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Effects of Caffeine Addiction

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Review Article

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ABSTRACT

Caffeine is a purine derivative. It can be described as a drug which is classified under methylxanthanes and is a CNS (Central Nervous System) stimulant. The whole world consumes it irrespective of geographical distribution. There are many illegal psychoactive substances like tobacco, marijuana, cannabis, ayahuasca, coca, caffeine, opium and peyote. Out of which only caffeine and coca are legal to consume or sell. Theobromine i.e., chocolate is similar to caffeine in chemical structure. Both differ only with a mighty methyl group. The presence of a methyl (CH_3) group in the methyl xanthine structural analogue is caffeine where the absence of it is theobromine i.e., chocolate.

INTRODUCTION

Caffeine is a bitter, white crystalline xanthine alkaloid-a term used for substances produced as end products of nitrogen metabolism in some plants [1-5]. The stimulant chemical is also known as caffeine, theine, mateine, guaranine, or methyltheobromine. The only constituent to be legally and abundantly sold and consumed throughout the world is caffeine. Every person i.e., human being consumes at least a 200 mg in a day. Sources may vary but the intake is regular. As we all know caffeine shot or even a snip helps us wake up from the bed, start our day, Alerts our CNS, stimulates and wakes us up when are at work [6-8]. Caffeine has turned the whole world to it and is still in the list and at the top of the beverages that are sold regularly. Apart from this it is said that regular intake of caffeine could be dangerous to humans too. Drink a cup of coffee everyday throughout the year i.e., for 365 days. And on the 366th day test your blood and you find 3.03% of poisons or caffeine toxins that could actually kill u if the percentile reaches above 10%. Here is a glance on Caffeine [9,10].

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Figure 1. Caffeine plant.

Why do We Usually Addict to Caffeine

Caffeine's **(Figure 1)** are the methyl xanthanes that structurally resemble tryptophan [11-15]. Tryptophan's are the neurotransmitters that are secreted in following cases:

1. When a person is in love
2. When in Coitus
3. Orgasm
4. Hallucinated to be happy

So, when a person usually ingests caffeine or chocolate they also contain some traces of tryptophan and it acts as a precursor to serotonin [16,17]. Serotonin is a neurotransmitter known for the mood enhancing property and high serotonin levels are known for the elation effects. Another one is Phenyl ethylamine. Phenyl ethylamine is an amphetamine derivative. Known for attraction and love. These are also released when caffeine and chocolate are ingested [18-22].

Sources of Caffeine

The following list contains the things or foods that contain caffeine:

- Coffee
- Tea
- Beverages
- Cola
- Soft Drinks
- Hot Chocolate
- Non-Cola Sodas
- Protein Bars
- Ice Cream and Yoghurt
- Candy Bars
- Fancy Water

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Chemistry of Caffeine

Caffeine is chemically 3,7-dihydro-1,3,7-trimethyl-1H-purine-2,6-dione or it can also be called as 1,3,7-trimethylxanthine **(Figure 2)** [23-27]. Its chemical formula is $C_8H_{10}N_4O_2$. Caffeine enters the circulatory framework around ten minutes after its ingestion and stays in the body for up to twelve hours. Like distinctive alkaloids, caffeine has extreme physiological effects on individuals and animals [28,29]. It quickens heart muscle and loosens up specific structures that contain smooth muscle, including the coronary channels and the bronchi. It is a diuretic. Theophylline and Theobromine [30], two other plant alkaloid backups of xanthine, have physiological effects like those of caffeine [31-35].

Caffeine goes about as a stimulant of the central tactile framework (CNS) through a couple proposed parts. The most basic is from every angle [36,37] its impedance with the limit of the neurotransmitter adenosine to attach to its nerve cell receptor. In like manner, caffeine controls the compound cyclic nucleotide phosphodiesterase [38-42], which isolates intracellular cyclic adenosine monophosphate (cAMP), another errand individual required in the transmission of nerve signs from hormones starting outside the central tangible framework [43-50].

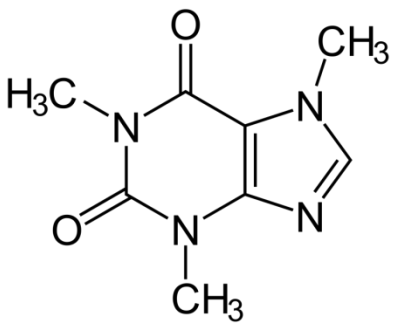

Figure 2. Chemical Structure of Caffeine.

Effects of Caffeine Addiction

Caffeine is not much harmful to any individual. But, it shows some effects on the body anyhow.
There are both good and bad effects of caffeine addiction [51-55].
The effects are listed and are classified into two types namely positive and negative [56-58].

Positive Effects of Caffeine

- Keeps you alert as it stimulates CNS.
- Reduces the risks of cancers by 50%
- Heart strokes can be reduced up to 22%
- Caffeine reduces the type 2 diabetes risks
- Sometimes helps you boost memory
- Caffeine and Carbs mixed together replenishes glycogen in muscles after exercise faster than normal
- Cleanses the liver and detoxes the colon when administered as enema
- Stimulate hair growth mostly in balding men
- Protects against Parkinson's

- People that take more caffeine are less subjected to commit suicides
- Helps in reducing fatty liver
- Prevents weight gain
- Helps increasing logical reasoning.
- Helps control asthma
- Lowers the risk of stones in Kidneys
- In men who take at least 250 mg of caffeine a day have lower risks of developing ED i.e., Erectile dysfunction

Men that consumed more caffeine showed increased semen vole and less sperm DNA fragmentation [59-61]. It is good for men mostly compared to women.

Negative Effects of Caffeine

Drinking 2 cups of coffee a day is okay but once if you exceed the limit you get addicted to caffeine [62-68]. Once you are addicted the effects could be worse and after addiction the withdrawing effects also could be worse [69-79].

They are:

Excess Caffeine:

Restlessness
Irritability
Insomnia
Heart Burn
Nausea
Bradycardia
Severe Headaches

Caffeine Withdrawal:

Anxiety
Restlessness
Muscle stiffness
Chills
Hot Spells

CONCLUSION

Caffeine and Its ingestion are very potent but have got both boons and curses distributed equally. One should keep all these effects in mind while consumption of caffeine. Pregnant women and pediatrics must be administered caffeine with special care. Due to the consumption of caffeine there are many beneficial and harmful effects as well. Although caffeine is a common substance found in many foods, beverages, and other supplements, it is clearly a drug and can be extremely harmful to the human body. Caffeine consumption should clearly be monitored and limited.

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