Antipsychotics Evoke Youthful Concerns

One-third of all children and adolescents treated with antipsychotic drugs in a New York psychiatric hospital developed symptoms of parkinsonism—mainly muscular rigidity and slowed movements—that interfered with daily activities and often persisted for weeks or months after antipsychotic use stopped, researchers report in the October AMERICAN JOURNAL OF PSYCHIATRY.

The findings, which have broad implications for treating psychiatrically disturbed youngsters, "demonstrate no easy solutions, but rather a serious, complex and troublesome phenomenon that demands monitoring by the clinician and more attention from the research community," conclude the investigators, led by psychologist Mary Ann Richardson of the Nathan S. Kline Institute for Psychiatric Research in Orangeburg, N.Y.

In contrast, about one in eight children and teens in the study who had taken antipsychotic drugs (also known as neuroleptics) for at least three months developed tardive dyskinesia, a condition marked by rapid, involuntary twitching or jerking of the mouth, lips, tongue or body. One-quarter of adults who take antipsychotic drugs develop tardive dyskinesia (SN: 5/11/91, p.293).

Mental health clinicians tend to underestimate a variety of antipsychotic-induced movement disorders, maintains psychiatrist C. Thomas Gualtieri of the University of North Carolina at Chapel Hill. Further studies must establish whether youngsters receiving these drugs consistently prove more likely to develop parkinsonian symptoms than tardive dyskinesia, he says. "But this new study suggests that neuroleptics are still being prescribed for childhood disorders, such as conduct disorder, for which they have no legitimate medical use," he asserts.

Conduct disorder involves persistent stealing, fighting and other violent behavior. Evidence of widespread prescription of neuroleptics to control aggressive and violent behavior among U.S. children with a variety of diagnoses, such as mental retardation and autism, turned up in the early 1980s, although this practice has since declined, Gualtieri notes.

Richardson's team studied 104 youngsters, averaging 15 years old, living in or admitted to a state-operated child psychiatric center in New York during a six-month period. The patients' psychiatric diagnoses ran the gamut, including conduct disorder, schizophrenia, severe depression, drug abuse and hyperactivity.

Of 61 youngsters who received neuroleptics upon entering the study, 21 displayed clear and often "striking" parkinsonian symptoms, Richardson says. Those with longer histories of antipsychotic treatment developed the most severe rigidity and slowed movement. Of 11 neuroleptic-treated children who took specific drugs to quell those symptoms, three nevertheless exhibited parkinsonism. In five of the 21 with parkinsonism, symptoms persisted for several weeks or months after neuroleptic treatment ceased.

Several troubling trends stand out, Richardson contends. First, schizophrenia and other severe disorders considered the prime candidates for neuroleptic treatment accounted for only slightly more than one-quarter of the diagnoses among youngsters receiving the drugs. Second, staff clinicians rarely looked for parkinsonian symptoms, although the severity of symptoms in some children interfered with running, swimming and other activities. Moreover, children felt that these symptoms made them "zombie-like," increasing the chance that they would discontinue neuroleptic use when they started outpatient treatment.

Clinicians did not dispense neuroleptics in a "cavalier manner" or use them as chemical straitjackets, Richardson asserts. Still, the specificity of these drugs for particular psychiatric symptoms remains "very primitive," she says, and "it's all a crap shoot" when physicians decide which antipsychotics to prescribe for children with severe mental disorders.

The new study underscores the need to pay special attention to parkinsonian symptoms among youths receiving neuroleptics, she says. "Clinicians are in a bind," she adds. "Drugs that treat parkinsonian symptoms can cause cognitive problems and interfere with school performance." — *B. Bower*

Salt's technique for tickling the taste buds

The nose may know, but the taste bud testifies — especially when it comes to sodium chloride, commonly known as table salt.

Sodium's positively charged ion plays a crucial role in maintaining the body's water balance. Taste buds coated with clumps of sodium-seeking cells dot the tongues of most land animals, including humans, as nature's way of driving us to eat enough of the mineral.

But our sense of sodium's saltiness varies depending on whether chloride or some other negatively charged ion (anion) is coupled to it. Now, three physiologists at Virginia Commonwealth University in Richmond have explained this phenomenon.

In the Nov. 1 SCIENCE, John A. DeSimone, Qing Ye and Gerard L. Heck reveal the mechanism behind the so-called "anion effect." They discovered that sodium chloride tastes saltier than sodium linked to other anions because chloride is small enough to worm its way into taste buds, where it affects the way taste cells perceive sodium.

The work confirms earlier findings by others that chloride diffuses into taste buds through a dense network of filaments that swathe taste cells and link them to one another. But DeSimone's team also found that once the chloride anions traverse the barrier, they dilute the net positive charge created by sodium ions already drawn inside.

The dilution helps neutralize the charge difference between the outside and inside of the bud, making it easier for sodium-scavenging taste cells to haul in more of the mineral, DeSimone says. Each time the taste cells gobble more sodium from outside the taste bud, he says, the process triggers nerves that register a salty sensation to the brain.

In their experiments, the Virginia team compared the effects of three different sodium salts on a patch of taste buds on the tongue of an anesthetized rat. Using electrodes, they measured the voltage difference between the patch's outer and inner surfaces after adding sodium chloride or sodium paired with the relatively large anions acetate or gluconate. They monitored the patch's response to the salts through other electrodes attached to nerve fibers relaying signals from the patch.

The group found that the chloride caused only half the voltage difference created by salts of the other two anions. This allowed the taste cells to pull in more sodium and elicit larger nerve impulses. When the researchers neutralized the voltage across the patch, it altered the diffusion rates of the three anions, eliminating the effect. But when they increased the positive charge on the patch's inner surface, even more chloride than acetate or gluconate anions flooded in, proving chloride's neutralizing role.

"I'm very impressed," says Joe Brand, a biophysicist at Monell Chemical Senses Center in Philadelphia. "This means that the functional unit of taste now has to include not just the taste cell, but its environment as well." — *C. Ezzell*