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FOUNDATION

PIONEERING RESEARCH, CHANGING MINDS:

The Latest Findings from the Beckley Foundation

Scientific Programme

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Interdisciplinary Conference on Psychedelics Research

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I am delighted to be back in Amsterdam, where my passion for psychedelic science was first nurtured.

I first took LSD in 1965, and then learnt how to *work with* it in a productive way the following year, when I met a Dutch scientist called Bart Huges. He introduced me to his theories underlying the changes in consciousness brought about by techniques such as yogic deep breathing, and the psychedelics, and explained the Ego as a conditioned reflex mechanism, which controls what enters consciousness and what does not, through the control of the blood supply in the brain. The theories are too complex to go into now, but they changed my life, and I decided to devote my energies to exploring the brain and how to enhance its functioning – and to share this knowledge.

Now, 50 years later, we are finally starting to empirically understand the mechanisms underlying the changes in consciousness brought about by the psychedelics and how and why they can be such useful tools in the treatment of many illnesses.

So why this gap of 50 years one might ask?

Sadly, because it took that long to drill a hole in the barricade of repression created by the War on Drugs. This war was enshrined in the UN conventions, and has remained unchanged, like a sacred text, although clearly it was based on prejudice and political expediency, not on scientific evidence. Prohibition has been an outstanding failure, causing devastating collateral harms, far in excess of the drugs themselves.

Although in theory, scientific and medical research into controlled substances was allowed by the conventions, in fact, the obstructions were so great, it became impossible: there was no funding, and no institutions or scientists wanted to be involved in research which would damage their reputations and careers.

It is an amazing indictment of modern society that these incredibly important psychoactive compounds, that have played such a vital role in our cultural evolution – aiding our development of language, spirituality, music, art and medicine – *became* Taboo. They have always been at the core of society – shrouded in mystery – but sadly they became toxic in the mind of society – moving from being known as the food of the gods – to substances of damnation and criminalisation. This move has been a grave mistake for society and has caused untold suffering.

Amazingly, now I think we are standing at the threshold of a new era.

Suddenly psychoactive substances are beginning to be recognised for their potential, for spiritual growth and healing, for better understanding of the ‘self’, for increased perception of beauty and music, and for enhancing compassion and openness.

My introduction to psychedelics was through LSD, and so I retain a great love and dedication to its re-integration into the fabric of society as a tool of incredible value. However, LSD carries the heavy weight of misplaced prejudice, unequal to any other substance. Luckily, psilocybin is the word that nobody knows, so it can ‘oil’ the key to the re-opening of the door to psychedelic science, complemented by ayahuasca, which has minimal recreational possibilities!

Following the promising explosion of research into LSD after its discovery, with over 3000 experimental and clinical studies undertaken, research was brutally terminated at the beginning of the 1970s- the baby was thrown out with the bath-water- and it has taken almost 50 years to undertake the first imaging study of its effects in the human brain.

Last month we launched the results of the Beckley/Imperial LSD study at the Royal Society in London. I had dedicated many years to undertake research with LSD, and it felt as if an important door had been opened.

It was a long journey from Amsterdam in 1966, to the Royal Society in 2016, and an important step on the way was setting up the Beckley Foundation in 1998... Becoming a Foundation adds gravitas to someone like me, with no letters after my name. The Foundation has two main aims: firstly to investigate the mechanisms underlying consciousness and its changing

states; and secondly to reform global drug policies – the 2 are closely interrelated.

Over the years I have undertaken many collaborations with leading scientists around the world. My partnership with Dave Nutt has been particularly rewarding. It began in 2005 when I encouraged him to join me in the research of psychedelics. Soon after Robin Carhart-Harris visited me, and I suggested he did his PhD with David. In 2009 Dave moved to Imperial, and we began the *Beckley / Imperial Research Programme*, co-directed by Dave and me, with Robin as Lead Investigator. Since then, the team has grown in a wonderful manner, including Mendel, Leor, Christopher and David Erritzoe, all of whom have given talks at this conference.

Our first study investigated the effects of psilocybin, using fMRI, ASL and MEG. The study was particularly revealing about the Default Mode Network. This study led to the Medical Research Council, a government body, funding our recent psilocybin for depression study. We later did similar explorations with MDMA, and finally, broke the boundaries to the forbidden territory of LSD.

In 2013 I began another productive collaboration with Jordi Riba. Jordi is a long-standing researcher of ayahuasca, and now we are expanding the field to include the investigations of DMT and 5-MeO-DMT. Our latest *in-vitro* study has revealed some very important data which Jordi will describe later today.

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What I would like to share with you today is why, in my opinion, psychedelics are such essential tools in gaining a better understanding of consciousness, and why they are proving to be such effective treatments of many of man's most intractable illnesses, including addiction and depression.

Their great gift is that they bring about profound changes in consciousness that no other substances do. They enable us to compare normal, daily consciousness with the altered states they generate, in a reliable way – states which have similarities not only to psychosis, but also to the state underlying the mystical experience, creative breakthroughs, and other peak moments of human experience. Key elements of the psychedelic experience are 'ego-dissolution', altered awareness and a greater depth of feeling.

We, and others, have found that the changes in consciousness that psychedelics bring about, leave profound lasting effects, such as increased openness, optimism and improved well-being. They seem to be able to *re-set* rigid patterns of thought and behaviour which underlie many mental disorders.

What is interesting, is HOW these changes happens, and our research is helping clarify this.

Using different, but complementary brain imaging techniques together with behavioural measures, we are beginning to put together the pieces of the puzzle.

The picture that emerges is somewhat similar to the 'reducing valve' hypothesis of Aldous Huxley. What we are finding is that the normal, highly organised and structured way of how the brain works, disappears, and under the effects of psychedelics is replaced by a different, more chaotic, or 'entropic', mode.

According to the 'entropic brain theory,' the psychedelic state is characterised by a higher degree of 'entropy' or 'chaos', than the normal waking consciousness. This increase in 'chaos' results from the fact that the usual top-down constraints are disrupted, thus increasing excitability in sensory, memory and emotional centres, and creating a shift from ordinary waking consciousness to a state more similar to dreaming, or infancy, where the mind is more emotionally flexible, and everything feels novel, fluid, and dynamic.

As infants grow up, the brain becomes more sophisticated, more specialized, more efficient at what needs to be done – but also more rigid and constrained. Psychedelics disrupt the balance, breaking up the fixed patterns of communication, and giving rise to new patterns of brain connectivity.

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Normally, without psychedelics, the brain functions in a very organized manner, with distinct networks doing their separate tasks, for example motor function, vision, hearing. There are also higher-order networks, an important one being the Default Mode Network – which behaves rather like the conductor in the orchestra.

This network is also important for introspection, daydreaming, memory and maintaining the sense of self, and is very prominent when the person is not engaged in goal-related tasks: *hyperactivity* of the DMN has been associated with several mental illnesses such as anxiety, depression and obsessive compulsive disorder. **Psychedelics disrupt the connectivity within this network, and the degree of this disruption is mirrored in the experience of ego-dissolution, a loss of sense of self.**

We see the same patterns of disruption in many other networks as well: namely that the connectivity *within* the networks *decreases* and the connectivity *between* the networks *increases*. This results in the *whole brain* becoming more integrated, allowing new connections to be formed between brain areas which normally do not 'speak to each other'. It is experienced as a *sense of oneness*, or *unity*, such as mystics experience through endogenous means and years of training.

The ayahuasca research carried out by Jordi Riba, as part of the Beckley / Sant Pau Research programme, leads to similar conclusions, including the reduction in the brain rhythms, and changes in the resting-state network connectivity, which reduces the grip of the Default Mode Network over sensory and emotional areas. Moreover, we find that these changes persist as an *afterglow*, for at least twenty-four hours after the acute effects of ayahuasca subside.

Jordi specifically looks at changes in connectivity between higher cognitive areas and areas associated with emotion. We find that these areas become more connected after ayahuasca, and this correlates with increased mindfulness scores – people become less judgemental and get a better insight into their own emotions. The increase in mindfulness scores are comparable to those of experienced meditators and last for at least two months after the initial experience.

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In addition to the changes in consciousness and personality described above, psychedelics can also shed light on the phenomenon of visual hallucinations.

In our LSD study, we find that when resting with eyes-closed, the visual areas of the brain were the only regions to show *increased* blood flow after LSD. All the imaging measures showed changes that we would normally see with visual stimulation – even though participants had their eyes closed. These changes correlated with self-reported visual hallucinations, demonstrating ‘seeing with eyes-shut,’ consistent with ayahuasca research. Moreover, the visual areas were much more connected with the rest of the brain under LSD than with placebo.

The above principles apply not only to the simple geometric patterns, but also to complex visions, which are deeply influenced by memory and emotions.

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We also explored the interaction of LSD with music. We found that LSD enhances the emotional response to music, creating a deeper and stronger experience than with placebo. There was increased brain connectivity when the music was present. The regions involved in emotional memories, such as the parahippocampus, affected the visual regions more.

The results provide strong support for the use of music in psychedelic-assisted psychotherapy to enhance personal memories and mental imagery. This part of the study was led by Mendel Kaelen.

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Finally, in addition to helping us understand how the brain works, and informing us about various states of consciousness, psychedelics have very

important practical applications, including in the treatment of depression, addiction, anxiety and other conditions.

Studies in which we are involved include the Beckley/Imperial psilocybin study for treatment-resistant depression already mentioned.

After 2 doses of psilocybin, in a supportive clinical setting, all patients showed some improvement in their symptoms. 67% were depression-free 1 week after treatment and 42% were still in remission 3 months later.

Even though the study was very small, the results are remarkable. Participants, who on average have been depressed for 18 years, reported *decreased* anxiety, *increased* optimism and an ability to enjoy things, and for some the improvement lasted for months!

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We have also seen great results in the Johns Hopkins study led by Roland Griffiths and Matthew Johnson which uses psilocybin for overcoming nicotine addiction.

Again, the sample size was small, but the success rate was outstanding. Twelve subjects, all of whom had tried to quit smoking multiple times using various methods, were verified as nicotine free six months after treatment, a success rate of 80%.

The psychedelic experience seems to allow many subjects to reframe, and then break, a lifelong habit. The volunteers who reported a more complete mystical experience had greater success in breaking the habit. The study is now being expanded, and will include a brain imaging component.

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I am very excited about the future, with many new and exciting studies taking shape with various collaborators around the world.

The field of psychedelics science is most certainly an abundant orchard, with much low hanging fruit, and I feel confident that it will grow exponentially, making the world a happier place.