QDx Instacheck™ NT-proBNP

INTENDED USE

QDx Instacheck™ NT-proBNP is a fluorescence Immunoassay (FIA) for the quantitative determination of NT-proBNP in human whole blood/ serum/plasma. It is useful as an aid in the diagnosis of persons suspected of having congestive heart failure.
For *in vitro* diagnostic use only.

INTRODUCTION

N-terminal pro-brain natriuretic peptide (NT-proBNP) is produced predominantly by the cardiac ventricular myocytes [1] and is released in response to myocardial stress and filling pressure [2] and is involved in maintaining intravascular volume homeostasis [3,4]. After stimulation of heart muscle cells, the natriuretic peptides are produced as prohormones (proBNP) and this is cleaved into two fragments which are secreted into the bloodstream as the 32 amino acids active BNP and the N-terminal fragment of 76 amino acids designated as NT-proBNP. NT-proBNP immunoassays are widely used and are now considered to be a useful marker and have a high degree of diagnostic accuracy in clinical practice and cardiovascular research as a diagnostic tool for the occurrence and severity of heart failure (HF) [5,6,7]. Therefore NT-proBNP measurements in human blood are helpful not only for the cardiac disease diagnosis but also for evaluation of patients with suspected HF and assessment of severity of the disease.

PRINCIPLE

The test uses a sandwich immunodetection method; dried detector antibody in the buffer binds to antigen in the sample, forming antigen-antibody complexes, and migrates onto the nitrocellulose matrix to be captured by the other immobilized-antibodies 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 **QDx Instacheck™** tests to show NT-proBNP concentration in sample.

COMPONENTS AND REAGENTS

QDx Instacheck™ NT-proBNP 'cartridges', 'detector tubes', 'detector diluent', 'ID chip' and 'instruction for use'.

- The cartridge contains the membrane called a test strip which has Streptavidin at the test line 1 and 2, and chicken IgY at the control line. All cartridges are individually sealed in an aluminum foil pouch containing a desiccant in a box.
- The detector tube has 2 granules containing Mouse Monoclonal Anti-NT-proBNP-fluorescence conjugate, Anti-chicken IgY-fluorescence conjugate, Mouse Monoclonal Anti-NT-proBNP-Biotin conjugate, Bovine Serum Albumin (BSA) as a stabilizer and sodium azide as a preservative in phosphate buffered saline. All detector tubes are packed in a pouch.
- The detector diluent contains Tween 20 as surfactant, Sodium azide as a preservative and NaCl in phosphate buffered saline, and it is pre-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 'Instruction for use'.
- Use only fresh samples and avoid direct sunlight.
- Lot numbers of all the test components (cartridge, ID chip and detector and diluent) 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 misleading of test result(s).
- Do not reuse cartridges or detector tubes. A detector 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 before use. Do not use the cartridge, if is damaged or already 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 hyperlipidemia must not be used.
- Allow the cartridge, detector, diluent and sample to be at room temperature for approximately 30 minutes.
- The instrument for QDx Instacheck™ tests may generate slight vibration during use.
- Used detectors, diluent, pipette tips, capillary tubes 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.
- **QDx Instacheck™ NT-proBNP** will provide accurate and reliable results subject to the below conditions.
  - **QDx Instacheck™ NT-proBNP** should be used only in conjunction with instrument for QDx Instacheck™ test.
  - Have to use recommended anticoagulant sample.

Recommended anticoagulant
K_2 EDTA, K_3 EDTA, Sodium heparin, Lithium heparin

STORAGE AND STABILITY

Storage condition			
Component	Storage Temperature	Shelf life	Note
Cartridge	4 - 30 °C	20 months	Disposable
Detector	2 - 8 °C	20 months	
Diluent	2 - 8 °C	20 months	Unopened
	2 - 8 °C	12 months	opened

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

LIMITATIONS 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 IFPC-31

Components of **QDx Instacheck™ NT-proBNP**

- **Cartridge Box:**
  - Cartridges 25
  - ID Chip 1
  - Instruction for Use 1
- **Buffer box:**
  - Detector tube 25
  - Detector diluent 1

MATERIALS REQUIRED BUT SUPPLIED ON DEMAND

Following items can be purchased separately from **QDx Instacheck™ NT-proBNP**.

Please contact our sales division for more information.

- **QDx Instacheck™ II** REF FPRR039
- **i-Chamber** REF FPRR009

SAMPLE COLLECTION AND PROCESSING

The sample type for **QDx Instacheck™ NT-proBNP** 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 wholeblood.
- If testing will be delayed more than 24 hours, serum or plasma sample should be frozen at -20 °C.
- Serum or plasma sample stored frozen at -20 °C for 3 months showed no performance difference.
- 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 components of **QDx Instacheck™ NT-proBNP:** Sealed Cartridges, Detector tubes, Detector diluent ID chip and Instruction for use.
- Ensure that the lot number of the cartridge matches that of the the detector tube, the detector diluent as well as the ID chip.
- If the sealed cartridges, the detector tubes 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 i-Chamber and set temperature to 25°C. To reach 25°C, it takes approximately 5-10 minutes. The necessary time may vary depending on environmental conditions.
- Turn on the instrument for QDx Instacheck™ test.
  (Please refer to the 'Instrument for QDx Instacheck™ test Operation Manual' for complete information and operating instructions.)

TEST PROCEDURE

1) Put the test cartridge into the i-Chamber slot.dnfle
2) Transfer 150 µL of diluent using a pipette to a tube containing detector.
3) Transfer 10 µL of sample (Human whole blood/serum/plasma/ control) to the detector tube.
4) Close the lid of the detector tube and mix the sample thoroughly by shaking it about 20 times
5) Pipette out 75 µL of a sample mixture and load it into the sample well on the cartridge.
6) Insert the sample-loaded cartridge into the i-Chamber slot (25°C) and leave the cartridge in i-Chamber for 12 minutes.

   ⚠ *Scan the sample-loaded cartridge immediately when the incubation time is over. If not, it will cause inaccurate test result.*
7) To scan the sample-loaded cartridge, insert it into the cartridge holder of the instrument for QDx Instacheck™ 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.
8) Tap the 'START' button on the instrument for QDx Instacheck™ test.
9) The instrument for QDx Instacheck™ tests will start scanning the sample-loaded cartridge immediately.
10) Read the test result on the display screen of the instrument for QDx Instacheck™ tests.
    (Please refer to the Instrument for QDx Instacheck™ tests operation manual for complete information and operation instructions.)

INTERPRETATION OF TEST RESULT

- The instrument for QDx Instacheck™ test calculates the test result automatically and displays NT-proBNP concentration of the test sample in terms of pg/mL
- Cut-off (reference value): 300 pg/mL
- Working range: 10-30,000 pg/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 standards are provided on demand with **QDx Instacheck™ NT-proBNP**. For more information regarding obtaining the control standards, contact the technical section at Diasys Diagnostics India Private Limited.
  (Please refer to the instruction for use of control material.)

PERFORMANCE CHARACTERISTICS

- **Analytical sensitivity**

Limit of Blank (LOB)	6 pg/mL
Limit of Detection (LOD)	10 pg/mL
Limit of Quantitation (LOQ)	30 pg/mL

- **Analytical specificity**

- Cross-reactivity

There was no significant cross-reactivity from these materials with the **QDx Instacheck™ NT-proBNP** test measurements.

Cross-reactivity material	Conc. (ng/mL)
Troponin Complex	1,000
CK-MB	1,000
D-Dimer	20,000
Myoglobin	10,000

- Interference

There was no significant cross-reactivity from these materials with the **QDx Instacheck™ NT-proBNP** test measurements.

Interference material	Conc.
Bilirubin	350 µmol/L
Cholesterol	13 mmol/L
D-Glucose	1,000 mg/dL
Hemoglobin	2 g/L
L-Ascorbic acid	350 µmol/L
Triglyceride mixture	500 mg/dL

- **Precision**

- Between lot

One person tested three different lots of **QDx Instacheck™ NT-proBNP,** ten times at each concentration of the control standard.

- Between person

Three different persons tested **QDx Instacheck™ NT-proBNP**, ten times at each concentration of the control standard.

- Between day

One person tested **QDx Instacheck™ NT-proBNP** for five days, ten times at each concentration of the control standard.

- Between site

One person tested **QDx Instacheck™ NT-proBNP** at three different sites, ten times at each concentration of the control standard.

Conc. (pg/mL)	between Lot		between person	
	mean	CV (%)	mean	CV (%)
234	233.43	5.93	233.98	5.55
1875	1844.81	6.32	1870.93	5.65
15000	15060.43	5.34	14950.65	5.27
Conc. (pg/mL)	between day		between site	
	mean	CV (%)	mean	CV (%)
234	234.76	6.35	234.10	6.26
1875	1866.67	5.90	1884.38	5.53
15000	14894.60	6.22	14973.26	5.88

- **Accuracy**

The accuracy was confirmed by testing with three different lots of **QDx Instacheck™ NT-proBNP**. The tests are repeated 10 times in each different concentration.

Conc. [pg/mL]	Lot 1	Lot 2	Lot 3	AVG	CV (%)	Recovery (%)
234	231.26	240.59	233.33	235.06	6.3	100.5
1875	1872.24	1860.88	1878.36	1870.49	6.3	99.8
15000	15016.80	14483.25	14786.10	14762.05	5.5	98.4

- **Comparability**

NT-proBNP concentration of 100 clinical samples were independently with **QDx Instacheck™ NT-proBNP** 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=0.9267X – 74.988 and R = 0.9906 respectively.

REFERENCES

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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
	Batch code
	Catalog number
	Caution
	Manufacturer
	Authorized representative of the European Community
	In vitro diagnostic medical device
	Temperature limit
	Do not reuse
	This product fulfills the requirements of the Directive 98/79/EC on in vitro diagnostic medical devices

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