

Welcome To Our First Newsletter

This is the first newsletter we are issuing to inform you about the status of the beryllium research we are doing at the National Institute for Occupational Safety and Health (NIOSH). Some of this work is done with Brush Wellman Inc. and some, like our genetics research, is done separately.

We would like to take this opportunity to thank you. It is through your efforts and the efforts of other current and former Brush Wellman Inc. employees that this work has been possible. I hope you will continue to support our research by participating in NIOSH studies and in the joint work with Brush Wellman. Together, we will learn how to keep you and your coworkers safer and healthier.

Dr. Kay Kreiss, M.D.
Chief, Field Studies Branch, NIOSH

About Chronic Beryllium Disease

Some people who are exposed to beryllium develop *beryllium sensitization*, which is similar to an allergy. Beryllium sensitization can be detected in the laboratory by exposing white blood cells to beryllium in a test tube. This test is called the *beryllium lymphocyte proliferation test*. An abnormal test is a sign of sensitization only.

Beryllium-sensitized people may have or may develop beryllium disease in their lungs. Additional tests at a medical center are needed to establish whether a sensitized person has *chronic beryllium disease (CBD)*. CBD is often diagnosed before a person has any symptoms. But, as the disease worsens, symptoms like shortness of breath, cough, chest discomfort, fatigue, and weight loss can develop. These symptoms can be treated with oral steroids and other medications to prevent or slow disability, but CBD is not curable.

We do not yet know whether all sensitized persons will eventually develop CBD. We also do not yet know whether stopping exposure by leaving beryllium work will reduce your future risk of becoming sensitized or of developing CBD. **As a current or former beryllium worker, you are at risk of CBD for the rest of your life.** Becoming involved in research is one way to stay on top of your own health.

In Brief

Findings

- Lowering beryllium levels in air has not prevented beryllium sensitization in workers, either those already exposed or those exposed for the first time.
- Sensitization can be detected early, sometimes within months of employment.

Questions We Are Trying to Answer

- What are the actual rates of sensitization and disease? By conducting studies every few years, we hope to have better estimates of true risk.
- Is there a better way to measure airborne beryllium? Most measurements have been of the weight or mass of beryllium, and we are looking at the number of particles, among other characteristics.
- Is exposure to beryllium through the skin important in developing sensitization? If so, it may help to explain high levels of disease at plants with relatively low air levels of beryllium.
- Why do some individuals seem to be at greater risk of developing sensitization or disease? We are studying the genes of beryllium-exposed people to better understand how the disease works at the molecular level.
- Is the risk of becoming sensitized or of developing beryllium disease different after exposure ends? We are contacting former workers to address this question.

Staff Changes

- Epidemiologist Christine Schuler is now the project leader, with assistance from Erin McCanlies, who is also an epidemiologist. Industrial hygienist Greg Day is taking over the sampling work started by Mike McCawley and Mike Berakis while they were at NIOSH.

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Informing Workers About Our Research

In 1997, Brush Wellman Inc. asked NIOSH for assistance in ongoing medical surveillance and beryllium-related research, and our collaborative work began the following year. NIOSH and BWI have regular Program Leadership Team (PLT) meetings to discuss our latest findings.

The last PLT was held in October of 2002. Representatives from NIOSH¹ and Brush Wellman², the Department of Energy, the Occupational Safety and Health Administration, and United Steel Workers of America attended this meeting.

At this meeting we talked about the following topics:

- The 1998 Tucson and 1999 Elmore surveys.
- The Reading industrial hygiene survey.
- Genetic research on *Glu69*.
- Skin exposure research.
- Better ways to communicate research results and new research to workers.
- How the results of research might be used to design a prevention program for the workplace.

Our next meeting will be in the fall of 2003. We plan to hear some presentations from the plant representatives!

¹From NIOSH: Ayne Amjad, Greg Day, Candace Deaton, Andre Dufresne, Joseph Hatcher, Paul Henneberger, Margaret Kitt, Paul Hewett, Mark Hoover, Erin McCanlies, Helen Montaglini, Christine Schuler, Marcia Stanton, Brian Tift, Sally Tinkle, Angela Velilla, Greg Wagner, and Ainsley Weston.

²From Brush Wellman: Matt Angel, Mike Berakis, Mark Cairnie, David Deubner, Kellie Fowler, Tom Frigon, David Hamrick, Bill Hixson, Chuck Kaylor, Michael Kent, Bob Lemke, Doug Markel, Marc Kolanz, Barbara Mentzer, Melinda Moreno, Rick Newman, Tim Noblit, Art Pepper, Gerry Rahm, Dave Renwand, John Scales, Warren Spinka, Keith Smith, and A.J. Young.



Laboratories of the National Institute for Occupational Safety and Health, Morgantown, WV.

Understanding the Genetic Research

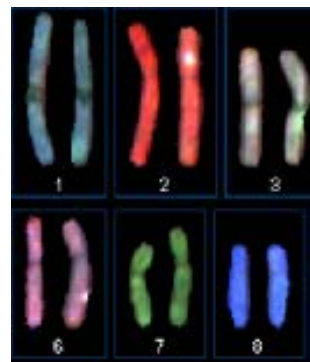
CBD is caused by exposure to beryllium. However, only some people who are exposed get the disease, while others do not. We do not know why this is true.

In the fall of 1998, we began the beryllium genetic study to understand the role genetics might play in the development of beryllium sensitization and CBD.

In the last five years, 1100 current and former beryllium workers donated a small amount of blood to help us study a group of genes we think might be involved in CBD. We worked on developing several special tests to study a variation called *Glu69* in the *HLA-DPB1* gene. Earlier studies found that *Glu69* occurred more often in individuals with CBD, so our first research step was to confirm this earlier work.

Thanks to these workers, we have the following results:

- *Glu69* is associated with CBD.
- *Glu69* is also associated with beryllium sensitization.
- Workers with CBD were more likely to have inherited two copies of *Glu69* (one from their mom and one from their dad) compared to workers without sensitization or CBD.
- One out of every six persons with CBD did *not* have the *Glu69* gene.
- One out of every three persons who were beryllium sensitized did *not* have the *Glu69* gene.



Chromosomes 1, 2, 3, 6, 7, 8.
The *HLA-DPB1* gene is located on chromosome 6.

The genetics of beryllium sensitization and CBD is complex, and we have only completed the first step in our planned research. We will continue to study other variations in the *HLA-DPB1* gene to see if they are associated with sensitization and CBD. We will also study other specific immune-system genes that we think might be involved in beryllium sensitization and CBD. We are *not* studying any genes that are not believed to be involved in sensitization or CBD.

These results and our future work will help us to understand the genetics of beryllium sensitization and CBD; however, we cannot predict who will become sensitized or get CBD.

Skin Exposure As An Alternative Route

In the past, researchers believed that beryllium could not be absorbed through intact skin, and skin exposure was not considered hazardous. So, it was thought that when beryllium air measurements were lowered and improved respiratory control measures were used, beryllium workers would be less likely to become sensitized to beryllium or develop CBD. However, workers are still getting sensitized and developing CBD. This inspired NIOSH to look for other explanations.

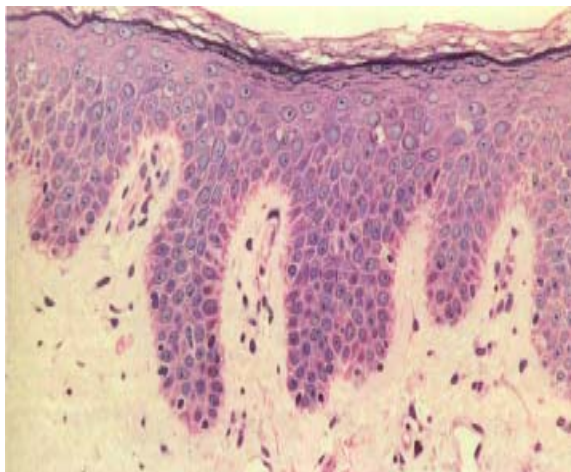
We know that beryllium must get into the lungs before a worker can get CBD. Beryllium gets into the lungs when a worker inhales beryllium-containing dust or fumes. We did *not* know if it was possible for sensitization to occur following skin exposure. To test this we conducted experiments in the lab, where we painted beryllium salts or beryllium oxide onto the ears of mice.

We found that beryllium *can* be absorbed through the mouse skin and lead to sensitization. We are now trying to find out if skin exposure, in the presence of inhaled beryllium, can lead to CBD. Our studies with mice are crucial for helping us to better understand how workers are becoming beryllium sensitized and getting CBD.

We have also gone to the plants and taken samples from various work surfaces and workers' hands. We use hand and surface wipe samples as a survey tool to see who has beryllium on their hands and which work surfaces are contaminated. This method helps us compare overall levels of beryllium contamination in different work areas. Work practices and engineering controls can then be used to prevent or reduce beryllium contamination. This method may also prove useful in determining the effectiveness of protective equipment such as gloves and overgarments.

The hand and surface wipe samples only measure what is on the outside, not what may have gotten inside the skin. There is no easy way to measure this, so we are exploring several options. In a small study we used tape stripping, where we applied tape repeatedly to the same place on the skin of a small group of workers to remove the outermost layers of dead cells. This method, however, did not prove useful because we were unable to detect any beryllium on the tape strips. We think this happened because of the low levels of beryllium that may have been on the workers' skin and because lab instruments were unable to measure such low levels. We are continuing to search for a better method.

Research that occurs on plant site and research done with mice may some day help us to better understand if skin exposure may be involved in sensitization and CBD and develop better ways to protect workers.



Cross-section of human skin

Worker Participation in Our Research

NIOSH is contacting current and former Brush Wellman Inc. workers to invite them to participate in our studies. We are conducting survey studies and genetic studies; these studies will help to identify jobs and genes that increase your risk of beryllium sensitization and disease, and how workplace changes may reduce this risk.

If you are a **current** Brush Wellman employee, Brush Wellman conducts the survey study and NIOSH analyzes the results. You can also participate in the NIOSH genetic study. You may be asked by Brush Wellman medical staff to do one or more of the following:

1. Read and sign a consent form to allow Brush Wellman Inc. to share your BeLPT results, work and medical histories with NIOSH.
2. Read and sign a consent form for the NIOSH genetic study.
3. Complete a medical and work history questionnaire.
4. Have blood drawn.

If you are a **former** worker, NIOSH will contact you and invite you to participate in our research. Based on previous participation, you may be asked to do one or more of the following:

1. Read and sign a consent form.
2. Complete a medical history questionnaire.
3. Update a work history questionnaire.
4. Have blood drawn.

Will my information be safe?

NIOSH keeps your BeLPT results and medical and work history information confidential. It is protected by the federal Privacy Act. Your genetic information is protected by a special assurance of confidentiality. This means that NIOSH can *never* release your genetic results to *anyone else* such as Brush Wellman Inc., a court, doctors, lawyers, family, or an insurance company. *You* can request your own genetic results, but if you have your results and share them, or are compelled to do so by a court, potential employer, or insurance company, you may put yourself at risk of employment or insurance discrimination. For this reason, NIOSH recommends that you carefully weigh the risks and benefits of getting your own genetic results.

Beryllium Compensation Program Update

In 2001, a new law was passed that provides medical and monetary benefits to some current and former workers with beryllium sensitization and CBD.

Who's Eligible?

Employees of certain companies that produced or processed beryllium for sale or use by the Department of Energy (DOE) during specific periods of time may be able to receive benefits. The law is called the Energy Employees Occupational Illness Compensation Program Act, and it took effect in July 2001.

There Are Two Types of Compensation

- If you are sensitized to beryllium, the program will pay for a thorough medical examination to confirm your beryllium sensitivity, and regular medical examinations to determine whether you have developed CBD.

- If you have been diagnosed with CBD, the program will pay for the treatment of your disease, and you will be eligible to receive additional monetary benefits.

To receive any benefits to which you may be entitled, you must file a claim with the Department of Labor, which is administering the program. We encourage you to obtain more information from the Department of Labor. If you have access to the Internet, a copy of the Act and lots of other information can be found on the Department of Labor website at <http://www.dol.gov>. You can also call the Department of Labor Hotline toll-free at 1-866-888-3322.

NIOSH is *not* involved in this beryllium compensation program. We are providing you with some general information, so you can decide whether you want to learn more and who to contact.

WEB: <http://www.cdc.gov/niosh> **PHONE:** 1-800-447-8305 **FAX:** 1-304-285-5820

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