Biomedicine

Kathy A. Fackelmann reports from Washington, D.C., at the International Conference on Preventive Cardiology

Child's aggression may foretell heart risk

Some children who show signs of Type A behavior are likely to continue in that hard-driving vein as adults, according to new research. The finding suggests that the Type A pattern of aggression and competitiveness shows up early in life and can persist, perhaps putting the individual at risk of heart disease as an adult.

Saundra MacD. Hunter, Carolyn C. Johnson and their colleagues at the Louisiana State University Medical Center in New Orleans studied 1,744 children and young adults aged 8 to 24, giving them a test measuring Type A behavior during the 1981-82 school year and again three years later. Typical questions asked participants to rate their tendency to fight or get angry. The research team is taking part in the Bogalusa Heart Study, a large-scale attempt to identify childhood markers of future heart disease (SN: 10/8/88, p.234).

Of the 145 children who had the highest Type A scores on the 1981-82 test, 43 percent remained in that group three years later, the researchers report. In addition, of the 148 easygoing children with the lowest Type A scores on the first test, 45 percent remained in that group three years later.

The team also took into account hostility, an emotion that Redford B. Williams Jr. at Duke University in Durham, N.C., pegs as Type A behavior's "toxic core" that boosts cardiovascular risk (SN: 1/28/89, p.60). Of the 128 children with the highest hostility scores on the initial test, 40 percent remained in that group three years later, the researchers report.

Johnson says her group plans to track the children in the study to see if they leave their schoolyard fights behind. If further research confirms a link between childhood Type A behavior and cardiovascular risk, scientists could begin identifying at-risk children who might benefit by taking a more laid-back approach to life, she adds.

Racial differences in heart rate

Black men have a faster heart rate than white men during moderate exercise, a finding that suggests blacks have a genetically different response to stress.

Lars G. Ekelund of the University of North Carolina at Chapel Hill and his colleagues analyzed the results of a 6-minute treadmill test taken by 2,548 white men and 83 black men aged 20 to 69 who participated in a nationwide study. Even after controlling for age, weight, typical physical activity and smoking, the team found that blacks walking on a slightly inclined treadmill at a rate of 2.5 miles per hour had an average heart rate of 139.6 beats per minute, nearly 8 beats per minute faster than that of whites taking the same test. The researchers found no racial differences in resting heart rate.

Ekelund's previous research showed that black males had higher blood pressure than white males during moderate exercise. Taken together, the studies may help explain why U.S. blacks run a 33 percent greater risk of hypertension than whites. Over time, he explains, the increased heart rate and high blood pressure triggered by climbing stairs or other daily activities may stress the cardiovascular system, leading to chronic hypertension even at rest. High blood pressure is often called a "silent killer" because it puts people at risk for heart attacks and strokes.

Ekelund speculates that black males may have inherited a faster heart rate in order to clear heat efficiently from the body, a mechanism that would have been useful to their African ancestors. A rapid heart rate pushes more blood through the arteries, allowing excess heat to escape, he says.

His early research findings need to be confirmed with a larger study, Ekelund says. But he suggests that physicians evaluating treadmill test results keep in mind that black males may respond differently from whites for genetic reasons.

Earth Sciences

Where Earth's insides ooze out

Drilling into a recently discovered form of underwater seamount, oceanographers have found a spot where material from Earth's mantle oozes onto the seafloor in cold eruptions.

Most seamounts that dot the ocean floor arise when hot, molten basaltic rock spews out of volcanoes and builds layer upon layer. But scientists several years ago identified a new type of submerged mountain. Dredged rock samples and dives in the submersible *Alvin* have revealed that these seamounts consist of serpentinite, a nonvolcanic rock formed when water reacts with minerals in the mantle (SN: 11/19/88, p.333).

Now, to get a better look, researchers have drilled into underwater mountains near the Izu-Bonin and Mariana trenches south of Japan. Reaching more than a mile above the seafloor, these seamounts sit above a subduction zone in which the Pacific plate slides under the Philippine plate, creating the famous trench system that includes the lowest point on Earth's surface.

The drilling cores, taken during a recent leg of the Ocean Drilling Program, show that serpentinite not only covers the tops of the seamounts but also fills their interiors. While the Izu-Bonin seamount is extinct, the Mariana seamount remains active, and the researchers pulled up soft, plastic serpentinite there. In fact, the drill could penetrate only 150 meters into the center of the seamount before sticking, says Patricia Fryer of the University of Hawaii at Manoa in Honolulu, a co-chief scientist on Leg 125.

On the basis of holes drilled into the seamounts' centers and flanks, the researchers believe they can now explain the processes that create these structures. Fryer says the origin relates directly to the subduction going on underneath. The serpentinite forms when water escapes out of rocks on the sinking Pacific plate. Because serpentinite is lighter than the surrounding mantle rock, it rises toward the surface. Reaching the crust, the serpentinite "mud" oozes upward along fractures that lead to the seamount summit. As it erupts, the cool mud flows down the flanks like lava from a volcano. Flow textures in some of the drill cores support this idea, Fryer says.

Higher hints of greenhouse effects

Computer models predict that increasing concentrations of greenhouse gases should have contrasting effects on different portions of the atmosphere. These gases are expected to heat the lowest layer, or troposphere. But the next region up — the stratosphere — should cool. A new study of atmospheric temperatures in the Northern Hemisphere finds that tropospheric and stratospheric temperatures have indeed headed in different directions over the last 20 years.

David J. Karoly of Monash University in Melbourne, Australia, examined temperature measurements taken by balloons at 147 stations in the Northern Hemisphere from 1964 to 1985. While other researchers studying similar data have grouped stations in latitude bands, Karoly broke the hemisphere up into boxes based on latitude and longitude. He did this to separate areas with many stations from areas with sparse coverage such as Africa, East Europe and Asia. Of the 61 grid boxes, 13 boxes (21 percent) showed a statistically significant divergence between tropospheric and stratospheric temperatures, Karoly reports in the May GEOPHYSICAL RESEARCH LETTERS. In an earlier study he had shown that an even larger percentage of boxes in the Southern Hemisphere exhibited this divergence.

In some ways, says Karoly, these patterns are consistent with trends expected from the greenhouse effect. But he stresses that other factors, including ozone loss in the stratosphere, could cause the temperature changes he observed. Other scientists have reported that human-made chemicals are noticeably thinning the global ozone layer.