

Neutrophil Oxidative Burst Test

Test Name: Neutrophil Oxidative Burst Test
Other Names: Chronic Granulomatous Disease (CGD) Test, Phagoburst®
Test Code(s): 403002
CPT Code: 82657 x 2

Clinical Utility:

The measure of neutrophil oxidation is a useful assay in the diagnosis of chronic granulomatous disease and is also a useful means to determine the overall metabolic integrity of phagocytosing neutrophils.

Specimen Requirements:

- A minimum of 5mL whole blood collected in a sodium heparinized tube is required.
- 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.

Background For Test Application:

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).

Units and Normal Reference Range:

Sample results are expressed as a normal oxidative index (NOI), which is the ratio of the fluorescence in stimulated cells to the fluorescence expressed in unstimulated cells.

Normal Range	> 73 NOI
--------------	----------

Method:

In the Neutrophil Oxidative Burst Test heparinized whole blood is incubated at 37°C with a compound phorbol myristate acetate (PMA) known to stimulate oxidative burst activity. Each flow cytometry pattern is referenced to the patients non-stimulated cells. In addition, a control blood is included in each run.

Upon stimulation, granulocytes and monocytes produce reactive oxygen metabolites (superoxide anion, hydrogen peroxide, hypochlorous acid) which destroy bacteria inside the phagosome.

Formation of the reactive oxidants during the oxidative burst can be monitored by the addition and enzymatic oxidation of a fluorogenic substrate, DHR 123. The level of reactive oxygen radicals is determined by flow cytometry.

Other Related Tests Available:

Phagocytosis Test (# 403053)
Neutrophil Function Panel (# 403054)
(Includes Phagocytosis Test and the Neutrophil Oxidative Burst Test)

References:

1. Roitt, I.M., Brostoff, J. and D.K. Male. 1996. Immunology, 4th ed. Gower Medical Publishing Ltd., London.
2. Sawyer, D.W., Donowitz, G.R. and 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: Klempner, M.S. et al. (eds) Phagocytes and Disease. Kluwer, Dordrecht Boston, New York, pp 103-118.
4. Smith, R.M. and J.T. Curnutte. 1991. Molecular basis of chronic granulomatous disease. Blood 77:673-686.
5. Rothe G, Oser A and G. Valet. 1988. Dihydrorhodamin 123: a new flow cytometric indicator for respiratory burst activity in neutrophil granulocytes. Naturwissenschaften 75: 354-355.
6. Miyagawa, B. and H., G. Klingmann. 1997. Phagocytosis and burst activity of granulocytes and monocytes after stem cell transplantation. J. Lab. Clin. Med. 129(6): 634-7.
7. Dobbmeyer, T.S., Raffel, B. Dobbmeyer, J.M., Findhammer, S., Klein, S.A., Kabelitz, D. Hoelzer, D., Helm, E.B. and Rossol. 1995. Decreased function of monocytes and granulocytes during HIV-1 infection correlates with CD4 cell counts. Eur. J. Med. Res. 1: 9-15.
8. Esparza, B., Sanchez, H., Ruiz, M., Barranquero, M., Sabino, E. and F. Merino. 1996. Neutrophil function in elderly persons assessed by flow cytometry. Immunol. Invest. 25(3): 185-190.
9. Gessler, P., Nebe, T. Birle, A., Haas, N. and W. Kachel. 1996. Neutrophil respiratory burst in term and preterm neonates without signs of infection and in those with increased levels of C-Reactive Protein. Pediatr. Res. 39: 843-848.
10. Elbim, C., Chollet-Martin, S., Bailly, S., Hakim, J. and M.A. Gougerot-Pocidal. 1993. Priming of polymorphonuclear neutrophils by tumor necrosis factor α in whole blood: Identification of two polymorphonuclear neutrophil subpopulations in response to formyl-peptides. Blood 82: 663-640.

For more information, contact

IBT Laboratories

11274 Renner Boulevard, Lenexa, Kansas 66219

913.492.2224 **800.637.0370**

www.ibtlabs.com