Lab Dept: Chemistry

Test Name: PROCALCITONIN

General Information

Lab Order Codes:	PROCA
Synonyms:	PCT; PROCL
CPT Codes:	84145 – Procalcitonin (PCT)
Test Includes:	Procalcitonin concentration measured in ng/mL.

Logistics

Test Indications:	Useful for diagnosis of bacteremia and septicemia in adults and children (including neonates); Diagnosis of renal involvement in urinary tract infection in children; Diagnosis of bacterial infection in neutropenic patients; Diagnosis, risk stratification, and monitoring of septic shock; Diagnosis of systemic secondary infection post-surgery, and in severe trauma, burns, and multiorgan failure; Differential diagnosis of bacterial versus viral meningitis; Differential diagnosis of community-acquired bacterial versus viral pneumonia; Monitoring of therapeutic response to antibacterial therapy.
Lab Testing Sections:	Chemistry (all specimens analyzed on the Mpls campus)
Phone Numbers:	MIN Lab: 612-813-6280 STP Lab: 651-220-6550
Test Availability:	Daily, 24 hours
Turnaround Time:	1 day, test performed daily
Special Instructions:	N/A

Specimen

Specimen Type:	Blood
Container:	Green top (Li heparin) tube, **preferred** Alternate tube: Red, marble or gold top tube
Draw Volume:	1 mL (Minimum: 0.6 mL) blood

Processed Volume: 0.3 mL (Minimum: 0.2 mL) plasma/serum

Collection: Routine venipuncture. Mix tubes containing anticoagulant by gentle inversion.

Special Processing: Lab Staff: Centrifuge specimen, remove plasma/serum aliquot into a screw-capped round bottom plastic via. Store at refrigerated temperatures.

Patient Preparation: None

Sample Rejection: Mislabeled or unlabeled specimens

Interpretive

Reference Range:

Age	**Range (ng/mL)**
Newborns:	
0 – 6 hours	< or = 2
6 – 12 hours	< or = 8
12 – 18 hours	< or = 15
18 – 30 hours	< or = 21
30 – 36 hours	< or = 15
36 – 42 hours	< or = 8
42 – 48 hours	< or = 2
Infants >48 hours – Adult:	
Infants >48 hours – Adult:	<0.1 ng/mL
Interpretation – General Considerations:	
Procalcitonin level <0.10 ng/mL: No systematic inflammatory response.	
Procalcitonin level 0.10 – 0.49 ng/mL: Minor or no significant inflammatory response. Local inflammation and local infection are possible.	

Procalcitonin level 0.50 – 1.99 ng/mL: Moderate risk for progression to severe systemic infection (Severe Sepsis). Patient should be closely monitored clinically, and retested if indicated. Note: Increased PCT levels are not always related to infection. Increases may also be seen in: ● First days after major trauma, major surgery, severe burns, treatment with drugs that stimulate release of pro-inflammatory cytokines. ● Patients with invasive fungal infections and acute infection with plasmodium falciparum malaria. ● Prolonged or severe cardiogenic shock, prolonged severe organ perfusion anomalies, small cell lung cancer, and medullary C-cell carcinoma of the thyroid.
Procalcitonin level 2.00 – 9.99 ng/mL: Severe systemic inflammatory response, most likely due to sepsis, unless other causes are known. High risk for progression to severe systemic infection.
Procalcitonin level > or = 10.00 ng/mL: HIGH LIKELIHOOD OF SEVERE SEPSIS OR SEPTIC SHOCK. Procalcitonin levels >10ng/ml are almost exclusively due to severe bacterial sepsis or septic shock.

Critical Values: N/A

Limitations: PCT can be elevated by non-infectious causes. These include, but are not limited to:

● Neonates < 48 hours of life (physiological elevation)
● The first days after a major trauma, major surgical intervention including extracorporeal circulation (ECMO), severe burns
● Treatment with OKT3 antibodies, interleukins, TNF-a and other drugs stimulating the release of pro-inflammatory cytokines
● Patients with invasive fungal infections, acute attacks of plasmodium falciparum malaria
● Patients with prolonged or severe cardiogenic shock, prolonged severe organ perfusion anomalies, small cell lung carcinoma or bronchial carcinoid, medullary C-cell carcinoma of the thyroid, Child-Pugh Class C liver cirrhosis, and peritoneal dialysis treatment.

Low PCT levels do not automatically exclude the presence of bacterial infection.
Such low levels may be obtained during the early course of infections, in localized infections and subacute endocarditis. Therefore, follow-up and reevaluation of PCT in clinical suspicion of infection is pivotal.

High Dose Hook Effect is detected by kinetics analysis of samples up to 5000 ng/mL. Measurement is stopped for samples greater than 50 ng/mL

and auto-diluted appropriately. A hook effect can occur at PCT concentrations >2,500 ng/mL (extremely rare), resulting in a lower measured PCT concentration than is actually contained in the specimen. This may complicate the interpretation of serial PCT measurements in rare patients with extremely high PCT levels.

The same matrix should be used for patient testing throughout admission due to variations in measurement (i.e. lithium heparin plasma, all serum, etc).

Methodology: Homogenous Time-Resolved Fluorescence

References:

BRAHMS KRYPTOR compact User Manual. 105325.5 D 14027, March 2008

BRAHMS Aktiengesellschaft.BRAHMS PCT Sensitive KRYPTOR Instruction for Use (Version 15.Ous), BRAHMS Gmbtt

Chiesa, C., et. al (1998). Reliability of procalcitonin concentrations for the diagnosis of sepsis in critically ill neonates. Clinical Infectious Diseases, 26, 664-72

Guide for the Clinical Use of Procalcitonin (PCT). 105033.7 D 14013, BRAHMS Aktiengesellschaft

The Children's Hospital, Aurora, CO. PCT result comments 10/2009.

Mayo Medical Laboratories,Test Code 83169: Procalcitonin – Clinical and Interpretive Guide

Updates: 3/25/2014: Removal of critical value, previously listed as ≥2.00 ng/mL
2/9/2016: Update alt tube type