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Olympian Research Effort

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1/7/2008

NEWARK

As China works feverishly to reduce air pollution ahead of the upcoming summer Olympics in Beijing, the University of Medicine and Dentistry of New Jersey (UMDNJ) is tracking the health impact of the changes.

The task is part of the work of the university's Center for Pharmacogenomics and Complex Disease Research in the New Jersey Dental School in Newark, whose research can help the pharmaceutical industry tailor drugs to groups with different genetic dispositions.

Pharmacogenomics measures how people with similar genetic makeups are affected by their environment and respond to medication. By studying the effect of air-quality changes in Beijing, the UMDNJ team hopes to pinpoint the impact of reduced pollution on a variety of groups.

"Our study is unique in that we are looking at the health effects of a very large-scale reduction in air pollution," says Scott Diehl, pharmacogenomics center director. "Most studies so far have looked at the risks of air pollution and increases in it."

Among those fretting about the air quality is Adam Craig, a champion U.S. cross-country mountain biker who says his lungs nearly shut down during a test event in Beijing last year. Paula Radcliffe, an asthmatic British long-distance runner, has also complained about the air.

The three-month study will assess the impact of pollution on a sample of 100 participants before, during and after the August games. Diehl's center is implementing the project in partnership with UMDNJ's School of Public Health in Piscataway. Junfeng Zhang, professor and acting chairman of the Department of Environmental and Occupational Health at the School of Public Health, is the study's principal investigator.

Diehl, Zhang and colleagues returned two weeks ago from China, where they finalized preparations for the study. "We are focusing on both cardiovascular and respiratory diseases," says Diehl. "When there is a severe increase in air pollution, the risk of death goes up substantially from lung and heart disease."

Zhang says he partnered with Diehl because "they are doing cutting-edge work in trying to sort out what genes or multiple genes are contributing to various health outcomes."

The Beijing Olympics study is one of two projects UMDNJ is conducting in China. Diehl will serve this summer as the principal investigator for a study of the effects of fluoride in the water system and in coal dust in China's Xi'an Province. Fluorosis causes staining and weakening of the teeth and bone enamel, Diehl says. Chinese experts will participate in both projects.

Diehl's center previously notched up research advances with regard to periodontitis, an inflammatory condition that affects the membranes that support teeth. One study focused on a form that develops in children after puberty.

"Periodontitis is the most common cause of tooth loss in America today," says Diehl. He says it occurs in 1 percent to 2 percent of young blacks, compared with just 0.1 percent to 0.2 percent of young whites. "So it is 10 times more common in African-Americans," he says.

"We do not know why this disease occurs much more often in African Americans," says Diehl. "It could be due to their more frequent exposure to pathogenic oral bacteria, or to differences in diet or dental hygiene. We know from twin studies that genetics has a major effect on differences among individuals in risk of developing periodontitis within races, so it is possible that the African Americans may have higher frequencies of gene variations that increase susceptibility to this disease compared to other populations. Most likely, the true cause is a combination of these and other things."

In another investigation, the UMDNJ center is working with German researchers to explore the connections between periodontitis and cardiovascular diseases.

Diehl says the possible benefits of such studies include helping pharmaceutical companies identify high-risk individuals for drug-development trials.

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