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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 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-antibody on a 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 the instrument for ichroma™ tests to show RF IgM concentration in the sample.

COMPONENTS

ichroma™ RF IgM consists of 'cartridges', 'detector tubes' and 'detector diluent'.

- The cartridge contains the membrane called a test strip, which has Purified Human IgG at the test line, and Streptavidin at the control line. All cartridges are individually sealed in an aluminum foil pouch containing a desiccant, and they are further packaged in a box.
- The detector tube has a granule anti human immunoglobulin-fluorescence conjugate, BSA-Biotin fluorescence conjugate, sucrose, bovine serum albumin (BSA) as a stabilizer and sodium azide as a preservative in phosphate buffered saline (PBS). All detector tubes are packed in a pouch.
- The detector diluent contains Tween20 as a surfactant, EDTA, NaCl and sodium azide in potassium phosphate, and it is dispensed in a vial. The detector diluent is packed in a box.

WARNINGS AND PRECAUTIONS

- For *in vitro* diagnostic use only.
- Follow the instructions and procedures described in this 'Instructions for use'
- Use only fresh samples and avoid direct sunlight.
- Lot numbers of all the test components (cartridge, detector tube, detector diluent 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 detector tubes. A cartridge should be used for testing one sample only. A detector 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 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.
- If test components and/or sample are stored in refrigerator, then allow cartridge, detector tube, detector diluent 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, detector tubes, detector diluent and pipette tips should be handled carefully and discarded by an appropriate method in accordance with relevant local regulations.
- The detector tube and the detector diluent contain sodium azide (NaN_3), and they may cause certain health issues like convulsions, low blood pressure and heart rate, loss of consciousness, lung injury and respiratory failure. Avoid contact with skin, eyes, and clothing. In case of contact, rinse immediately with running water.
- No Biotin interference was observed in **ichroma™ RF IgM** when biotin concentration in the sample was below 3,500 ng/mL. If a patient has been taking biotin at dosage of more than 0.03 mg a day, it is recommended to test again 24 hours after discontinuation of biotin intake.
- **ichroma™ RF IgM** will provide accurate and reliable results subject to the below conditions.
  - **ichroma™ RF IgM** should be used only in conjunction with the instrument for ichroma™ tests.
  - Have to use recommended anticoagulant.

Recommended anticoagulants
Na_2 EDTA, K_2 EDTA, Sodium citrate, Lithium Heparin

STORAGE AND STABILITY

Storage condition			
Component	Storage Temperature	Shelf life	Note
Cartridge	2 - 30 °C	20 months	Disposable
Detector tube	2 - 30 °C	20 months	Unopened
Detector diluent	2 - 30 °C	20 months	Unopened
	2 - 30 °C	3 months	Opened

- 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 in conjunction with clinical symptoms and other relevant test results.

MATERIALS SUPPLIED

REF CFPC-39

Components of **ichroma™ RF IgM**

- Cartridge box:
  - Cartridge 25
  - Detector tube 25
  - Detector diluent 1
  - ID chip 1
  - Instructions for use 1

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™ III** REF FPRR037
  - **ichroma™ M3** REF FPRR035
- **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 samples (serum, plasma) should be separated from the clot by centrifugation within 3 hours after the collection of whole blood.
- The samples (serum, plasma) may be stored for a week at 2-8 °C prior to being tested. If testing will be delayed more than a week, samples (serum, plasma) should be frozen at -20 °C.
- The samples (serum, plasma) stored frozen at -20 °C for 2 months showed no performance difference.
- However, the whole blood sample should not be kept in a freezer in any case.
- As a repeated freeze thaw cycle may affect the test result, do not refreeze previously frozen samples.

TEST SETUP

- Check the contents of **ichroma™ RF IgM**: Sealed cartridges, detector tubes, a detector diluent, an ID chip, and an instructions for use.
- Ensure that the lot number of the cartridges matches that of the detector tube, the detector diluent as well as an ID chip.
- If the sealed cartridge, the detector tube and the detector diluent 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'.

※ **Please refer to the instrument for ichroma™ tests operation manual for complete information and operating instructions.**

TEST PROCEDURE

▶ **ichroma™ Reader, ichroma™ II, ichroma™ M3**

Multi test mode

1) Take 150 µL of detector diluent using a pipette and dispense it to the detector tube containing a granule. When the granule form is completely dissolved in the tube, it becomes detection buffer. (The detection buffer must be used immediately. Do not exceed 30 seconds.)
2) Take 10 µL (Human whole blood) or 5 µL (Human serum/plasma/control) of sample using a pipette and dispense it to the detector tube.
3) Close the lid of the detector tube and mix the sample thoroughly by shaking it about 10 times. (The sample mixture must be used immediately. Do not exceed 30 seconds.)
4) Take 75 µL of the sample mixture and dispense it into the sample well of the cartridge.
5) 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*

inaccurate test result.

6) 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.
7) Press the 'Select' or tap the 'Start' button on the instrument for ichroma™ tests to start the scanning process.
(ichroma™ M3 is tested automatically after inserting.)
8) The instrument for ichroma™ tests will start scanning the sample-loaded cartridge immediately.
9) Read the test result on the display screen of the instrument for ichroma™ tests.

Single test mode

1) The test procedure is same with the 'Multi test mode 1) – 4)'.
2) Insert the sample-loaded 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.
3) Press the 'Select' or tap the 'Start' button on the instrument for ichroma™ tests.
(ichroma™ M3 is tested automatically after inserting.)
4) The cartridge goes inside the instrument for ichroma™ tests and will automatically start scanning the sample-loaded cartridge after 5 minutes.
5) Read the test result on the display screen of the instrument for ichroma™ tests.

▶ **ichroma™ III**

1) The test procedure is same with the 'Single test mode'.

INTERPRETATION OF TEST RESULT

- The instrument for ichroma™ tests calculates the test result automatically and displays RF IgM concentration of the test sample in terms of IU/mL.
- Cut-off 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.
- 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™ RF IgM**. For more information regarding obtaining the control materials, contact Boditech Med Inc.'s Sales Division for assistance.
(Please refer to the instructions for use of control material.)

PERFORMANCE CHARACTERISTICS

- **Analytical sensitivity:**
  - Limit of Blank (LoB): 2.630 IU/mL
  - Limit of Detection (LoD): 3.667 IU/mL
  - Limit of Quantitation (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
    Interferents listed in the following table were added to the test at the concentration mentioned below. **ichroma™ RF IgM** test results did not show any significant interference with these materials.

Interferents	Std. conc. [IU/mL]		
	14	54	109
	Interference (%)		
Hemoglobin (500 mg/dL)	2.31	0.49	3.20
Bilirubin (40 mg/dL)	0.44	-0.35	3.04
Triglyceride (2,000 mg/dL)	-1.75	2.53	2.33
Biotin (3,500 ng/mL)	-1.49	-0.75	1.08

- **Precision**
  - Single-site study
    Repeatability (within-run precision)
    within-laboratory precision (Total precision)
    Lot to lot precision
    3 Lots of **ichroma™ RF IgM** were tested for 20 days. Each standard material was tested 2 times per day. For each test, each material was duplicated.
  - Multi-site study
    Reproducibility
    1 Lot of **ichroma™ RF IgM** was tested for 5 days in 3 different sites (1 person per 1 site, 1 instrument per 1 site). Each standard material was tested 1 time per and 5 replicates per day.

RF IgM [IU/mL]	Repeatability		Within-lab	
	Mean	CV (%)	Mean	CV (%)
14	14.31	7.52	14.39	7.53
54	53.39	6.14	53.86	5.92
109	107.12	6.08	108.27	6.08

RF IgM [IU/mL]	Lot to lot		Reproducibility	
	Mean	CV (%)	Mean	CV (%)
14	14.20	7.50	13.91	6.29
54	54.03	6.31	54.72	7.26
109	109.14	6.1	109.81	7.89

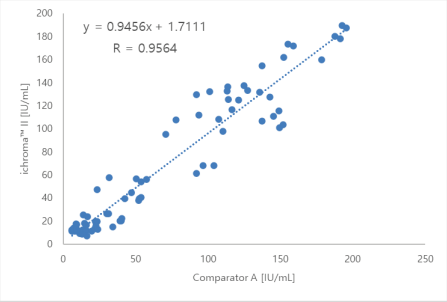
■ **Accuracy**

The accuracy was confirmed by testing with 3 different lots of **ichroma™ RF IgM.** The tests were repeated 10 times at each concentration of the control standard.

RF IgM [IU/mL]	Lot 1	Lot 2	Lot 3	Mean	Recovery (%)
8	7.74	8.11	7.66	7.83	97.9
14	13.78	14.59	14.35	14.24	101.7
27	27.33	28.06	26.85	27.41	101.5
54	52.80	54.48	53.94	53.74	99.5
109	109.35	104.04	105.81	106.40	97.6
200	201.30	206.65	202.82	203.59	101.8

■ **Comparability**

RF IgM concentrations of 90 clinical samples were quantified independently with **ichroma™ RF IgM (ichroma™ II)** and **comparator A** as per prescribed test procedures. Test results were compared, and their comparability was investigated with linear regression and correlation coefficient (R). The regression equation and correlation coefficient are as follows.



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

	Sufficient for <n> tests
	Read instruction for use
	Use by Date
LOT	Batch code
REF	Catalog number
	Caution
	Manufacturer
	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:
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