

Phagocytosis Test

Test Name: Phagocytosis Test
Other Names: Phagocytic Index
Test Code(s): 403053
CPT Code(s): 86344

Background:

Phagocytosis by polymorphonuclear neutrophils and monocytes constitutes an essential arm of host defense against bacterial or fungal infections. The phagocytic process can be separated into several major stages: chemotaxis (migration of phagocytes to inflammatory sites), attachment of particles to the cell surface of phagocytes, ingestion (phagocytosis) and intracellular killing by oxygen-dependent (oxidative burst) and oxygen-independent mechanisms (1, 2).

Method:

The phagocytosis test allows the quantitative determination of leukocyte phagocytosis (ingestion of bacteria). It measures the percentage of neutrophils that have ingested bacteria and their activity (number of bacteria per cell). In the phagocytosis test whole blood is incubated with FITC-labeled opsonized *E.coli* at either 37°C or on ice (negative control). The phagocytosis is stopped, and a quenching solution is added to allow for discrimination between attachment and internalization of bacteria by quenching the FITC fluorescence of surface-bound bacteria, leaving the fluorescence of the internalized bacteria only. A lysing solution is then added to remove erythrocytes and partially fix leukocytes. After washing, a DNA staining solution is added to allow exclusion of artifacts such as bacterial or leukocyte aggregates. Flow cytometric analysis is then performed on the samples.

Specimen Requirements:

A minimum of 5mL whole blood collected in a sodium heparinized tube is required. In addition, it is recommended that a control specimen be included from a healthy individual as a shipping control. The specimen must be shipped **priority overnight** at ambient temperatures.

Please call in advance when this test is being ordered.
For local clients only: Samples must arrive by noon.

Setup schedule: Monday – Friday

Units and Normal Reference Range:

The result is reported as percent phagocytosing neutrophils, which is the quantitative determination of neutrophil phagocytosis in heparinized whole blood determined by flow cytometry.

Phagocytosis Test Reference Range	
Normal	≥95%

Clinical Utility:

The phagocytosis test is intended to examine the phagocytic activity in patients with various disorders and to evaluate the effects of pharmaceuticals on phagocytic activity. Decreased phagocytic function is associated with repeated bacterial infection.

Other Related Tests Available:

Neutrophil Oxidative Burst Test (# 403002)

Neutrophil Function Panel (# 403054)

(Includes Phagocytosis test and the Neutrophil Oxidative Burst Test)

References:

1. Roitt, I.M., Brostoff, J. & D.K. Male. 1996. Immunology, 4th ed. Gower Medical Publishing Ltd., London.
2. Sawyer, D.W., Donowitz, G.R. & G.L. Mandell. 1989. Polymorphonuclear neutrophils: An effective antimicrobial force. Rev. Infect. Dis. 11: S1532-S1544.
3. Donadebian, H.D. 1989. Congenital and acquired neutrophil abnormalities. In: Klemner, M.S. et al. (eds) Phagocytes and Disease, Kluwer, Dordrecht, Boston, New York, pp 103-118.
4. Robinson, J.P. & W.O. Carter. 1993. Flow cytometric analysis of granulocytes. In: Bauer, K.D. et al. (eds) Clinical Flow Cytometry, Principles and Applications. Williams and Wilkins, Baltimore, pp 405-433.
5. Bassoe, C.F. 1984. Flow cytometric studies on phagocyte function in bacterial infections. Acta path. Microbiol. Immunol. Scand. Sect. C, 92: 167-171.

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