Emotional Stress Linked to Common Cold

Psychologists report that high levels of mental stress increase the risk of both infection by cold viruses and the appearance of cold symptoms. For researchers probing the complex relationship between psychology and immunity, the new evidence provides a rare link between stress and an immune illness.

"Our study shows psychological stress has a big impact on the biological system of immunity," says psychologist Sheldon Cohen of Carnegie Mellon University in Pittsburgh, who co-directed the work with two British colleagues.

The researchers administered questionnaires on psychological stress to 420 healthy British adults. Participants reported the number of major stressful events experienced in the past year, the degree to which they felt able to cope with daily demands, and the frequency of "negative" emotions such as depression, anger and irritation. The investigators used these data to divide volunteers into four groups, from lowest to highest stress. Questionnaires also assessed three personality characteristics associated with stress: self-esteem, feelings of control over external events, and degree of extroversion or introversion.

Next, 394 volunteers received nasal drops containing a low dose of one of five respiratory viruses; the remaining 26 got saline drops. For two days before and seven days after the viral exposure, they stayed in large apartments either alone or with one or two others. Before exposure and for six days afterward, researchers collected nasal-wash samples to search for cold viruses or virus-specific antibodies. Clinicians examined participants daily for sneezing, watery eyes, sinus pain and other cold symptoms.

Among the virus-exposed volunteers, 325 became infected and 148 developed colds, the investigators report in the Aug. 29 New England Journal of Medicine. Cold virus infections also showed up in five saline recipients, apparently from exposure to infected housemates, they note. No one in the saline group developed cold symptoms.

Cohen's group found that the rates of respiratory infection and colds increased in accordance with stress levels reported on the questionnaires. Compared with the lowest-stress group, volunteers who reported the most psychological stress ran twice the risk of getting a cold and more than five times the risk of becoming infected with a cold virus, the investigators say. The pattern held despite statistical controls for varied influences on immune function, including age, sex, education, allergies, weight, viral status prior to the study, cigarette and alcohol use, exercise, diet, quality of sleep, number of housemates, and housemate infection rates. The link between stress and colds also proved independent of the personality characteristics assessed on questionnaires.

The consistency of the stress-infection connection across different cold viruses suggests a close relationship between stress and the suppression of either a general disease resistance or many immune processes involved in several illnesses, the researchers maintain.

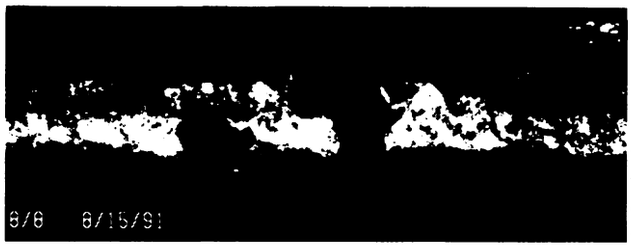
"We don't find a tremendous statistical effect for stress on the common cold, but it's reasonably strong given the many other biological and environmental influences on colds," Cohen says.

Studies of stress, immunity and infection often generate inconclusive findings and physician skepticism (SN: 4/6/91, p.216). In a commentary accompanying the new report, Morton N. Swartz of Massachusetts General Hospital in Boston lauds the team's careful methods but cautions that the results might stem not from stress-induced effects on immunity, but rather from prior behaviors – such as sleep problems and alcohol use – that can undermine immunity and that often do not show up in brief responses to questionnaires.

Extensive measures of these behaviors require large amounts of time and money, Cohen responds. Although his study did not exhaustively review all such behaviors, he says the findings clearly suggest that stress helps produce a susceptibility to colds. *– B. Bower*

Pinatubo's impact spreads around the globe

More than 10,000 kilometers lie between the United States and the Philippines, but the eruption of Mt. Pinatubo in June may increase the risk of skin cancer in North America next summer, according to some preliminary estimates of the volcano's effect on stratospheric ozone. Scientists also expect the eruption to cool the globe for the next few years – a climatic twist that would complicate efforts to discern whether greenhouse-gas pollution is currently warming the Earth.



Satellite measurements of reflected sunlight during mid-August show a band of volcanic aerosols girdling the globe.

Pinatubo can wreak such distant and long-lasting effects because its eruption lofted millions of tons of sulfur dioxide gas into the stratosphere. As winds blew the volcanic cloud westward, the gas molecules reacted with water in the atmosphere to form tiny droplets, or aerosols, of sulfuric acid, which will stay in the stratosphere for two to three years before they fall.

Some computer models of atmospheric chemistry suggest that this huge increase in sulfur dioxide aerosols could thin the protective ozone layer, allowing more harmful ultraviolet radiation to reach Earth's surface. "We found a substantial ozone decrease, especially in the mid- and high-latitudes, and especially in winter," says Guy P. Brasseur, director of the atmospheric chemistry division at the National Center for Atmospheric Research (NCAR) in Boulder, Colo.

Scientists believe sulfuric acid aerosols affect ozone levels through a complex cascade of events. The aerosols provide tiny surfaces on which certain nitrogen molecules can react. These reactions alter the chemistry of the stratosphere, causing "safe" chlorine molecules to transform into ones that can destroy ozone.

Satellite and aircraft measurements indicate Pinatubo was probably the largest volcanic eruption of the century, belching out at least twice as much sulfur dioxide as the 1982 eruption of Mexico's El Chichon. Using these data, Brasseur's model calculates that the aerosol increase will cause a 15 percent reduction in mid-latitude ozone values during winter. Brausseur cautions, however, that these predictions include significant uncertainties.

Susan Solomon, an atmospheric chemist at the National Oceanic and Atmospheric Administration in Boulder, used a different model to calculate the effect of the volcanic aerosols. Although she says it's too early to discuss specific results, she hints that her model predicts an ozone decrease even greater than that calculated by Brasseur.