

# [Roles of endocannabinoids](https://assignbuster.com/roles-of-endocannabinoids/)

Cannabinoids refers to a group of substances which are associated with tetrahydrocannabinol or THC. Endocannabinoids on the other hand are endogenous metabolites capable of activating the cannabinoid receptors. It was in 1992 when the first endogenous cannabinoid was identified. Called AEA it is also known as anandamide. Right after, the second endocannabinoid, 2-arachidonoyl glycerol also called 2-AG, was discovered. Although there are stark differences between their affinities and activation efficacies, these two compounds are both derivatives of arachidonic acid and both can bind to CB1 and CB2 receptors.

During the last few years, there are other bioactive lipid mediators identified. They come out acting, at least in part, through CB1 and/or CB2 receptors and give exact pharmacological effects in vivo. These particular compounds are 2-arachidonoyl-glyceryl-ether (noladin ether), O-arachidonoyl-ethanolamine (virodhamine), N-arachidonoyl-dopamine, and possibly even oleamide. But further investigation is still needed about the endogenous functions these latter compounds play in physiological processes. There are yet other putative lipid mediators which could probably have cannabimimetic actions.

However, their precise mechanism of action is not identified in detail. Their cannabimimetic effects may be partly associated to interference with the endocannabinoid-inactivating enzymes. This happens in some instances. It is expected that the lipids would be able to improve the activity of cannabinoid receptors by increasing the concentration of the endocannabinoids such as AEA and/or 2-AG (Pagotto et. al, 2005 pp. 2-8). Cannabinoids come from cannabis, a green plant that grows in different tropical countries in the world.

Its most generally used parts are the leaves and the flowering top. With this importance, cannabis is cultivated both indoor and outdoor. The flowering top of it can be used smoked or eaten. This plant produces concentrated resinous which is called hashish and sultry black liquid called hash oil. Cannabis are divided into three species namely sativa, indica, and rudelis. There are arguments though if this should be called varieties rather than species. The product of interbreeding these three groups is the most recreationally used cannabis.

Low variety of cannabis is called hemp which is used for industrial purposes (Erowid 2007 pp. 1). Tetrahydrocannabinol, or THC, the constituent that causes the 'high' was revealed in 1960s. A component of the cannabis plant, THC was found out to be binding the periphery and specific receptors in the brain after two decades. This interaction set off to different biological processes also known as marijuana process (Mechoulam, 2007 pp. 1 ). Cannabis is also known as marijuana which is considered one of the most illegal drugs but frequently used in Europe.

It started to become famous during the 1990s, particularly to young people including the school students. This is popular among 14 to 24 years of age and common in most countries with a range of 20-40%. Not long ago, it had been alarming to discover the social and health effects of using cannabis. Severe use of it is usually linked with non-drug-specific mental problems. It is very important for adolescents to prevent the use of it. (Mechoulam, 2007 pp. 1). When the use of cannabis had been proclaimed illegal, basic and clinical cannabis research became a trifle difficult.

However, as a result, researchers began to exert efforts in identifying psychoactive components of it. They discovered in the end that the endocannabinoid system can actually be found in physiological systems such as the immune, cardiovascular, nervous, reproductive systems. Through the years, the study of cannabinoid biology had been a great help in the field of biomedical research. The research gave way in examining the biochemical and physiological effects in the use and abuse of cannabis.

Endocannabinoids targets cannabinoid receptors or the CB1 and CB2, the anandamide transporter and the enzyme anandamide amidohydrolase” (Palmer, et. al pp. 1). Endogenous Cannabinoids System (ECS) Endocannabinoids are made up of lipophilic metabolites from arachidonic acid. AEA (anandamide) and 2-AG (2-arachidonoyl-glycerol are the earliest discoveries and had been studied thoroughly. The membrane depolarization of postsynaptic cells makes new formation of 2-AG and AEA through the pathways of phospholipid-dependent in neurons.

The combination of endocannabinoids to its direct depolarization is depending upon the increase of intracellular calcium. This is aside from the fact that the activation of group 1 metabotropic glutamate receptors and other phospholipase C-linked G-protein-coupled receptors also fuels production of endocannabinoid. The endocannabinoids appear to be made out of demand and act on cells in an autocrine or paracrine manner when outside the brain. Both AEA and 2-AG circulating levels are seen present in women. Their preclinical studies prove their presence in pancreas, uterus, and liver.

Generally, fast induction of endocannabinoid synthesis, receptor activation, and endocannabinoid degradation, with tightly regulated spatial and temporal selectivity are the characteristics of ECS (Di Marzo, et al pp 5-8. ). Practical and beneficial roles of endocannabinoids Major endocannabinoids (2-AG) are located in the central nervous system and in the periphery. There was once an experiment that shows that the traumatic brain injury (TBI) or stress stimulus improves the 2-AG levels in the brain of mice.

Then, it was shown that the mice’s 2-AG in endogenous and exogenous origins were neuroprotective in relation to excitotoxicity, ischemia and closed head injury. From here, it could be drawn the cannabinoids capacity in reacting to different biochemical mechanisms. Also, 2-AG was discovered to have assisting properties for repairing barriers in the flowing of blood to the brain when the condition TBI occurs. Furthermore, endocannabinoids perform through exact cannabinoid receptors which are most plenty in the central nervous system.

It was found out in the study that mice do not react to treatment with endocannabinoids if CB1 receptors are knocked out. It has been recorded that for the past few year, several groups found out that also formed in the brain are CB2 receptors, as the effect to a number of neurological diseases. These are eventually started by the endocannabinoids as their defensive mechanism (Mechoulam, 2007 pp. 1). The immune system, protecting people from protein attacks such as microbes for parasites and other external attacks went through various evolution for its development.

Two collaborated researches found out that the endocannabinoid system, through different biological ways can lower effect caused by brain trauma. It moreover helps to reduce the pain in brain edema and other neurological injuries. (Mechoulam, 2007). It is considered of great importance for science and therapeutics when endocannabinoid system was discovered. Starting off from the discovery of cannabis plant which has helped people to better understand its use and effects, endocannabinoids helped established the existence of physiological roles of biochemical system particularly in neuroprotection.

These findings have paved the way in developing new types of drugs like using THC in treating nausea and for boosting the appetite of cachectic patients. The system has also a hand to play in the pathogenesis of hepatic encephalopathy, a neuropsychiatric syndrome stimulated by failures of fulminant hepatic. It was also found out that endocannabinoid system play a part in inducing the the body to protect itself against multiple sclerosis, Alzheimer's, Parkinson's and other neurological diseases. This raised new hope for therapeutic cures for these diseases (Mechoulam, 2007 pp. 1).

In the news In February 2007, studies discovered that by increasing the level of the brain's cannabis-like chemicals, Parkinson's disease could be treated. The test was done in mice with the same condition which can move normally for fifteen minutes. These mice have been given cocktails infused with a certain compound that could increase the endocannabinoid levels. However, smoking the cannabis will not result to same according to scientists. “ For the treatment, researchers from Stanford University Medical Center in California focused on the part of the brain called striatum.

This portion has already been linked to Parkinson's. With this chemical dopamine, they observe how the nerve activity cells in the striatum function. Too little of dopamine in the area can develop Parkinson's”. The conducted study used mice genetically modified to have a condition like Parkinson's. Researchers marked particular cells with a fluorescent protein that can clearly be seen under a microscope. Included are two types of cells forming a push and pull system in the brain. One is considered to activate motion, while the other stops unwanted movement.

While too little dopamine is present, it is considered that the cells which limit motion become leading, resulting hard moving for a person. A drug firm in California which developed the experimental drug breaking down endocannabinoids, demonstrated a progress on the mice. The mice then moved for 15 minutes freely from not moving at all. There researchers saw the insights of possible new kind of therapy for Parkinson's disease. However, the lead doctor who made the study explained that this might be a long way to go yet before finally tested to humans.

It is nevertheless a success in a way having identified of the possibility of controlling paths that affect Parkinson's. The researcher added that their manipulation of chemicals is far different than simply smoking marijuana. The study was recognized as one offering greater analysis of how the nerve cells in the brain affecting Parkinson’s are linked to endocannabinoid system and how they communicate with each other. This is how the director of UK’s Parkinson’s Disease Society see this (BBC News, 2007 pp 1-3).