

Psycholytic dosing or 'microdosing' of *Amanita muscaria* (red fly agaric) mushrooms—A retrospective case study

Mika Turkia

mika.turkia@alumni.helsinki.fi, psychedelitherapy.fi, January 15, 2024

Abstract

Following advice received in a dream, a woman in her early thirties, suffering from depression, anxiety, and sleep disorders caused by complex trauma in her childhood, experimented with 'microdosing' or psycholytic dosing of *Amanita muscaria* (fly agaric) mushrooms. Over a 3.5-month period, following an intuition-based, gradually declining dosing regimen, a notable reduction in her symptoms was observed. No adverse effects were reported. Hematological tests indicated no abnormalities but revealed a slight improvement in liver function, potentially attributed to the remission of addictive behavioral patterns related to sugar consumption and the hepatoprotective effects of muscimol. These findings aligned with the existing literature.

Keywords: *Amanita muscaria*, fly agaric, ADD, ADHD, psychedelic therapy, psychedelics, self-medication, C-PTSD, domestic violence, childhood abuse

Introduction

Recently, 'microdosing' of *Amanita muscaria* (fly agaric) has increased in popularity, with three guidebooks published about the practice in 2022 and 2023 (Dreamer, 2023; Harret and Sasha, 2022; Masha, 2022). In addition to a review by Feeney (Feeney, 2023), interviews with their authors have been featured on a social media video platform (e.g., Nelson (2022a,b, 2023)).

While raw samples of *Amanita muscaria* are toxic, dried mushrooms in small amounts have appeared relatively benign. As an example, a case report featured five people between the ages of 18 and 21 who had consumed dried samples at a party in order to evoke hallucinations (Satora et al., 2005). Visual and auditory hallucinations occurred in four of them, whereas an 18-year-old girl lost consciousness. To rule out possible damage, she visited a clinic, where she was observed for several days and had check-up examinations performed. After four days without any problems, she was discharged. No organ complications were observed. The remaining four people were free from any complaints.

A book edited by Feeney provided background on the history, mythology, and pharmacology of the use of *Amanita muscaria* (Feeney, 2020; Winkelman, 2022). New findings supported *Amanita muscaria* as the ancient sacrament of the Vedas. There was also evidence of its traditional use on Russia's Kamchatka Peninsula (Masha, 2022).

Psychedelic therapy pioneer and UK psychiatrist Ben Sessa wrote that *Amanita muscaria* 'also has psychedelic qualities as a result of the active components muscimol and ibotenic acid, which can cause nausea, drowsiness, and low blood pressure as a result of its cholinergic effects. Despite its classically lethal appearance, the toxicity, as well as the psychedelic effects of *Amanita*, are not too much to write home about. Certainly, it can cause harm, though reported fatalities are very rare indeed. Furthermore, drying or boiling the mushroom can reduce the toxicity' (Sessa, 2012).

Due to the remaining ibotenic acid content or other components, excessive doses of dried *Amanita muscaria* may still be fatal, as in one case involving six to ten dried mushrooms (Meisel et al., 2022). In another case described by the same authors, one large cap of raw *Amanita muscaria* was near-fatal. Meisel et al. also described that from 2011 to 2018, the American Association of Poison Control Centers reported 312 exposures to ibotenic acid-containing mushrooms (assumedly, species containing amatoxin were included). Of these, only 15 (4.8%) had a major outcome, with one (0.3%) fatality. 46% of reported ingestions were intentional. A review of six case series accounted for 98 patients, of whom seven were intubated, without any fatalities reported. Mikaszewska-Sokolewicz et al. described a case of coma caused by severe poisoning (Mikaszewska-Sokolewicz et al., 2016). Patocka et al. described symptoms of toxicity at high doses (Patocka and Kocandrlová, 2017). Pieta-Chrystofiak et al. reported results of an online survey about *Amanita muscaria* consumption among participants of internet discussion groups in Poland (n=95) (Pieta-Chrystofiak and Brohs, 2023).

In a comprehensive review of cyclic peptide toxins of the genus *Amanita*, Walton described that *Amanita muscaria* does not make amatoxins or phallotoxins,¹ which are the most lethal compounds found in the dangerous species of the genus (Walton, 2018). Instead, the relevant compounds in *Amanita muscaria* are the nonpeptidic mushroom toxins ibotenic acid and muscimol, structurally similar the two main neurotransmitters of the central nervous system, glutamic acid and γ -aminobutyric acid (GABA), respectively (Satora et al., 2005). The red skin of the cap and the yellow tissue beneath it contain the highest amounts of these substances.

Ibotenic acid is converted to muscimol by decarboxylation during cooking and/or in the gastrointestinal tract (Walton, 2018). As a mimic of GABA, muscimol is a potent agonist of the GABA_A neurotransmitter receptors. Walton noted that it is almost certainly the compound responsible for *Amanita muscaria*'s psychotropic effects.

The GABAergic system is involved in the brain's reward pathways. As such, there may be some potential for tolerance, cross-tolerance, addiction, and withdrawal. Alternatively, the different components of *Amanita muscaria* might partially counteract each other with regard to this potential. There did not appear to be data on this issue, i.e., muscimol was not typically associated with addiction.

In addition, *Amanita muscaria* contains low levels of muscarine, which is a mimic of acetylcholine and defines the muscarinic acetylcholine subclass of neurotransmitter receptors (Walton, 2018). It therefore stimulates the peripheral parasympathetic nervous system. *Amanita muscaria* may also contain small or trace amounts of muscazone, choline, acetylcholine, betaine, muscardine, atropine, hyoscyamine, scopolamine, and bufotenine (Satora et al., 2005). Voynova et al. listed a large number of additional components and pointed out that UV light (e.g., drying in the sun) converted ibotenic acid to muscazone (Voynova et al., 2020); they also showed that synthetic muscimol had an effect on monoamine oxidase B (MAO-B), indicating that naturally-derived psychoactive alkaloids such as muscimol could have a role in the treatment of neurodegenerative diseases such as Alzheimer's and Parkinson's (Voynova et al., 2021). Wiczorek et al. discussed bioactivity of these components (Wiczorek et al., 2015). Carboué et al. provided an encyclopedia entry (Carboué and Lopez, 2021).

Tsunoda et al. investigated changes in ibotenic acid and muscimol contents in *Amanita muscaria* during drying, storing, or cooking (Tsunoda et al., 1993). Twelve raw samples contained 462 units of ibotenic acid and 8 units of muscimol. Samples dried in sunlight for three days contained 216 units (47% of the initial amount) of ibotenic acid and 96 units (1200%) of muscimol. Samples dried in sunlight for eleven days contained 36 units (8%) of ibotenic acid and 33 units (413%) of muscimol. Samples dried near an oil heater for two days contained 58 units (13%) of ibotenic acid and 31 units (388%) of muscimol. Table 1 presents the information in a tabular format.

method	raw		sundried 3d		sundried 11d		heater dried 2d	
	ibo	mus	ibo	mus	ibo	mus	ibo	mus
units	462	8	216	96	36	33	58	31
percent	100%	100%	47%	1200%	8%	413%	13%	388%

Table 1: Changes in ibotenic acid and muscimol contents during drying (Tsunoda et al., 1993)

In another set of experiments, raw samples were air-dried in a forced convection oven at various temperatures for various durations (tables 2 and 3).

method	40°C for 18.5 h				50°C for 10.5 h				60°C for 9.5 h			
	raw		dried		raw		dried		raw		dried	
	ibo	mus	ibo	mus	ibo	mus	ibo	mus	ibo	mus	ibo	mus
units	394	5	256	31	515	5	332	29	575	6	313	41
percent	100%	100%	65%	620%	100%	100%	64%	580%	100%	100%	54%	683%

Table 2: Changes in ibotenic acid and muscimol contents during forced convection oven drying (40–60°C) (Tsunoda et al., 1993)

Boiling dried samples in acidic water (pH 4.0) increased the solubility of muscimol and reduced the solubility of ibotenic acid, resulting in more muscimol than ibotenic acid being dissolved in the water after 90 minutes of

¹As a side note, a letter to the editor by Laing described a treatment method for poisonings by toxic species of the *Amanita* genus containing phallotoxins (e.g., *Amanita phalloides* or the 'death cap', with reported fatality rates between 34 and 63%) (Laing, 1984). The treatment consisted of intravenous vitamin C (ascorbic acid) at 3 g/d, oral nifuroxazide at 1200 mg/d, and dihydro-streptomycin at 1500 mg/d, administered for three days during which carrot broth was the only source of nutrition. The method had reportedly been successful in all but one case, in which treatment was initiated too late. The inventor of the method had fatally poisoned himself twice and then successfully treated himself in order to advertise the method. A case report in the *Lancet* provided more details (Dumont et al., 1981).

method	80°C for 5.5 h				100°C for 4 h				120°C for 4 h			
	raw		dried		raw		dried		raw		dried	
	ibo	mus	ibo	mus	ibo	mus	ibo	mus	ibo	mus	ibo	mus
units	494	6	82	40	429	13	51	37	335	11	2	6
percent	100%	100%	17%	666%	100%	100%	12%	280%	100%	100%	0.6%	54%

Table 3: Changes in ibotenic acid and muscimol contents during forced convection oven drying (80–120°C) (Tsunoda et al., 1993)

incubation. Storing dried samples for 90 days in a cool and dark place did not significantly affect the concentrations of ibotenic acid and muscimol.

It thus appeared that either drying with low heat for at least two weeks or drying at 100°C for four hours would reduce the amount of ibotenic acid to a tolerable level while producing a relevant amount of muscimol, after which boiling the dried samples would dissolve more of the muscimol than ibotenic acid in the water. On the other hand, it appeared that boiling raw samples in acidic water for 90 minutes would produce a similar or better outcome.

An earlier study by Nielsen et al. indeed indicated that at least a 150-minute boil in a pH 2.7 water solution eliminated all ibotenic acid (Nielsen et al., 1985). Based on the above investigations, in a blog post, Gruska thus indicated that as the current recommended decarboxylation method (Gruska, 2020). The pH of the solution could be easily adjusted with citric acid or lemons. A complex, patented method of using fermentation for decarboxylation also existed.

Regarding the usefulness of *Amanita muscaria* as a psychopharmaceutical, Feeney wrote that *Amanita muscaria* had the odd property of producing both stimulating and relaxing effects, though these effects generally depended on the timing of ingestion; in this way, the mushroom could be seen as a modulator of wakefulness (Feeney, 2023).

Masha had collected the experiences of more than 3000 participants who had tested the method for a broad range of conditions (Masha, 2022). Table 4 lists the conditions, with the the number of participants and percentages of positive, neutral, and negative outcomes during the experiment. In depression, 8% experienced temporary relief only. Mild withdrawal effects were reported in a quarter of *Amanita muscaria* microdosers (unbalanced mood in 17%, insomnia in 6%, other symptoms in 3%) (Masha, 2022).

condition	n	positive	no change	negative
allergy	104	59%	41%	0%
asthma	26	54%	46%	0%
autism	13	77%	15%	8%
depression	999	79%	10%	3%
sleep disorders	980	73%	17%	10%
migraine	115	72%	38%	5%
addictions				
alcohol	385	85%	15%	0%
amphetamines	78	78%	14%	8%
caffeine	210	40%	58%	2%
cannabis	169	57%	40%	3%
cocaine	38	74%	26%	0%
designer drugs	74	88%	12%	0%
opioids	34	68%	17%	15%
sugar	503	48%	52%	0.4%

Table 4: Effects of *Amanita muscaria* microdosing on various conditions (Masha, 2022).

Feeney noted that Masha had collected an enormous amount of likely important data, but it had been underutilized (Feeney, 2023). Masha also provided methods for preparing the mushroom for safe use.

Dreamer’s self-help book focused on mental health and issues arising out of trauma (Dreamer, 2023; Feeney, 2023). Feeney commented that the book was ‘more personal and intuitive and provided the reader with hands-on tools for different types of dosing as well as self-reflection’. Dreamer described that she had suffered from debilitating panic attacks and anxiety and had consumed high doses of synthetic pharmaceuticals without success. *Amanita muscaria* had ‘saved her life, so she had chosen to devote the rest of her life to helping others learn about it’. After encountering ‘harsh censorship’ on mainstream platforms, she created her own website.

Stebelska provided a review of the pharmacodynamics, detection, and isolation of ibotenic acid and muscimol (Stebelska, 2013). Referring to an earlier study (Tamminga et al., 1978), she mentioned that muscimol applied in

relatively low doses improved schizophrenia symptoms by working as an anxiolytic. Masha noted, however, that in her experiments, feedback from patients with bipolar disorder or schizophrenia had been 'quite negative', and she subsequently listed these conditions as contraindications (Masha, 2022). More recently, GABA agonists have been suggested for the reduction of antipsychotic-induced tardive dyskinesia (Alabed et al., 2018).

A study by Gabriella et al. elicited intense, dose-dependent feeding in rats, suggesting muscimol as possibly useful in the treatment of eating disorders (Gabriella et al., 2022). Escartin-Perez et al. reviewed the interactions between serotonin, GABA, and cannabinoids in food intake regulation (Pérez et al., 2021).

As additional details, muscimol promoted slow-wave sleep (delta sleep), a stage of increasingly intense deep sleep in non-rapid eye movement sleep, prior to the onset of rapid eye movement sleep (Bacon et al., 2007). Wang et al. demonstrated the hepatoprotective effect of muscimol in mice (Wang et al., 2017). Similarly, Li et al. demonstrated a protective effect of muscimol against systemic inflammatory response (Li et al., 2022). Muscimol activated the TREK-2 channel (Kim et al., 2021), and appeared to antagonize some effects of ketamine (Fuchikami et al., 2015). A Canadian biotechnology company successfully distilled and purified muscimol (MacDonald, 2021).

Masha also described similar positive effects of *Amanita muscaria* in somatic conditions such as allergy, asthma, gingivitis, goiter, hypertension, pain, prostatitis, stroke, and cardiac recovery (Masha, 2022). Previously, Voynova et al. briefly reviewed the mushroom's anticarcinogenic and antioxidant effects (Voynova et al., 2020).

As with most psychedelics, variations in doses as well as in timing may produce qualitatively different effects, with low doses being anxiolytic and high doses producing 'trips' largely similar to those with classical psychedelics, including visions of fractal patterns, as well as various emotional-cognitive-somatic effects, the exact characteristics of which depend on the life history of the person. Depending on the ibotenic acid-muscimol ratio, the effects of higher doses may be more or less unpleasant.

One of the author's earlier case studies contained examples of low dosing (Turkia, 2022a). In that case describing the experiences of a young man, the effect of muscimol was considered 'very different' from other psychedelics. Low doses 'completely removed fear and anxiety, calming the mind', and produced a feeling of 'being normal'. They attenuated trauma-related social anxiety, allowing for functioning in social situations that had previously caused panic attacks. The effects of muscimol 'altered social dynamics', so that bullies stopped targeting him. The interviewee commented that his experiences exemplified that 'if something essential changed in social interactions, it would look and feel like this'.

With regard to the current case, the interviewee referred to the concept of a 'highly sensitive person' (HSP), introduced by US psychologist Elaine Aron in the 1990s (Aron, 1997, 2002; Aron and Aron, 1997). She described four central aspects of a HSP: depth of processing, overarousability, emotional intensity, and sensory processing sensitivity. Acevedo et al. suggested that sensory processing sensitivity served species survival via deep integration and memory for environmental and social information that might subservise well-being and cooperation (Acevedo et al., 2018).

The information was acquired by a semi-structured interview conducted online in November 2023, augmented with earlier interviewee-produced written documentation, including a diary covering the first week of dosing and an excerpt of a medical record of a clinical consultation concerning possible somatic issues related to the experiment. The duration of the interview was approximately one hour. A few follow-up questions, checks, and reviews were performed in the following week. As this paper was made available shortly after the interview, there was no follow-up period in this case.

Case description

A woman in her early thirties reported that following a dream that advocated 'microdosing' (psycholytic dosing) of *Amanita muscaria*, she had utilized it for approximately three months, experimenting with varying methods of administration and experiencing benefits from it.

Her childhood was influenced by chronic domestic violence perpetrated by her parents. As a result, in her teens and adulthood, she suffered from chronic depression, anxiety, panic attacks, and sleeplessness. She was prescribed escitalopram for depression, propranolol for panic attacks, and quetiapine for sleep disorders. Escitalopram caused 'electric shocks from her brain to her body' that could be so severe that she dropped her tray on the floor in her school's cafeteria. Propranolol took half an hour to produce an effect; it then slowed down her heart rate so much that she got another panic attack from suspecting that her heart was stopping. Quetiapine allowed her to sleep, but then she 'never woke up again', spending the next day 'in a fog'. She commented that these medications 'never fit her', as they numbed and desensitized her, in effect 'thwarting her from being herself'.

She described herself as a 'highly sensitive person' (HSP). In her twenties, she completed a vocational education. Her central issue with regard to capability to work and study was overarousability: currently, one day of work

triggered so many somatic and emotional, likely trauma-related, reactions that she needed four days of rest to recover.

Approximately 4.5 years before starting the experiment, she had been diagnosed with ADHD and prescribed lisdexamfetamine; all the previous medications she discontinued at this time. After that, she also received cognitive psychotherapy once a week for three years. She considered it useful, as some traumas that were surfacing could be discussed there, and she had been able 'to connect better with her wounds'. In addition, lisdexamfetamine 'was helpful in the beginning . . . it is not a completely bad substance'. Due to the national limits of public health insurance coverage, the therapy had ended approximately three months before the beginning of the experiment, approximately six months before the interview.

A month or two before the end of therapy, she had discontinued lisdexamfetamine. She described that for some time, an inner voice had 'shouted at her', saying that the medication was not good for her. According to her, it 'suppressed parts of her', 'accumulated things inside her', so that through becoming suppressed, she could function in her society as a HSP.

After the psychotherapy ended, the accumulated stress culminated in burnout, with escalating symptoms of depression and sleeplessness. She felt 'numb' and was 'unable to feel any kind of joy'. In her view, the burnout was a release of everything that had been repressed during the last few years under lisdexamfetamine. In her view, the medication had 'attenuated parts of her'.

Through her friends, she had heard about the possibility of 'microdosing' fly agaric, but she 'had been programmed to be afraid of it', considering it 'horribly dangerous, even deadly'. However, one night during the burnout, she saw a dream in which she was advised to visit a specific place in a nearby forest outside of her usual path. In that place, she was told, there would be fly agaric mushrooms that she should consume.

She visited the location, and to her surprise, she found the mushrooms as advised. She commented that she had not even known that these mushrooms could grow in July. She picked some but did not consume them immediately due to fears of toxicity. However, this event initiated her interest in the practice, and she began looking for information about it online. She was surprised by the amount, clarity, and good quality of the information found in the videos. Eventually, she felt ready to initiate the experiment.

Soon after that, she encountered a really large red fly agaric elsewhere, decided to initiate the process, picked it up, and put it in the sauna to dry. After a while, she noticed a liquid dripping from it, of which she ingested several large drops. Its taste was 'strong, salty', similar to game meat, resembling that of forest; according to her, the flavor was 'a combination of many flavors . . . the flavor, in itself, was a special, awakening experience' for her. After the first taste, fears of toxicity dissolved.

An initial sensation was that of a dry mouth. She noticed that it was a full moon and walked out to a balcony, being enchanted by her surroundings, 'as if seeing it all for the first time'. Simultaneously, she listened to music on headphones and felt as if 'living through each song' and dancing while watching the night sky, fascinated, with her body 'swaying'. Her mood was elated, 'as if nature were embracing her'. The drops thus triggered a 'trip' or a 'trance state' involving hyperfocus and a partial loss of the experience of time; she could not say how long she stayed in that state. At some point, she also saw fractal patterns but remained unconcerned by that, as she assumed it was a benign effect of the mushroom. Next, her hands appeared to 'radiate shining energy'.

After that, she went to sleep. After a few hours, she woke up to hear 'a voice inside me shouting, calling her by her real name' (i.e., she woke up because she had shouted out loud while sleeping). In retrospect, she considered that 'the voice' had been her 'inner child' or 'myself, locked up inside me'. She had lacked connection to this inner child, and the connection had re-emerged due to the effect of the mushroom.

On the second day, she continued experimenting with a few small drops of the liquid, mixing them with blueberry juice. She went for a walk in the forest and began feeling 'how all my thoughts were billowing to the surface, as if floodgates had opened up'. She 'stepped aside to observe herself' and was 'surprised at how many thoughts she was entertaining in her mind'. Thoughts kept billowing on her, with 'all that mess in my head surfacing'. She began 'discussing with the spirit of the mushroom', deliberating on whether her intention was to get intoxicated in order to 'escape herself', or 'to reconnect with nature' and get support for dealing with her traumas originating from domestic violence. As she then 'felt having been heard, she 'felt relieved. In her mind, she 'agreed with the spirit of the mushroom to continue the experiment'. Later, she described becoming conscious of her subconscious thoughts as 'a purgative experience'.

On the third day, she took a small piece of dried mushroom, approximately the size of the tip of her little finger. The taste was again 'pleasant, slightly salty'. She noticed a slightly dry mouth but no other effects. During the day, however, she experienced an absence of depression and hopelessness; everything felt 'tolerable'. The next night, she slept 'better than usually'.

On the fourth day, she felt that her usual morning tiredness had abated. Waking up was 'less difficult than usually'. Also, her repetitive thought patterns typical for mornings appeared 'fast-forwarded'. She was able to clean up her apartment 'without forcing herself'. Later that day, for the first time, she made tea from a thumbtip-sized dried piece of the mushroom. The taste was pleasant, 'mushroomy'. As social workers came for a visit, she noticed that she felt 'unusually clear and bright'. She described that usually in these meetings, she had trouble remembering things, her narration was disoriented, and she was 'jumping from one subject to another'. This time, she noticed that she could remember unusually well what she had been up to during that week, as well as narrate the events in a more logical order. Her feeling was peaceful, and she could 'also discuss her emotions, for example, what the week's events had felt like'. She 'could laugh to herself'. As a result, the meeting was much more productive than the earlier ones, and they were able to organize issues related to childcare.

On the fifth day, she drank the leftover tea from the previous day, which she had stored in the fridge. She felt that she needed rest and skipped her rehabilitation. She felt 'lighter than usual', and her usual self-accusations were absent. It was 'easier to let unpleasant thoughts go'. In a park, she was swinging fast, thinking of 'how it would feel if she was no one and would not care what other people think' about her. This made her laugh, enjoy the sunlight on her skin, and become 'filled with joy'. She realized that during the experiment, her usual constant need to snack or eat candy had been absent. Instead, she had cooked salads and mushrooms dishes and drank enough water. Regardless, on that day she did eat a few cookies but was able to stop it. There was a slight headache.

On the sixth day, she prepared mushroom tea again. She visited a supermarket, but her usual feelings of anxiety and overwhelm were absent. Instead, she 'felt the same kind of relief as in a forest'. She 'tolerated sensory stimulation much better, without getting stuck or anxious, and got her business done'. She experienced slight aches in her stomach, possibly related to her period or the snacking last evening. After eating a salad and mushroom tacos, the stomachache disappeared.

After midnight, she felt 'an inner energy rising, as if it wanted to be dispelled from her'. She 'accepted her restlessness and surrendered to it'. As she had experienced similar feelings before, she was not scared of them. At times, she acted 'like a werewolf growling in the dark night and speaking a foreign language, a creature of the night forest'. She 'let it all come out of her'. Her body was moving; its movements resembled convulsions. The 'voice of the creature was scary and aggressive'. During the whole episode, she was 'observing herself, knowing that she was still in her right mind'. She considered that the movement was trauma-related, originating from a part of her that 'wanted to become seen'. After 'releasing enough movement and sound out from inside her', she relaxed to sleep.

On the seventh day (the last day in her diary notes), despite the stomach pains the previous day, she decided to continue the experiment and drank some more tea. On the previous day, she posted about her experiment on social media. Replies made her feel that *Amanita muscaria* was 'as misunderstood as she herself had been'. She hoped that awareness of it would increase. Otherwise, the day 'went well, with slight, cozy tiredness taking over', of the kind that 'could have allowed her to take a nap'. Usually, relaxing for a nap had been difficult for her.

All in all, she wrote that on the positive side, her anxiety and depression had been alleviated, getting over things was easier, sleep was improved, mornings were 'easier', memory had significantly improved, mood was more stable, and social situations were easier to handle. On the negative side, there had been slight stomach pain and a slight headache around the eyes. Tiredness and the possibility of traumatic memories emerging were considered neutral.

The most noticeable effect was a complete disappearance of cravings for sugar. She had been addicted to the daily consumption of candy and processed foods. Suddenly, she felt no desire for candy or sugar, and processed foods began appearing 'suspicious' to her, causing an embodied sensation of slight repulsion. Subsequently, she began cooking her meals using only fresh ingredients. After the first week, her stomachaches and headaches were alleviated.

She continued the process by taking small pieces of the dried mushroom daily, about the size of the tip of her thumb. After three weeks of daily dosing, her friends began to worry about the possibility of kidney and liver damage. To rule out this possibility, she contacted a municipal health care clinic, describing her experiments. When asked for central nervous system (CNS) symptoms such as euphoria, hallucinations, or disorientation, she reported none of those but added that her anxiety and sleeplessness had been notably alleviated. A surprised nurse consulted an apparently equally surprised doctor, who contacted the national poison information center.

Current public advice on the center's website stated that fly agaric was poisonous to the central nervous system, with typical symptoms being fatigue, disorientation resembling alcohol intoxication, sweating, increased salivation, vomiting, and diarrhea. If the ingested amount was less than two cubes of sugar, the patient could be monitored at home. If the ingested amount was greater, medical assistance was recommended.

A basic blood panel was prescribed, and an 'immediate discontinuation of consumption of toxic mushrooms' was 'strongly advised'. The results, however, came back uneventful. During the consumption of psychiatric

medication a few years before, her alanine aminotransferase value had been over 500 U/l. Nine months before the experiment, it had been 79 U/l. After three weeks of dosing, alanine aminotransferase was 13 U/l (reference range 0–35), alkaline phosphatase 44 U/l (35–105), creatinine 66 $\mu\text{mol/l}$ (50–90), estimated glomerular filtration rate (CKD-EPI) 107 ml/min/1.73 m² (≥ 90), C-reactive protein <1 mg/l (< 4), hemoglobin 140 g/l (117–155), leukocytes 7.4 x 10⁹/l (3.4–8.2), and trombocytes 303 x 10⁹/l (150–360).

As she continued the experiment, the purgative emotional process was continuously repeated. Occasionally, instead of eating the dry piece, she made tea of it. She 'tried to find her own way of consuming the mushroom'. Her daily anxiety and depression continued to ease. Mushroom tea consumed in the morning energized her, whereas tea consumed in the evening sedated her. She felt as if *Amanita muscaria* was 'amplifying her body's natural needs'.

The dosing had 'helped her to observe and recognize the limits of her endurance'. Currently, her 'resources and boundaries were very clear'. She considered the changes caused by fly agaric as 'one of the two most influential improvements in her life' (the other was related to drumming and its vibrational effects). She had become 'more authentic', expressing herself more freely, with increased trust in other people.

Concerning ADHD, referring to a person with the condition living 'as if with multiple televisions on simultaneously', she currently considered that to be 'a natural part of herself that she did not want to suppress in order to focus on just one aspect'. Lisdexamfetamine had 'suppressed the inner child' and attenuated her natural shyness. She was currently being evaluated for autism-spectrum disorders. She felt that under the influence of the medication, she had not been allowed to be herself: the intention of the medication had been to adapt her to society by reducing her sensitivity to 'external loads'.

The dosing was no longer daily but based on intuitively observed need. She was no longer trying to suppress symptoms of anxiety and depression; instead, she had 'accepted them'. This had alleviated their severity. She experienced the effect of the mushroom as 'gentle holding'. Instead of suppressing issues, it brought them up. Subsequently, she was better able to process them, 'whatever was coming up', utilizing 'a gentle connection to her inner feelings'. The improved connection to the inner child had caused adverse childhood experiences to surface more on an emotional level.

In the process, she 'had grown an inner intuition' about the timing of dosing: she 'just knew' when to take the next dose. After the first time, she had not utilized liquid. Eating the mushroom dry appeared to produce an effect faster, while tea appeared more sedative.

For a week, she had also experimented with similar 'microdosing' of psilocybin mushrooms but had considered them inferior in comparison. Although psilocybin had appeared to 'produce more joy', for the whole time she had 'hoped that the week would be over' so that she could return to using *Amanita muscaria* instead.

A later one-gram session with psilocybin mushrooms had produced no visions but had 'clarified what she wanted from life'. As a result, she had ended a 'dysfunctional relationship'. The session had also clarified to her that she did not want to work further with psilocybin, as she felt that '*Amanita* was more suitable for her' and psilocybin was perhaps 'less effective'.

She had found videos on social media platforms useful in the beginning but was currently not interested in books about the subject as she 'trusted more in her own intuition'. She utilized intuition 'a lot in her life', also in, for example, cooking with intuition instead of with recipes.

Currently, she was a single parent of a small child, and taking care of the child took almost all her resources. During the day, the child was in a daycare. In addition, she participated in rehabilitation for one day per week. Similar to working, one evening of socializing with other parents exhausted her so that she needed to rest the following day. To the question of how she assumed the dosing would affect her ability to work in the long term, she said that she had not thought about it because, due to motherhood, her life had been 'so hectic' recently. Currently, motherhood was her first priority.

When asked what was the most relevant issue, she replied that she had found *Amanita muscaria* 'to have the potential to be a universal medicine for many indications'. She had had panic disorder 'as long as she could remember'. Currently, if she felt a panic arising, she took a small piece of mushroom, chewing it and 'focusing on the taste'. She felt the panic abating almost immediately, with the attack over in 'maybe five minutes'. The mushroom had seemed to be 'a precision medicine' for this indication. She applied the same procedure for sleeplessness.

Openly talking about her experiences without fear and expressing herself more freely had created 'a certain kind of freedom and peace of mind'. She considered that 'an extreme mercifulness towards oneself had been the best medicine'. This involved 'treating herself as a small child and not demanding too much from herself'. Sensitivity predisposed her to overloading, which in turn triggered symptoms, after which social or work-related issues could escalate.

In the last few years, her parents 'had changed a lot'. They had realized the harm caused by the violence in her childhood and apologized to her, saying that they had 'done wrong'. To her, their admission indicated 'significant personal growth'. Subsequently, she had forgiven them. She commented that this was 'good enough for her'. Regardless, this 'did not eliminate' her traumatic early experiences: she still 'had to live with those traumas'. They could not be hidden or pushed away; one just had to accept that they had happened and live with them 'every day'.

She did not want to talk about this subject too much, as she felt it would have been blaming. She wanted to protect her parents, as they were, after all, her parents. In her view, they had been ignorant of the consequences of their actions, and had they known that she likely ended up unable to work, 'they probably would not have done it'. Their issues were due to transgenerational trauma, which had 'circulated'. Her parents had also suffered from domestic violence in their childhoods. In addition, the culture of not seeking help in time and ignoring mental health issues had likely contributed to the continuation of violence.

In summary, she had found *Amanita muscaria* to be 'a tool for clarifying her boundaries'. In the long term and in the future, she assumed it would continue to help her. Her social workers had accepted her practice, considering her 'brave' for taking care of herself in such a way.

Discussion

Maté investigated the interconnections between childhood developmental trauma and attention deficit disorder, concluding that ADD was not an inherited illness but a reversible impairment and developmental delay in which brain circuits responsible for emotional self-regulation and attention control failed to develop in infancy due to environmental factors (Mate, 2019). The resulting distractibility was thus considered to be a psychological product of adverse early life experiences.

Depending on the severity of early trauma, its consequences may manifest themselves in such ways that traumatized individuals are assigned various psychiatric diagnoses in the current diagnostic systems (ICD-10, ICD-11, or DSM-5). Alternatively, such individuals may be labeled as HSP or 'being on an autistic spectrum'. In severe cases, the applicable diagnosis, focusing more on etiology than symptoms, may be complex post-traumatic stress disorder (C-PTSD; ICD-11 6B41).

In the Internal Family Systems (IFS) therapy terminology (Schwartz, 2021), 'treating oneself as a small child' could be interpreted as the Self taking care of exiled child parts, producing corrective emotional experiences, and/or updating the child parts.

With regard to the advice to ingest *Amanita muscaria* having emerged in a dream, as an example, some indigenous tribes in the Amazonian area believed that after the use of mind-altering substances, the information received during their acute effect was not a priority; instead, what was to be relied on was the information received afterwards in dreams. As another example, many inventors have stated that their ideas originated from similar, unconventional sources (Raami, 2015, 2019).

A reasonable conclusion about indications of *Amanita muscaria* might be that it is unsuitable for applications where a psychedelic effect is desired, but it may be suitable for applications where a sub-psychedelic effect is sufficient or more desirable. While classical psychedelics have appeared suitable for psycholytic, 'regular', or high dosing, muscimol may be primarily useful with psycholytic dosing (Passie, 1997; Passie et al., 2022), i.e., dosing that causes mild but noticeable acute effects, in comparison to 'microdosing' understood as producing no noticeable acute effects. In addition, whereas non-psycholytic doses of psychedelics may be best used intermittently (rarely) or for a short period only, psycholytic dosing is typically utilized for longer periods. The lack of a follow-up period in this study did not allow for the determination of whether C-PTSD-related symptoms could gradually fully resolve in the course of, say, a few years.

As the current experiment may be considered more psycholytic than 'microdosing', studies of actual microdosing, such as the self-blinding citizen science study by Szigeti et al. (Szigeti et al., 2021), may not be directly relevant. With regard to the placebo effect, it could be noted that, as long as the outcome is favorable, the cause of the effect may not really matter. Regardless, in this case, the initial effect appeared real, and the subsequent effects were based on that. The first experience with *Amanita muscaria* was stronger and significantly different from the interviewee's usual daily experience. The taste of the mushroom would then remind the person of the original experience, functioning as a cue, causing the person to return to the state of mind of the initial experience (also, for example, the music played during a psychedelic experience could later function as a cue). In this case, without an initial 'trip', such a cue would not work. When asked about this possibility in a follow-up, the interviewee commented that in her experience, the taste was so significant that it alone reminded her of the first time, calming her down, 'so this may well be the case'.

The effect may be similar to the 'reactivation' phenomenon associated with 5-MeO-DMT use (see, e.g., Bernal et al. (2022)). Reactivation refers to 'a re-experiencing of certain elements of the drug-induced state after the

drug's effects have worn off'. They could appear days or months after the session, typically in conjunction with the use of low doses of other psychedelics such as LSD, but occasionally also without an obvious trigger. Reactivations could thus be interpreted as a continuation of a long-term process of realignment of the nervous system or the body as a whole.

Szigeti mentioned that 'triggering one's own placebo effect either through microdosing or some other practice can be transformative' (Plant Medicine Podcast, 2022). In the IFS context, one's own placebo effect would correspond to 'an innate healing capacity of the Self'. In, for example, craniosacral therapy (CST) context (see, e.g., Cohen (1995); Kalinowska et al. (2016)), it might be called an intrinsic, embodied intelligence of the client, aimed at releasing, restructuring, and integrating what is necessary for healing. In this process, the role of a therapist or a substance would be limited to initiating and supporting such an innate mechanism. In this interpretation, muscimol would not be strictly a 'cause' of healing but a facilitator of it. Thus, the idea of a substance as a 'cause' of an 'effect' might appear to be a counterproductive oversimplification.

If the current psychiatric care system is considered to have already failed (Aalto, 2023a,b; Rajamäki, 2023), attempts to maintain a failed system will only lead to the development of independent, parallel systems that will be more functional and efficacious while simultaneously being significantly more affordable, as described by Kheriaty (Kheriaty, 2023). This case featured an example of a grassroots initiative: an innovative, out-of-the-box, no prescription or appointment needed approach. As also illustrated by three previous case studies (Turkia, 2022a,b, 2023), such initiatives may be the key to functional, affordable healthcare based on self-empowerment.

Conclusions

This study investigated the initial stages of self-treatment with *Amanita muscaria*, a legal and relatively abundant psychoactive substance in the Northern Hemisphere. The interviewee engaged in unsupervised psycholytic dosing, reporting notable improvements in various aspects of daily life. These included a heightened sense of self-awareness, introspection into subconscious thought patterns, and the facilitation of processing traumatic past events. Furthermore, she reported a reduction in sleeplessness, anxiety, and depression.

No notable somatic or psychological adverse effects were observed. *Amanita muscaria* compounds appeared to exhibit potential synergy, suggesting a role as a 'universal psychopharmaceutical'. This implied its potential as a cost-effective alternative to synthetic psychopharmaceuticals. An initial experience with a slightly higher dose might have been necessary for the subsequent lower doses to function as a cue, facilitating a return to the mental and physiological state of the initial psychedelic experience.

Abbreviations:

5-MeO-DMT	5-methoxy-N,N-dimethyltryptamine
ADD	attention deficit disorder
ADHD	attention-deficit hyperactivity disorder
C-PTSD	complex post-traumatic stress disorder
CST	craniosacral therapy
CNS	central nervous system
DSM-5	Diagnostic and Statistical Manual of Mental Disorders, 5th Edition
GABA	γ -aminobutyric acid
HSP	highly sensitive person
IFS	Internal Family Systems
ICD-10	International Classification of Diseases, 10th Revision
ICD-11	International Classification of Diseases, 11th Revision
LSD	lysergic acid diethylamide

Authors' contributions: The author was responsible for all aspects of the manuscript.

Funding: This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

Availability of data and materials: Due to the protection of anonymity, the materials are not available.

Ethics approval and consent to participate: A consent to participate from the patient was obtained. Ethics pre-approval does not apply to retrospective ethnographic studies.

Consent for publication: A verbal informed consent from the interviewee was obtained. Due to the sensitive nature of the subject the interviewee requested a waiver of documentation of informed consent (45 CFR § 46.117(c)(1)(i)).

Competing interests: The author declares that he has no competing interests.

Author details: Independent researcher, Helsinki, Finland. ORCID iD: 0000-0002-8575-9838

References

- Aalto, M., 2023a. Mieleltään sairastuneiden äidit kertovat hädästä: ”Tuki tulisi halvemmaksi kuin se, että nuoret ovat vaarassa kuolla”. <https://web.archive.org/web/20231015180456/https://www.hs.fi/kaupunki/art-2000009910736.html>.
- Aalto, M., 2023b. Säilössä kunnes ei satuta itseään. <https://web.archive.org/web/20231015011219/https://www.hs.fi/kaupunki/art-2000009807612.html>.
- Acevedo, B., Aron, E., Pospos, S., Jessen, D., 2018. The functional highly sensitive brain: a review of the brain circuits underlying sensory processing sensitivity and seemingly related disorders. *Philosophical Transactions of the Royal Society B: Biological Sciences* 373, 20170161. <https://doi.org/10.1098/rstb.2017.0161>, doi:10.1098/rstb.2017.0161.
- Alabed, S., Latifeh, Y., Mohammad, H.A., Bergman, H., 2018. Gamma-aminobutyric acid agonists for antipsychotic-induced tardive dyskinesia. *Cochrane Database of Systematic Reviews* 2018. <https://doi.org/10.1002/14651858.cd000203.pub4>, doi:10.1002/14651858.cd000203.pub4.
- Aron, E., 1997. *The Highly Sensitive Person: How to Thrive When the World Overwhelms You*. Broadway Books, New York.
- Aron, E., 2002. *The Highly Sensitive Child: Helping Our Children Thrive When The World Overwhelms Them*. Broadway Books, New York.
- Aron, E.N., Aron, A., 1997. Sensory-processing sensitivity and its relation to introversion and emotionality. *Journal of Personality and Social Psychology* 73, 345–368. <https://doi.org/10.1037/0022-3514.73.2.345>, doi:10.1037/0022-3514.73.2.345.
- Bacon, E., Chatterjee, S., Williams, M., 2007. Sleep, in: *Comprehensive Medicinal Chemistry II*. Elsevier, pp. 139–167. <https://doi.org/10.1016/b0-08-045044-x/00166-8>, doi:10.1016/b0-08-045044-x/00166-8.
- Bernal, A.M.O., Raison, C.L., Lancelotta, R.L., Davis, A.K., 2022. Reactivations after 5-methoxy-n,n-dimethyltryptamine use in naturalistic settings: an initial exploratory analysis of the phenomenon’s predictors and its emotional valence. *Frontiers in Psychiatry* 13. <https://doi.org/10.3389/fpsy.2022.1049643>, doi:10.3389/fpsy.2022.1049643.
- Carboué, Q., Lopez, M., 2021. *Amanita muscaria: ecology, chemistry, myths*. *Encyclopedia* 1, 905–914. <https://doi.org/10.3390/encyclopedia1030069>, doi:10.3390/encyclopedia1030069.
- Cohen, D., 1995. *An Introduction to Craniosacral Therapy: Anatomy, Function, and Treatment*. North Atlantic Books, Berkeley, Calif.
- Dreamer, A., 2023. *Dosing Amanita Muscaria: And What to Expect*. Amanita Dreamer Publishing, Ball Ground, GA.
- Dumont, A.M., Chenebault, J.M., Alquier, P., Jardel, H., 1981. Management of Amanita phalloides poisoning by Bastien’s regimen. *The Lancet* 317, 722. [https://doi.org/10.1016/s0140-6736\(81\)91997-8](https://doi.org/10.1016/s0140-6736(81)91997-8), doi:10.1016/s0140-6736(81)91997-8.
- Feeney, K., 2023. On microdosing with the Mario mushroom. *Journal of Psychedelic Studies* 7, 151–154. <https://doi.org/10.1556/2054.2023.00303>, doi:10.1556/2054.2023.00303.

- Feeney, K.M. (Ed.), 2020. Fly Agaric: A Compendium of History, Pharmacology, Mythology & Exploration. Fly Agaric Press, Ellenburg, Washington.
- Fuchikami, M., Thomas, A., Liu, R., Wohleb, E.S., Land, B.B., DiLeone, R.J., Aghajanian, G.K., Duman, R.S., 2015. Optogenetic stimulation of infralimbic PFC reproduces ketamine's rapid and sustained antidepressant actions. *Proceedings of the National Academy of Sciences* 112, 8106–8111. <https://doi.org/10.1073/pnas.1414728112>, doi:10.1073/pnas.1414728112.
- Gabriella, I., Tseng, A., Sanchez, K.O., Shah, H., Stanley, B.G., 2022. Stimulation of GABA receptors in the lateral septum rapidly elicits food intake and mediates natural feeding. *Brain Sciences* 12, 848. <https://doi.org/10.3390/brainsci12070848>, doi:10.3390/brainsci12070848.
- Gruska, J., 2020. Amanita muscaria: the science and use of the Fly agaric mushroom. <https://medium.com/@jonasgruska/amanita-muscaria-the-science-and-practice-of-the-fly-agaric-mushroom-587893d4bfe2>.
- Harret, B., Sasha, A.V., 2022. Amanita Muscaria Microdosing: Complete Guide to Microdosing with Fly Agaric for Mind and Body Healing. Inspirational Creator.
- Kalinowska, L., Hatton, D., Vigon, L., 2016. Every Body Tells a Story: A Craniosacral Journey. Singing Dragon, London, Philadelphia.
- Kheriaty, A., 2023. Rebellion, not retreat. <https://web.archive.org/web/20230628011111/https://americanmind.org/salvo/rebellion-not-retreat/>.
- Kim, E.J., Kwon, O.S., Hur, C.G., Nyiramana, M.M., Lee, D.K., Hong, S.G., Han, J., Kang, D., 2021. Muscimol directly activates the TREK-2 channel expressed in GABAergic neurons through its n-terminus. *International Journal of Molecular Sciences* 22, 9320. <https://doi.org/10.3390/ijms22179320>, doi:10.3390/ijms22179320.
- Laing, M.D., 1984. A cure for mushroom poisoning. *South African medical journal / Suid-Afrikaanse tydskrif vir geneeskunde* 15, 590. <https://www.researchgate.net/publication/16995208>.
- Li, Y.H., Hsu, D.Z., Liu, C.T., Chandrasekaran, V.R.M., Liu, M.Y., 2022. The protective effect of muscimol against systemic inflammatory response in endotoxemic mice is independent of GABAergic and cholinergic receptors. *Canadian Journal of Physiology and Pharmacology* 100, 665–678. <https://doi.org/10.1139/cjpp-2021-0682>, doi:10.1139/cjpp-2021-0682.
- MacDonald, A., 2021. Harnessing the therapeutic potential of muscimol. <https://web.archive.org/web/20210607141002/https://www.technologynetworks.com/neuroscience/blog/harnessing-the-therapeutic-potential-of-muscimol-349541>.
- Masha, B., 2022. Microdosing with Amanita muscaria: Creativity, Healing, and Recovery with the Sacred Mushroom. Park Street Press, Rochester, Vermont.
- Mate, G., 2019. Scattered Minds: The Origins and Healing of Attention Deficit Disorder. Ebury Digital, London.
- Meisel, E.M., Morgan, B., Schwartz, M., Kazzi, Z., Cetin, H., Sahin, A., 2022. Two cases of severe amanita muscaria poisoning including a fatality. *Wilderness & Environmental Medicine* 33, 412–416. <https://doi.org/10.1016/j.wem.2022.06.002>, doi:10.1016/j.wem.2022.06.002.
- Mikaszewska-Sokolewicz, M.A., Pankowska, S., Janiak, M., Pruszczyk, P., Lazowski, T., Jankowski, K., 2016. Coma in the course of severe poisoning after consumption of red fly agaric (*Amanita muscaria*). *Acta Biochimica Polonica* 63. https://doi.org/10.18388/abp.2015_1170, doi:10.18388/abp.2015_1170.
- Nelson, R., 2022a. How to prepare Amanita muscaria – Zoom chat with Amanita Dreamer. <https://youtu.be/AXcim-BqmZ4>.
- Nelson, R., 2022b. The misunderstood magical mushroom - Amanita muscaria (Fly Agaric). <https://youtu.be/oF1r-AB2rYk>.
- Nelson, R., 2023. Why micro-dosing Amanita muscaria (the fly agaric) may help you! Full interview with Baba Masha. <https://youtu.be/13Uw67GNyAw>.
- Nielsen, E.Ø., Schousboe, A., Hansen, S.H., Krogsgaard-Larsen, P., 1985. Excitatory amino acids: studies on the biochemical and chemical stability of ibotenic acid and related compounds. *Journal of Neurochemistry* 45, 725–731. <https://doi.org/10.1111/j.1471-4159.1985.tb04052.x>, doi:10.1111/j.1471-4159.1985.tb04052.x.

- Passie, T., 1997. Psycholytic and Psychedelic Therapy Research 1931–1995: A Complete International Bibliography. Number 3 in Kleine bibliographische Reihe der Zeitschrift Laurentius Kleine bibliographische Reihe, Laurentius Publ, Hannover.
- Passie, T., Guss, J., Krähenmann, R., 2022. Lower-dose psycholytic therapy – a neglected approach. *Frontiers in Psychiatry* 13. <https://doi.org/10.3389/fpsy.2022.1020505>, doi:10.3389/fpsy.2022.1020505.
- Patocka, J., Kocandrová, B., 2017. Pharmacologically and toxicologically relevant components of *Amanita muscaria*. *Military Medical Science Letters* 86, 122–134. <https://doi.org/10.31482/mmsl.2017.020>, doi:10.31482/mmsl.2017.020.
- Pérez, R.E.E., Díaz, J.M.M., Salazar, F.C., Alonso, V.E.L., Garduño, B.F., 2021. CB1/5-HT/GABA interactions and food intake regulation, in: *Progress in Brain Research*. Elsevier, pp. 177–196. <https://doi.org/10.1016/bs.pbr.2021.01.005>, doi:10.1016/bs.pbr.2021.01.005.
- Pieta-Chrystofiak, M., Brohs, D., 2023. Zjawisko zażywania muchomorą czerwoną (*amanita muscaria*) wśród uczestników internetowych grup dyskusyjnych. *Studia Paedagogica Ignatiana* 26, 195–221. <https://doi.org/10.12775/spi.2023.2.009>, doi:10.12775/spi.2023.2.009.
- Plant Medicine Podcast, 2022. Microdosing and the placebo effect with Balázs Szigeti, PhD. <https://web.archive.org/web/20231107141239/https://www.plantmedicine.org/podcast/microdosing-and-the-placebo-effect-balzas-szigeti-phd>.
- Raami, A., 2015. Intuition unleashed: on the application and development of intuition in the creative process. Doctoral thesis. Aalto University School of Arts, Design and Architecture. <http://urn.fi/URN:ISBN:978-952-60-6108-5>.
- Raami, A., 2019. Towards solving the impossible problems, in: Cook, J.W. (Ed.), *Sustainability, Human Well-Being, and the Future of Education*. Springer International Publishing, Cham, pp. 201–233. https://doi.org/10.1007/978-3-319-78580-6_6, doi:10.1007/978-3-319-78580-6_6.
- Rajamäki, T., 2023. Psykiatrinen hoito ei ole romahtamassa – se on jo romahtanut. <https://web.archive.org/web/20230508083156/https://www.hs.fi/mielipide/art-2000009543981.html>.
- Satora, L., Pach, D., Butryn, B., Hydzik, P., Balicka-Ślusarczyk, B., 2005. Fly agaric (*amanita muscaria*) poisoning, case report and review. *Toxicon* 45, 941–943. <https://doi.org/10.1016/j.toxicon.2005.01.005>, doi:10.1016/j.toxicon.2005.01.005.
- Schwartz, R.C., 2021. *No Bad Parts: Healing Trauma & Restoring Wholeness with the Internal Family Systems model*. Sounds True, Boulder, Colorado.
- Sessa, B., 2012. *The Psychedelic Renaissance: Reassessing the Role of Psychedelic Drugs in 21st Century Psychiatry and Society*. Muswell Hill Press, London.
- Stebelska, K., 2013. Fungal hallucinogens psilocin, ibotenic acid, and muscimol. *Therapeutic Drug Monitoring* 35, 420–442. <https://doi.org/10.1097/ftd.0b013e31828741a5>, doi:10.1097/ftd.0b013e31828741a5.
- Szigeti, B., Kartner, L., Blemings, A., Rosas, F., Feilding, A., Nutt, D.J., Carhart-Harris, R.L., Erritzoe, D., 2021. Self-blinding citizen science to explore psychedelic microdosing. *eLife* 10. <https://doi.org/10.7554/elife.62878>, doi:10.7554/elife.62878.
- Tamminga, C.A., Crayton, J.W., Chase, T.N., 1978. Muscimol: GABA agonist therapy in schizophrenia. *American Journal of Psychiatry* 135, 746–747. <https://doi.org/10.1176/ajp.135.6.746>, doi:10.1176/ajp.135.6.746.
- Tsunoda, K., Inoue, N., Aoyagi, Y., Sugahara, T., 1993. Change in ibotenic acid and muscimol contents in *amanita muscaria* during drying, storing or cooking. *Food Hygiene and Safety Science (Shokuhin Eiseigaku Zasshi)* 34, 153–160. doi:10.3358/shokueishi.34.153.
- Turkia, M., 2022a. Self-treatment of depression and complex post-traumatic stress disorder with psilocybin and LSD extemdasha retrospective case study. *PsyArXiv* <https://doi.org/10.31234/osf.io/wupvy>, doi:10.31234/osf.io/wupvy.
- Turkia, M., 2022b. Self-treatment of psychosis and complex post-traumatic stress disorder with LSD and DMT—A retrospective case study. *Psychiatry Research Case Reports* 1, 100029. <https://doi.org/10.1016/j.psycr.2022.100029>, doi:10.1016/j.psycr.2022.100029.

- Turkia, M., 2023. Self-treatment of parental neglect-induced mixed anxiety and depressive disorder with psilocybin—a retrospective case study. *PsyArXiv* <https://doi.org/10.31234/osf.io/qyce5>, doi:10.31234/osf.io/qyce5.
- Voynova, M., Shkondrov, A., Kondeva-Burdina, M., Krasteva, I., 2020. Toxicological and pharmacological profile of *amanita muscaria* (L.) lam. — a new rising opportunity for biomedicine. *Pharmacia* 67, 317–323. <https://doi.org/10.3897/pharmacia.67.e56112>, doi:10.3897/pharmacia.67.e56112.
- Voynova, M., Shkondrov, A., Krasteva, I., Kondeva-Burdina, M., 2021. In vitro effects of synthetic muscimol and an extract from *Amanita muscaria* on human recombinant MAOB enzyme. *Pharmacia* 68, 147–150. <https://doi.org/10.3897/pharmacia.68.e60705>, doi:10.3897/pharmacia.68.e60705.
- Walton, J., 2018. *The Cyclic Peptide Toxins of Amanita and Other Poisonous Mushrooms*. Springer International Publishing. <https://doi.org/10.1007/978-3-319-76822-9>, doi:10.1007/978-3-319-76822-9.
- Wang, S., Sui, S., Liu, Z., Peng, C., Liu, J., Luo, D., Fan, X., Liu, C., Lu, W.Y., 2017. Protective roles of hepatic gamma-aminobutyric acid signaling in acute ethanol exposure-induced liver injury. *Journal of Applied Toxicology* 38, 341–350. <https://doi.org/10.1002/jat.3544>, doi:10.1002/jat.3544.
- Wieczorek, P.P., Witkowska, D., Jasicka-Misiak, I., Poliwoda, A., Oterman, M., Zielińska, K., 2015. Bioactive alkaloids of hallucinogenic mushrooms, in: *Studies in Natural Products Chemistry*. Elsevier, pp. 133–168. <https://doi.org/10.1016/b978-0-444-63462-7.00005-1>, doi:10.1016/b978-0-444-63462-7.00005-1.
- Winkelman, M.J., 2022. *Amanita muscaria*: fly agaric history, mythology and pharmacology. *Journal of Psychedelic Studies* 6, 1–4. <https://doi.org/10.1556/2054.2022.00216>, doi:10.1556/2054.2022.00216.