Making a medicine out of MDMA

Ben Sessa and David Nutt

Summary
From its first use 3,4-methylenedioxymethamphetamine (MDMA) has been recognised as a drug with therapeutic potential. Research on its clinical utility stopped when it entered the recreational drug scene but has slowly resurrected in the past decade. Currently there is enough evidence for MDMA to be removed from its Schedule 1 status of ‘no medical use’ and moved into Schedule 2 (alongside other misused but useful medicines such as heroin and amphetamine). Such a regulatory move would liberate its use as a medicine for patients experiencing severe mental illnesses such as treatment-resistant post-traumatic stress disorder.

Declaration of interest
None.

For those of us researching the development of 3,4-methylenedioxymethamphetamine (MDMA) therapy for patients with post-traumatic stress disorder (PTSD), the drug’s historical association with recreational ecstasy is a hindrance. Although clinical use precedes recreational ecstasy the media focuses primarily on the rare incidences of harm associated with misuses of the latter. After a quarter of a century of epidemiological evidence of MDMA’s low rates of morbidity and mortality (even when used recreationally as ecstasy), as well as mounting data supporting clinical MDMA as a therapeutic agent, we feel it is time to concentrate on the objective evidence-based research. Otherwise, we risk denying a population of needy patients a potentially important treatment. An important step towards recognising MDMA as a medicine is to move it from Schedule 1 to Schedule 2 of the UK’s drug classification system.

A brief history of MDMA in medicine
First synthesised in 1912 by the German pharmaceutical company Merck as a chemical precursor, MDMA failed to make an impact on the 1960s drug scene. In the 1970s a few psychotherapists were using it legally as a tool in couples therapy, where it was seen to help traumatised clients address repressed emotional memories without being overwhelmed by the negative affect that usually accompanies such memories. It was then banned in the mid-1980s in the wake of growing recreational use. No placebo-controlled studies were conducted with MDMA in the 1980s, but case–control studies showed MDMA could be used without adverse effects to produce qualitative improvements in psychological functioning and resolution of relationship difficulties.3

Controlled clinical trials
A recent placebo-controlled study of participants with treatment-resistant PTSD showed that 85% of those in the MDMA group (compared with 15% in the placebo group) no longer had a diagnosis of PTSD after three sessions of MDMA-assisted psychotherapy.4 These results were sustained at 3.5 years long-term follow-up, with no further MDMA interventions required and many patients reducing or stopping their regular psychiatric medications.5 A subsequent Swiss MDMA study demonstrated substantial improvements for treatment-resistant PTSD.4

MDMA exerts its effects through 5-hydroxytryptamine (5-HT)1A, 5-HT1D, 5-HT2A, dopamine and alpha-2 receptors. It also produces oxytocin release, which improves bonding and raises levels of empathy. Its multiple and varied effects make the drug a good candidate for facilitating psychotherapy – especially for patients with post-traumatic symptoms, in which helping the patient to reach a position of empathic understanding and compassionate regard is part of their resolution and remittance of symptoms.5

Participants given MDMA are more likely to use words relating to friendship, support and intimacy, in comparison to the drug methamphetamine, which by contrast reduced participants’ discussions about compassion.6 MDMA appears to enhance the quality of social interactions and thereby improve relationships, recently tested using a simulated experimental paradigm of social exclusion by Frye et al, showing how participants taking MDMA exhibited reduced social exclusion phenomena.7 Similarly, MDMA enhances levels of shared empathy and prosocial behaviour compared with placebo.8 Furthermore, Wardle et al showed how MDMA can facilitate a faster detection of happy faces, and reduces the detection of negative facial expressions, which leads participants to view their social interaction partner as more caring.9 A recent study by Kirkpatrick et al comparing MDMA against intranasal oxytocin demonstrated the former produced greater improvements in prosocial communication.10 And the positive effects of MDMA appear consistent across different environments, with participants examined in San Francisco, Chicago and Basel demonstrating broadly similar prosocial outcomes.11

Recently, several groups have used neuroimaging to explore the actions of MDMA in the brain. For example, Carhart-Harris et al, using magnetic resonance imaging blood oxygen level-dependent and arterial spin labelling techniques, showed that MDMA reduced amygdala and hippocampus activity and selectively attenuated the magnitude of negative memories.12

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Declaration of interest
None.
Given the evidence that MDMA is a useful and safe adjunct to the
treatment of PTSD and has plausible mechanisms of action, one
might well ask why MDMA is not available for clinical use. The
answer is simple – when MDMA was banned in the 1980s it
was put into Schedule 1 of the 1971 UN convention and in the
UK placed in Schedule 1 of the Misuse of Drugs Regulations
2001. Both regulatory systems define Schedule 1 drugs as those
with ‘very limited medical use’. This is no longer defensible. So
what does being in Schedule 1 mean for researchers and doctors
who wish to prescribe it? In most countries Schedule 1 drugs
are subject to stringent controls. In the UK one needs a special
license to hold or use a Schedule 1 drug, whereas Schedule 2
drugs, such as heroin and morphine, much more addictive and
dangerous than MDMA, are available in all hospitals. Schedule 1
licenses cost about £5000, can take a year to obtain and require
special criminal record checks, extra-secure pharmacy safe
and police inspections. Only four hospitals in the country presently
have them. Furthermore, production sites and distributors need the
special license too, which massively escalates costs and limits
the number of companies able to manufacture and supply
clinical-grade material.

Safety and risks

One must distinguish the clinical use of pure MDMA from the
recreational use of ecstasy. The former involves moderate,
infrquent medically supervised doses whereas the latter often
involves high and frequent use, the risk of adulterants and the
concomitant use of other drugs – especially cannabis, amphetamine
and cocaine. There is no evidence that pure MDMA as proposed for
therapy causes any lasting physiological or psychological
harm.13 None of the controlled studies of MDMA-assisted therapy
has demonstrated any significant neurophysiological impairments
or evidence of dependence following its use clinically, validating
the observed low risk of addiction when used recreationally. The
fears about lasting neurophysiological damage, popularised in the
1990s, have since been challenged, further validating the
epidemiological evidence of low rates of clinical problems
associated with ecstasy use, despite its widespread popularity.14

The concept of risk–benefit analysis is important when
considering any medical interventions – pharmacological or
otherwise. With dozens of individuals with post-combat
treatment-resistant PTSD dying by suicide every day,15 the
massive social, financial and clinical burden of untreated PTSD
is a far greater risk to society than the low risks associated with
using MDMA in the clinical setting.

The future for MDMA research

Further Phase II MDMA-assisted psychotherapy for PTSD studies are
happening, after which Phase III studies are planned across the
globe. A planned functional magnetic resonance imaging study at
Cardiff University will explore MDMA’s mechanism in individuals
with post-combat PTSD to add more physiological data to the
ongoing therapeutic studies. And an ongoing study underway in
the USA is exploring MDMA’s ability to boost empathy and for
adults with anxiety associated with autism.16 But for MDMA to
become a medicine it needs to be removed from Schedule 1 and
put alongside other therapeutic (but also misused) stimulants
such as amphetamine and methamphetamine in Schedule 2. If
the UK government advisory body on drugs, the Advisory Council
on the Misuse of Drugs, recommends this to the Home Secretary,
regulations can then be amended within weeks. It is important to
note that the UK is not legally obliged to adopt the UN structure
for scheduling drugs; and based on medical advice put heroin in
Schedule 2 against the UN recommendation. Similarly, in another
example the UN placed tetrahydrocanibinol in Schedule 1 in 1971,
but in the UK it is available (in the form of the drug sativex) and
placed in Schedule 4. Moreover there is no reason to suppose put-
ting MDMA into Schedule 2 would have any impact on illicit use
of ecstasy, just as pharmaceutical heroin in Schedule 2 is almost
never diverted into criminal hands.

We call on the Advisory Council on the Misuse of Drugs to
recommend MDMA become a Schedule 2 drug. This will allow
medical research to explore the full potential of MDMA as a
medicine for treatment-resistant PTSD and other possible brain
disorders.

Conclusion

MDMA has been subjected to inappropriate, non-evidence-based,
legislative restrictions. These have not effectively reduced the harm
or burden of recreational ecstasy use on society but they have
effectively held back research on clinical MDMA. We urge the
regulatory authorities to consider whether a move from Schedule
1 to Schedule 2 might more accurately reflect MDMA’s relative
harm and safety, while also facilitating greater research of the
substance for possible therapeutic uses within psychiatry.

Acknowledgements

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Leon Bonvin
Raymond Cavanaugh Jr

Born in the outskirts of Paris in 1834, Léon Bonvin was the son of a policeman and a seamstress. There were numerous siblings from multiple marriages, and money was scarce. Léon’s strongest bond was with his older brother François. They shared a desire to draw and a precocious aesthetic sensibility. Apprenticed to a printer in his adolescence, François would give the younger Léon artistic advice for the remainder of his life.

Most of Léon’s earliest works were charcoal renditions of his austere surroundings. He would later work in graphite, pen and ink, and eventually in the watercolour medium, with which he would carve his niche. Oil painting was a rare activity for him, because he was rarely able to afford oil paints.

Though lacking in materials, Bonvin benefited from his elder brother’s guidance. François suggested that he study the Dutch masters and pay particular attention to their ‘meticulous realism and use of outline’. In time, the younger brother would employ sepia-toned ink outlines to produce his own ‘meticulous realism’ in the form of watercolours with startling, quasi-photographic effects.

However, this stylistic innovation did little to enhance Bonvin’s overall quality of life. Forced to work tirelessly at his job as innkeeper, there was precious little time for the artistic vocation. Early morning and sunset were usually the only times at which he could practise his coloured magic.

The online art publication The Blue Lantern explores the psychodynamic elements of Bonvin’s Interior of a House with an Open Door. This painting has a very claustrophobic feel, which likely reflects its painter’s ongoing sentiments of ‘frustration’ and ‘confinement’. Though the painting, through its ‘open door’, includes a ‘glimpse of a wider world’, this glimpse is ‘obscured by blazing sunlight’.

The early 1860s saw Bonvin marry, start a family, and sink further into poverty. By January 1866 his financial situation had become dire. Carrying as many paintings as he could, he headed to Paris and approached an art dealer. ‘Too dark’, was the dealer’s response. Having been dismissed with these few words, the starving artist was sent on his way, not one franc the richer.

Emotionally drained, Bonvin went to a hill that overlooked the plains of Issy. This view had inspired some of his most passionately painted watercolours.

Here, hours later, the painter was found hanging from a tree. If there was any good to come of this demise, it was that a posthumous charity auction of his works raised enough money to spare his family from utter destitution.