

Infections May Underlie Cerebral Palsy

For more than 150 years, most doctors have believed that cerebral palsy—a form of brain damage that impairs movements—results from a difficult birth that temporarily deprives a fetus of oxygen.

While asphyxia may indeed be a cause of cerebral palsy, a new study provides evidence that the brain damage might often arise from some other, as yet unidentified assault on an unborn child. Molecular clues now lead to inflammatory infection as a possible culprit, says Karin B. Nelson, a pediatric neurologist at the National Institute of Neurological Disorders and Stroke in Bethesda, Md.

Nelson and her colleagues report in the October ANNALS OF NEUROLOGY that some cytokines, proteins that direct immune cells' responses against foreign microbes and perform other duties, are abundant

in newborns who were later diagnosed with cerebral palsy.

A placental infection and its potentially harmful effects might send a fetus' immune system spinning into action making cytokines, Nelson says. Little is known about this risk because after supervising a birth, obstetricians seldom examine the placenta for signs of inflammation, she adds. Also, an infection in the mother could ship potent toxins through the placenta.

Using blood taken from infants immediately after delivery, the researchers compared 31 children who showed symptoms of cerebral palsy several months after birth with a control group of 65 children without cerebral palsy. All the births were full-term. By testing for dozens of immune-system compounds, the team found

that all the stricken children harbored greater concentrations of five cytokines than any of the controls.

The cytokines may indicate a subtle attack on the fetus, says Nelson. "This may not be an acute, overwhelming infection at the time of birth," she says. "It may be a long-standing infection [in the mother] that has had a chance to march through the placenta."

"This is very important and perhaps novel work that hopefully will redirect thinking about causes of brain damage and, ultimately, cerebral palsy," says Karl C. Kuban, a pediatric neurologist at Tufts University School of Medicine and the Floating Hospital for Children in Boston. The new study supports other work suggesting that in cerebral palsy, "something went awry in development rather than delivery," he says.

The study also reveals that the children with cerebral palsy were much more likely than those in the control group to have excess amounts of several proteins that regulate blood clotting. Moreover, blood from three children with cerebral palsy, but none from the control group, contained an anticoagulant associated with lupus. This hints that the autoimmune disease, in which the body's immune cells attack its own tissue, might have been present in the mother or child. Thus, in addition to raising a red flag for infections, the data suggest an autoimmune reaction in some of these fetuses.

Although the cause of cerebral palsy remains hidden, previous research has suggested that both premature birth and maternal infections can boost the risk of the disorder. Nelson and study coauthor Judith K. Grether of the California Birth Defects Monitoring Program in Emeryville reported in 1997 that mothers with a fever at birth were more likely to have a child with cerebral palsy than healthy mothers. However, roughly half of children with cerebral palsy are born full-term to outwardly healthy mothers.

Despite vast improvements in obstetrics that have made childbirth safer, the frequency of cerebral palsy hasn't dropped in recent decades. About 500,000 people in the United States currently have the disorder.

Researchers are working their way back from the symptoms of cerebral palsy to its possible causes. After discovering that fever and acute infection seem to place neonates at risk, the scientists have now identified excess cytokines. "It may be that, as we move backward, [the cause] may not have much to do with cytokines directly," Kuban says. "It may involve other factors." —N. Seppa

Botanical 'Velcro' entraps hummingbirds

Burrs can snag more than sweaters. Last month, they snared at least four ruby-throated hummingbirds—three of them fatally, according to National Park Service biologists.

One of nature's cleverer feats of engineering, burrs' tough, hooklike fibers securely lock onto anything that brushes against the seed heads. This strategy usually allows them to hitchhike to a new site. Occasionally, however, a snagged animal isn't strong enough to rip a burr free from its parent plant and finds itself locked in a potential death trap.

Four hummingbirds met that fate over a 3-day period while migrating through Rock Creek Park in Washington, D.C., though birders rescued one. The birds were snagged by burdock (*Arctium minus*), a weed that can grow to 6 feet.

"I've never heard of anything like this," said burdock expert Wayne R. Hawthorn of the University of Waterloo in Ontario. Yet "this is a case of death by misadventure," he says. "Burdock is not some weird, carnivorous plant." Its seed heads



Burrs stick even to bare fingers.

stiffen into effective burrs only when the biennial plant dies and dries out.

Should a small bird run into such a plant, however, it's not hard to imagine the outcome, he says. Any thrashing to get loose of one burr will cause its victim to hit neighboring burrs, ensnaring it more. In effect, "this is nature's Velcro," explains Bob Ford, a National Park Service biologist at Rock Creek Park.

Birders, who found the trapped hummingbirds, led park officials to a pair of thickets containing 50 to 60 plants, which park employees have since eradicated. "We haven't historically done a lot to control burdock," says Susan E. Salmons, who is in charge of controlling unwanted plants in the park. From now on, she says, "we probably will."

Though burdock's bird-snaring abilities have garnered little attention over the years, Martin K. McNicholl, a consulting ornithologist based in Burnaby, British Columbia, has accumulated a growing rap sheet on the plant, culled largely from reports in small, regional journals. They indicate this weed sporadically claims the lives of small birds and even brown bats. —J. Raloff

Photos: Rosa Wilson, NPS



Preserved Rock Creek Park burdock and its victim.