BIO TECHNOLOGY boditech

Infection

ichroma™ CRP

INTENDED USE

ichroma™ CRP is a fluorescence Immunoassay (FIA) for the quantitative determination of CRP in human whole blood/serum/ plasma. It is useful as an aid in management and monitoring of autoimmune diseases and infectious processes, such as rheumatoid arthritis.
For *in vitro* diagnostic use only.

INTRODUCTION

The C-Reactive Protein (CRP) is synthesized by the liver in response to interleukin-6 and well known as one of the classical acute-phase reactants and as a marker of inflammation. CRP is the first acute-phase protein to be described and is an exquisitely sensitive systemic marker of inflammation and tissue damage. The acute-phase response comprises the nonspecific physiological and biochemical responses of endothermic animals to most forms of tissue damage, infection, inflammation, and malignant neoplasia. The serum CRP level may rise from a normal level of <5 mg/L to 500 mg/L during the body's general, non-specific response to infectious and other acute inflammatory events. For some time, the measurement of CRP concentration has been used as a clinical tool for monitoring autoimmune diseases and infectious processes, such as rheumatoid arthritis.[1,2]

PRINCIPLE

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

More antigens in the sample will form more antigen-antibody complexes which lead to stronger fluorescence signal by detector antibodies, which is processed by instrument for ichroma™ tests to show CRP concentration in the sample.

COMPONENTS

ichroma™ CRP consists of 'cartridges', 'detection buffer'.

- The cartridge contains the membrane called a test strip which has anti human CRP at the test line, and streptavidin 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 CRP fluorescence conjugate, BSA-biotin-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. Detection buffers are packaged in detection buffer box and further packed in a Styrofoam box with ice-pack for the shipment.

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 cartridge, if pouch is damaged or has already been opened.
- Frozen sample should be thawed only once. For shipping, samples must be packed in accordance with local regulations. Sample with severe hemolysis and/or hyperlipidemia must not be used.
- Allow the 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 buffers 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™ CRP** will provide accurate and reliable results subject to the below conditions.
  - Use **ichroma™ CRP** should be used only in conjunction with instrument for ichroma™ tests.
  - Have to use recommended anticoagulant sample.

Recommended anticoagulant
K_2 EDTA, K_3 EDTA, Sodium heparin

STORAGE AND STABILITY

Storage condition		
Component	Storage Temperature	Shelf life
Cartridge	2 - 30 °C	20 months
Detection buffer	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 the 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 result 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 i-CHROMA CRP-25

Components of **ichroma™ CRP**

- Cartridge Box:
  - Cartridge 25
  - ID Chip 1
  - Instruction for Use 1
  - Sample Collector 25
- Box containing Detection Buffer
  - Detection buffer 25

MATERIALS REQUIRED BUT SUPPLIED ON DEMAND

Following items can be purchased separately from **ichroma™ CRP**.

Please contact our sales division for more information.

- Instrument for ichroma™ tests
  - **ichroma™ Reader** REF FR203
  - **ichroma™ II** REF FPRR021
  - **ichroma™-50** REF FPRR022
- **Printer** REF FPRR007
- **Boditech CRP Control** REF CFPO-100

SAMPLE COLLECTION AND PROCESSING

The sample type for **ichroma™ CRP** is human whole blood/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. If longer storage is required, e.g. if the test could not be performed within 24 hours, serum or plasma should be immediately frozen below -20 °C. The freezing storage of sample up to 3 months does not affect the quality of results.
- However, the whole blood sample should not be kept in a freezer in any case.
- Once the sample was frozen, it should be used one time only for test, because repeated freezing and thawing can result in the change of test values.

TEST SETUP

- Check the contents of **ichroma™ CRP**: Sealed Cartridges, Detection buffers, Sample collectors, an ID Chip and an Instruction for use.
- Ensure that the lot number of the cartridges matches that of the detection buffers as well as the ID chip.
- If the sealed cartridge and the detection buffer 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.
- Insert the ID Chip into the ID chip port of the instrument for ichroma™ tests.
- Press the 'Select' button on the instrument for ichroma™ tests.

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

TEST PROCEDURE

▶ ichroma™ Reader/ ichroma™ II

<Multi Mode>

1) Make a puncture on the top of a detection buffer by inserting an empty sample collector.
2) Draw 10 µL (Human whole blood/serum/ plasma/control) of sample with a sample collector.
3) Assemble the sample collector and the detection buffer into one.
4) Shake 10 times or more until the sample out of the sample collector by inversion. The mixture of the buffer and the sample has to be used within 30 seconds.
5) Remove the cap off the top of assembled tube. Discard two drops of reagent onto the paper towel before applying to a cartridge.
6) Load only two drops of the mixture onto the sample well of the cartridge.
7) Leave the cartridge at room temperature for 3 min before inserting the device into the holder.

   ⚠ *Scan the sample-loaded cartridge immediately when the incubation time is over. If not, it will cause inaccurate test result.*
8) 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.
9) Press the 'Select' or Tap the 'START' button on the instrument for ichroma™ tests to start the scanning process.
10) Instrument for ichroma™ tests will start scanning the sample-loaded cartridge immediately.
11) Read the test result on the display screen of the instrument for ichroma™ tests.

< Single Mode >

1) Make a puncture on the top of a detection buffer by inserting an empty sample collector.
2) Draw 10 µL (Human whole blood/serum/plasma/control) of sample with a sample collector.
3) Assemble the sample collector and the detection buffer into one.
4) Shake 10 times or more until the sample out of the sample collector by inversion. The mixture of the buffer and the sample has to be used within 30 seconds.
5) Remove the cap off the top of assembled tube. Discard two drops of reagent onto the paper towel before applying to a cartridge.
6) Load only two drops of the mixture onto the sample well of the cartridge.
7) Inserting the device 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.
8) Press the 'Select' or Tap the 'START' button button on the instrument for ichroma™ tests.
9) Cartridge goes inside the Instrument for ichroma™ tests and will automatically start scanning the sample-loaded cartridge after 3 min.
10) Read the test result on the display screen of the instrument for ichroma™ tests.

▶ **ichroma™-50**

1) Insert the tip array in the tip station.
2) Insert the detection buffer array in the reagent station and cover the reagent station.
3) Open the detection buffer and insert it in the detection buffer station.
4) Open the cover of the magazine station and pull and lift the cartridge magazine.
5) Insert the cartridges in the cartridge magazine individually.
6) Insert the cartridge loaded cartridge magazine into the magazine station and close the cover of the magazine station.
7) Insert the sample tube into the blood collection tube rack and load the blood collection tube rack into the sampling station (loading part).
8) Tap the button located in the upper side of the No. of test cartridge region to select ID chip what you want to use.
9) When the selected cartridge slot is activated, set the number of test cartridge by tapping.
10) Tap the button located in the upper side of the No. of reagent region to select ID chip what you want to use.
11) When the selected slot is activated, set the number of detection buffer by tapping.
12) Set the number of pipette tips by tapping.
13) Tap the 'START' button on the left upper of the main screen to start test.

(Please refer to the ichroma™-50 operation manual for complete information and operation instructions.)

INTERPRETATION OF TEST RESULT

- Instrument for ichroma™ tests calculates the test result automatically and displays CRP concentration of the test sample in terms of mg/L.
- The cut-off (reference value): 10 mg/L
- Working range: 2.5-300 mg/L

QUALITY CONTROL

- Quality control tests are a part of the good testing practice to confirm the expected results and validity of the assay and should be performed at regular intervals.
- The control tests should be performed immediately after opening a new test lot to ensure the test performance is not altered.
- Quality control tests should also be performed whenever there is any question concerning the validity of the test results.
- Control materials are provided on demand with **ichroma™ CRP**. For more information regarding obtaining the control materials, contact Boditech Med Inc.'s Sales Division for assistance.

  (Please refer to the instruction for use of control material.)

PERFORMANCE CHARACTERISTICS

■ Analytical sensitivity

Analytical sensitivity of **ichroma™ CRP** was determined by testing 10 times with three lots of reagents. Analytical sensitivity of **ichroma™ CRP** system was 0.5 mg/L.

■ Specificity

Biomolecules such as hemoglobin, CEA, AFP, ALT, Troponin I, CK-MB, Albumin and serum amyloid P were added to the test sample(s) at concentration much higher than their normal physiological levels in the blood. ichroma CRP test results did not show any significant cross-reactivity with these biomolecules.

■ Precision

- Intra-assay

  The intra-assay precision was calculated by one evaluator, who tested different concentration of control standard twenty times each with three different lots of **ichroma™ CRP.**
- Inter-assay

  The inter-assay precision was confirmed by 3 different evaluators with 3 different lots, testing ten times each different concentration for ten days.

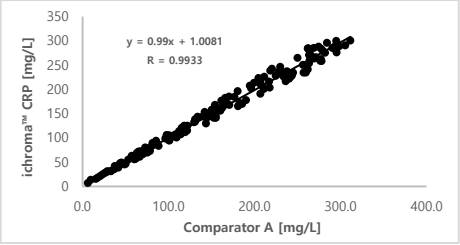
CRP (mg/L)	Intra-assay			Inter-assay		
	Mean	SD	CV (%)	Mean	SD	CV (%)
5.0	5.06	0.3	6.7	5.11	0.4	7.1
40.0	39.95	3.0	7.6	40.18	3.1	7.6
150.0	150.46	5.9	3.9	150.15	4.5	3.0

■ **Linearity**

The high pool (300 mg/L) was diluted with the low pool (2.5 mg/L) to the following final percentages; 100%, 75%, 50%, 25%, 10%, 5% and 0%. Sample was assayed in triplicate in one analytical run at each CRP level. The coefficient of linear regression was R=0.997.

■ **Comparability**

CRP concentrations of 166 samples were quantified independently with **ichroma™ CRP (ichroma™ Reader)** and Comparator A 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=0.99X + 1.0081 and R = 0.9933 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

CE IVD