

Alzheimer's causes unique cell death

A new study documents the striking differences in brain cell loss experienced by the mentally alert elderly and those with Alzheimer's disease, researchers report.

The number of neurons, or brain cells, normally declines in old age. In Alzheimer's patients, however, that drop takes on a distinct pattern, Mark J. West of the University of Aarhus in Denmark and his colleagues report in the Sept. 17 LANCET. Cell death either leads to memory loss or results from the same process that causes memory deficits, scientists suspect.

The new study provides a quantitative assessment of the areas of the brain hardest hit by Alzheimer's, says Warren J. Strittmatter of Duke University Medical Center in Durham, N.C. The findings also offer additional evidence that Alzheimer's is not accelerated aging, as some researchers argue, but a unique pathological process, Strittmat-

ter and the authors note.

The researchers determined the density of neurons in different parts of the hippocampus, a region of the brain that handles memory and shows early damage from Alzheimer's, the team reports. Unlike other researchers, they also calculated the volume of the areas of the brain they examined, says coauthor Dorothy G. Flood of the University of Rochester (N.Y.) Medical Center. Brain volume often shrinks in Alzheimer's patients, and that would affect neuronal density, she notes.

The team used tissue samples from 7 deceased Alzheimer's victims and from 38 people, age 13 to 101, who died with no history of long-term illness, dementia, or neurological disease.

"We noticed [Alzheimer's-]related neuronal loss in two subdivisions that normally lose neurons with age, the hilus and the subiculum, but also noticed neuronal loss in CA1, a region in

which there is no evidence of normal age-related loss," they report. The Alzheimer's group averaged 68 percent fewer neurons in the CA1 than nondemented people of similar age.

The demented group lost more cells in the CA1 than in any other area of the brain examined by the team. Two of the Alzheimer's tissue samples had essentially no neurons, they note. The authors acknowledge, however, that they cannot rule out the unlikely possibility that the Alzheimer's patients had fewer neurons from an early age.

Alzheimer's disease results in physical changes in the brain in addition to cell loss. And it leads to gradual declines in cognitive abilities and to personality changes. Researchers have had a host of theories on the cause of this debilitating illness (SN: 1/1/94, p.8). Recently, investigators showed that inheriting one form of a molecule called apolipoprotein E increases a person's risk of developing Alzheimer's (SN: 5/7/94, p.295). — T. Adler

Consensus reached on climate change causes

While the politics of global warming inspire division and argument among nations, the world's scientists have reached a consensus on what causes climate change. Hundreds of top researchers from more than 80 countries agreed last week that carbon dioxide and other greenhouse gas pollutants represent the most important forces currently altering the climate, drowning out other effects that can cool the globe.

To produce the authoritative document, the Intergovernmental Panel on Climate Change (IPCC) enlisted more than 140 scientists to write the report and then sent the work to 230 reviewers. "We involved virtually all the scientists in the world who have done serious research in this area," British climate researcher John Houghton, who cochaired the science working group that produced the assessment, told SCIENCE NEWS.

The IPCC report notes that scientists still face many uncertainties regarding climate change. These outstanding questions, however, have not contradicted the basic conclusions that the group reached in its first major report in 1990. At the time, the IPCC stated with confidence that greenhouse gas emissions would warm the climate. It predicted that without any limits on these emissions, the climate would warm by roughly 1°C by 2025 and 3°C by the year 2100.

"It is interesting that in this very uncertain area, over a period of 5 years, the essential story remains the same. There's been no evidence that's come to light to destroy those basic findings," Houghton says.

Since the initial report, some researchers have explored whether changes in solar radiation or emissions of light-blocking sulfur pollution could offset warming caused by greenhouse gases.

The new study concludes that solar variations and sulfur pollution are too weak to counter the warming influence of carbon dioxide, methane, chlorofluorocarbons, nitrous oxide, and other heat-trapping gases. Although sulfur droplets and smoke from fires do reflect sunlight back toward space, such pollutants do not exert a uniform cooling effect because they have a spotty distribution around the globe.

The report also offered new information concerning efforts to curb emissions of greenhouse gases. In 1992, 155 nations signed a treaty in Rio de Janeiro pledging to stabilize atmospheric concentrations of greenhouse gases at an unspecified level. Toward that goal, developed nations agreed in a nonbinding way to scale back their emissions to 1990 amounts by the year 2000. The treaty does not say whether countries must cap their emissions after that time.

The new IPCC assessment concludes that the limits discussed in the Rio treaty will not stop the atmospheric accumulation of greenhouse gases. To stabilize concentrations at today's amounts or even twice those, nations will need to decrease their emissions to well below 1990 levels, Houghton says.

International negotiators are currently considering whether to set binding emissions limits and whether to require further cuts beyond the year 2000. Countries

that signed the Rio treaty will take up those contentious issues next March in Berlin. But the deadline for draft treaties closes in a week. If that date passes without any submissions, no strict limits on gas emissions will emerge from Berlin.

— R. Monastersky

Pacific hints of new El Niño

Only a year after the last El Niño warming upset world weather, the Pacific Ocean is showing signs that another may soon develop, reports the National Weather Service's Climate Analysis Center (CAC) in Camp Springs, Md.

El Niños occur when westward-blowing winds slacken along the equator, allowing ocean warmth from the western Pacific to spread east. The pool of warm water shifts the position of thunderstorms that pump heat and water into the air. This, in turn, reroutes atmospheric currents around the globe. As a result, El Niños bring torrential rains to some regions and droughts to others.

The CAC reported last week that water temperatures have started creeping upward in the central Pacific and that westward-blowing winds have weakened. The next few months will determine whether an El Niño develops or the warming dies out.

El Niños typically occur 3 to 7 years apart and last about a year. But the Pacific has had unusual conditions of late, serving up an El Niño in mid-1991 that persisted until mid-1993. Now another may be coming. "We just haven't been able to get rid of all that warm water," says the CAC's Gerald Bell.

— R. Monastersky