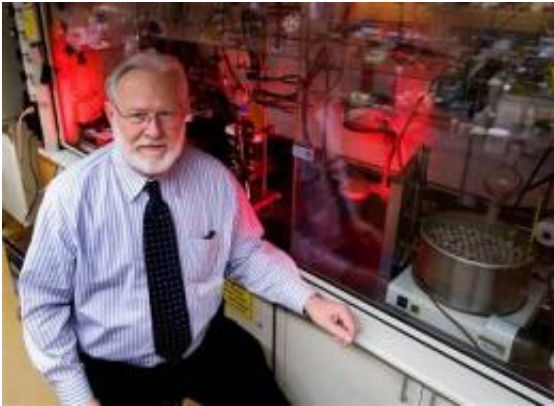


Scientist haunted by misuse of drugs he invented

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This handout photo provided by Purdue University shows David Nichols in a lab at the university in West Lafayette, Ind., Wednesday, Jan. 5, 2011. Nichols studies the way psychedelic drugs act in the brains of rats. But he's haunted by how his work is being hijacked by humans selling street drugs. (AP Photo/Purdue University, Mark Simons)

David Nichols studies the way psychedelic drugs act in the brains of rats. But he's haunted by how humans hijack his work to make street drugs, sometimes causing overdose deaths.

Nichols makes chemicals roughly similar to ecstasy and LSD that are supposed to help explain how parts of the [brain function](#). Then he publishes the results for other scientists, hoping his work one day leads to treatments for depression or Parkinson's disease.

But Nichols' findings have not stayed in purely scientific circles. They've also been exploited by black market labs to make cheap and marginally legal recreational drugs.

"You try to work for something good, and it's subverted in a way," Nichols said. "I try not to think about it."

Now the 66-year-old chairman of the Purdue University pharmacology department is speaking out in one of the world's most prestigious scientific journals to describe an ethical struggle seldom discussed by brain researchers.

"You can't control what people do with what you publish, but yeah, I felt it personally," he said in a phone interview, explaining that his struggles are probably somewhat similar to those faced by the inventor of the machine gun, although not as severe. The journal *Nature* published his essay online Wednesday.

"What if a substance that seems innocuous is marketed and becomes wildly popular on the dance scene, but then millions of users develop an unusual type of [kidney damage](#) that proves irreversible and difficult to treat, or even life-threatening or fatal?" Nichols wrote. "That would be a disaster of immense proportions. This question, which was never part of my research focus, now haunts me."

Nichols has studied psychedelic drugs for more than 40 years, concentrating on serotonin. That's a basic chemical "that goes to every part of the brain. It's involved in appetite, sleep, sex, aggression, you name it," Nichols said in the interview with The Associated Press. "It really plays a key role in [brain activation](#), the difference between being awake and being asleep."

Nichols estimates that at least five of his compounds - out of hundreds -

have been turned into street drugs.

His drug work used to be a joking matter. People would ask him if he needed human test subjects, and he would respond: "No, it's just rat stuff."

"I never thought of these getting out of the lab," he told the AP. Sure, the field includes research into LSD and other hallucinogens, but Nichols never imagined his work escaping the lab and causing death. The worst would be maybe someone getting high on stuff they shouldn't, he figured.

"Every time we make a molecule now, I do think, 'Is this the one that's going to be a problem?' I never used to think that before," Nichols said.

One chemical was so potent that "I just stopped and said, 'We're not going to study this one. This stuff would hit the market big-time,'" he said.

That wasn't the case almost 20 years ago, when he developed something similar to ecstasy - but not nearly as potent. Back then it was a little-known street drug. He published his study, found little interest from pharmaceutical companies in his chemical, called MTA, and moved on.

But somebody in the illicit world of drug abuse read his research and synthesized that drug into tablets for street use. It was eerily called "flatliners." But it really didn't provide much of a high. "Flatline implies that you're brain dead," Nichols said. "Why would anyone take it?"

People did. They took too much. Their brains were flooded with serotonin, and they died. The first time Nichols was told about it, only two people had died.

"I sat in my office and thought. 'Wow, if you shoot somebody with a gun, you know you killed them, but if technology escapes and someone dies,'" Nichols said, his voice trailing off. "You're kind of disconnected from it."

At least five or six people died from that first drug. A second drug, a hallucinogenic called bromo-dragonfly, has killed two others. It could have been worse because it was chemically similar to a potent toxin that causes liver cancer, Nichols said.

A story last year in the Wall Street Journal said Nichols' published research is a favorite for European chemists who make black market street drugs. That hit him hard, but didn't surprise him. In the past year or so, he's been getting inquiries about his research from investigators and forensic labs.

Johns Hopkins University behavioral biology professor Roland Griffiths struggles with the same ethical questions when he studies the chemicals behind hallucinogenic mushrooms. But Griffiths believes the key to scientific progress is the free exchange of ideas, saying it's better than no information.

University of Pennsylvania bioethicist Art Caplan said there are times when you can share too much scientific information - with nuclear weapons, biological weapons and the like - despite the desire for open research. And this may be one of those cases given the large [black market](#) out there, he said.

Caplan said Nichols' essay "should lead to more careful thinking about the unintended consequences of scientific advances."

More information: Nature: www.nature.com/nature

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