Stress reaction may bode ill for some kids

Some children may experience biological reactions to stress that, under consistently threatening conditions in their social worlds, render them particularly vulnerable to various respiratory ailments, such as nasal congestion, sore throats, and ear infections. However, the same "biologically reactive" youngsters gain protection against such illnesses when they live in nurturing, low-stress surroundings.

That, at least, is the suggestion of a pair of studies in the September-October PSYCHOSOMATIC MEDICINE. If future research confirms the findings, efforts to prevent various childhood illnesses may need to focus on kids who show a biological sensitivity to stress.

"Only a subset of individuals may be susceptible to the health-altering effects of stressors and adversity," contend W. Thomas Boyce, a pediatrician at the University of California, San Francisco, and his colleagues.

Boyce's group first conducted a 6-month study of 77 boys and 60 girls, all 3 to 5 years old and living in middle-class families. Every 2 weeks, the researchers rated stress encountered by children at the four child-care centers they attended. Ratings drew on teacher reports of incidents such as a child's getting snubbed by peers, as well as on the ratio of teachers to children and other indicators of child-care quality.

Children classed as biologically reactive displayed large jumps in heart rate and blood pressure on a series of laboratory tasks, such as recalling lists of numbers and identifying incomplete pictures of objects.

A nurse examined the kids each week for symptoms of respiratory illness.

In a second study, the scientists tracked respiratory illnesses in 50 boys and 49 girls, all 5 years old, for 4 months after their entry into kindergarten. Each youngster gave a blood sample for analysis 1 week before and 1 week after kindergarten started. Those treated as biologically reactive showed large changes, either up or down, in the number of several types of immune cells and in the ability of immune cells to proliferate when stimulated chemically.

Psychological stress at the start of kindergarten was assessed through parents' reports of events in the past year, such as divorce or the birth of a sibling, as well as chronic areas of family discord.

In both studies, biologically reactive children experienced modest, but statistically significant, rises in respiratory illness when they faced stressful child-care or family situations. Youngsters exhibiting minimal biological responses to experimental tasks showed no increase in respiratory ailments associated with stress.

Most surprisingly, biologically reactive children who encountered little child-care or school stress suffered fewer infections than all other children.

Exaggerated biological reactions to stress may reflect "a heightened sensitivity to the character of the social world," the scientists propose. Thus, this bodily disposition boosts vulnerability to illness in adverse situations and fosters resistance to illness in supportive surroundings, they theorize.

The new data address unresolved questions about how stress may trigger illness in some individuals but not others, contend Sheldon Cohen of Carnegie Mellon University in Pittsburgh and Stephen B. Manuck of the University of Pittsburgh in an accompanying comment. But the results are preliminary and the theory advanced by Boyce's team remains speculative, the two psychologists contend.

No known physiological process can account for the lower occurrence of illness in biologically reactive kids under low stress, they note. Moreover, it is unclear whether individual immune reactions to stress are as consistent as those of heart rate and blood pressure, Cohen and Manuck add. — *B. Bower*

Pig cells used for Parkinson's disease

Mired in political and ethical controversy, fetal cell research has inched forward during the last decade. In a provocative study that may eliminate such controversy and avoid problems of supply, researchers have taken the first steps toward routinely using fetal cells from pigs, not humans.

Mounting evidence indicates that human fetal cells transplanted into the brain can replace the nerve cells ravaged by neurological illnesses such as Parkinson's disease (SN: 4/29/95, p.262). Yet investigators must struggle to obtain enough human fetal tissue to pursue their studies.

Much of the tissue derived from miscarriages and ectopic pregnancies is unsuitable (SN: 1/7/95, p.6). And even if obtaining fetal cells from induced abortions weren't an explosive issue, researchers doubt that this option can provide enough tissue to meet the demands of all potential patients.

Treating one Parkinson's patient, for example, requires tissue from five or more intact fetuses. "Getting the number of cells needed to treat the disease is very difficult," says neurosurgeon James M. Schumacher of the Lahey Hitchcock Clinic in Burlington, Mass.

"There is a real need to identify an alternative cell source," adds Jonathan H. Dinsmore, director of cell transplantation at Diacrin, a Boston biotech firm.

Both Dinsmore and Schumacher belong to a team that in April began transplanting cells from pig fetuses into the brains of Parkinson's patients. This is the first such experiment approved by the Food and Drug Administration.

"It's a bold move," says Paul R. Sanberg of the University of South Florida in Tampa, president of the American Society for Neural Transplantation.

In Boston last week, at a meeting focused on xenotransplantation—the transplanting of tissue across species—Dinsmore announced that the three patients treated so far have apparently not rejected the fetal pig cells. To prevent rejection, the patients were given a powerful drug that suppresses the immune system.

"We've done a PET scan on [the brain] of the first patient, and after 5 months it appears there's a living, dopamine-producing graft," Schumacher says. Parkinson's disease destroys brain cells that make dopamine, a neurotransmitter, producing problems with speech and motor coordination.

Though these initial studies are designed to test only the safety of the xenotransplant, researchers note that two of the three patients have improved. "Although the clinical data is preliminary, it looks promising," Dinsmore reported at the Third International Congress for Xenotransplantation.

This week, says Schumacher, he and his colleagues will begin transplanting fetal pig cells into three more patients. But instead of using an immunosuppressive drug, which can eventually leave patients vulnerable to infections and cancer, the investigators will try to prevent rejection of the cells by treating them first with antibody fragments.

These antibody fragments should mask the pig-specific proteins that stud the surface of the fetal cells (SN: 6/22/91, p.391) and give the patient's immune system time to learn to ignore the foreign cells, says Dinsmore.

Once investigators complete their trials with the Parkinson patients, they plan to move forward with a small FDA-approved trial of fetal pig cells for people with Huntington's disease, another neurological illness resulting from a loss of specific brain cells. Obtaining the proper human fetal cells to treat Huntington's is almost impossible, because the abortion procedure normally destroys the part of the fetus that makes them, notes fetal cell researcher Curt R. Freed of the University of Colorado in Denver. — *J. Travis*