



PROFILE

Dr Z is the pseudonym of a man who is arguably the world's most productive discoverer of "designer drugs". His most famous creation is mephedrone, which shot to popularity before being banned in many countries in 2010

Photographed for New Scientist by Jonathan Bloom

The high life

Biochemist **Dr Z** is the world's most productive discoverer of legal highs. He tells **Michael Slezak** how they can be a force for good

You invented mephedrone, aka "m-cat" or "meow meow", which was probably the world's most famous legal high. Why did you do it?

I'm a discoverer by trade and by nature. I also believe that healthy balanced adults should be free to make up their own minds about how to alter their mental state, and that they should have access to whatever they would like to experiment with – as long as they don't harm others. And if I discover a really exciting substance, the first thing I want to do is share it with everybody else.

In the early 2000s, mephedrone was in every way legal in Israel, where I was based. That got me to thinking that it doesn't make sense for the public not to have access to this compound. It's legal. It's pure. It's inexpensive. And I didn't want to enjoy it alone.

You test the substances you invent on yourself first. What does a mephedrone high feel like? The classic explanation by one "psychonaut" is that "it's like coke and pills". I think we often lack the language to describe a state of mind that is novel by definition. So we try to use experiences we already have words for.

What other testing do the drugs you invent go through before they are released?

After I test them on myself, then, according to the method mapped out by the late US chemist Alexander Shulgin, the group of knowledgeable self-experimenters expands. So, for example, mephedrone was tested by human experimenters from its inception all through its popularisation.

Yet, today I realise that it is not responsible to give the substance commercial exposure before doing initial preclinical toxicology, so now we also conduct that first. That means seeing what the maximum tolerated dose is. If that threshold is within abuse boundaries – that is, if the drug appears to be dangerous in quantities that someone might take if abusing it on a binge – then you stop developing it.

How do you safely determine the maximum tolerated dose?

If the family of molecules is completely unknown and untested, you follow a logarithmic scale starting from micrograms and taking a dose over a couple of days and doubling it unless an effect is perceived. Shulgin laid out the method. When an effect is perceived, the increase in dosing is slowed down. When the family of molecules being studied is well-known and when we have a

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lot of experience with them, I can often guess at what dose level to start. Of course for caution's sake I start lower.

For animals, there are strict protocols that define how to assess safety when, say, new pharmaceuticals are being tested.

Do you think everyone in the legal-highs industry is concerned with avoiding harm?

No, I do not. I think many are driven simply by profit. It's very difficult not to succumb to temptation. This is a field of endeavour that makes poor people rich very quickly. New psychoactive substances are a global get-rich-quick scheme that works.

How much money did you make from mephedrone?

I make a reasonable salary from the drugs I invent. I avoid making big money, otherwise I'd be "Al Capone'd" into inactivity by the tax authorities or police or ministry of health. I license the know-how to vendors, who make the substances and sell them.

With mephedrone, I didn't appreciate how easy it is to reverse-engineer and synthesise. So when the drug became really big, I wasn't making any money. It was being made by

people without my control. But for those selling it, every kilogram might have made about £20,000 profit.

Can inventing new drugs benefit society?

Yes, in many ways. There is no shortage of examples of how the enforcement of prohibitionist policy harms the population it is meant to protect. I think legislators should be held accountable for that.

Also, the sale of legal marijuana in the US states of Colorado and Washington has shown that a legal alternative for illicit drugs could financially cripple the cartels. Similarly, options for legally acquiring enjoyable imitations of illicit drugs could cripple organised crime. These groups are money-centric, often fringe dwellers of society that have taken opportunism to a sub-human degree. I detest organised crime.

How do you feel when you find out a drug you discovered contributes to someone's death?

Don't forget that I try everything on myself before ever offering it to anyone else – in prodigious amounts. And most of the scare stories in the British media prior to mephedrone's banning there in 2010 turned out to be incorrect, pertained to other substances or were simply made-up. But I am greatly saddened by anything I've done that has contributed to harming another person. It is never my intention to harm anyone. That's why I take pains not to be reckless in my discovery process.

How do you actually invent a new designer drug – and how many have you invented?

Designer drugs are actually not designed, they are discovered. And I have discovered lots, including K-MEX and 5-MAPB.

The distinction between design and discovery is that, when I'm inventing a molecule, I precisely map out its chemistry, but not its effect on the human body or the ➤

brain. There are physico-chemical properties of the molecule that can be predicted with a high degree of precision. Polarity, for example, can affect the traversal of the blood-brain barrier. But from all of the options you start with on paper, you have to throw away 95 per cent – including the ones that will be difficult to synthesise or that have physico-chemical properties that are likely to make them unstable. Then you invent the chemical route of synthesis for the remaining shortlist and start self-experimenting.

Were you surprised by mephedrone's effects?
I was and I always am. I have been a discovery scientist for 15 years, worked at major pharmaceutical companies and have several biological patents. If my training has had any effect, it is to reduce expectations. When I don't overcome the temptation to expect, more often than not I'm disappointed.

Why do you go by a pseudonym?

Because by-and-large most people believe I do this out of a sinister chasing of profit. Beliefs run faster than fact. By exposing my identity, I run the risk of being alienated, ostracised and prosecuted. There could be misinformed vigilantes who might do me harm.

Do you think the drugs you invent should just be legal and easy to get?

No, they should be regulated. I think we should look to New Zealand's approach to new psychoactive substances. The government is

Dr Z remains anonymous out of concern that some may misunderstand his intentions

willing to go against the indoctrination of prohibition. I think it's very brave and wise. The same cycle occurs with every new drug: they are introduced, become popular and then banned. And so on, ad nauseam. New Zealand has broken the cycle. They are saying to vendors: "Be responsible. If you do harm to somebody, we're whisking away your livelihood. So take all the pains to make sure that nothing ever happens to anyone."

Are recreational drugs a good thing?

Recreational drugs are drugs for healthy people. So you have to ask, why do I take a substance if there's nothing wrong? A possible answer is for pleasure – but there you're setting yourself a trap. Pleasure on tap can be inherently demotivating. There has to be a connection

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between the reward that you get and the action that you have taken to receive that reward, and this natural balance can be short circuited by the consumption of substances.

But all that said, the thing is, modern day life drives us into very unnatural, very eccentric situations: we have to stay focused; we have to stay up; we are unnaturally plagued by stress. If you can use state-altering substances to mitigate the psychological harms caused by the financial crisis, the population explosion, the tribulations of modern day life, then they can actually be used to correct an ill that was thrust on us by progress. ■



Social brains

From Nicholas Humphrey
Alun Anderson describes Robin Dunbar as the "key thinker behind the social brain hypothesis" (19 July, p 48). But Dunbar was actually a latecomer to the idea, which I and others developed in the 1970s.

My 1976 essay "The social function of intellect" was the first of numerous publications on the evolution of brain size, social life and theory of mind, culminating in a book, *The Inner Eye: Social intelligence in evolution*, and a Channel 4 UK television series in 1986.

Dunbar's first paper on the topic came in 1992, although I'm happy to acknowledge that since then, he has done more than anyone to provide empirical backing for the hypothesis. But it's wrong to give Dunbar all the credit.

Considering his particular interest in how primates manipulate their own and others' reputations to their own advantage, I hope Dunbar sees the irony.

Cambridge, UK

Intelligent life

From Andrew Brooker
The artificial intelligences we create will lead to an autonomous system that develops technologies "to shape the future of life according to its preferences", writes Nick Bostrom (5 July, p 26).

To have preferences implies consciousness, not a simple weighing of data, however complex and adaptable the rules for weighing.

The superintelligence may well be able to rewrite its software, redesign its hardware, command the manufacture of more machines, and generally overwrite whatever goals and constraints we originally gave it.

But without consciousness, and the motivation of felt desire, fear and ambition, I think the