Microbe linked to Alzheimer's disease

Chlamydia pneumoniae is getting a bad reputation. Scientists first identified the bacterium a decade ago as the cause of severe, even fatal, respiratory failure in people. More recently, some investigators connected *C. pneumoniae* with atherosclerosis (SN: 6/14/97, p. 374). Now, a research group contends that this relatively common bacterium can invade the brain and perhaps trigger Alzheimer's disease.

Although the origin of most cases of Alzheimer's disease remains mysterious, scientists long ago ruled out infectious agents as suspects. Still, many researchers have amassed data suggesting that inflammation resulting from abnormal immune responses in the brain may lead to the cell death characteristic of the illness (SN: 12/5/92, p. 394). Moreover, anti-inflammatory drugs seem to slow the disease's progression (SN: 2/19/94, p. 116).

Brian J. Balin of the Philadelphia College of Osteopathic Medicine and Alan P. Hudson of Wayne State University School of Medicine in Detroit wondered if *C. pneumoniae* sparks the brain's aberrant immune response in Alzheimer's disease.

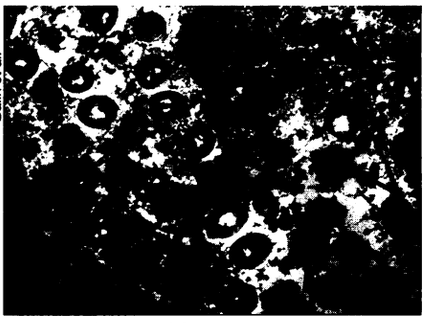
The researchers found traces of the bacterium in the brains of 17 out of 19 people who had died with Alzheimer's disease. In contrast, only 1 autopsied brain out of 18 from people without the illness had signs of the microbe, Balin and his colleagues reported at last week's Society for Neuroscience meeting in Los Angeles. They also described the research in the August MEDICAL MICROBIOLOGY AND IMMUNOLOGY.

Other scientists studying Alzheimer's disease are intrigued by the new work but remain skeptical. "A bacterial infection in the brain could explain the widespread evidence of inflammation that one sees in Alzheimer's brains," says Joseph Rogers of the Sun Health Research Institute in Sun City, Ariz. "We need to find out if this [finding] is a statistical fluke or true in many patients."

"Clearly, someone else is going to have to verify this information. On the surface, it's difficult to believe," adds Paul Brown of the National Institute of Neurological Disorders and Stroke in Bethesda, Md., who many years ago unsuccessfully tried to transmit Alzheimer's disease to monkeys by injecting tissue from diseased human brains.

The evidence of *C. pneumoniae*'s presence in the brain took several forms. Two tests detected DNA unique to the microbe. Antibodies that bind only to the bacterium stained regions of the brain affected in Alzheimer's disease. Electron microscopy yielded pictures of *C. pneumoniae* in brain cells. Finally, the researchers grew the microbe from some of the brain tissue samples.

Unlike most bacteria, *C. pneumoniae* lives inside cells. While it hasn't been found in the brain before, scientists could have mistaken the microbe for cellular structures known as lysosomes, argues Balin. Moreover, it infects brain cells called glia rather than the nerve cells that die in Alzheimer's disease.



Balin *et al.*

Various forms of Chlamydia pneumoniae *(arrows) inside brain cells from an Alzheimer's patient.*

When glia are infected, they may produce immune molecules that ultimately harm neighboring nerve cells. "We think it's the inflammation that's really doing the damage," says Balin.

He and Rogers agree that it's unclear how a bacterial infection produces the abnormal protein deposits typical of Alzheimer's disease. One difficulty in evaluating the importance of *C. pneumoniae*'s presence in the brain, adds Rogers, is that pneumonia is the most common cause of death for people enfeebled by late-stage Alzheimer's. "They may just be more susceptible to *Chlamydia pneumoniae*," he says. —*J. Travis*

Climate treaty talks mark some progress

On Nov. 12, the United States signed the 11-month-old Kyoto Protocol, an accord to limit emissions of carbon dioxide and other greenhouse gases.

Although it has been signed by 60 countries, it has only been ratified to date by Fiji and by Antigua and Barbuda. U.S. ratification requires Senate action. Once it is ratified by at least 55 countries, the protocol becomes a binding treaty.

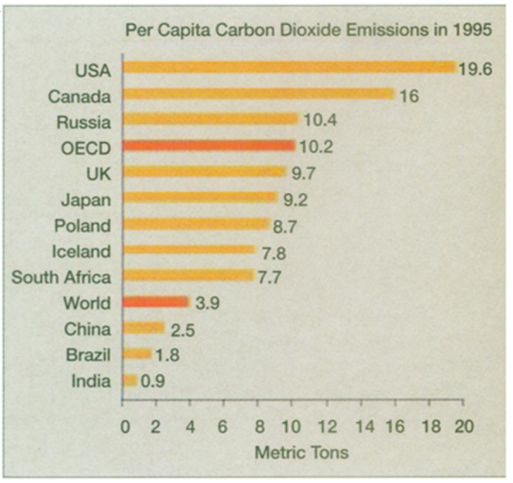
While last week's U.S. signing did not commit the world's leading greenhouse-gas polluter to any specific actions, it was necessary to revive stalled treaty deliberations then under way in Buenos Aires, according to Stuart E. Eizenstat, the chief U.S. negotiator. Two days later, diplomats from 170 countries ended the meeting with a report of substantial progress—in recognizing the most important conflicts on how to implement the most treaty and in setting a deadline of late 2000 for resolving them.

Emission credits proved one source of conflict. Under the treaty, industrial nations would have to cut their combined emissions to 5 percent below their 1990 levels, which is 29 percent below what has otherwise been projected for 2010. In Kyoto last year, industrial nations won the right to use certain foreign investments as write-offs against some of their mandated reductions. The industrial nations would work through a "clean development mechanism," or CDM, to fund low-emissions technologies in developing countries. Big polluters could also buy the right to emit the unused portion of another nation's pollution allowance (SN: 12/20&27/97, p. 388).

In June, however, U.S. negotiators began arguing that the United States should be able to write off all of its required reductions—not just some small share—through such foreign investments.

Many nations now view the United States as "reneging on its Kyoto commitments," says Philip Clapp of the National Environmental Trust in Washington, D.C. Speaking from Buenos Aires, he predicted that if the United States holds to its stance, it could kill hopes of advancing treaty negotiations next year.

Another potential deal breaker, says Connie Holmes of the Global Climate Coalition, a group of U.S. industrial firms, is an insistence by many developing countries that CDM rules be set before those for emissions trading. Unless the rules are developed in tandem, she fears, the more numerous developing countries may adopt rules that they want for the CDM investments and then boycott efforts to set up the emissions trading desired by industrial nations.



P. Rekacewicz/E. Bourray, GRID-Arendal, Norway

Under the treaty, developing countries would not be subject to specific emissions targets, only asked to slow their growing greenhouse emissions. Last week, however, two developing countries—Argentina and Kazakhstan—volunteered to accept emissions targets.

At the Buenos Aires meeting, Sen. John Kerry (D–Mass.) said that this "important break in the heretofore solid Block of 77" developing nations, which had argued against such limits, signifies major treaty progress. —*J. Raloff*