

Mele, a coinvestigator at Philip Morris' short-lived behavioral pharmacology laboratory in Richmond, Va., appeared before the subcommittee to discuss their nicotine studies.

While saccharin and water can set up reinforcing behavior, DeNoble said, they do so only if an animal can taste the saccharin or is thirsty for water. What sets addictive drugs apart is that brain chemistry drives the reinforcing behavior. Thus, intravenous injections of an addictive substance — which can't be tasted or felt in the tactile sense — will satisfy the brain's craving.

DeNoble said his work demonstrated that, like heroin and cocaine, intravenous nicotine satisfies such a craving. Moreover, he and Mele used a series of chemicals that block certain drug receptors in the brain "to show that it was the brain activity of nicotine . . . that determined its reinforcing effects." That's what makes intravenous self-administration of nicotine by animals — as demonstrated by DeNoble and Mele — "a hallmark" of addiction, observed NIDA Director Alan Leshner in an April 13 letter to Waxman.

And what of the tobacco companies' claim that DeNoble's work indicated nicotine is not addictive?

"When you talk about addiction, you're talking about a human condition," DeNoble says. Animal studies, especially the preliminary ones his lab conducted in the early 1980s, could not establish whether a substance would prove addictive, he says. Indeed, his lab was unable to establish that discontinuing nicotine could induce withdrawal symptoms. Those findings would come later, DeNoble testified, from labs that used more sensitive screening techniques.

However, he pointed out, his lab's groundbreaking work on self-administration by rodents "clearly shows that nicotine is an intravenously delivered reinforcer." And that, he emphasized, "is a

characteristic of a drug of abuse." As such, he testified, his work indicated the potential for nicotine to be addictive in humans. And work since 1984, DeNoble said, has established "an overwhelming body of evidence that nicotine does produce an addiction in the human."

How much of this did company officials know, Waxman and others asked? "Senior research management in Richmond, Va., as well as top officials at the Philip Morris Co. in New York continually reviewed our research and approved our research," DeNoble said.

But were they specifically told about nicotine's potential addictiveness, the subcommittee asked? Yes, DeNoble and Mele said — and that appeared to be why the company asked them to pull two manuscripts and a poster paper that had been approved for publication.

"It had to do with the fact that this would not look good in current litigation," DeNoble recalled — litigation in which admitting nicotine's addictiveness would undercut claims that people could voluntarily quit smoking any time they learned it might harm their health.

Indeed, DeNoble and Mele recalled that at least three attorneys descended on the lab for days, sifting through their research files, photocopying documents and data. Two months later — in November 1983 — the company's president-CEO and a lawyer from its New York office visited their lab. After DeNoble and Mele demonstrated a rat self-administering nicotine, the CEO asked if this indicated that the drug was addictive. DeNoble told him such behavior only suggested the drug's potential for addictiveness. That prompted the lawyer to ask if the test they had just witnessed was one a government agency would use to demonstrate addiction. DeNoble says he answered, "It's the exact procedure that NIDA would use to demonstrate abuse liability, yes."

At about this time, officials at the company's Richmond research facility began talking about shutting down the

nicotine pharmacology lab it had asked DeNoble to establish only 3 years earlier. But because the officials thought the nicotine work ought to continue, they considered having the pharmacologists set up as independent contractors in the Richmond area, the researchers testified. However, DeNoble recalled, "that really [wouldn't] remove [the studies] from the company as much as they would like, so they talked about sending us to Lausanne, Switzerland, to a contract facility"

Since cigarette companies have the technical know-how to eliminate nicotine, why don't they? It provides "an important flavor to me," explains Alexander W. Spears, chief operating officer of the New York City-based Lorillard.

But other, nonaddictive compounds could provide the same biting, acrid flavor, so why not use a substitute and "take the nicotine out of the product," Synar asked.

"Why should we take the nicotine out?" Spears responded. "It is integral to the product."

Waxman proposes either requiring manufacturers to take nicotine out or putting a label on cigarette packs warning against nicotine's addictive properties — something he says the industry has successfully lobbied against in the past.

New legislation would also step up policing of cigarette sales to minors. Figures from the Centers for Disease Control and Prevention indicate that about 75 percent of smokers become addicted by age 18 — before it is even legal for most of them to buy tobacco products.

Contending that cigarettes are "the single most dangerous consumer product ever sold," Waxman argues that such moves would constitute pretty tame medicine. □

Next: Chemicals That Manufacturers Add to Cigarettes

Letters continued from p.307

The major emitters of mercury are soil and vegetation evapotranspiration, followed by all kinds of combustion (household fires, forest fires, slash-and-burn clearing of land, brick-making, and, last, power plants).

One ton of mercury emissions per day is nothing compared to over 100 tons per day from all global sources.

*Evaldo L. Kothny
Walnut Creek, Calif.*

Hidden risks of testicular cancer?

In the sidebar to the article about testicular cancer ("Manhood's Cancer," SN: 2/26/94, p.138), there was posed the question of why such cancers are occurring more frequently since the early 1940s. I suspect that the cause is related to the reduction in sperm counts observed in recent years.

I suggest that both phenomena are related to the switch during the past 40 years from loose (boxer) underwear to tight (jockey) underwear worn by men.

*Loy Wiese
Berkeley, Calif.*

Since professional and white-collar occupations tend to be sit-down occupations, I am moved to wonder whether the true risk factor for testicular cancer is not a period of elevated testicular temperature and to ask whether anyone has compared the incidence of testicular cancer in wearers of jockey and boxer shorts.

*Thomas A. Easton
Belfast, Maine*

No chance of bias

I would like to respond to Warner Clements' charge ("Questioning psi-ence," SN: 3/19/94,

p.179) that subjects' preferences for particular targets in the ganzfeld ESP experiments reviewed by Bem and Honorton would raise the probability of .25. This is impossible.

If a sender has a preference for one of the targets in a four-item target pool, the probability that that target will in fact prove to be the actual target is still .25 because the targets are selected randomly. The sender is not free to select whatever target he or she finds most appealing, as is implied in Clements' letter. Thus, any common bias the sender and receiver might have for a particular target cannot raise the probability of a hit above chance.

*Douglas M. Stokes
Wayne, Pa.*

CORRECTION

In "Radar paints land with colors of life" (SN: 4/23/94, p.263), the two radar images are reversed.