BIO TECHNOLOGY boditech

Rheumatoid Arthritis

ichroma™ RF IgM

INTENDED USE

ichroma™ RF IgM is a fluorescence Immunoassay (FIA) for the quantitative determination of RF IgM in human whole blood/serum/plasma. It is useful as an aid in management and monitoring of rheumatoid arthritis.

For *in vitro* diagnostic use only.

INTRODUCTION

Rheumatoid arthritis (RA) is the most common chronic autoimmune arthritis worldwide, leading to disability and substantial economic costs. It is a chronic and systemic inflammatory disorder that may affect many tissues and organs, but principally attacks synovial joints. About 1% of the world's population is afflicted by rheumatoid arthritis, women three times more often than men. Onset is most frequent between the ages of 40 and 50, but people of any age can be affected. It can be a disabling and painful condition, which can lead to substantial loss of functioning and mobility if not adequately treated.

PRINCIPLE

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

The more antigen in sample forms the more antigen-antibody complex and leads to stronger intensity of fluorescence signal on detector antibody, which is processed by instrument for ichroma™ tests to show RF IgM concentration in sample.

COMPONENTS

ichroma™ RF IgM consists of 'Cartridges', 'Detection Buffer Tubes', 'Sample collectors' and an 'ID chip'.

- The cartridge contains a test strip, the membrane which has Human Immunoglobulin at the test line, while Streptavidin at the control line.
- Each cartridge is individually sealed in an aluminum foil pouch containing a desiccant. 25 sealed cartridges are packed in a box which also contains an ID chip and 25 sample collectors.
- The detection buffer contains anti human Immunoglobulin-fluorescence conjugate, BSA-Biotin fluorescence conjugate, bovine serum albumin (BSA) as a stabilizer and sodium azide in potassium phosphate buffer as a preservative.
- The detection buffer is dispensed in a tube. 25 detection buffer tubes are packaged in a 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, ID chip and detection buffer) 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 detection buffer tube should be used for processing of one sample only. A cartridge should be used for testing one sample only.
- The cartridge should remain sealed in its original pouch until just before use. Do not use 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 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 detection buffer tubes, pipette tips and cartridges 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™ RF IgM will provide accurate and reliable results subject to the below conditions.
  - ichroma™ RF IgM should be used only in conjunction with instrument for ichroma™ tests.
  - Have to use recommended anticoagulant sample.

Sample type	Recommended anticoagulant
Whole blood	EDTA, Sodium citrate, Li-haparin
Plasma	
Serum	Not applicable.

STORAGE AND STABILITY

- The cartridge is stable for 20 months (while sealed in an aluminum foil pouch) if stored at 4-30 °C.
- The detection buffer dispensed in a tube is stable for 20 months if stored at 2-8 °C.
- 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 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 CFPC-39

Components of **ichroma™ RF IgM**

- Cartridge Box:
  - Cartridges 25
  - Sample collectors 25

- ID Chip 1
- Instruction For Use 1

- Box containing Detection Buffer Tubes
  - Detection Buffer Tubes 25

MATERIALS REQUIRED BUT SUPPLIED ON DEMAND

Following items can be purchased separately from **ichroma™ RF IgM**. Please contact our sales division for more information.

- Instrument for ichroma™ tests
  - **ichroma™ Reader** REF FR203
  - **ichroma™ II** REF FPRR021
- **ichroma™ Printer** REF FPRR007
- **Boditech RF IgM Control** REF CFPO-103

SAMPLE COLLECTION AND PROCESSING

The sample type for **ichroma™ RF IgM** 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.
- Fingertip blood sample should be collected as follows:
  - Position the hand such that the palm should be facing upwards.
  - Blood should be normally drawn from the middle or ring finger of the non-dominant hand. Apply intermittent pressure on the least calloused finger towards its tip.
  - Wipe the fingertip clean with an alcohol pad.
  - Allow the finger to dry completely because blood will not form a drop if the puncture site is moist. The residual alcohol at the fingertip may also dilute the blood sample thereby affecting the test result.
  - Hold the finger and puncture the fingertip by firmly pressing a new sterile lancet against it at an off-center position.
  - Wipe away the first drop of blood with a sterile gauze pad or cotton ball.
  - Massage the finger towards its tip to form a new drop of blood. Blood will flow easily if the finger is held lower than the elbow.
  - Hold the handle of a capillary tube and touch the mouth of the capillary to the drop of blood.
  - Let the blood fill the capillary tube completely.
  - It may be sometimes necessary to massage the finger again for an additional drop of blood for filling the capillary tube.

TEST SETUP

- Check the contents of **ichroma™ RF IgM**: Sealed Cartridge, Detection Buffer Tubes, Sample collectors and ID Chip.
- Ensure that the lot number of the cartridge matches that of the ID chip as well as the detection buffer.
- Keep the sealed cartridge (if stored in refrigerator) and the detection buffer tube at room temperature for at least 30 minutes just prior to the test. Place the cartridge on a clean, dust-free and flat surface.
- 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

1) Make a puncture on the top of the detection buffer tube by inserting an empty sample collector.
2) Draw 10 µL (Human whole blood) of sample using a sample collector. If the sample is not whole blood, transfer 5 µL (Human serum / plasma / control) with a pipette to detection buffer tube.
   (If necessary, wipe out the excess blood outside of the capillary on the sample collector with paper towel.)
3) Assemble the sample collector and the tube into one.
4) Shake the 10 times or more until the sample out of the sample collector by inversion. The mixture of 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 sample mixture onto the paper towel before loading.
6) Load only three drops of the mixture onto the sample well of the cartridge.
7) Leave the sample-loaded test cartridge at room temperature for 5 minutes.
   ⚠ *Scan the sample-loaded cartridge immediately when the incubation time is over. If not, it will cause inexact 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 has been marked on the cartridge especially for this purpose.
9) Press 'Select' 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.

INTERPRETATION OF TEST RESULT

- Instrument for ichroma™ tests calculates the test result automatically and displays RF IgM concentration of the test sample in terms of IU/mL.
- The cut-off (reference value) : 15 IU/mL
- Working range : 8-200 IU/mL

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 not provided with **ichroma™ RF IgM**. 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:**
  - Limit of Blank (LoB): 2.6 IU/mL
  - Limit of Detection (LoD): 3.28 IU/mL
  - Limit of Quantification (LoQ): 7.78 IU/mL
- **Analytical specificity**:
  - Cross-reactivity
    Cross-reactivity test is not considered because RF is non-specific for non-rheumatic and healthy persons.

- Interference
  There, in test samples, are biomolecules such as hemoglobin, bilirubin, triglyceride in higher concentration than their normal physiological levels. But this doesn't interfere with the **ichroma™ RF IgM** test measurements.

Interference material	Standard material conc. (IU/mL)		
	14	54	109
	Interference rate (%)		
Hemoglobin (500 mg/dL)	1.9	3.2	4.0
Bilirubin (40 mg/dL)	3.9	0.7	1.8
Triglyceride (2,000 mg/dL)	1.3	3.3	5.5

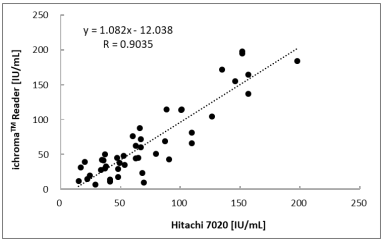
- **Precision**
  - Between lot
    One person tested three different lots of **ichroma™ RF IgM,** ten times at each concentration of the control standard.
  - Between person
    Three different persons tested **ichroma™ RF IgM,** ten times at each concentration of the control standard.
  - Between day
    One person tested **ichroma™ RF IgM** during five days**,** five times at each concentration of the control standard.
  - Between site
    One person tested **ichroma™ RF IgM** at three different sites, five times at each concentration of the control standard.

RF IgM	Between lot		Between person		Between day		Between site	
[IU/mL]	AVG	CV (%)	AVG	CV (%)	AVG	CV (%)	AVG	CV (%)
14	13.46	5.7	13.20	5.9	13.70	5.5	13.69	5.8
54	51.82	3.7	52.20	4.3	52.04	3.6	52.63	3.1
109	100.31	3.3	101.88	6.5	99.38	3.2	100.80	3.2

- **Accuracy**
  The accuracy was confirmed by testing with 3 different lots of **ichroma™ RF IgM.** The tests are repeated 6 times in each different concentration.

RF IgM [IU/mL]	Lot 1	Lot 2	Lot 3	Mean	CV (%)	Bias (%)
15.75	16.29	16.49	16.37	16.38	0.55	4.0
20.25	20.92	20.63	20.90	20.82	1.33	2.8
33.75	36.37	36.86	35.83	36.36	1.61	7.7
61.00	62.43	61.13	61.40	61.65	4.93	1.5
81.25	73.66	74.54	73.45	73.88	1.61	-8.8

- **Comparability:** RF IgM concentrations of 89 clinical samples were quantified independently with **ichroma™ RF IgM** and HITACHI 7020 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=1.082 X - 12.038 and R = 0.9035 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

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