

Frequently Asked Questions about the Beryllium Blood Lymphocyte Proliferation Test (BeBLPT) FAQ203

What is the BeBLPT?

The BeBLPT is a laboratory test conducted on a blood sample to measure the reaction of a person's immune cells to beryllium. When copies of the person's immune cells that carry the allergic response to beryllium are exposed to beryllium, the immune cells respond by multiplying. The amount of immune cell multiplication is measured and recorded, and then used to calculate the results which are expressed as stimulation indices (SIs). These SIs are compared to a standard, most labs use "3", and the test is considered positive or abnormal if 2 or more of the results are above the standard. The test is considered negative or normal if none of the results exceed the standard and the test is considered negative-borderline if one result exceeds the standard. Persons with two or more positive or abnormal BeBLPTs are considered to be sensitive to beryllium in most research studies.

What is beryllium sensitization?

Sensitization to beryllium means that a person's immune system can recognize and respond to the presence of beryllium. Sensitization to beryllium is not an illness or disability and as such is not considered a health effect.

Is a positive BeBLPT the same as a diagnosis of CBD?

No. Diagnosing sub-clinical CBD requires a biopsy to obtain samples of lung tissue using a medically invasive procedure called a bronchoscopy, which has associated health risks, such as a collapsed lung, bleeding or infection and a possibility of death.

Is the BeBLPT reliable?

No. The BeBLPT is highly variable¹ and unreliable. Substantial disagreement in test results has been found when test data are compared within and between the laboratories that conduct the BeBLPT^{2,3,4}. Materion Brush Inc. has observed periods of instability in laboratory performance in three of the four commercial labs offering the BeBLPT. This instability among the laboratories has been confirmed in a blinded scientific study by Cher 2006. This lack of stability makes consistent scientific and clinical work very difficult. Additionally, some individuals who test consistently positive at one point in time may test consistently negative at a later point in time. In a survey at Materion Brush Inc.'s Elmore, Ohio facility, 18 persons who were confirmed BeBLPT positive (2 positive tests) in the early 1990s and who continued to work in beryllium operations were retested in 1999. The retest found 10 of the 18 (55%) tested negative based on testing a blood sample at two different laboratories³. A study by Donovan performing serial testing of new workers using the BeBLPT demonstrated that individual worker test results can vary back and forth between positive and negative over time. Studies have also found that 1-2% of individuals not occupationally exposed test positive for sensitivity to beryllium using the BeBLPT^{5,6,7,8}.

Should beryllium workers be tested with the BeBLPT?

When carefully used by physicians who are experienced with the variation in laboratory performance, the BeBLPT may have value in the diagnosis of symptomatic persons suspected of having chronic beryllium disease and in well designed and executed medical surveillance projects. Based on criteria established by the World Health Organization (WHO), the BeBLPT is not recommended for screening individuals without clinical symptoms⁹. The BeBLPT should not be used for screening apparently healthy workers on the assumption they will obtain medical benefit from the detection of sensitization nor for monitoring beryllium workers for the purpose of detecting failure of a beryllium safety program.

This recommendation is supported by independent scientific bodies and government authorities, such as the American Conference of Governmental Industrial Hygienists (ACGIH) Biological Exposure Indices (BEI) Committee, the U.S. Army, U.S. Navy and U.S. Air Force^{2,10,11,12}

How does Brush Wellman use the BeBLPT?

Consistent with the above recommendation, Brush Wellman uses the BeBLPT in diagnosis, the evaluation of persons with suspicious symptoms, or pulmonary function test or x-ray findings, and in persons included in carefully planned medical surveillance projects.

How can I obtain assistance?

If you have any questions regarding the above information, please contact your sales representative or call the Product Safety Hotline at (800) 862-4118. Get product specific material safety data information at www.materion.com.

¹ Bobka C, Stewart L, Engelken G, Golitz L, Newman L. Comparison of In Vivo and In Vitro Measures of Beryllium Sensitization. *J Occup Environ Med* 39(6): 540-547 (1997).

² American Conference of Governmental Industrial Hygienists. *Biological Exposure Index Feasibility Assessment for Beryllium and Inorganic Compounds* (2002).

³ Deubner D., Goodman M, Iannuzzi J. Variability, Predictive Value, and Uses of the Beryllium Blood Lymphocyte Proliferation Test (BLPT): Preliminary Analysis of the Ongoing Workforce Survey. *Appl Occup Environ Hyg* 16(5): 521-526 (2001).

⁴ Cher D.J., et al. Assessment of the Beryllium Lymphocyte Proliferation Test Using Statistical Process Control. *Inhalation Toxicology* 18:901-910 (2006).

⁵ Brush Wellman internal study of new workers prior to exposure.

⁶ Kolanz, M. Introduction to Beryllium: Uses, Regulatory History, and Disease. *Appl Occup Environ Hyg* 16(5) 559-567 (2001).

⁷ Yoshida T., Shima S., Nagaoka K., et al. A Study on the Beryllium Lymphocyte Transformation Test and the Beryllium Levels in the Working Environment. *Industrial Health* 35: 374-379 (1997).

⁸ Donovan E.P., et al. Performance of the beryllium blood lymphocyte proliferation test based on a long-term occupational surveillance program. *Int Arch Occup Environ Health.* (2007).

⁹ Borak J., Woof S.H., Fields C.A. Use of Beryllium Lymphocyte Proliferation Testing for Screening of Asymptomatic Individuals: An Evidence-Based Assessment. *J Occup Environ Med* 48(9): 937-947 (2006).

¹⁰ United States Army. *Beryllium Surveillance and Medical Monitoring Policy* (2002).

¹¹ United States Navy. *Response to OSHA's Occupational Exposure to Beryllium; Request For Information* (2003).

¹² United States Air Force. *Beryllium Surveillance and Medical Monitoring Policy* (2002).