

# MAGLUMI PCT (CLIA)



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**FOR PROFESSIONAL USE ONLY**  
Store at 2...8 °C



**COMPLETELY READ THE INSTRUCTIONS BEFORE  
PROCEEDING**



## SYMBOLS EXPLANATIONS



Authorized Representative in Europe



Manufacturer



Attention. See Instructions For Use



Contents of kit



In vitro diagnostic medical device  
(In vitro diagnostic use)



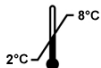
Lot number



Catalogue Code



Expiry date (Use by...)



Temperature limitation  
(store at 2...8 °C)



Number of tests



Keep away from direct sunlight



Keep upright for storage

## INTENDED USE

The kit has been designed for the quantitative determination of procalcitonin (PCT) in human serum, plasma and whole blood. The method can be used for samples over the range of 0-100 ng/ml.

The test has to be performed on the MAGLUMI chemiluminescence immunoassay (CLIA) fully auto analyzer (Including MAGLUMI 1000, MAGLUMI 2000, MAGLUMI 2000 Plus and new developed models).

## SUMMARY AND EXPLANATION OF THE TEST

Procalcitonin (PCT) is the hormonally inactive propeptide of calcitonin with a molecular weight of 12.6 kD. Because PCT is decomposed by proteolysis in individuals with a normal metabolism, PCT normally exists at undetectable levels (< 0.1 ng/ml) in healthy subjects. In severe infections due to bacteria, fungi and parasites as well as in sepsis, PCT serum titres may increase to over 500 ng/ml. Mononuclear blood cells are, among others, currently regarded as the site of procalcitonin synthesis under the conditions of a systemic inflammatory response.

Clinical evaluations in various specialized fields of medicine have shown that PCT is an excellent parameter

- For early diagnosis of generalized bacterial and mycotic infection and sepsis.

- To assess the degree of severity and prognosticate the outcome of systemic infection, sepsis, and multiple organ failure.

- For monitoring high-risk patients for the development of infections, e.g. after surgery or organ transplantation, under immune-suppression, or in patients with multiple trauma.

- For differential diagnosis between systemic infection and acute inflammatory disease.

- For differential diagnosis between bacterial and viral infection.

## PRINCIPLE OF THE TEST

Sandwich immunoluminometric assay:

Use an anti-PCT monoclonal antibody to label ABEI, and use another monoclonal antibody to label FITC. Sample, Calibrator or Control with ABEI Label, FITC Label and magnetic microbeads coated with anti-FITC are mixed thoroughly and incubated at 37 °C to form a sandwich then cycle washing for 1 time. Subsequently, the starter reagents are added and a flash chemiluminescent reaction is initiated. The light signal is measured by a photomultiplier as RLU within 3 seconds and is proportional to the concentration of PCT present in controls or samples.



## KIT COMPONENTS

### Material Supplies

Reagent Integral for 100 determinations	
<b>Nano magnetic microbeads:</b> TRIS buffer, 1.2% (W/V), 0.2%NaN <sub>3</sub> , coated with sheep anti-FITC polyclonal antibody.	2.5ml
<b>Calibrator Low:</b> bovine serum, 0.2%NaN <sub>3</sub>	2.5ml
<b>Calibrator High:</b> bovine serum, 0.2%NaN <sub>3</sub>	2.5ml
<b>FITC Label:</b> anti-PCT monoclonal antibody labeled FITC, contains BSA, 0.2%NaN <sub>3</sub>	10.5ml
<b>ABEI Label:</b> anti-PCT monoclonal antibody labeled ABEI, contains BSA, 0.2%NaN <sub>3</sub>	10.5ml
<b>Diluent:</b> buffer, contains BSA, 0.2%NaN <sub>3</sub>	25 ml
All reagents are provided ready-to-use.	

Reagent Vials in kit box : Internal Quality Control	
<b>Level 1:</b> containing BSA, 0.2%NaN <sub>3</sub>	2.0ml
<b>Level 2:</b> containing BSA, 0.2%NaN <sub>3</sub>	2.0ml

Target value refer to Quality Control Information date sheet

#### Accessories Required But Not Provided

MAGLUMI Reaction Module	REF: 630003
MAGLUMI Starter 1+2	REF: 130299004M
MAGLUMI Wash Concentrate	REF: 130299005M
MAGLUMI Light Check	REF: 130299006M



#### Preparation of the Reagent Integral

Before the sealing is removed, gentle and careful horizontal shaking of the Reagent Integral is essential (avoid foam formation!) Remove the sealing and turn the small wheel of the magnetic microbeads compartment to and fro, until the colour of the suspension has changed into brown. Place the Integral into the reagent area and let it stand there for 30 min. During this time, the magnetic microbeads are automatically agitated and completely resuspended.

**Do not interchange integral component from different reagents or lots!**

#### Storage and Stability

- Sealed: Stored at 2-8 °C until the expiry date.
- Opened: Stable for 4 weeks. To ensure the best kit performance, it is recommended to place opened kits in the refrigerator if it's not going to be used on board during the next 12 hours.



- Keep upright for storage.



- Keep away from direct sunlight.

## CALIBRATION AND TRACEABILITY

### 1) Traceability

To perform an accurate calibration, we have provided the test calibrators standardized against the WHO International Standard 89/620.

### 2) 2-Point Recalibration

Via the measurement of calibrators, the predefined master curve is adjusted (recalibrated) to a new, instrument-specific measurement level with each calibration.

### 3) Frequency of Recalibration

- After each exchange of lot (Reagent Integral or Starter Reagents).
- Every 2 weeks and/or each time a new Integral is used (recommendation).
- After each servicing of the MAGLUMI Fully Auto analyzer.
- If controls are beyond the expected range.

## SPECIMEN COLLECTION AND PREPARATION

### Serum

- elbow vein blood 5ml in the tube, centrifugation at room temperature, serum was separated and stored at 2-8 °C
- Serum samples were stable for 12 hours at 2-8 °C. If preserved colder, °C can be stored for more than 12 hours, please packed, -20 °C can be stored for 30 days,
- Avoid repeated freezing and thawing

### Plasma

- elbow vein blood 5ml in the tube, then add EDTA anticoagulant (50ul 0.3M EDTA per 5ml blood), centrifuged and separated plasma, stored at 2-8 °C.
- (Note: recommended EDTA-4Na as an anticoagulant, can not use heparin as an anticoagulant)
- Plasma was stable at 2-8 °C for 24 hours. If preserved more

than 12 hours, please packed, -20 °C can be stored for days.

- Avoid repeated freezing and thawing.

### Whole blood

- elbow vein blood 5ml in the tube, then add EDTA anticoagulant, (50ul 0.3M EDTA per 5ml blood),
- (Note: recommended EDTA as an anticoagulant, cannot use heparin as an anticoagulant).
- Seal the nozzle, and upside down several times stored in room temperature. If preserved for long time, please packed, -20 °C can be stored for 30 days.
- Avoid repeated freezing and thawing.

### Vacuum Tubes

- (a) Blank tubes are recommended type for collecting samples.
- (b) Please ask SNIBE for advice if special additive must be used in sample collecting.

### Specimen Conditions

- Do not use specimens with the following conditions:
  - (a) heat-inactivated specimens;
  - (b) Cadaver specimens or body fluids other than human serum;
  - (c) Obvious microbial contamination.
- Use caution when handling patient specimens to prevent cross contamination. Use of disposable pipettes or pipette tips is recommended.
- Inspect all samples for bubbles. Remove bubbles with an applicator stick prior to analysis. Use a new applicator stick for each sample to prevent cross contamination.
- Serum specimens should be free of fibrin, red blood cells or other particulate matter.
- Ensure that complete clot formation in serum specimens has taken place prior to centrifugation. Some specimens, especially those from patients receiving anticoagulant or thrombolytic therapy, may exhibit increased clotting time. If the specimen is centrifuged before a complete clot forms, the presence of fibrin may cause erroneous results.

### Preparation for Analysis

- Patient specimens with a cloudy or turbid appearance must be centrifuged prior to testing. Following centrifugation, avoid the lipid layer (if present) when pipetting the specimen into a sample cup or secondary tube.
- Specimens must be mixed **thoroughly** after thawing by **low** speed vortexing or by gently inverting, and centrifuged prior to use to remove red blood cells or particulate matter to ensure consistency in the results. Multiple freeze-thaw cycles of specimens should be avoided.
- All samples (patient specimens or controls) should be tested within 3 hours of being placed on board the MAGLUMI System. Refer to the SNIBE service for a more detailed discussion of onboard sample storage constraints.

### Storage

- If testing will be delayed for more than 8 hours, remove serum or plasma from the serum or plasma separator, red blood cells or clot. Specimens removed from the separator gel, cells or clot may be stored up to 24 hours at 2-8°C.
- Specimens can be stored up to 30 days frozen at -20°C or colder.

### Shipping

- Before shipping specimens, it is recommended that specimens be removed from the serum or plasma separator, red blood cells or clot. When shipped, specimens must be packaged and labeled in compliance with applicable state, federal and international regulations covering the transport of clinical specimens and infectious substances. Specimens must be shipped frozen (dry ice). Do not exceed the storage time

limitations identified in this section of the package insert.

**WARNING AND PRECAUTIONS FOR USERS**



- For use in *IN-VITRO* diagnostic procedures only.
- Package insert instructions must be carefully followed. Reliability of assay results cannot be guaranteed if there are any deviations from the instructions in this package insert.

**Safety Precautions**

**CAUTION:** This product requires the handling of human specimens.

- The calibrators in this kit are prepared from bovine serum products. However, because no test method can offer complete assurance that HIV, Hepatitis B Virus or other infectious agents are absent; these reagents should be considered a potential biohazard and handled with the same precautions as applied to any serum or plasma specimen.
- All samples, biological reagents and materials used in the assay must be considered potentially able to transmit infectious agents. They should therefore be disposed of in accordance with the prevailing regulations and guidelines of the agencies holding jurisdiction over the laboratory, and the regulations of each country. Disposable materials must be incinerated; liquid waste must be decontaminated with sodium hypochlorite at a final concentration of 5% for at least half an hour. Any materials to be reused must be autoclaved using an overkill approach (USP 24, 2000, p.2143). A minimum of one hour at 121 °C is generally considered adequate, though the users must check the effectiveness of their decontamination cycle by initially validating it and routinely using biological indicators.
- It is recommended that all human sourced materials be considered potentially infectious and handled in accordance with the OSHA Standard on Bloodborne Pathogens<sup>13</sup>. Biosafety Level 214 or other appropriate biosafety practices should be used for materials that contain or are suspected of containing infectious agents.
- This product contains Sodium Azide; this material and its container must be disposed of in a safe way.
- Safety data sheets are available on request.

**Handling Precautions**

- Do not use reagent kits beyond the expiration date.
- Do not mix reagents from different reagent kits.
- Prior to loading the Reagent Kit on the system for the first time, the microbeads requires mixing to re-suspend microbeads that have settled during shipment.
- For microbeads mixing instructions, refer to the KIT COMPONENTS, Preparation of the Reagent Integral section of this package insert.
- To avoid contamination, wear clean gloves when operating with a reagent kit and sample.
- Over time, residual liquids may dry on the kit surface, please pay attention the silicon film still exists on the surface of the kit.
- For a detailed discussion of handling precautions during system operation, refer to the SNIBE service information.

**TEST PROCEDURE**

To ensure proper test performance, strictly adhere to the operating instructions of the MAGLUMI Fully Auto analyzer. Each test parameter is identified via a RFID tag on the Reagent Integral. For further information please refer to the MAGLUMI Chemiluminescence Analyzer Operating Instructions.

40µl	Sample, calibrator or controls
+80µl	ABEI Label
+80µl	FITC Label
+20µl	Nano magnetic microbeads

15 min	Incubation
400µl	Cycle washing
3s	Measurement

**DILUTION**

Samples with concentrations above the measuring range can be diluted. After manual dilution, multiply the result by the dilution factor. After dilution by the analyzers, the analyzer software automatically takes the dilution into account when calculating the sample concentration.

Availability of sample dilution by analyzer please refers to the MAGLUMI analyzer user software program. Dilution settings please follow MALGUMI analyzer operating instructions.

**QUALITY CONTROL**

- Observe quality control guidelines for medical laboratories
- Use suitable controls for in-house quality control. Controls should be run at least once every 24 hours when the test is in use, once per reagent kit and after every calibration. The control intervals should be adapted to each laboratory's individual requirements. Values obtained should fall within the defined ranges. Each laboratory should establish guidelines for corrective measures to be taken if values fall outside the range.

**LIMITATIONS OF THE PROCEDURE**

**1) Limitations**

Patient samples with malignancies may exhibit PCT values within the normal range. PCT concentrations may be elevated in case of liver cirrhosis, hepatitis or tyrosinaemia. Thus, PCT determination is more suitable for therapeutic monitoring and follow-up as well as for a comparison with histological results. PCT serum levels may only be interpreted in context with the clinical picture and other diagnostic procedures. The PCT assay should not be used as the only criterion for cancer screening.

**2) Interfering Substances**

No interference with test results is seen by concentrations of bilirubin<0.06mg/ml, haemoglobin<16mg/dl or triglycerides<12.5mg/ml.

**3) HAMA**

Patient samples containing human anti-mouse antibodies (HAMA) may give falsely elevated or decreased values. Although HAMA-neutralizing agents are added, extremely high HAMA serum concentrations may occasionally influence results.

**4) High-Dose Hook**

High dose hook is a phenomenon whereby very high level specimens may read within the dynamic range of the assay. For the MAGLUMI PCT assay, no high dose hook effect was observed when samples containing up to 10,000 ng/ml.

**RESULTS**

**1) Calculation of Results**

- The analyzer automatically calculates the PCT concentration in each sample by means of a calibration curve which is generated by a 2-point calibration master curve procedure. The results are expressed in ng/ml. For further information please refer to the MAGLUMI Chemiluminescence Analyzer Operating Instructions.

**2) Interpretation of Results**

- Reference values:

Clinical(serum or plasma)	concentration (ng/ml)
Normal	< 0.5
Chronic non-specific inflammation and autoimmune diseases	< 0.5

Virus infection	< 0.5
moderate local bacterial infection	< 0.5
Systemic inflammatory response syndrome (SIRS), multiple trauma, burns	0.5~2.0
Serious bacterial infection, sepsis, multiple organ failure	>2.0(can reach 10~100)

Clinical(whole blood)	concentration (ng/ml)
Normal	< 1.0
Chronic non-specific inflammation and autoimmune diseases	< 1.0
Virus infection	< 1.0
moderate local bacterial infection	< 1.0
Systemic inflammatory response syndrome (SIRS), multiple trauma, burns	0.5~4.0
Serious bacterial infection, sepsis, multiple organ failure	>4.0(can reach 10~100)

- Results may differ between laboratories due to variations in population and test method. If necessary, each laboratory should establish its own reference range.

## PERFORMANCE CHARACTERISTICS

### 1) Precision

Intra-assay coefficient of variation was evaluated on 3 different levels of control serum repeatedly measured 20 times in the same run, calculating the coefficient of variation.

#### Intra-assay precision

Control	Mean(ng/ml)	SD(ng/ml)	CV%
Level 1	1.95	0.10	5.00%
Level 2	9.11	0.37	4.11%
Level 3	52.09	2.24	4.30%

Inter-assay coefficient of variation was evaluated on three batches of kits. Repeatedly measured 3 different levels of control serum 21 times, calculating the coefficient of variation.

#### Inter-assay precision

Control	Mean(ng/ml)	SD(ng/ml)	CV%
Level 1	2.01	0.18	8.90%
Level 2	9.54	0.77	8.11%
Level 3	52.11	4.18	8.02%

### 2) Functional Sensitivity

The functional sensitivity is the PCT concentration which is reproducibly measured with an inter-assay coefficient of variation of <20%. The functional sensitivity is 0.13 ng/ml

### 3) Specificity

The specificity of the PCT assay system was assessed by measuring the apparent response of the assay to various potentially cross reactive analytes.

Compound	Concentration	Cross reactivity
Calcitonin	20ng/ml	0.8%

### 4) Recovery

Consider calibrator high of known concentration as a sample, dilute it by 1:2 ratios with diluents, and measure its diluted concentration for 10 times. Then calculate the recovery of measured concentration and expected concentration. The recovery should be within 90% -110%.

Expected	Mean Measuring	Recovery
51.57ng/ml	52.02ng/ml	101%

### 5) Linearity

Use PCT calibrator to prepare the six-point standard curve,

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measuring all points' RLU except point A, and then do four-parameter linear fitting in double logarithm coordinate, the absolute linear correlation coefficient(r) should be bigger than 0.9800.

Calibrator Point	Concentration ng/ml	Absolute linear correlation coefficient (r)
A	0	
B	0.5	r=0.9860
C	2.0	
D	10	
E	50	
F	100	

## 6) Method comparison

A comparison of MAGLUMI PCT (y) with a commercially available PCT test (x) using clinical samples gave the following correlations (ng/ml):

Linear regression

$$y = 0.96x + 1.2$$

$$r = 0.964$$

$$S_{y.x} = 2.8$$

Number of samples measured: 87

The sample concentrations were between 0.55 and 94 ng/ml

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