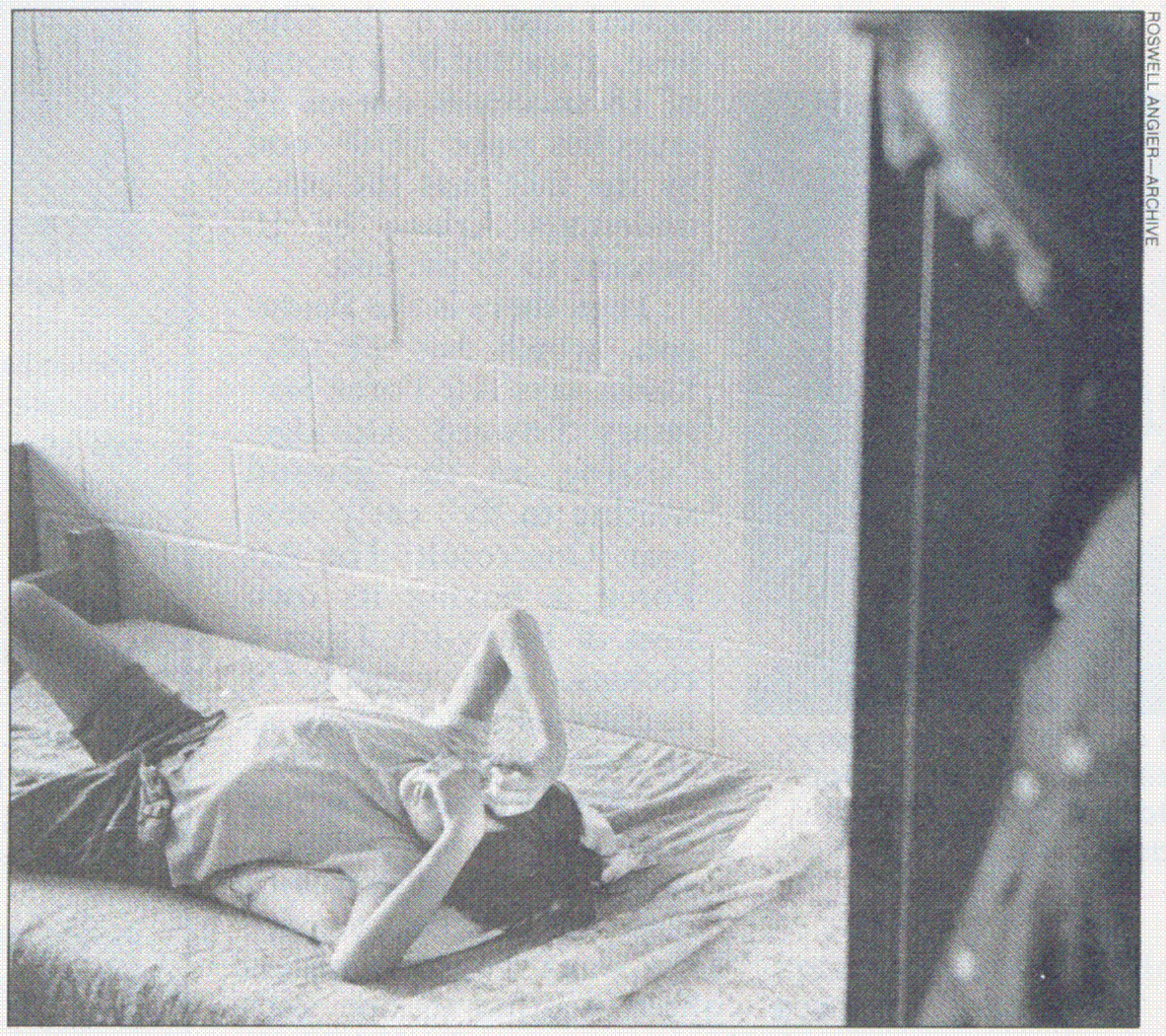
A substance that lowers the brain's own opiates may undo the chemistry of autism

A drug that lets the real world in

■ Perhaps nothing so warms the heart as the mutually satisfying affection that springs up between mother and infant shortly after birth. It may be something of a damper to consider the possibility that this bonding process, with its smiles, gurgles and baby talk, merely reflects a craving for a brain chemical. Recent evidence, moreover, suggests that if the brain produces too much of this chemical, the result may be the condition known as autism. The chemical may also be the reason that some children deliberately scratch and batter themselves ceaselessly.

New studies done on children, as well as more than a decade of animal research, bolster this discomfitingly chemical view of mother-infant bonding. Various investigators over the past decade have theorized that babies seek their mothers' attention, warmth and nourishment because these are things that trigger the brain to pour out a natural form of opiates, called opioids. In autism—a state in which children are aloof, avoid making eye contact and either echo whatever they hear or rarely speak at all—the brain produces too high a level of these opioids. Barbara Herman and Dr. Kathryn Hammock of the Brain Research Center at Children's Hospital National Medical Center in Washington, D.C., decided to take the theory a step further. If an oversupply of opioids is why parents hold no special attraction for such youngsters, they reasoned, then countering the oversupply with another chemical might be of benefit.



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At a school for autistic children: Ritualistic gestures are common

Making contact

To find out, Herman and Hammock gave five autistic children naltrexone, a drug that blocks the action of opioids in the brain and so is used to wean addicts from heroin. The drug did not promote more or better speech in the children, who ranged from retarded to extremely bright. But all of them exhibited less of the abnormal behavior—such as hand flapping and standing in one spot and whirling—that is characteristic of autistic children. Three of the youngsters also made more-frequent eye contact with those around them. And all of the parents reported that their children responded much more positively to hugging—to which autistic children usually react indifferently.

Encouraged by these findings, the researchers extended the test to children who bit and hit themselves in uncontrollable outbursts, as young autistic children often do. The investigators suspected that here, too, an abnormally high level of opioids was the problem. "When these children hurt themselves, their pain perception may be diminished as if they were on morphine," says Herman. "I've seen blasé expressions on the faces of 6-year-old autistic children getting their blood drawn. A normal child will have tears streaming down his face."

To test their theory, Herman and Hammock administered naltrexone to three youngsters who frequently engaged in self-mutilation. Indeed, two of the children routinely wore helmets to protect their heads against self-inflicted cuts and bruises. The results were dramatic: One child reduced this behavior by 30 percent, another by 84 percent. One boy, by far the most self-destructive, stopped almost completely. Before treatment, he had hit himself on the head with his arm or shoulder a seemingly impossible 200 times within 5 minutes. Now, Herman reports, he no longer has to wear a protective helmet.

Similar results have come from four other U.S. studies in which naltrexone—or naloxone, a chemical cousin—was given to small numbers of adults who persisted in hurting themselves. It is the first drug that has worked to any real degree. Thorazine, a "chemical straitjacket," is used to calm schizophrenics during severe bouts of paranoia. But the drug doesn't inhibit self-mutilation, and such behavior is "one of the worst managerial problems for mental institutions," says Herman. By comparison, naltrexone helps patients without drugging them into a stupor.

Until larger clinical trials are completed, Herman warns that the naltrexone findings must be viewed as preliminary. "It is much too small a sample to generalize from," she says. Nonetheless, her approach has been reinforced by studies of infant-mother bonds in animals ranging from guinea pigs and chicks to dogs. At Bowling Green State University in Ohio, Jaak Panksepp, a psychobiologist, has tested dozens of chemicals for their ability to reduce crying and other signals of distress when a young animal is separated from its mother. Only opiates, at doses far too low to sedate the animal, have worked. Further investigations have revealed that the neural circuits that control crying are rich in opioid receptors—the chemical locks, into which opioid molecules fit, on the surface of brain cells.

Panksepp then reasoned that if raising opioids in the brain could keep baby animals happy, then lowering the opioid level with naloxone logically should have an effect. It did: Just as in humans, the animals became more outgoing. Puppies, for example, wagged their tails faster when people approached.

"Infant and mother seem to depend upon each other for their emotional well-being," says Panksepp, whose experiments inspired Herman and Hammock's work. "Bonding may be so crucial for social learning that nature made it addictive." ■

by Kathleen McAuliffe