data sheet(s) and/or safety statement(s) for specific advice.
- Reagents are intended for research use only and are not for use in diagnostic or therapeutic procedures.
- Do not mix or substitute reagents with those from other lots or other sources.
- Do not use kit reagents beyond expiration date on label.
- Do not expose kit reagents to strong light during storage or incubation.
- Do not pipet by mouth.
- Do not eat or smoke in areas where kit reagents or samples are handled.
- Avoid contact of skin or mucous membranes with kit reagents or samples.
- Rubber or disposable latex gloves should be worn while handling kit reagents or samples.
- Avoid contact of substrate solution with oxidizing agents and metal.
- Avoid splashing or generation of aerosols.
- To avoid microbial contamination or cross-contamination of reagents or samples that may invalidate the test, use disposable pipette tips and/or pipettes.
- Use clean, dedicated reagent trays for dispensing the conjugate and substrate reagent.
- Exposure to acid inactivates the conjugate.
- Glass-distilled water or deionized water must be used for reagent preparation.
- Substrate solution must be at room temperature prior to use.
- Decontaminate and dispose samples and all potentially contaminated materials as if they could contain infectious agents.

  The preferred method of decontamination is autoclaving for a minimum of 1 hour at 121.5°C.
- Liquid wastes not containing acid and neutralized waste may be mixed with sodium hypochlorite in volumes such that the final mixture contains 1.0% sodium hypochlorite. Allow 30 minutes for effective decontamination. Liquid waste containing acid must be neutralized prior to the addition of sodium hypochlorite.
- Decontaminate and dispose samples and all potentially contaminated materials as if they could contain infectious agents.

  The preferred method of decontamination is autoclaving for a minimum of 1 hour at 121.5°C.

- Liquid wastes not containing acid and neutralized waste may be mixed with sodium hypochlorite in volumes such that the final mixture contains 1.0% sodium hypochlorite. Allow 30 minutes for effective decontamination. Liquid waste containing acid must be neutralized prior to the addition of sodium hypochlorite.

Preparation of reagents

1. Buffer concentrates should be brought to room temperature and should be diluted before starting the test procedure.
2. If crystals have formed in the Buffer Concentrates, warm them gently until they have completely dissolved.

Wash buffer (1x)

1. Pour entire contents (50 mL) of the Wash Buffer Concentrate (20x) into a clean 1000 mL graduated cylinder. Bring to final volume of 1000 mL with glass-distilled or deionized water.
2. Mix gently to avoid foaming.
3. Transfer to a clean wash bottle and store at 2° to 25℃. Please note that Wash Buffer (1x) is stable for 30 days.
4. Wash Buffer (1x) may also be prepared as needed according to the following table:

Number of Strips	Wash Buffer Concentrate (20x) (mL)	Distilled Water (mL)
1 - 6	25	475
1 - 12	50	950

Assay buffer (1x)

1. Pour the entire contents (5 mL) of the Assay Buffer Concentrate (20x) into a clean 100 mL graduated cylinder. Bring to final volume of 100 mL with distilled water. Mix gently to avoid foaming.
2. Store at 2° to 8℃. Please note that the Assay Buffer (1x) is stable for 30 days.
3. Assay Buffer (1x) may also be prepared as needed according to the following table:

Number of Strips	Assay Buffer Concentrate (20x) (mL)	Distilled Water (mL)
1 - 6	2.5	47.5
1 - 12	5.0	95.0

Biotin-Conjugate

Note: The Biotin-Conjugate should be used within 30 minutes after dilution.

Make a 1:100 dilution of the concentrated Biotin-Conjugate solution with Assay Buffer (1x) in a clean plastic tube as needed according to the following table:

Number of Strips	Biotin-Conjugate (mL)	Assay Buffer (1x) (mL)
1 - 6	0.03	2.97
1 - 12	0.06	5.94

Streptavidin-HRP

Note: The Streptavidin-HRP should be used within 30 minutes after dilution.

Make a 1:200 dilution of the concentrated Streptavidin-HRP solution with Assay Buffer (1x) in a clean plastic tube as needed according to the following table:

Number of Strips	Streptavidin-HRP (mL)	Assay Buffer (1x) (mL)
1 - 6	0.03	5.97
1 - 12	0.06	11.94

Human YKL-40 standard

1. Prepare human YKL-40 standard by addition of distilled water.
2. Reconstitution volume is stated on the label of the standard vial. Swirl or mix gently to insure a homogeneous reconstitution (concentration of standard = 10 ng/mL).
3. Standard dilutions can be prepared directly on the microwell plate (see “Test protocol“ on page 3) or alternatively in tubes (see “Preparation of reagents“ on page 3).

External standard dilution

1. Label 7 tubes, one for each standard point: S1, S2, S3, S4, S5, S6, S7.
2. Then prepare 1:2 serial dilutions for the standard curve as follows: Pipette 225 µL of Assay Buffer (1X) into each tube.
3. Pipette 225 µL of diluted standard (concentration = 10 ng/mL) into the first tube, labeled S1, and mix (concentration of standard 1 = 5000 pg/mL).
4. Pipette 225 µL of this dilution into the second tube, labeled S2, and mix thoroughly before the next transfer.
5. Repeat serial dilutions 5 more times thus creating the points of the standard curve (see Figure 7).

   Assay buffer (1X) serves as blank.

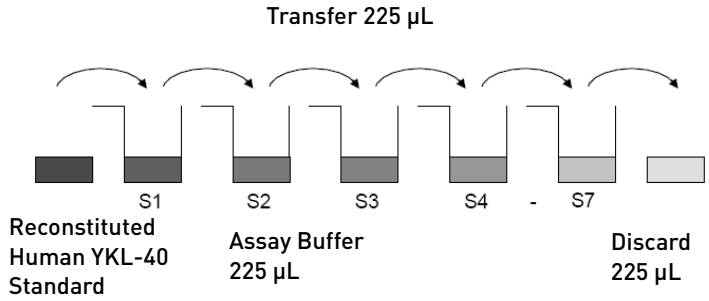

Fig. 7 Dilute standards – tubes

Test protocol

1. Predilute your serum or plasma samples before starting with the test and dilute at least 1:10 with Assay Buffer (1X). For example:

   Predilution: 1:10 [15 µl + 135 µl Assay Buffer (1X)]
2. Determine the number of microwell strips required to test the desired number of samples plus appropriate number of wells needed for running blanks and standards. Each sample, standard, blank and optional control sample should be assayed in duplicate. Remove extra microwell strips from holder and store in foil bag with the desiccant provided at 2°-8℃ sealed tightly.
3. Wash the microwell strips twice with approximately 400 µL Wash Buffer per well with thorough aspiration of microwell contents between washes. Allow the Wash Buffer to sit in the wells for about 10 – 15 seconds before aspiration. Take care not to scratch the surface of the microwells.

   After the last wash step, empty wells and tap microwell strips on absorbent pad or paper towel to remove excess Wash Buffer. Use the microwell strips immediately after washing. Alternatively, microwell strips can be placed upside down on a wet absorbent paper for not longer than 15 minutes. Do not allow wells to dry.

4. Standard dilution on the microwell plate (Alternatively the standard dilution can be prepared in tubes - see "Preparation of reagents" on page 3):

   Add 100 µL of Assay Buffer (1X) in duplicate to all standard wells. Pipette 100 µL of standard (see "Human YKL-40 standard" on page 3, concentration = 10 ng/mL) in duplicate into well A1 and A2 (see Table 1 on page 4). Mix the contents of wells A1 and A2 by repeated aspiration and ejection (concentration of standard 1, S1 = 5000 pg/mL), and transfer 100 µL to wells B1 and B2, respectively (see Figure 8). Take care not to scratch the inner surface of the microwells. Continue this procedure 5 times, creating two rows of human YKL-40 standard dilutions ranging from 5000 to 78 pg/mL. Discard 100 µL of the contents from the last microwells (G1, G2) used.

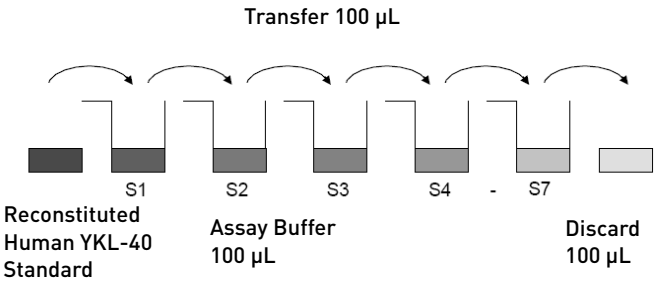

Fig. 8 Dilute standards - microwell plate

Table 1 Example of the arrangement of blanks, standards and samples in the microwell strips.

	1	2	3	4
A	Standard 1 5000.0 pg/mL	Standard 1 5000.0 pg/mL	Sample 1	Sample 1
B	Standard 2500.0 pg/mL	Standard 2 2500.0 pg/mL	Sample 2	Sample 2
C	Standard 3 1250.00 pg/mL	Standard 3 1250.00 pg/mL	Sample 3	Sample 3
D	Standard 4 625.00 pg/mL	Standard 4 625.00 pg/mL	Sample 4	Sample 4
E	Standard 5 312.50 pg/mL	Standard 5 312.50 pg/mL	Sample 5	Sample 5
F	Standard 6 156.25 pg/mL	Standard 6 156.25 pg/mL	Sample 6	Sample 6
G	Standard 7 78.13 pg/mL	Standard 7 78.13 pg/mL	Sample 7	Sample 7
H	Blank	Blank	Sample 8	Sample 8

   In case of an external standard dilution (see "Preparation of reagents" on page 3), pipette 100 µL of these standard dilutions (S1 - S7) in the standard wells according to Table 1 on page 4.
5. Add 100 µL of Assay Buffer (1X) in duplicate to the blank wells.
6. Add 50 µL of Assay Buffer (1X) to the sample wells.
7. Add 50 µL of each sample (1:10 prediluted) in duplicate to the sample wells.
8. Cover with an adhesive film and incubate at room temperature (18 to 25℃) for 2 hours on a microplate shaker.
9. Prepare Biotin-Conjugate (see "Biotin-Conjugate" on page 3).
10. Remove adhesive film and empty wells. Wash microwell strips 3 times according to point 3. of the test protocol. Proceed immediately to the next step on page 4.
11. Add 50 µL of Biotin-Conjugate to all wells.
12. Cover with an adhesive film and incubate at room temperature (18 to 25℃) for 1 hour on a microplate shaker.
13. Prepare Streptavidin-HRP (refer to "Streptavidin-HRP" on page 3).
14. Remove adhesive film and empty wells. Wash microwell strips 3 times according to point 3. of the test protocol. Proceed immediately to the next step on page 4.
15. Add 100 µL of diluted Streptavidin-HRP to all wells, including the blank wells.
16. Cover with an adhesive film and incubate at room temperature (18° to 25℃) for 1 hour on a microplate shaker.
17. Remove adhesive film and empty wells. Wash microwell strips 3 times according to point 3. of the test protocol. Proceed immediately to the next step on page 4.
18. Pipette 100 µL of TMB Substrate Solution to all wells.
19. Incubate the microwell strips at room temperature (18° to 25℃) for about 30 min. Avoid direct exposure to intense light.

    The color development on the plate should be monitored and the substrate reaction stopped (see next point of this protocol) before positive wells are no longer properly recordable. Determination of the ideal time period for color development has to be done individually for each assay. It is recommended to add the stop solution when the highest standard has developed a dark blue color. Alternatively, the color development can be monitored by the ELISA reader at 620 nm. The substrate reaction should be stopped as soon as Standard 1 has reached an OD of 0.9 – 0.95
20. Stop the enzyme reaction by quickly pipetting 100 µL of Stop Solution into each well. It is important that the Stop Solution is spread quickly and uniformly throughout the microwells to completely inactivate the enzyme. Results must be read immediately after the Stop Solution is added or within one hour if the microwell strips are stored at 2 - 8℃ in the dark.
21. Read absorbance of each microwell on a spectro-photometer using 450 nm as the primary wave length (optionally 620 nm as the reference wave length; 610 nm to 650 nm is acceptable). Blank the plate reader according to the manufacturer's instructions by using the blank wells. Determine the absorbance of both the samples and the standards

Note: If instructions of this protocol have been followed, samples have been diluted 1:20 and the concentration read from the standard curve must be multiplied by the dilution factor (20x).

Note: In case of incubation without shaking the obtained O.D. values may be lower than indicated below. Nevertheless, the results are still valid.

Calculation of results

- Calculate the average absorbance values for each set of duplicate standards and samples. Duplicates should be within 20 percent of the mean value.
- Create a standard curve by plotting the mean absorbance for each standard concentration on the ordinate against the human YKL-40 concentration on the abscissa. Draw a best fit curve through the points of the graph (a 5-parameter curve fit is recommended).
- To determine the concentration of circulating human YKL-40 for each sample, first find the mean absorbance value on the ordinate and extend a horizontal line to the standard curve. At the point of intersection, extend a vertical line to the abscissa and read the corresponding human YKL-40 concentration.
- If instructions in this protocol have been followed, samples have been diluted 1:20 and the concentration read from the standard curve must be multiplied by the dilution factor (x 20).
- Calculation of samples with a concentration exceeding standard 1 may result in incorrect, low human YKL-40 levels. Such samples require further external predilution according to expected human YKL-40 values with Assay Buffer (1X) in order to precisely quantitate the actual human YKL-40 level.
- It is suggested that each testing facility establishes a control sample of known human YKL-40 concentration and runs this additional control with each assay. If the values obtained are not within the expected range of the control, the assay results may be invalid.

A representative standard curve is shown in Figure 8 on page 5. This curve cannot be used to derive test results. Each laboratory must prepare a standard curve for each group of microwell strips assayed.

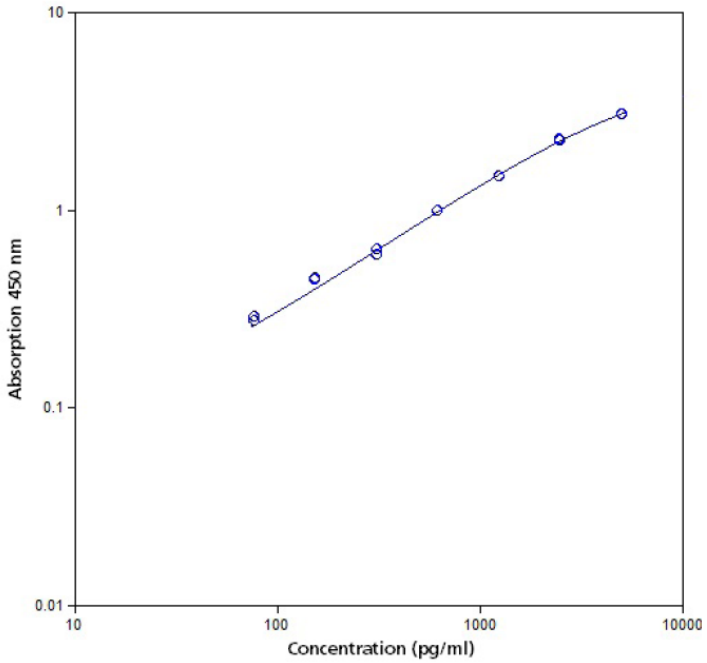

Fig. 9 Representative standard curve for human YKL-40 ELISA. Human YKL-40 was diluted in serial 2-fold steps in assay buffer (1X). Do not use this standard curve to derive test results. A standard curve must be run for each group of microwell strips assayed.

Table 2 Typical data using the human YKL-40 ELISA

Measuring wavelength: 450 nm

Reference wavelength: 620 nm

Standard	Human YKL-40 Concentration (pg/mL)	O.D. at 450 nm	Mean O.D. at 450 nm	C.V. (%)
1	5000	3.014 3.027	3.020	0.2
2	2500	2.252 2.210	2.231	0.9
3	1250	1.459 1.471	1.465	0.4
4	625	0.972 0.981	0.976	0.5
5	312.50	0.588 0.621	0.605	2.8
6	156.25	0.445 0.436	0.441	1.0
7	78.13	0.284 0.271	0.278	2.4
Blank	0.0	0.144 0.143	0.143	0.4

The OD values of the standard curve may vary according to the conditions of assay performance (e.g. operator, pipetting technique, washing technique or temperature effects).

Furthermore shelf life of the kit may affect enzymatic activity and thus color intensity. Values measured are still valid.

Limitations

- Since exact conditions may vary from assay to assay, a standard curve must be established for every run.
- Bacterial or fungal contamination of either screen samples or reagents or cross-contamination between reagents may cause erroneous results.
- Disposable pipette tips, flasks or glassware are preferred, reusable glassware must be washed and thoroughly rinsed of all detergents before use.
- Improper or insufficient washing at any stage of the procedure will result in either false positive or false negative results. Empty wells completely before dispensing fresh wash solution, fill with Wash Buffer as indicated for each wash cycle and do not allow wells to sit uncovered or dry for extended periods.
- The use of radioimmunotherapy has significantly increased the number of patients with human anti-mouse IgG antibodies (HAMA). HAMA may interfere with assays utilizing murine monoclonal antibodies leading to both false positive and false negative results. Serum samples containing antibodies to murine immunoglobulins can still be analyzed in such assays when murine immunoglobulins (serum, ascitic fluid, or monoclonal antibodies of irrelevant specificity) are added to the sample.

Performance characteristics

Sensitivity

The limit of detection of human YKL-40 defined as the analyte concentration resulting in an absorbance significantly higher than that of the dilution medium (mean plus 2 standard deviations) was determined to be 10.83 pg/mL (mean of 3 independent assays).

Reproducibility

Intra-assay

Reproducibility within the assay was evaluated in 3 independent experiments. Each assay was carried out with 6 replicates of serum or plasma samples containing different concentrations of human YKL-40. 2 standard curves were run on each plate. Data below show the mean human YKL-40 concentration and the coefficient of variation for each sample (see Table 3 on page 5). The calculated overall intra-assay coefficient of variation was 2.3%.

Table 3 The mean human YKL-40 concentration and the coefficient of variation for each sample.

Sample	Experiment	Mean Human YKL-40 Concentration (pg/mL)	Coefficient of Variation (%)
1	1 2 3	61432.6 76984.9 67382.9	3.3 2.6 2.5
2	1 2 3	47794.8 53520.9 51066.2	1.2 4.8 3.2
3	1 2 3	12104.4 14360.3 12692.7	1.6 2.3 1.7
4	1 2 3	12818.3 11667.3 12258.9	1.3 2.5 1.5
5	1 2 3	23918.1 27745.1 30123.6	1.7 3.4 2.0
6	1 2 3	21817.8 18899.2 20401.0	2.8 2.1 0.6
7	1 2 3	44429.8 39156.1 43799.4	1.8 1.6 3.7
8	1 2 3	10004.0 9878.4 10102.4	2.4 2.3 1.4

Inter-assay

Assay to assay reproducibility within one laboratory was evaluated in 3 independent experiments. Each assay was carried out with 6 replicates of serum or plasma samples containing different concentrations of human YKL-40. 2 standard curves were run on each plate. Data below show the mean human YKL-40 concentration and

the coefficient of variation calculated on 18 determinations of each sample (see Table 4 on page 6). The calculated overall inter-assay coefficient of variation was 7.2%.

Table 4 The mean human YKL-40 concentration and the coefficient of variation of each sample

Sample	Mean Human YKL-40 Concentration (pg/mL)	Coefficient of Variation (%)
1	68600.1	11.4
2	50794.0	5.7
3	13052.5	9.0
4	12248.4	4.7
5	27262.3	11.5
6	20372.7	7.2
7	42461.7	6.8
8	9995.0	1.1

Spike recovery

The spike recovery was evaluated by spiking 2 levels of human YKL-40 into serum, plasma (EDTA, heparin, citrate) and cell culture supernatant. Recoveries were determined with 2 replicates each. The amount of endogenous YKL-40 in unspiked samples was subtracted from the spike values.

Sample Matrix	Spike High		Spike Low	
	Mean (%)	Range (%)	Mean (%)	Range (%)
Serum	115	110 - 119	104	97 – 108
Plasma (EDTA)	107	93 – 120	109	104 – 117
Plasma (Citrate)	109	106 – 115	106	99 – 112
Plasma (Heparin)	111	104 – 122	107	101 – 115
Cell culture supernatant	107	-	116	-

Dilution parallelism

Serum and plasma (EDTA, citrate, heparin) samples with different levels of human YKL-40 were analyzed at serial 2-fold dilutions with 4 replicates each.

Sample Matrix	Dilution	Recovery of Expected Values	
		Mean (%)	Range (%)
Serum	1:80	99	91-108
	1:160	101	91-114
	1:320	106	94-118
Plasma (EDTA)	1:80	97	84-117
	1:160	104	87-145
	1:320	107	83-146
Plasma (Citrate)	1:80	100	95-104
	1:160	104	92-111
	1:320	108	89-123
Plasma (Heparin)	1:80	103	98-111
	1:160	106	98-114
	1:320	113	104-125

Sample stability

Freeze-Thaw stability

Aliquots of serum samples were stored at -20℃ and thawed 3 times, and the human YKL-40 levels determined.

There was no significant loss of human YKL-40 immunoreactivity detected by freezing and thawing.

Storage stability

Aliquots of serum samples (were stored at –20℃, 2–8℃, room temperature (RT) and at 37℃, and the human YKL-40 level determined after 24 hours. There was no significant loss of human YKL-40 immunoreactivity detected during storage under above conditions.

Specificity

The interference of circulating factors of the immune system was evaluated by spiking these proteins at physiologically relevant concentrations into human serum. No cross-reactivity was detected.

Expected values

Panels of 40 serum as well as plasma samples (EDTA, citrate, heparin) from randomly selected apparently healthy donors (males and females) were tested for human YKL-40.

Sample Matrix	Number of Samples Evaluated	Mean (pg/ml)	Range (pg/ml)	Standard Deviation (pg/ml)
Serum	40	28208	6339 - 98296	22918
Plasma (EDTA)	40	31277	6377 - 98010	26478
Plasma (Citrate)	40	12647	5994 - 32726	5288
Plasma (Heparin)	40	17438	5265 - 85610	15335

Reagent preparation summary

Wash buffer (1x)

Add Wash Buffer Concentrate 20x (50 mL) to 950 mL distilled water.

Number of Strips	Wash Buffer Concentrate (mL)	Distilled Water (mL)
1 - 6	25	475
1 - 12	50	950

Assay buffer (1x)

Add Assay Buffer Concentrate 20x (5 mL) to 95 mL distilled water.

Number of Strips	Assay Buffer Concentrate (mL)	Distilled Water (mL)
1 - 6	2.5	47.5
1 - 12	5.0	95.0

Biotin-Conjugate

Make a 1:100 dilution of Biotin-Conjugate in Assay Buffer (1x):

Number of Strips	Biotin-Conjugate (mL)	Assay Buffer (1x) (mL)
1 - 6	0.03	2.97
1 - 12	0.06	5.94

Streptavidin-HRP

Make a 1:200 dilution of Streptavidin-HRP in Assay Buffer (1x):

Number of Strips	Streptavidin-HRP (mL)	Assay Buffer (1x) (mL)
1 - 6	0.03	5.97
1 - 12	0.06	11.94

Human YKL-40 standard

Prepare human YKL-40 standard by addition of of distilled water. (Volume is stated on the label of the standard vial.)

Swirl or mix gently to insure a homogeneous reconstitution.

Test protocol summary

1. Dilute samples 1:10.
2. Determine the number of microwell strips required.
3. Wash microwell strips twice with Wash Buffer.

4. Standard dilution on the microwell plate: Add 100 µL Assay Buffer (1X), in duplicate, to all standard wells. Pipette 100 µL prepared standard into the first wells and create standard dilutions by transferring 100 µL from well to well. Discard 100 µL from the last wells.

   Alternatively external standard dilution in tubes (see "Preparation of reagents" on page 3): Pipette 100 µL of these standard dilutions in the microwell strips.
5. Add 100 µL Assay Buffer (1X), in duplicate, to the blank wells.
6. Add 50 µL Assay Buffer (1X) to sample wells.
7. Add 50 µL prediluted sample in duplicate, to designated sample wells.
8. Cover microwell strips and incubate 2 hours at room temperature (18° to 25°C).
9. Prepare Biotin-Conjugate.
10. Empty and wash microwell strips 3 times with Wash Buffer.
11. Add 50 µL Biotin-Conjugate to all wells.
12. Cover microwell strips and incubate 1 hour at room temperature (18° to 25°C).
13. Prepare Streptavidin-HRP.
14. Empty and wash microwell strips 3 times with Wash Buffer.
15. Add 100 µL diluted Streptavidin-HRP to all wells.
16. Cover microwell strips and incubate 1 hour at room temperature (18° to 25°C).
17. Empty and wash microwell strips 3 times with Wash Buffer.
18. Add 100 µL of TMB Substrate Solution to all wells.
19. Incubate the microwell strips for about 30 minutes at room temperature (18° to 25°C).
20. Add 100 µL Stop Solution to all wells.
21. Blank microwell reader and measure color intensity at 450 nm.

Note: If instructions in this protocol have been followed, samples have been diluted 1:20and the concentration read from the standard curve must be multiplied by the dilution factor (x 20).

Note: In case of incubation without shaking the obtained O.D. values may be lower than indicated below. Nevertheless the results are still valid.

Bender MedSystems GmbH | Campus Vienna Biocenter 2 | 1030 Vienna, Austria
For descriptions of symbols on product labels or product documents, go to **thermofisher.com/symbols-definition**.