5-methoxy-N,N-dimethyltryptamine

Desert toads, shamans, and entheogens

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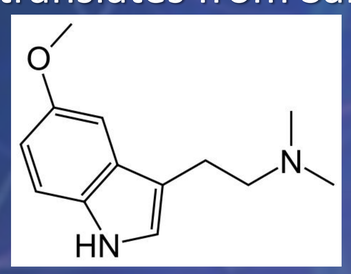
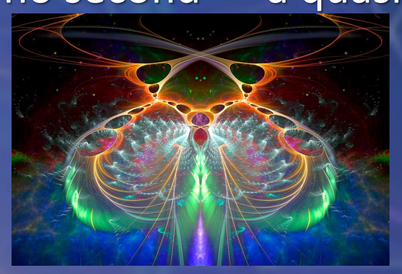
Abstract: 5-Methoxy-N,N-dimethyltryptamine (acronymized as 5-MeO-DMT) is a unique member of a group of naturally-occurring psychoactive indolealkylamine substances and has been described as a prototypical entheogen. It acts as a nonselective 5-hydroxytryptamine (serotonin) agonist and causes a broad spectrum of highly interesting physiological and psychological effects. Research indicates that 5-MeO-DMT may be synthesized in human pineal and retina, and it has been identified in human body fluids including urine, blood, and cerebrospinal fluid. 5-MeO-DMT is ubiquitously present in the plant kingdom and has been utilised for medicinal, psychological, and spiritual purposes by shamans for thousands of years. In additions to its phytochemical distribution, it is present in the skin and venom of a single amphibian species that is endemic to the Sonoran desert.

Incilius alvarius: The Sonoran Desert toad (binomial nomenclature: *Incilius alvarius*) produces significant amounts of 5-MeO-DMT in its numerous parotoid glands. The salience of toad symbolism in Mesoamerican iconography and mythology is well documented by anthropologists and toad-effigies (with accentuated glands) are found in archaeological excavation from ancient Mayan and Aztec cultures.

Qualitative phenomenological effects: 5-MeO-DMT is extremely neuroactive (4-10 times more potent than its relative DMT but less visual), it has a fast onset (full effects almost instantaneously present after administration), and a relatively short-lived action (ca. 20-50 minutes). Anecdotal evidence indicates that 5-MeO-DMT expands and transforms consciousness inconceivably and that it has the potential to induce a temporary non-dualistic experience of reality. In other words, the dichotomy between subject and object (the observer and the observed) dissipates. This phenomenon has also been described as ego-dissolution and unity consciousness and it is congruent with epiphanies described in ancient Asian wisdom traditions (e.g., Hinduism and Buddhism). For example, the quintessential hinduistic/vedantic concept of “Advaita” translates from Sanskrit into English as “not-two” or “no second” – a quasi-mystical all-is-one state.





Neurochemical receptor-binding characteristics: 5-MeO-DMT has an exceptionally high affinity for certain members of the 5-HT receptor family. Specifically, this molecule acts as a nonselective partial agonist for the 5-HT_{1A} and 5-HT_{2A} receptor subtypes. The 5-HT system is associated with mood, cognition, and memory. For example, its receptors are located in the cerebral cortex (cognition), in the amygdala (emotions), and in the raphe nucleus. This nucleus is located in the most primitive part of the brain, the brainstem, and its axons project widely throughout the cortex. The raphe nucleus produces the majority of the brains serotonin. Ergo, when it is stimulated by 5-MeO-DMT it causes extensive serotonergic activation throughout many neural networks of the brain. Moreover, 5-HT receptors are present in the hypothalamus which connects the central nervous system to the endocrine system. It has been convincingly argued that 5-MeO-DMT causes the hypothalamus to release large amounts of oxytocin via the pituitary gland. This increase in oxytocinergic activity might explain why the qualitative description of 5-MeO-DMTs phenomenology oftentimes include words like “love”, “unity”, and “connectedness”. Accumulating evidence indicates that 5-MeO-DMT is an endogenous ligand of the Trace amine-associated receptors (TAARs), a class of G protein-coupled receptors that were recently discovered in 2001. It has been hypothesized that the TAARs are involved in sensory perception. Moreover, the TAARs have been associated with pathological neuroadaptations associated with prolonged exposure to drugs (e.g., alcohol or cocaine addiction). Consequently, this might explain 5-MeO-DMTs apparent effectiveness in addiction treatment. That is, because 5-MeO-DMT is able to target these receptors it might be able to regulate the pathological neurological adaptions caused by addiction. Furthermore, 5-MeO-DMT has been found to match the σ_1 receptor and it has been shown to have anti-inflammatory effects. The effects of 5-MeO-DMT on the dopaminergic system are currently controversial and more research is clearly needed to elucidate its mechanisms of action.

5-MeO-DMT as an entheogen: An entheogen is a chemical substance used in a religious, shamanic, or spiritual contexts that has the potential to produce profound psycho-spiritual changes. The etymology of the neologism “entheogen” is derived from the ancient Greek and translates into “generating the divine within“. 5-MeO-DMT is a prototypical representative of an entheogenic substance. For instance, it is a ceremonial sacrament (Eucharist) of the Church of the Tree of Life. Research focusing on 5-MeO-DMT might provide impetus for the emergence of a new neuroscientific paradigm which goes by the name “neurotheology”. It has been proposed by Efrain C. Azmitia that “*the ability of these drugs to induce a feeling of closeness to God is a special property of the indoles and this property is attributed to activation of the cortical 2A serotonin receptor*” (Azmitia, 2012). However, systematic scientific research is currently legally highly restricted due to the irrational generic Class A status of psychoactive tryptamines (i.e., “Psychoactive Substances Act” which reached Royal Assent in January 2016).