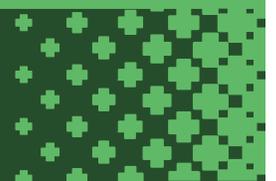




Green Market
Report

Trends In PSYCHEDELIC INVESTING

Prepared with support from Green Market Summit sponsors Mind Medicine Inc., Atai Life Sciences, Field Trip Health, Green Sky Strategies, Back of the Yards Algae Sciences and Eleusis Ltd.





Introduction To Psychedelic Treatment

Psychedelics as a medical treatment have been used for hundreds of years. Plant-based or nature-based products like ayahuasca, ibogaine, peyote, DMT and even morning glory seeds have all been used to expand people's minds and treat various problems. This report will focus mostly on psilocybin, which comes from mushrooms and isn't a plant but is instead the fruit of a fungus.

Several tribes have used psilocybin producing mushrooms for ceremonial purposes. The market often refers to psilocybin producing mushrooms as "magic mushrooms" for the psychedelic properties of the fungi. Often the ceremonies are characterized as a spiritual experience, one that leaves the participant feeling awakened and enlightened afterward. These tribal ceremonies were largely unknown to most Americans until the 1960's when Dr. Timothy Leary started the [Harvard Psilocybin Project](#) to study the effects of psilocybin.



Figure 1 Timothy Leary and Richard Alpert (Ram Dass) courtesy Richard Leary Archives

In 1960, Leary and his fellow researcher Richard Alpert, who later changed his name to Ram Dass ordered psilocybin from the Swiss-based drug company Sandoz in order to conduct a formal study. According to "[The Strange Case of the Harvard Drug Scandal](#)", they believed that psilocybin could be the solution to the emotional problems of Western individuals. At the end of the study, 95% of the subjects declared that the psilocybin experience had "changed their lives for the better". However, the study wasn't without controversy. The professors had given the mushrooms to undergraduate students, which did not meet Harvard's approval. The college was also not happy that the professors took the drug along with their students. To add to these problematic issues, two students ended up in a mental hospital following the use of psilocybin and that was it for the study.

"There has been a tremendous amount of clinical research around psilocybin and LSD and other molecules. Those molecules escaped the lab and ran into the general public. There was a massive backlash by the

Federal government led by Richard Nixon and it really killed this movement," said Lewis Goldberg, Managing Partner at KCSA Strategic Communications at the recent *Green Market Report's* conference on Psychedelic Investing. Goldberg said the goal now is how not to scare off the "straights" over this medicine. "These drugs have been demonized and this is not okay," he said.

Legal Status

Magic mushrooms were essentially declared illegal under the Drug Abuse Control Amendments of 1965, a product of a bill sponsored by Senator Thomas J. Dodd. The law—passed in July 1965 and effected on February 1, 1966-- didn't specifically state psilocybin, but because the drug was considered a hallucinogen it was considered to be included.



The federal law that specifically banned psilocybin and psilocin was enacted on October 24, 1968. Psilocybin and psilocin became classified as Schedule I drugs. On October 27, 1970, both were labeled as "hallucinogens" under the Controlled Substances Act. Despite this, it seemed that mushrooms were often not treated as an illegal drug like cannabis. This is possibly because there's a bit of a grey area in the law; the spores of these mushrooms are legal to sell in many states.

The landscape unexpectedly changed in May 2019, when Denver, Colorado, became the first US city to decriminalize psilocybin mushrooms after an ordinance was admitted to the ballot and voted on. Denver's moves were followed shortly by Oakland and Santa Cruz in California. Then in October 2019, the Chicago City Council introduced a resolution expressing support for decriminalizing entheogenic plants. Other cities that are considering a decriminalization move include Portland, Berkeley and Dallas. At the Federal level, Congresswoman Alexandria Ocasio-Cortez proposed legislation to allow for research with psilocybin, but it didn't pass.

The New Interest in Psilocybin

Psilocybin is being viewed as a treatment for several conditions including drug-resistant depression. Studies have been performed to illustrate the efficacy of psilocybin for this specific purpose. One completed study found that psilocybin produced substantial and sustained decreases in depression and anxiety in patients with life-threatening cancer. The study was [published in 2016](#), and wrote that "At 6-month follow-up, these changes were sustained, with about 80% of participants continuing to show clinically significant decreases in depressed mood and anxiety. Participants attributed improvements in attitudes about life/self, mood, relationships, and spirituality to the high-dose experience, with >80% endorsing moderately or greater increased well-being/life satisfaction."

Earlier in 2006, the Multidisciplinary Association for Psychedelic Studies, known as MAPS sponsored a study using psilocybin for 10 patients suffering from obsessive-compulsive disorder (OCD). The authors noted "a marked decrease in OCD symptoms of variable degrees were observed in all subjects during 1 or more testing sessions." The potential use of mushrooms for depression has many companies vying to get a piece of the market.

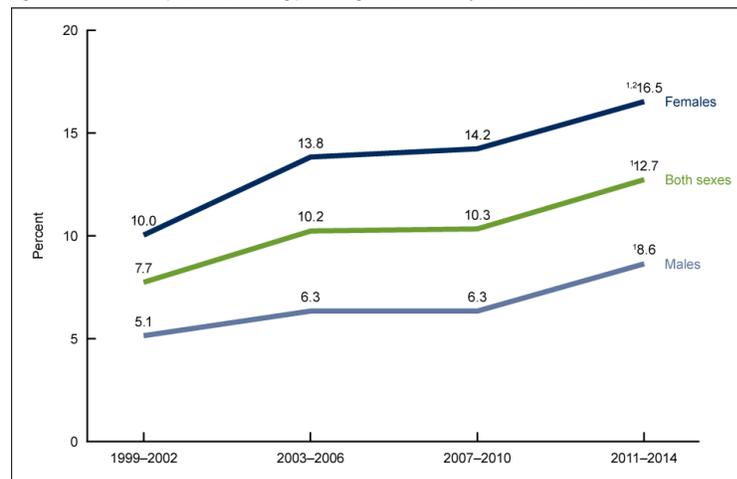
Depression Patient Population

According to the World Health Organization, almost 350 million people worldwide were affected by depression in 2016. Common antidepressant drugs help maintain the balance of various hormones and chemicals in the brain, which assists in the treatment of depression.

The Center for Disease Control and Prevention (CDC), reported that the percentage of people above the age of 12 years using antidepressants in the U.S. rose to 12.7% in 2011-2014. According to MedGadget, the antidepressant drug market was valued at \$13.69 billion in 2018 and is expected to reach \$15.88 billion by 2025. The CDC said that in the U.S., antidepressants were the most commonly prescribed drugs in 2013 and from over 16 million long term users, around 70% are female.



Figure 4. Trends in antidepressant use among persons aged 12 and over, by sex: United States, 1999–2014



¹Significant increasing trend.
²Significantly higher than males for all years.
NOTE: Access data table for Figure 4 at: https://www.cdc.gov/nchs/data/databriefs/db283_table.pdf#4.
SOURCE: NCHS, National Health and Nutrition Examination Survey, 1999–2014.

The mental health condition also has an impact on the economy. The American Journal of Psychiatry has said that people with serious mental illness earn, on average, \$16,000 less than their mentally well equivalents. This equals \$193 billion annually in lost earnings. Mentally ill workers are more likely to miss work and when they are at work are likely to be less productive.

The World Health Organization lists depression as the leading cause of disability worldwide, with more than 300 million people struggling with this complex disease. The intensity of emotional and psychological suffering can be overwhelming and can cause the people who are suffering to attempt or die by suicide, of which 800,000 people are victims each year. There is clearly a desire for a better solution to treat depression, as the drugs that are currently being prescribed don't seem to be working as intended.

Recreational Use



Unlike cannabis, the recreational market for magic mushrooms is much smaller. A quick puff on a joint causing a slight buzz is a far cry from a five-hour trip where the consumer is much more vulnerable. The recreational market in cannabis has generated millions in sales and tax revenues; that is not a focus for those advocating for the legalization of psilocybin mushrooms.

There is however a growing interest in microdosing mushrooms, which involves taking a small amount that doesn't result in an hours-long out of body experience. As the process becomes more refined, young professionals in Silicon Valley say that small doses of these mushrooms allow for



greater focus and is preferred over the off-label use of the ADHD drug Adderall. This isn't viewed as recreational and instead is seen more as an approach towards mental wellness.

Many Paths

There are other non-psylocybin options like ketamine, which is used at the Innovative Ketamine clinic located in Chicago. Off-label ketamine use for depression is not approved by the FDA, but small studies have found the infusions to be effective. DMT is another plant-based psychedelic compound found in Mexico, South America, and parts of Asia, such as *Psychotria viridis* and *Banisteriopsis caapi*. It is known for its fast onset, but very intense hallucinations. The experience doesn't last long, but is described as profound and tends to be the least used hallucinogen.

There are many companies pursuing the promise of psilocybin mushrooms, but the paths vary. Some are choosing to take a clinical approach with patient study trials. Others are focusing on cultivation methods and some are attempting to create synthetic versions. There's even a company that is taking the lessons learned from the early cannabis clinics and applying it to mushrooms.

These are some of the up-and-coming companies in the psychedelic space:

Mind Medicine Inc.

MindMed is anticipated to be the world's first publicly listed psychedelic pharmaceutical company. In June 2019, the neuro-pharmaceutical company MindMed finalized its acquisition of the 18-MC drug development program, which is an anti-addictive molecule that was previously funded by the National Institute on Drug Abuse (NIDA) with \$6.8m USD. MindMed acquired the project from a company called Savant HWP Inc., whose leadership team of top researchers and drug developers joined MindMed.

MindMed raised an additional \$6.2 million to discover and develop "psychedelic inspired medicines", which includes both hallucinogenic and non-hallucinogenic compounds. Investors in this previous round include 'Shark Tank' host Kevin O'Leary, as well as Bruce Linton, one of the founders of cannabis giant Canopy Growth.

"We believe that both hallucinogenic and non-hallucinogenic therapies have great merit and benefits for patients," said Mindmed Co-Founder and Co-CEO JR Rahn. "We are unique in the psychedelic pharmaceutical industry because we see the potential for medicines to be based on psychedelics that do not necessarily require a hallucinogenic experience."

18-MC is based on the natural psychedelic substance ibogaine, which is an indole alkaloid from equatorial Africa. Historically, ibogaine has shown most success in treating heroin addiction and abuse but has been shown to have serious cardiac risks to patients. MindMed is focused on addressing the opioid crisis and other forms of addiction with its 18-MC program. 18-MC has been synthesized to be non-hallucinogenic and without cardiac effects / risk shown with ibogaine use, while



maintaining ibogaine's anti-addictive properties. Mindmed is now preparing 18-MC for a Phase II FDA clinical trial targeting opioid withdrawal and opioid use disorder.

The company has also established a microdosing division to evaluate various forms of microdose versions of psychedelic substances. MindMed is also preparing a Phase II clinical trial (ADHD) for micro-dosing LSD.

In October, MindMed signed a deal to do a reverse takeover with Broadway Gold. According to a press release, MindMed will complete a brokered private placement financing of up to C\$15 million at a price of C\$0.33 per Share. It is expected that MindMed will become a publicly-traded stock in March 2020 (under the ticker MMED on the NEO exchange).

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Atai Life Sciences

Atai Life Sciences calls itself a mental health company and it, too, is looking at psychedelics. The company's core focus is on patients with issues revolving around depression, addiction, and anxiety. CEO Florian Brand said, "We started Atai from very personal motives." He said that several people at the top levels of the company had dealt with mental health issues including the traumatic loss of a parent. Psilocybin was suggested as a treatment. "That was basically the starting point," he said and the creation of Compass Pathways. Since then the company has added more to its portfolio. "It bridges the gap between what's available right now and what's desperately needed for millions of people that suffer from these issues," he added.

Atai has assembled a stable of brands under its umbrella including Perception Neurosciences, DemeRX, Innoplexus, Gaba Therapeutics and Neuronasal. Perception Neuroscience develops Arketamine therapy for patients with neuropsychiatric diseases. Its lead product is the NMDA antagonist Arketamine (PCN 101), a single isomer of ketamine. Arketamine belongs to a new generation of glutamate receptor modulators with the potential for rapid acting antidepressant (RAAD) activity and anti-suicidal effects.

The company said that these new RAAD drugs are expected to be more efficacious than current FDA-approved antidepressant therapies, which often take weeks to achieve maximal effectiveness, if at all. Ketamine, as described in the *Journal of Science* "is arguably the most important discovery in half a century" of research in depression, and Arketamine is anticipated to differentiate robustly from other development stage RAAD's on both efficacy and safety.

Perception Neuroscience was founded on the basis of strong evidence, both in animal models as well as in normal human volunteers, that Arketamine has an improved profile versus both racemic



ketamine, as well as esketamine, both in terms of efficacy as well as safety. Clinical trials will begin in early 2019.

DemeRx is a clinical-stage pharmaceutical development company that is advancing two lead drug candidates for medically assisted therapies for opioid addiction, Ibogaine and its active metabolite - Noribogaine. DemeRx is advancing Ibogaine for medication-assisted detoxification in controlled medically supervised inpatient settings. Noribogaine is being developed for office-based opioid dependent withdrawal treatment and for detoxification of incarcerated addicts.

ATAI Life Sciences has also partnered with artificial intelligence drug discovery specialist Cyclica to form a new joint venture. The two companies will use Cyclica's AI approach and ATAI's biotech to design and synthesize new compounds from psychoactive seed small molecule compounds (SMCs) to find the next generation of drugs to augment mental health care and combat diseases such as depression, bipolar disorder, and schizophrenia. Together they have created Entheogenix Biosciences to discover and work on approaches, like psychedelics to create new therapies.

Eleusis Ltd.

Eleusis Ltd. is a clinical-stage life science company dedicated to unlocking the therapeutic potential of serotonin 2A receptor agonists (another term for psychedelics), through the mitigation and management of psychoactivity. Founder and Chairman of Eleusis, Shlomi Raz recently said, "In 2008, our scientific founder, Professor Charles Nichols at LSU Health Center in New Orleans, discovered that some psychedelics are potently anti-inflammatory at low dose concentrations that are unlikely to be perceptible."

In 2013, Shlomi Raz founded Eleusis to pursue this opportunity. He was at NYU studying to be a psychotherapist at the time. "That's when my training from Wall Street kicked in - I realized that this was a huge therapeutic opportunity if correctly developed," said Raz. He said he was inspired by the success of GW Pharmaceuticals, and their success in developing a stigmatized drug, and transforming it into a medicine.

Raz said the company's first objective is to develop a new class of serotonin 2A agonists for sub-perceptual use, meaning at dose levels sufficient for anti-inflammatory effects, but without perceptible effects for the patient. His company is also developing LSD for the treatment of Alzheimer's disease, an effort set to get underway once the company first establishes the clinical and commercial viability in the treatment of retinal disease associated with aging and chronic inflammation.

"Aging both drives and is driven by inflammation in a process called 'inflammaging'. The compounds that we are developing have efficacy in multiple translational models of age associated with chronic inflammatory disease. Strangely enough, if we can move quickly, the first psychedelic drug that may be approved by regulators, will be for use within ophthalmology rather than psychiatry." Raz says he is dedicated to the transformation of psychedelics as medicines, and given the preclinical evidence his company has generated thus far, believes the opportunity could rival or even dwarf that of cannabis/CBD.



Field Trip

Ronan Levy, a Co-Founder and the Executive Chairman of Field Trip was instrumental in building a clinical infrastructure in cannabis in Canada. He has since sold his cannabis company, jumping into the psychedelic industry. He believes the compounds will be legal sooner than many people expect. “We don’t know exactly what the future of psychedelics looks like. We don’t know the legal path that’s going to get across the line first, but there’s the infrastructure we can start building now,” said Levy. His company’s core focus is creating a large-scale network of psychedelic focused medical clinics which will be called Field Trip Health. The companies first three clinics will be open this year starting in Toronto, New York, and Los Angeles.

Field Trip will begin with ketamine psychotherapy with plans to scale beyond that. Levy said that at the same time, the company is making strategic investments in research and development in areas where the company sees a lot of potential. One area is psychedelic mushrooms. “There are over 200 species of psilocybin producing mushrooms and so we’re investing heavily into plant-based research on the fungus and other plant-based psychedelics to identify new molecules. We’re anticipating a future market for psilocybin producing mushrooms, developing the standard procedures and protocols to grow these mushrooms in a compliant manner,” said Levy.

The company entered into a strategic partnership with the University of the West Indies, Mona, Jamaica to create a legal research and cultivation facility dedicated to psilocybin-producing mushrooms. Field Trip Natural Products Limited (Field Trip’s Jamaican subsidiary) will construct, fund and operate a state-of-the-art research and cultivation facility on UWI’s Mona campus. In consideration, UWI will lease to Field Trip the land to build the Facility as well as make available leading biology, mycology and chemistry researchers to assist Field Trip’s research and cultivation efforts.

The focus of the facility will be broad-ranging, from genetics, to breeding and cultivation work on the 180+ plus species of psilocybin-producing mushrooms, to developing methods and analysis for extractions and formulations, to the identification of novel molecules for drug development purposes. Levy said there’s no shortage of opportunities around psychedelics right now.

Green Sky Strategies, LLC

There is a great deal of crossover between cannabis investors and psychedelic investors. Many of the early cannabis investors are seeing similarities at this stage and it is this same excitement that is sparking the crossover. Brian Quigley of Green Sky Strategies, not only left tobacco for cannabis when he founded Green Sky Strategies, but he is also now forming a new company called Mogu that is not only producing psilocybin but also other plant-based therapies.

Mogu has a three-pronged approach to scaling its business. It will have a near term revenue-producing model focused on adaptogens and grow supplies that will fund long-term clinical development of micro-dosed and therapeutic doses of psilocybin. The company is forming partnerships on the grow technology side of the equation in order to produce consistent efficacious products. The company also has a DEA licensed Schedule 1 lab that will do all clinical and



formulation work on the drug side. He said the near-term focus is in adaptogenics, but looking at products including Lions Mane which exist but hasn't been capitalized on to provide everyday relief. This is a space the company will be going into this year.

"I've really been passionate about these plant-based ways to deal with crippling anxiety," said Quigley. The company will deliver proprietary blends and formulations for consumers this year. The company also wants to help facilitate consumers who would like to grow their own psilocybin mushrooms as decriminalization efforts move forward. These short-term revenue producers that will fund the clinical development for microdosing efforts.

Back of the Yards Algae Sciences

Back of the Yards Algae Sciences founder Leonard Lerer's focus is on developing a safe, sustainable supply of psilocybin that demonstrates good laboratory practice. "We think we can do it because we're doing it already," he said. His company is Cellular Agriculture Specialists and has one of the largest facilities of robotic cell culture in the world.

"It's a long and hard and tough road and one that requires a huge amount of investment." His company has targeted sustainable cellular agriculture. "There's no way on this planet that regulators are going to approve a drug that is grown in shit, with all respect," he recently told the audience at the *Green Market Report* Summit of Psychedelic Investing. His goal is to never have to grow mushrooms in manure ever again.

"We're into helping nature do things better," said Lerer. His company's main product is an extract of spirulina, which is a potent antioxidant that comes from blue-green algae. "We're the first in the world to make this in a non-polluting sustainable way. We've been testing it for depression in animal studies, so we've learned a lot about animal testing," he said. His CECA LAB also has sophisticated equipment for food safety and nutritional analysis.

In Closing

The psychedelic market is very different from the cannabis market. Unlike the "green rush" that drew a fair share of 'get rich quick' types, the people involved in this market are in it for the long term. Investors seem to know that their money will be locked up for some time as the compounds remain on the Controlled Substances List.

Despite this, the promise of being able to address drug-resistant depression drives these companies. Of course, that takes money and the entrepreneurs have addressed the size of the patient populations in order to justify the investments being made in their companies. Yet, the sincerity of wanting to truly help people reminds many of the early days in the cannabis industry when it was about helping children with rare forms of epilepsy. If these compounds can be harnessed and finessed for addiction and depression treatment, then they will truly be at the forefront of a medical revolution.