Promising Addition to Autism Treatment

For most of his life, the 12-year-old autistic boy had uttered only single words or short phrases. A constant anxiety flared into panic if he noticed that the table was not set in just the right way for a meal. He flapped his arms for hours at a time, shunning toys or other children. A scar on his neck testified to the repeated scratching he inflicted on himself.

Then the boy entered a drug experiment in which he received clomipramine, an antidepressant previously found to reduce the vexing rituals of obsessive-compulsive disorder (SN: 5/21/88, p.324), as well as compulsive hair pulling (SN: 9/9/89, p.175) and nail biting. Not only did the boy's arm flapping subside markedly within a few weeks of clomipramine treatment, but his anxiety, self-injury and social withdrawal lessened. Toys he had not touched for years now drew his interest. Although still saddled with language difficulties and other autism-related problems, his progress remains steady after 18 months on the drug.

This case illustrates the encouraging, but preliminary, results of the first controlled trials of clomipramine in autistic children. "We're not talking night-and-day improvement for autistic children on clomipramine," cautions psychiatrist Charles T. Gordon of the National Institute of Mental Health in Bethesda, Md., who has directed two clomipramine studies with a total of 25 autistic youngsters. "But this drug produces clinically significant behavior improvement for many of the kids we've studied."

Clomipramine treatment also allowed some autistic children to benefit more from behavior therapy, in which adults offer immediate rewards for appropriate actions, Gordon says.

In 1990, his team studied seven youngsters, ages 6 to 18, with mild to severe autistic symptoms (the boy described above displayed moderate symptoms). Participants had taken no psychoactive drugs for at least three months prior to the trial. For two weeks, each child received placebo pills. The children were then assigned at random to five weeks of treatment with either clomipramine or desipramine, an antidepressant with different biochemical effects. Five weeks of treatment with one drug was followed by five weeks of therapy with the other.

Neither experimenters nor parents knew when a child got clomipramine or desipramine, and parents did not know the initial phase involved placebos.

Youngsters received increasing doses for two to three weeks until a positive response or side effects appeared; they then remained at that dosage.

Clomipramine proved much superior to desipramine and placebo, Gordon's group reports in the March AMERICAN JOURNAL OF PSYCHIATRY. Ratings of compulsive behavior, social withdrawal, anxiety, angry outbursts and self-injurious actions improved significantly with clomipramine. Both active drugs caused minor side effects, such as mild sleep problems and dry mouth.

At their parents' behest, four youngsters still take clomipramine and have maintained their improvement with minimal or no side effects, Gordon says.

In an unpublished 10-week study of 18 more autistic children, his group found similar improvement with clomipramine, but not with desipramine or placebo.

Moderate or "remarkable" improvement occurred among 15 of the 25 participants in the two trials, Gordon says. A long-term study of clomipramine use by autistics must follow, he adds.

Clomipramine increases the availability of the chemical messenger serotonin, but its specific effects on serotonin receptors in the brain remain unclear, Gordon notes. Fenfluramine, another drug that alters serotonin supplies, has yielded mixed results with autistics. Clinicians often prescribe the antipsychotic drug haloperidol for autism, but its purported effectiveness and sometimes severe side effects have proved controversial.

Based on clomipramine's effects, Gordon's team theorizes that all ritualistic, impulsive behaviors – whether they occur with autism or any other disorder – may stem from a "core" disturbance of serotonin function in the brain.

– *B. Bower*

New polymers shine in rainbow patterns

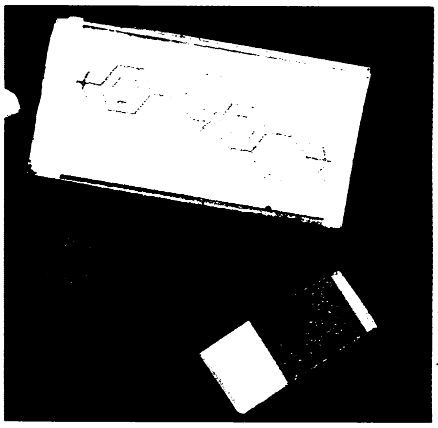
Scientists manipulating the chemical makeup of polymers have expanded the potential of plastics for making light-emitting diodes in a rainbow of colors. These materials could lead to billboard-size, multicolor electronic displays, higher resolution in portable computer screens and new devices for guiding light.

Polymer processing can be fine-tuned to alter the ability of semiconducting polymers to emit light when subjected to an electrical current, Paul L. Burn and his colleagues from the University of Cambridge in England report in the March 5 NATURE.

These physicists and chemists first discovered electroluminescent polymers in late 1990. Now they've created several new materials that work up to 30 times better than their original one and as well as the inorganic materials currently used in light-emitting diodes, they add.

The British team uses a conjugated polymer—every other carbon atom in the polymer's extensive backbone chain connects via a double bond, thereby creating a route along which electrons can travel. They make the polymer from building blocks, called monomers, that are poorly conjugated; their second bonds instead usually connect to side groups of atoms. By knocking off these side groups, chemists cause more double connections to form.

Burn and his colleagues put different side groups on the building blocks. By kicking off some or all of these side groups while joining the building blocks and by varying the ratio of the monomers, they adjust the degree and spacing of conjugation, and consequently the color of light emitted. "The secret is in the



Holmes, Friend/NATURE

These samples, shown fluorescing under ultraviolet light, demonstrate the patterning potential (indicated by the chemical structure) and range of colors now possible in light-emitting polymers.

conversion," says Andrew B. Holmes, a synthetic organic chemist who works with Burn. Polymers with longer conjugated sections emit redder light, while those with lots of side groups tend to glow yellow.

Physicist Richard H. Friend and his colleagues at the Cavendish Laboratory in Cambridge have fashioned this new material into prototype light-emitting diodes with patterns of colors.

"They've made a combination of [chemical] structures and used them in a creative way. It saves steps in patterning," comments physicist-chemist Alan J. Heeger, who develops electroluminescent polymers at the University of California, Santa Barbara.

To achieve electroluminescence, researchers place a thin film of these poly-