
Stress may damage cell immunity

Mounting evidence that emotional stress can trigger physical problems is opening up revolutionary areas of interdisciplinary research (SN: 12/10/77, p. 394). Stress-illness links have been indicated in cardiovascular disease, gastrointestinal ailments and other problems. Now investigators are beginning to report some rather surprising findings at the cellular level.

Based on a study of 117 randomly selected college students, Boston University researcher Steven Locke reports that persons who cope poorly with stress appear to suffer deficits in cell-mediated immunity against certain diseases. Those who cope well with stress display comparatively active Natural Killer Cell Activity (NKCA) when the body is threatened by disease or by abnormal cells.

"These findings suggest the possibility that susceptible individuals, characterized by psychobiological adaptive failure (or poor coping), may have diminished cell-mediated immunity in the presence of high life stress symptoms," says Locke, a staff member at McLean Hospital in Belmont, Mass.

Test subjects were classified as good copers or poor copers on the basis of a 91-item, self-reporting list of stresses during the past year, month and several weeks, along with a self-reporting list of symptoms during the week prior to testing. Each student rated his or her own stresses — such as death in the family, probation, pregnancy, rejection from a graduate program and homosexual encounters — in terms of how much readjustment they entailed. Those ratings were matched against the self-reported symptoms (nervousness, depression, sleeping problems, etc.) to yield a coping level.

"Our hypothesis was that stress alone is not sufficient to impair immunity," Locke says. "... We postulated that the crucial factor would be how well a person coped with stress (in this case, life change stress)."

Blood samples containing approximately equal numbers of white blood cells were drawn from each subject. In test tubes, the samples were exposed to human leukemia cells. Researchers then measured the activity of the natural killer cells, Locke explained in an interview.

Each leukemia cell was tagged with radioactive chromium; the level of killer cell activity was measured by the amount of chromium released into the test tube medium when a leukemia cell was killed. "As predicted, we observed that natural killer cell activity was highest for the group reporting fewest symptoms in the face of the highest levels of life change

stress," Locke reports. Conversely, the opposite was true of the poorest copers.

"There could be possible clinical applications," he says. "If there are ways of identifying people who don't cope well with stress, you might be able to predict those at risk to impaired immune function." Lock also suggests guardedly that the findings might have implications in susceptibility to cancer, depending ultimately upon how closely the immunity system may be tied in to certain forms of cancer.

The first published indication of a possible stress-immunity link, according to Locke, was reported in the April 16, 1977 LANCET — Australian researchers found that lymphocytes of bereaved spouses displayed an impaired immunity response to invading cells. In addition, a University of Rochester group will present similar results later this month at a meeting of psychosomatic medicine specialists, he says. □

DSDP: More on sea-floor spreading

Sea-floor spreading, the gradual expansion of the ocean bottom from a central point, is the generally accepted explanation of ocean basin formation and continental drift. Evidence collected in the Atlantic by the *Glomar Challenger* during the on-going Deep Sea Drilling Project supports the hypothesis. But data from Leg 58 of the DSDP, just in from its 51-day expedition in the Diato and Shikoku Basins of the North Philippine Sea, indicate that simple symmetrical sea-floor spreading may not explain the formation of back arc basins like those just studied.

Although earlier mapping of the magnetic imprint left in the crust of the Shikoku Basin indicated symmetrical spreading, the ages of the *Glomar* samples do not match the predicted model. The data is not clear enough, however, to eliminate other possible spreading modes, expedition co-chief George DeVries Klein says.

"It all adds to learning about the formation of the active continental margins [the area most involved in spreading]," adds Stan White of Scripps Institution of Oceanography. "In contrast to the simple formation of the Atlantic, it appears the formation of the active margins is complex."

Drilling samples that showed intrusive igneous rocks add another piece to the Shikoku Basin's complex geologic history. The intrusions indicate that volcanic activity occurred 15 million years ago, after spreading stopped. This post-spreading volcanic activity may account for the awkward topography, higher heat flow and peculiar seismic characteristics that distinguish back arc basins, Klein ventured. Back arc basins, such as the Shikoku Ba-

sin, are separated from the rest of the ocean by a ridge or line of islands and are part of the active continental margin. The volcanic activity may therefore play a role in forming the active margin.

Leg 58 also unveiled some of the history of the Diato Ridge and Basin. Snails and shell fragments characteristic of a shallow-water environment were found in the core samples, showing that part of the region stood above sea level about 45 million years ago. It has since subsided to 1,200 meters below sea level. Magnetic characteristics of the sediments and the tropical-equatorial fossils further indicate that this area of the ocean floor drifted northward about 1,000 kilometers since that time, presumably by spreading. □

DOE radiation studies

The Energy Department plans to expand its study on the health of laboratory workers exposed to radiation (SN: 2/18/78, p. 103) to all DOE and DOE-contractor facilities, according to James Liverman, head of the agency's environmental programs. It also plans to initiate medical follow-ups of personnel who have — since 1942 — been exposed to more than 5 rems of ionizing radiation in any one year. □

Toxic spill regulations

The Environmental Protection Agency issued regulations this week in an effort to reduce the number and magnitude of toxic-chemical spills. Its initial list of hazardous substances contains 271 chemicals. EPA lists those that are considered "removable" once a spill occurs, what amount is "harmful" if spilled and penalties and obligations of spillers. In addition, the government can collect cleanup costs to \$50 million per spill unless willful negligence is shown; in that case there is no upper limit to liability. □

FDA okays epilepsy drug

In an unusually quick action, the Food and Drug Administration approved an anticonvulsive drug for persons suffering from epilepsy. The drug, valproate, has been available in Europe for a decade. It will benefit more than 560,000 patients a year, the Epilepsy Foundation predicts. FDA said it found valproate effective against petit mal epilepsy.

Valproate will be marketed under the brand name Depakene by Abbott Laboratories in Chicago. Abbott's application was submitted at FDA request and approved 160 days later. The Epilepsy Foundation said the delay in the drug's availability here demonstrated the need for special mechanisms to encourage companies to develop drugs required by only a limited number of patients. □