The wider use of psychedelic compounds in healthcare has many regulatory hurdles to overcome before it can realise its potential as a clinical tool for addressing medical health complaints. HM*i* caught up with **Danny Gelman**, senior associate with FPA Patent Attorneys

FPA Patent Attorneys

A **psychedelic route** through the patent pathway

What is the legal background to the use of psychedelic drugs in research?

LSD is a good example of the way the law tends to deal with these kinds of compounds in that once they become a drug of abuse or potential abuse, regulation is increased – essentially the drug is put on a list (technically a 'schedule' of restricted substances). That's certainly the case in Australia and it seems in the UK as well.

LSD was originally developed as potential anti-psychotic. And it had this psychedelic effect, creating hallucinations in subjects, so it was promptly shelved and then scheduled.

Depending on which schedule drugs are listed, there are a range of penalties associated with their possession and use. This makes researching them much more difficult. Typically, for drugs scheduled among the more illicit drugs (which is the case for many of the psychedelics), research access requires permissions, and tight controls on the amounts you can access. This environment means that while research can take place, it is relatively more difficult to carry out and the potential commercialisation of any research output is also more difficult, so activity has been lower until recently.

There has also been a stigma attached to researching illicit drugs, including psychedelics. So, serious researchers didn't necessarily want to look at drugs of abuse or drugs that cause hallucinations. More recently, the molecular biology of these drugs is being unpacked concurrently with our developing a better understanding of the biochemical basis of mental disease. It's entirely plausible that psychedelic drugs – drugs that are known to affect molecular targets involved in mental and cognitive function – will be useful to treat mental disease.

From a scientific point of view, possessing a tool (in this case a drug) that interacts with a biochemical target (typically a protein) allows researchers to study what that target does, and whether disorder in the native function of this target may be implicated in a disease. This is true for targets associated with mental disease, just as it is for other disease types.

> I THINK THAT THE MEDICINAL CANNABIS EXPERIENCE HAS SET THE STAGE FOR PSYCHEDELICS

So, where a drug (i.e. tool) is known to affect mental and cognitive function, understanding biochemically how that compound works may lead us to better understand the biochemistry of mental disease and reveal new treatment options.

For example, recently a lot of the research on psilocybin, or psilocin the active metabolite of psilocybin, is starting to unpack what its molecular targets are, and through this, potentially unearthing new avenues for treating mental disease.

Has research taken similar path to research in medicinal cannabis?

There is a parallel between current interest in psychedelics to research into medicinal cannabis. Cannabis was long known to possess biological activity, and certainly possesses a tolerable safety profile – otherwise it would not have gained as many illicit users for so long. Many people had also claimed health benefits of cannabis, based on circumstantial evidence. So once clinical evidence had been gathered, enabled by society becoming more open to cannabis' medicinal use, it turns out that there are some significant clinical benefits, but not for everything promised. I think that the medicinal cannabis experience has, in some way, set the stage for psychedelics, because just like for cannabis, psychedelics have clear biological activity and possess tolerable side effects. There are going to be some useful applications of psychedelics as therapeutics for a range of diseases, but we just need to unpack what they might be.

Where's most of the research going on? And how is that affecting the regulatory landscape?

The main research centres, as you would expect, are in the US, Europe, including the UK, and here in Australia. Relaxation of rules controlling access to psychedelics seems most advanced

in some parts of the US. I know that here in Australia, the Therapeutics Good Administration (TGA), which is the Australian equivalent to the EMA or FDA, has considered whether they should move psilocybin and MDMA to a less severe schedule. They've not yet taken up that option, this shows that there is movement towards relaxing access to some of these drugs.

Psychedelic research is certainly capturing the interest of the medical research community and I think that this is partly due to the successes of medicinal cannabis.

Drawing on the parallel with medicinal cannabis, do you see similar kind of patenting issues arising?

There was a lot of surprise that patents that covered cannabis were not treated as a special class of patents. I think that's something that is consistent with the patent system; it's technology agnostic. There are always difficulties with patenting something that is naturally derived because it is something that already exists. The US in particular has a judicially created ban on patenting naturally derived substances. However, there are still many ways to gain commercially meaningful patent protection.

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There was a concern with medicinal cannabis patent application that, in some jurisdictions, patents covering their therapeutic use would be barred for relating to methods that are 'contrary to law'. This is not my experience to date.

Also, my understanding is that even if a patent covered a scheduled drug (including a psychedelic), it is not 'contrary to law' to seek take that drug through the regulatory pathway and commercialise it as a prescription drug assuming all the right regulatory approvals were obtained. So, I wouldn't expect that the psychedelics will have a harder path through the patent system than cannabis.

An example of a drug that was naturally derived, that led to great commercial success – although not for its inventors – was penicillin. In penicillin's case, patent protection covering method of manufacture proved commercially valuable.

However, this is only one way to capture commercially meaningful scope for a naturally derived compound, for example other aspects relevant to naturally derived compounds that can result in patent protection include: what in-

dications each active compound can be used for, better ways of formulating a compound for pharmaceutical use; and wherever there's a technical difficulty in delivering it to patients or delivering it to the market. There's not a finite list of ways that potential patent protection can be obtained, rather it will change on a case-by-case basis. Essentially any technical solution to a problem can lead to patent protection, so it is never possible to predict what the highest impact advances will be.

Another strategy may be to treat a known psychedelic as a lead in a medicinal chemistry effort to make new compounds that possess similar, or improved biological activity. These new compounds – not themselves being naturally derived – should be patentable themselves.

As you can see, there are many options to pursue patent protection for psychedelics and psychedelic-inspired programmes. However, I expect that many existing patent applications covering psychedelic programmes are not yet published - patent applications typically only publish 18 months after their initial filing date. So, the full extent of the psychedelics patent landscape is unclear, but I expect that a wave of filings will begin to publish in the near future.

What about synthesising compounds?

Yes, synthesising compounds can be protected in a patent. But it must be the right synthesis because I would be shocked if there weren't already known syntheses for many of the psychedelics of highest interest. To be commercially valuable, the synthesis should also be able to be carried out on a commercial scale and without too ready a work-around, because there are 1,000,001 ways to make any one compound. While synthesis patents are valuable and there are many good examples of enforcement, they tend to be pursued later in the development pipeline of a drug.

Where do you see the most likely developments?

Psilocybin seems to be the forerunner in terms of interest, followed closely by MDMA. I suspect other compounds like LSD, because of their broad biomolecular targeting profile, make them less attractive.

At the very least, I see this first wave of research is likely to be useful in helping us better understand brain biochemistry. And if we get a useful therapy for disease that's hard to treat with existing therapies, then all the better.

What about easing of the regulatory environment?

The experience with medicinal cannabis is likely to be a good one for psychedelics. I think that, in general, the hard line taken on drugs that were previously socially unacceptable but are now proven to have medicinal use will cause a change in mind-set. There will be a benefit to regulating and controlling the quality of the product.

Of course, there are already drugs that we think of as 'drugs of abuse', like cocaine, that is still used in many countries on prescription for some indications.

One of the major arguments to regulating these compounds rather than keeping them restricted is quality control.

The worst outcomes usually stem from taking poor quality drugs, such as those made in clandestine labs for illicit use. By regulating psychedelics, users will likely have more surety about the contents and quality of the dose they take, which should also lead to better therapeutic outcomes.

Licenced growers for medicinal cannabis are required to control the actives in the strain and use modern growing techniques to ensure quality and dose. It will likely be the same for psilocybin growers. They would be able to give you the same dose of active, or the right dose of active, to ensure you're taking the right treatment. Who knows what you're taking if you buy it illegally?

Speaking to growers, I understand that there are benefits to targeting markets that have legalised cannabis for medicinal use, but not for recreational use, because pharmaceutical products typically provide higher value.

I don't know where the economics and market will take us with psychedelics, but I am looking forward to finding out.

Danny Gelman, PhD, is a senior associate with FPA Patent Attorneys, a top tier, Australia- and Singapore-based patent attorney firm that focuses on patent and design protection.

Gelman specialises in the drafting and prosecution of global patent families across the chemical field including organic synthetic chemistry, medicinal chemistry, pharmaceuticals and plant-based extracts. He is a registered Australian and New Zealand patent attorney.

Gelman completed his PhD at Monash University and Harvard University focussing on organic synthetic chemistry. And it was during his PhD, when looking at synthesising several psychoactive compounds that he can trace his interest in psychedelics.

Before joining FPA Patent Attorneys, Gelman gained experience as a Senior Scientist in a drug discovery role in the UK pharmaceutical industry.

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