

Body peddles its own drugs

S.Ananthanarayanan.

The psychotic effects of Marijuana are because it passes off as a drug which the brain makes all on its own. Scientists have isolated this substance and named it 'Anandamide', after the Sanskrit word 'Ananda' (bliss), because it is similar in structure and action to the operative thing in hashish, bhang and 'pot'.

Cannabis Sativa

The leaves, the flowers and the resin of this humble Indian plant have been used as a drug since centuries. Apart from its use as an intoxicant, or a hallucinogen, Marijuana was used a reliever of pain or anxiety. In Iraq it was used to treat epilepsy, centuries ago, and now it is routine with cancer patients – it suppresses nausea and enhances appetite, useful during chemotherapy.

After years of research, it was only in 1964 that the chemical agent responsible for all this physiological action was isolated – delta-9-tetrahydrocannabinol, or 'THC'. The next step was to see what it was in the brain that reacted to this chemical?

Receptors and Nerve cells

Receptors are structures on the surface of cells and they are designed to allow particular chemicals to attach – like a socket where a particular plug can fit. When the particular chemical 'docks', it causes changes inside the cell, usually by subtle electrical effects of the charges on the atoms that the chemical is composed of. The chemical can then act like a switch, to trigger or suppress some of the cell's functions.

To track the route that THC took, scientists 'marked' TCH molecules with a radioactive component, and watched where in rats' brains the radioactive marker got deposited. They found that the trace ended at a specific part of nerve cells, now called the cannaboid receptor or CB1. To make sure that it was CB1 that connected to the THC, rats that lacked the CB1 feature were bred and it was found that cannabis administered to such rats had none of the physiological effects seen in normal rats.

It turned out that CB1 was one of the most abundant receptors in the brain, and found in nearly all areas of the brain. This explained why Marijuana has such variety of effects – at the cerebral cortex, it became psychoactive, it acted on the hippocampus to impair memory and improve appetite, it hit the movement control center to cause motor dysfunction, at the brain stem and spinal cord, it brought about the reduction of pain and reduced the vomiting reflex, at the amygdala it affected emotional responses.

But why CB1?

OK, Marijuana has so many effects because the brain has so much of CB1. But why on earth should the body have grown receptors to a chemical derived from a plant? The answer to this came from studies that had been made on the response to morphine, a derivative of opium. In the 1970s, it was found that morphine had its effects because it mimicked opium-like chemicals that the body itself manufactured. In 1992, a similar thing was found to be true for THC and Marijuana – the body manufactured a fatty acid that bound to the CB1, the receptors that THC was found to attach to. And the fatty acid had all the physiological effects of THC – hence the name ‘Anandamide’.

It is found that Anandamide takes part in an important way that nerve cells communicate and, among other things, help the brain, over time, to blot out the fear that is learnt from painful experiences. This is vital in relieving anxiety. THC in Marijuana looks like Anandamide and ends up doing the same thing!
