Diabetes

ichroma™ Cystatin C

INTENDED USE

ichroma™ Cystatin C is a fluorescence Immunoassay (FIA) for the quantitative determination of cystatin C in human serum/plasma. It is useful as an aid in management and monitoring of renal disease.

For *in vitro* diagnostic use only.

INTRODUCTION

The level of serum cystatin C has been proposed as a simple, accurate, and rapid endogenous marker of glomerular filtration rate (GFR) in research and clinical practice. The measurement of serum cystatin C may detect mild to moderate decrease in GFR that are not evident with the serum creatinine measurement.

In kidney transplant patients, cystatin C was reported to be more sensitive than serum creatinine for detecting decreases in GFR and delayed graft function, offering an opportunity for timely intervention.

PRINCIPLE

The test uses a sandwich immunodetection method; the detector recombinant protein in buffer binds to antibody in sample, forming recombinant protein-antibody complexes, and migrates onto nitrocellulose matrix to be captured by the other immobilized-antigen on test strip.

More antibody in sample will form the more recombinant protein-antibody complex which lead to stronger fluorescence signal on detector recombinant protein, which is processed by instrument for ichroma™ tests to show cystatin C concentration in sample.

COMPONENTS

ichroma™ Cystatin C consists of 'cartridges', 'detection buffer tubes' 'ID chip' and 'instruction for use'.

- The cartridge contains the membrane called a test strip which has anti human cystatin C at the test line, and chicken IgY at the control line. All cartridges are individually sealed in an aluminum foil pouch containing a desiccant in a box.
- The detection buffer contains anti human cystatin C-fluorescence conjugate, anti chicken IgY-fluorescence conjugate, bovine serum albumin (BSA) as a stabilizer and sodium azide in phosphate buffered saline (PBS) as a preservative. The detection buffer is pre-dispensed in a tube. All detection buffer tubes are packed in a box.

WARNINGS AND PRECAUTIONS

- For *in vitro* diagnostic use only.
- Follow instructions and procedures described in this 'Instruction for use'.
- Use only fresh samples and avoid direct sunlight.
- Lot numbers of all the test components (cartridge, detection buffer and ID chip) must match each other.
- Do not interchange the test components between different lots or use the test components after the expiration date, either of which might yield incorrect test result(s).
- Do not reuse cartridges or detection buffer tubes. A cartridge should be used for testing one sample only. A detection buffer tube should be used for processing of one sample only.
- The cartridge should remain sealed in its original pouch until just before use. Do not use the test cartridge, if is damaged or has already been opened.
- Frozen sample should be thawed only once. For shipping, samples must be packed in accordance with the local regulations. Sample with severe hemolysis and/or hyperlipidemia must not be used.
- Allow the test cartridge, detection buffer and sample to be at room temperature for approximately 30 minutes before use.
- The instrument for ichroma™ tests may generate slight vibration during use.
- Used cartridges, detection buffer tubes and pipette tips should be handled carefully and discarded by an appropriate method in accordance with relevant local regulations.
- An exposure to larger quantities of sodium azide may cause certain health issues like convulsions, low blood pressure and heart rate, loss of consciousness, lung injury and respiratory failure.
- **ichroma™ Cystatin C** will provide accurate and reliable results subject to the below conditions.
  - **ichroma™ Cystatin C** should be used only in conjunction with instrument for ichroma™ tests
  - Have to use recommended anticoagulant sample.

Recommended anticoagulant
K2 EDTA, Sodium citrate, Li-Heparin

STORAGE AND STABILITY

Component	Storage Temperature	Shelf life
Cartridge	4 - 30 °C	20 months
Detection buffer tube	2 - 8 °C	20 months

- After the cartridge pouch is opened, the test should be performed immediately.

LIMITATION OF THE TEST SYSTEM

- The test may yield false positive result(s) due to the cross-reactions and/or non-specific adhesion of certain sample components to the capture/detector antibodies.
- The test may yield false negative result(s) due to the non-responsiveness of the antigen to the antibodies which is most common if the epitope is masked by some unknown components, so therefore not being able to be detected or captured by the antibodies. The instability or degradation of the antigen with time and/or temperature may also cause false negative results as it makes antigen unrecognizable by the antibodies.
- Other factors may interfere with the test and cause erroneous results, such as technical/procedural errors, degradation of the test components/reagents or presence of interfering substances in the test samples.
- Any clinical diagnosis based on the test result must be supported by a comprehensive judgment of the concerned physician including clinical symptoms and other relevant test results.

MATERIALS SUPPLIED

REF CFPC-43

Components of **ichroma™ Cystatin C**

- Cartridge Box:
  - Cartridge 25
  - ID Chip 1
  - Instruction for Use 1
- Detection buffer box
  - Detection buffer tube 25

MATERIALS REQUIRED BUT SUPPLIED ON DEMAND

Following items can be purchased separately from **ichroma™ Cystatin C**.

Please contact our sales division for more information.

- Instrument for ichroma™ tests
  - **ichroma™ Reader** REF FR203
  - **ichroma™ II** REF FPRR021
- **Printer** REF FPRR007

SAMPLE COLLECTION AND PROCESSING

The sample type for **ichroma™ Cystatin C** is human serum/plasma.

- It is recommended to test the sample within 24 hours after collection.
- The serum or plasma should be separated from the clot by centrifugation within 3 hours after the collection of whole blood.
- Samples may be stored for up to two weeks at 2-8 °C prior to being tested. If testing will be delayed more than two weeks, samples should be frozen at -20 °C.
- Samples stored frozen at -20 °C for 3 months showed no performance difference.
- Once the sample was frozen, it should be used one time only for test, because repeated freezing and thawing can result in the change test values.

TEST SETUP

- Check the contents of **ichroma™ Cystatin C**: Sealed Cartridges, Detection buffer tubes, ID chip and Instruction for use.
- Ensure that the lot number of the cartridge matches that of the detection buffer tubes as well as an ID chip.
- If the sealed cartridge and the detection buffer tube have been stored in a refrigerator, place them on a clean and flat surface at room temperature for at least 30 minutes before testing.
- Turn on the instrument for ichroma™ tests.
  (Please refer to the 'Instrument for ichroma™ tests Operation Manual' for complete information and operating instructions.

TEST PROCEDURE

< Multi mode>

1) Transfer 10 µL (human serum/plasma/control) of sample using a pipette to a tube containing the detection buffer.
2) Close the lid of the detection buffer tube and mix the sample thoroughly by shaking it about 10 times. (The sample mixture must be used immediately.)
3) Pipette out 75 µL of the sample mixture and load it into a sample well on the Cartridge.
4) Leave the sample-loaded cartridge at room temperature for 10 minutes.
   ⚠ *Scan the sample-loaded cartridge immediately when the incubation time is over. If not, it will cause inaccurate test result.*
5) To scan the sample-loaded cartridge, insert it into the cartridge holder of the instrument for ichroma™ tests. Ensure proper orientation of the cartridge before pushing it all the way inside the cartridge holder. An arrow is marked on the cartridge especially for this purpose.
6) Press the 'Select' or Tap the 'start' button on the instrument for ichroma™ tests to start the scanning process.
7) The instrument for ichroma™ tests will start scanning the sample-loaded cartridge immediately.
8) Read the test result on the display screen of the instrument for ichroma™ tests.

<Single mode >

1) Transfer 10 µL (human serum/plasma/control) of sample using a pipette to a tube containing the detection buffer.
2) Close the lid of the detection buffer tube and mix the sample thoroughly by shaking it about 10 times. (The sample mixture must be used immediately.)
3) Pipette out 75 µL of the sample mixture and load it into a sample well on the Cartridge.
4) Insert the cartridge into the holder of the instrument for ichroma™ tests. Ensure proper orientation of the cartridge before pushing it all the way inside the

cartridge holder. An arrow is marked on the cartridge especially for this purpose.
5) Press the 'Select' or Tap the 'start' button on the instrument for ichroma™ tests to start the scanning process.
6) Cartridge goes inside the instrument for ichroma™ tests and will automatically start scanning the sample-loaded cartridge after 10 minutes.
7) Read the test result on the display screen of the instrument for ichroma™ tests.

Please refer to the 'Instrument for ichroma™ tests Operation Manual' for complete information and operating instructions.

INTERPRETATION OF TEST RESULT

- The instrument for ichroma™ tests calculates the test result automatically and displays cystatin C concentration of the test sample in terms of mg/L
- Cut-off (reference range)
  Concentration of cystatin C in healthy individuals

Age range	Reference range
18 - 50 years old	0.56 - 0.90 mg/L
51 - 70 years old	0.58 - 1.09 mg/L

- Concentration of cystatin C vs. GFR

Stage	Cystatin C (mg/L)	GFR (ml/min/1.73m^2)	State
Normal	0.52-0.91	≥ 90	Normal GFR
1	0.91-1.1	≥ 90	Kidney damage with normal
2	1.1-1.7	60-89	Mild Decrease
3	1.7-2.5	30-59	Moderate Decrease
4	2.5-4.0	15-29	Severe Decrease
5	> 4.0	< 15	ESRD (Kidney failure)

- Prognosis of CKD by GFR and albumin categories

		Albuminuria categories		
		A1	A2	A3
Stage	GFR	< 30 mg/L	30-300 mg/L	> 300 mg/L
1	≥90	Low risk	Medium risk	High risk
2	60-89			
3	45-59	Medium risk	High risk	Very high risk.
4	30-44	High risk		
5	15-29	Very high risk.		
6	<15			

- Working range: 0.1-7.5 mg/L

PERFORMANCE CHARACTERISTICS

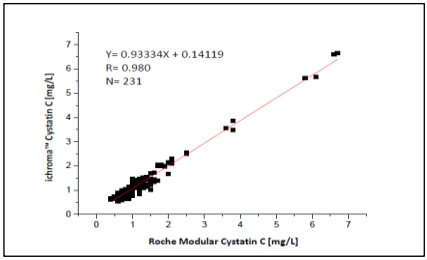
- **Specificity**
  There, in test samples, are biomolecules such as EDTA, urea, sodium citrate, D-glucose, heparin in higher concentration than their normal physiological levels. But this doesn't interfere with the **ichroma™ Cystatin C** test measurements, nor occurs any significant cross-reactivity.

Interference	Concentration
EDTA	100 mg/ml
Urea	2 mg/ml
Sodium Citrate	22 mg/ml
D-Glucose	10 mg/ml
Heparin	10 KU/ml

- **Prozone/Hook Effect**
  No prozone/hook effect was observed with **ichroma™ Cystatin C** at cystatin C concentrations less to 8 mg/L
- **Precision**
  The intra-assay precision was calculated by one evaluator, who tested different concentration of control standard ten times each with three different lots of **ichroma™ Cystatin C.** The inter-assay precision was confirmed by 3 different evaluators with 3 different lots, testing ten times each different concentration.

Cystatin C [mg/L]	Intra-assay		Inter-assay	
	Mean	CV (%)	Mean	CV (%)
0.5	0.48	3.11	0.48	2.66
1	0.99	1.38	0.98	3.18
2.5	2.35	1.84	2.32	3.04

- **Comparability**
  Cystatin C concentrations of 231 plasma samples were quantified independently with **ichroma™ Cystatin C** and Roche Modular as per prescribed test procedures. Test results were compared, and their comparability was investigated with linear regression and coefficient of correlation (R). Linear regression and coefficient of correlation between the two tests were Y=0.93334X + 0.14119 and R = 0.980 respectively.



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Note: Please refer to the table below to identify various symbols.

Σ	Sufficient for <n> tests
	Read instruction for use
	Use by Date
LOT	Batch code
REF	Catalog number
	Caution
	Manufacturer
EC REP	Authorized representative of the European Community
IVD	In vitro diagnostic medical device
	Temperature limit
	Do not reuse
CE	This product fulfills the requirements of the Directive 98/79/EC on in vitro diagnostic medical devices

For technical assistance, please contact:
Boditech Med Inc.'s Technical Services
Tel: +(82) -33 -243-1400
E-mail: sales@boditech.co.kr

Boditech Med Incorporated
43, Geodudanji 1-gil, Dongnae-myeon,Chuncheon-si, Gang-won-do, 24398, Republic of Korea
Tel: +(82) -33-243-1400
Fax: +(82) -33-243-9373
www.boditech.co.kr

EC REP **Obelis s.a**
Bd. Général Wahis 53, 1030 Brussels, BELGIUM
Tel: +(32) -2-732-59-54
Fax: +(32) -2-732-60-03
E-Mail: mail@obelis.net

CE IVD