SARS-CoV-2 IgM

iFlash
Immunoassay Analyzer

REF C86095M **2×50 Tests** CE

INTENDED USE

The iFlash-SARS-CoV-2 IgM assay is a paramagnetic particle chemiluminescent immunoassay (CLIA) for qualitative determination of IgM antibody to SARS-CoV-2 in human serum and plasma using the iFlash Immunoassay Analyzer. The iFlash-SARA-CoV-2 IgM aids in the diagnosis of SARS-CoV-2 infection and the determination of immunity.

SUMMARY AND EXPLANATION

SARS-CoV-2 was first founded in a viral pneumonia case in Wuhan in 2019. The researcher detected new strains of coronavirus in patient samples in January 7, 2020, and completed viral nucleic acid test in January 10, 2020, the virus was named as SARA-CoV-2 by the International Committee on Taxonomy of Viruses (ICTV). SARA-CoV-2 is a new strain of coronavirus that has never been found in human before.[1-3] Coronaviruses are a large family of viruses. There are known to cause influenza and more serious illnesses such as MERS and SARS. The similarity between SARS-CoV-2 and SARS virus in the whole genome is about 80%.[4] From the current cognition, the SARS-CoV-2 is weaker than SARS in virulence, in transmissibility, SARA-CoV-2 has a long incubation period, and asymptomatic infected persons can also infect other people, and all population is susceptible, which lead to greater difficulty in transmission control. On January 29, 2020, the confirmed case of SARS-CoV-2 infection is more than that of SARS in 2003. Based on current epidemiology investigation, the incubation period of the disease is generally 3-7 days, 1 day at least and 14 days at the most. It remains infectious during this period. The virus can be transmitted from person to person, mainly through droplets and contact, and there may be a risk of aerosol transmission in close, unventilated places.[5-6] People with low immunity are in more serious condition after being infected and children and infants can also be infected. The common symptoms after infected are respiratory symptom, fever, cough, anhelation and dyspnea. In more severe cases, the infection can cause pneumonia, severe acute respiratory syndrome, renal failure and even death.[7-8]

There is no specific drug and vaccine for SARS-CoV-2 at present. 7 days after SARS-CoV-2 infection, the body will produce IgM antibody against the virus and the IgG antibody will be produced at 14th days. The antibody produced is protective and can promote recuperation and self-cure from virus infection.

ASSAY PRINCIPLE

The iFlash-SARS-CoV-2 IgM assay is a two-step indirect immunoassay.

- 1st incubation: Add pre-diluted sample, sample treating agent, SARS-CoV-2 IgM antibody in the sample and SARS-CoV-2 antigen-coated paramagnetic microparticles react to form antigen-antibody complex.
- Wash: Under magnetic field, magnetic particles are absorbed to the inner wall of reaction tubes and the unbound materials are washed away from the solid phase in a magnetic field.
- 2nd incubation: Acridinium-labeled anti-human IgM conjugate is added for further reaction to form an antigen-antibody-anti-human IgM antibody complex.
- Another Wash.
- Trigger of signal: The Pre-Trigger and Trigger Solutions are added to the reaction mixture. The resulting chemiluminescent reaction is measured as relative light units (RLUs).
- A direct relationship exists between the amount of SARS-CoV-2 IgM antibody in the sample and the RLUs detected by the iFlash optical system.
- Results are determined via a calibration curve, which is instrument-specifically generated by 2-point calibration and a master curve provided via the reagent QR code.

REAGENTS

Reagent kit, 100 tests, 2 packs, 50 tests/pack; Composition from different batch cannot be interchanged.

R1	SARS-CoV-2 antigen (recombinant protein) - coated paramagnetic microparticles, 3.5 mL/pack; ProClin 300.
R2	Acridinium-labeled anti-human IgM conjugate; 6.5 mL/pack; ProClin 300.
R3	Reaction buffer, 8.0 mL/pack; surfactant, ProClin 300.
R4	Sample treating agent, 6.5mL/pack; surfactant, ProClin 300.
CAL1	1 bottle, 1.0 mL, protein stabilizers, ProClin 300.
CAL2	1 bottle, 1.0 mL, humanized SARS-CoV-2 antibody, protein stabilizers, ProClin 300.

MATERIALS REQUIRED (BUT NOT PROVIDED)

REF C89999/ C89959/ C89949, iFlash Pre-Trigger Solution: hydrogen peroxide solution.

REF C89998/ C89958/ C89948, iFlash Trigger Solution: sodium hydroxide solution.

REF C89997, iFlash Wash Buffer: phosphate buffered saline solution with 0.05% ProClin 300.

REF C80001, iFlash Wash Buffer (10×): phosphate buffered saline solution with 0.05% ProClin 300.

REF C89996, reaction vessels.

WARNINGS AND PRECAUTIONS

IVD For in vitro diagnostic use

- The calibrators and controls have been prepared exclusively from the blood of donors tested individually and shown to be free from HBsAg, anti-HCV, anti-HIV-1/2 and anti-TP by approved methods.
- No known test method can offer the complete assurance that products derived from human sources will not transmit infection. Therefore, all human sourced materials should be considered potentially infectious.
- For methodology and immunologic specificity, different detection results of sample by reagent kit may be obtained from different manufacturers. Therefore, the results obtained by the determination of different reagents should not be directly compared with each other, so as to avoid the wrong medical interpretation. It is recommended that the laboratory indicate the characteristics of the reagent used in the test report.

- Exercise the normal precautions required for handling all laboratory reagents.
- Disposal of all waste material should be in accordance with local guidelines.
- Wear gloves when handling specimens or reagents.
- Clean and disinfect all spills of specimens or reagents using a suitable disinfectant.
- iFlash Trigger solution contains sodium hydroxide (NaOH) and should be avoided contact with eyes.
- For further information on warnings and precautions, see Annex B.

REAGENT HANDLING

- The reagents may not be used after the stated expiration date.
- Avoid the formation of foam with all reagents.
- The reagents in the pack and calibrators are ready for use.
- Close the bottles of calibrator right after calibration and store at 2-8°C.
- Do not pool reagents within a reagent kit or between reagent kits.
- Prior to loading the iFlash-SARS-CoV-2 IgM reagent pack on the system for the first time, resuspending the microparticles by inverting the reagent pack slightly.
- For further information on reagent handling precautions during system operation, refer to the iFlash system operating instruction.

STORAGE AND STABILITY

Storage:

- Store at 2-8°C in an upright position.
- The kit may be used immediately after removal from 2-8°C storage.

Stability:

- Unopened at 2-8°C: up to the stated expiration date.
- Opened at 2-8°C: 28 days.
- Store on-board: 28 days.

SPECIMEN COLLECTION AND PREPARATION

- Serum or plasma (EDTA anticoagulant) is the recommended sample. Other anticoagulants have not been validated for use with the iFlash-SARS-CoV-2 assay.
- Centrifuge the specimens, avoiding bubbles before detection.
- Ensure that complete clot formation in serum specimens has taken place prior to centrifugation. (Clotting time is not less than 1 hour). For patients undergoing heparin (anticoagulant) treatment, prolong the time for clot formation in serum specimens.
- If the sample is frozen, the sample should be thoroughly mixed by low speed vortex or reverse back and forth and the sample may be frozen for maximum 2 times.
- Frozen specimens must be mixed thoroughly after thawing.
- Centrifuge specimens with a lipid layer on the top, and transfer only the clarified specimen without the lipemic material.
- Centrifuge the specimens prior to test if clotted fibrin and cellular material exist, or after freeze-thawing.
- Ensure that residual fibrin and cellular matter have been removed prior to analysis.
- Store specimens at refrigerate temperature (2 to 8℃) for no longer than 3 days. For long time storage at -20℃.
- Use with caution in handling patient specimens to prevent cross-contamination.
- Do not use hemolysis, lipedemia, microbial contamination or floccule samples.
- The deviation of testing result may occur when using heat-inactivated samples.
- Ensure that the patient samples, calibrators and controls are at ambient temperature (20-25°C) before measurement.
- Due to the possible evaporation, specimens and calibrators on the analyzers should be measured within 2 hours.
- Samples must be packed and labeled according to the relevant national and international regulations for transport of clinical samples and contaminated materials.
- Samples should be sent to laboratory once collected, if long distance transportation is needed, it is recommended that dry ice and other refrigeration method is needed.

ASSAY PROCEDURE

- Refer to the system operating instruction or the online help system for detailed information on preparing the system.
- The test-specific parameters stored in barcode on the reagent pack are read in. In cases the barcode cannot be read, enter the sequence numbers.
- Load iFlash-SARS-CoV-2 IgM rack, before placing on the analyzer, fully suspension of R1.
- Before testing, the analyzer will automatically resuspend the magnetic particles to mixing.
- Place the calibrators CAL1, CAL2 in the calibrator rack in the sample zone. Only keep calibrators open during calibration.
- Load samples.
- The working environment is recommended as 10℃ ~30℃.
- Calibration application.
- Test application.
- Click RUN, the iFlash System performs all the functions automatically and calculates the results.

CALIBRATION

- Every iFlash-SARS-CoV-2 IgM reagent kit has a QR code label containing the specific information for calibration of the particular reagent lot.
- To perform an iFlash-SARS-CoV-2 IgM calibration, test CAL1. CAL2 in duplicate, and the predefined master curve is adapted to the analyzer.
- Once an iFlash-SARS-CoV-2 IgM calibration is accepted and stored, all subsequent samples may be tested without further calibration unless:
  - After 28 days when using the same reagent lot.
  - A reagent kit with a new lot number is used.
  - Controls are out of range.
  - Required by pertinent regulations.

QUALITY CONTROL

Quality control materials should be run as single determinations at least once every 24 hours when the test is in use, once per reagent kit and after every calibration. Include commercially available quality control materials that cover at least two levels of analyte. Follow manufacturer's instructions for reconstitution and storage. Each laboratory should establish mean values and acceptable ranges to assure proper performance. Quality control results that do not fall within acceptable ranges may indicate invalid test results.

CUT-OFF

10 AU/mL

RESULT

Calculation:

The iFlash system automatically calculates the analytic concentration of each sample. The results are given in AU/mL.

Interpretation of Results

- Nonreactive: < 10.0 AU/mL
- Reactive: ≥ 10.0 AU/mL
  - Individuals with nonreactive results are presumed to be not infected with SARS-CoV-2 and susceptible to primary infection.
  - A reactive result is potentially at risk of transmitting SARS-CoV-2 virus infection and should be confirmed combined with clinical manifestations or other diagnostic methods.
- The results may be influenced by:
  - Failed to calibrate according to calibration requirements
  - Failed to follow the operation instructions of the applicable instrument.
  - Irregular collection, preparation, storage and transportation of samples.
  - The QC is out of limited range.
- A confirmation test is needed in such case:
  - The RLU of sample is abnormal. Such as excessive CV, no RLU value or excess RLU value.
  - When the assay result is inconsistent with clinical symptoms.

LIMITATIONS

- The iFlash-SARS-CoV-2 IgM assay is limited to the determination of SARS-CoV-2 IgM antibody in human serum or plasma (EDTA anticoagulant). It has not been validated for use with other types of plasma.
- The results of this product are for clinical reference only and should not be used as the sole basis for clinical diagnosis and treatment.
- The use of serum separator (gel) blood collection tubes has been validated for use with this assay; however it is not possible to survey all manufacturers or tube types.
- If the results are inconsistent with clinical evidence, additional testing is suggested to confirm the result.
- The assay is unaffected by icterus (bilirubin < 60 mg/dL), hemolysis (Hb < 1000 mg/dL), lipemia (Intralipid < 3000 mg/dL) and total serum protein (< 10 g/dL).
- The assay is unaffected by HAMA (<600 ng/mL), RF (< 1000 IU/mL) and ANA(<500 U/mL).

PERFORMANCE CHARACTERISTICS

Positive coincidence rate

No negative result will be tested with positive reference.

Negative coincidence rate

No positive result will be tested with negative reference.

Analytical sensitivity

To test the lowest detection reference (L1-L4), the results of L1 shall be positive, L2 shall be positive, L3 could be positive or negative, L4 shall be negative.

Repeatability

The coefficient of variation (CV) ≤10%.

Inter-batch

The coefficient of variation (CV) ≤15%.

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ANNEX A:

Explanation of abbreviation

Abbreviation	Explanation
REF	Catalogue number
CAL	Calibrator
R	Reagent
	Contains sufficient for <n> tests
	Manufacturer
EC REP	Authorized representative in the European Community
CE	CE Conformity Marking
	Caution
	Consult instructions for use
IVD	In vitro diagnostic medical device
LOT	Batch code
	Date of manufacture
	Use-by date
	Temperature limit (2-8°C)
	Biological risks
GHS07 	Pictograms for Caution
GHS09 	Pictograms for Hazardous to the aquatic environment
	This way up

ANNEX B:

WARNINGS AND PRECAUTIONS (Proclin 300)

- Hazardous Component: Proclin 300

  (Reaction mass of: 5-chloro-2-methyl-4-isothiazolin [EC no. 247-500-7] and 2-methyl-4-isothiazolin-3-one [EC no. 220-239-6] (3:1))
- Hazard Statement:

  H317: May cause an allergic skin reaction.

  H410: Very toxic to aquatic life with long-lasting effects.
- Precautionary Statement:

  P261: Avoid breathing dust/ fume/ gas/ mist/ vapours/ spray.

  P272: Contaminated work clothing should not be allowed out of the workplace.

  P273: Avoid release to the environment.

  P280: Wear protective gloves/protective clothing/eye protection/face protection.

  P302+P352: IF ON SKIN: Wash with plenty of soap and water.

  P333+P313: If skin irritation or rash occurs: Get medical advice/attention.

  P321: Seek immediate care from a doctor.

  P363: Wash contaminated clothing before reuse.

  P391: Collect spillage.

  P501: Dispose of contents/container in a safe way.