

A REVIEW

A study of alcohol and its side effect on human physiology

DEBASISH KUMAR DEY AND MEENU SINGH

Department of Biosciences, Barkatullah University, BHOPAL (M.P.) INDIA

Email : deepdey1993@gmail.com

Article Info : Received : 04.12.2014; Accepted : 22.03.2015

From the very beginning of ancient time we are using alcohol as a part of our culture just to enhance the fun in different ceremonies, but drinking too much of alcohol or indulging it into one's habit can cause serious problems to one's health such as various cancer, alcoholic hepatitis, cirrhosis, pancreatitis and so on. Not only this much even some time may it lead to a serious accident. But of course this is very true that "Alcohol affects different people differently" as per the tolerance level of an individual. As per Plato "The excessive increase of anything causes a reaction in the opposite direction" the same applies here too in case of alcohol. In fact a moderate drinking has also been proved that it has some positive effects on the body. It only effects negatively to the body when the concentration of alcohol in the blood will be relatively higher say 5-10 m mol L⁻¹ and also at low concentration of alcohol there will be a feeling of euphoria. According to the book "Beyond hangovers" A research demonstrates "low risk" drinking level for men are no more than four drinks per day and fourteen in a week, at the same time three drinks in a day and seven drinks in a week for women. Even after drinking moderately one may have problems, if one drinks too quickly; this case is considered only for those who are over age 65. And for older adults, they should not take more than three drinks in a day and seven drinks in a week. When someone drinks beverage alcohol around 2 per cent to 8 per cent is lost through urine and sweat. The other 92 per cent to 98 per cent is metabolized by our body. At the same time alcohol exerted its effects on CNS by non-selectivity disrupting the lipid bilayers of neurons. Actually alcohol passes directly from the digestive tract into the blood vessels. Within minutes, the blood transports the alcohol to all parts of the body, including the brain. And it affects the brain's neurons in several ways. It also alters their membranes as well as their ion channels, enzymes and receptors. Alcohol also binds directly to the receptors for acetylcholine, serotonin, GABA and also with the NMDA receptors for glutamate. GABA's effect is to reduce neural activity by allowing chloride ions to enter the post-synaptic neuron. These ions have a negative electrical charge, which helps to make the neuron less excitable. This physiological effect is amplified when alcohol binds to the GABA receptor, because it enables the ion channel to stay open longer and thus let more Cl⁻ ions into the cell. The neuron's activity would thus, be further diminished, thus, explaining the sedative effect of alcohol. This effect is accentuated because alcohol also reduces glutamate's excitatory effect on NMDA receptors.

Key words : Drug, Alcohol, GABA, GABA receptors, CNS, Cl⁻ ions

How to cite this paper : Dey, Debasish Kumar and Singh, Meenu (2015). A study of alcohol and its side effect on human physiology. *Asian J. Bio. Sci.*, **10** (1) : 89-100.

INTRODUCTION

What is drug? : According the book "Dorland's Medical Dictionary for Health Consumers by Saunders" (Saunders, 2011). Drug is a chemical that we take to have some effects on the way our body works. Alcohol, caffeine, aspirin and nicotine are some examples of drugs.

A drug must be able to pass through our body to our brain. Once it is inside our brain, it can change the messages which come from brain cells, instead of passing these messages to other cells they send it to one another and provide rest to our body. This all happens due to interference of chemical signals that are sent by the brain cells, those are nothing but neurotransmitters that transfer

signals across synapses.

According to “Mosby’s Medical Dictionary, 8th Edition” (Mosby, 2009). A drug can also be a substance which may have medicinal, intoxicating, performance enhancing or other effects when taken or injected into a human body or the body of another animal and it is not at all considered as a food.

A drug may be the same thing that is produced inside our body by an organ of our body but only when it is injected as a foreign product e.g. insulin, it is a hormone produced by pancreases, but when it is injected inside the body from outside, it is called as a drug.

WHO, 1966 has defined a drug as “DRUG is a substance or product that is used to modify physiological and psychological system for the benefit of the recipients”. WHO, has also concluded that, “drug is a substance that can change how a living organism works”.

According to the book “Drug use and abuse”, Drug abuse is a generic term for the use of illegal substances or legal substances used in a disapproved manner, such as alcohol intoxication or non – medical use of prescription drugs and according to DEA 2011, “When drug are used in a manner or amount inconsistent with the medical or social patterns of a culture it is called drug abuse”. When drugs are taken in an excessive amount that impairs one’s physical and psychological function then it leads to drug abuse and the person is called drug abuser. A medication or medicine can also be a drug, which we take to cure any symptoms of an illness or medical condition, or may be used as preventive medicine that has future benefits but does not treat any existing or pre-existing diseases.

In very simple words we can say that it can be any substance other than food used in the prevention or diagnosis of disease. It may have a physiological effect when ingested or otherwise introduced into the body, in particular.

History of drug :

From “Online Etymology Dictionary”, (Harper and Douglas, 2001-2014) it is concluded that, In English, the noun “drug” is thought to be originate from Old French word “drogue”, possibly which derived later into “droge-vate” from Middle Dutch meaning “dry barrels”, referring to medicinal plants preserved in them. The transitive verb “to drug” which means intentionally administration of a substance to someone; it’s often without their knowledge and invokes the psychoactive rather than medicinal properties of a substance.

Classification of drugs :

According to the books “Drug classification: making a hash of it?” (2005–06) and “The Drug Evaluation and Classification” (October 2004), DREs classify drugs in one of seven categories: Central Nervous System (CNS) Depressants, CNS Stimulants, Hallucinogens, Phencyclidine (PCP) and its analogy, Narcotic Analgesics, Inhalants and Cannabis. Drugs from each of these categories can affect a person’s central nervous system and impair a person’s normal faculties, including a person’s ability to safely operate a motor vehicle.

CNS depressants :

It “slows” down a person’s brain and central nervous system. Alcohol is the most prominent CNS depressant. Other popular CNS depressants include anti-anxiety tranquilizers, anti-depressants, anti-psychotic tranquilizers and various derivatives of barbituric acid. It seems anomalous to classify “anti-depressants” as depressants; however, medical doctors, toxicologists and DREs generally classify drugs according to their effect on the brain and body, not their effect on mood. Specific drugs include Xanax, Valium, Rohypnol, Halcion, Soma, and GHB.

CNS stimulants :

It “speed up” a person’s mind and central nervous system. Cocaine and methamphetamine are the two most commonly abused stimulants. Ritalin, Cylert, ephedrine and caffeine are other well-known stimulants.

Hallucinogens :

It impairs a user’s ability to perceive reality by distorting perceptions of sight, sound, touch and odour. They may even cause “synaesthesia,” a phenomenon where a person “mixes” the senses. For example, the person may “see” sounds or “hear” colours. This category includes natural substances like peyote, psilocybin and morning glory seeds, as well as synthetic substances like lysergic acid (LSD) and Ecstasy (MDMA).

PCP and its analogs :

PCP and its analogs, including Ketamine, are “dissociative anaesthetics”. They are extremely dangerous. People under the influence of PCP may be very violent.

Narcotic analgesics :

It includes opiate class drugs and similar synthetic drugs. Most prescription painkillers are narcotic analgesics. This category includes heroin, morphine, codeine, methadone, Oxycontin, Vicodin, Percodan, Fentanyl, Dilaudid and Demerol. Narcotic analgesics are the only drugs that routinely constrict a person's pupils. Narcotic analgesics are highly addictive.

Inhalants :

Named for their primary method of ingestion, inhalants are breathable chemicals, including volatile solvents, propellant gases or aerosols and some anaesthetic gases. This group includes glue, gasoline, paint thinner, hair spray, insecticides, nitrous oxide ("laughing gas"), amyl nitrite and ether. Some solvents, like aerosols and anaesthetic gases are extremely fast acting, short duration substances, while others, including volatile solvents, may produce effects for several hours.

Cannabis :

It is the scientific name for marijuana. The active ingredient in cannabis is delta-9 tetrahydrocannabinol or THC. This category includes cannabinoids and synthetics like dronabinol.

What is alcohol? :

In terms of chemistry, an alcohol is an organic compound in which a hydroxyl group (OH) is bound to a carbon atom (C) of an alkyl or substituted alkyl group. The general formula for a simple acyclic alcohol is $C_nH_{2n+1}OH$.

In layman's term, the word alcohol usually refers to ethanol, also known as grain alcohol or (older) spirits of wine, or to any alcoholic beverage.

History of alcohol :

In 12th century the word "alchemy" was introduced to European terminology by Latin translations of work of Rhazes (865-925). Then the word alcohol appears in English in the 16th century, loaned via French from medical Latin, ultimately from the Arabic "alkuhl", meaning "collyrium", the name of very finely powdered antimony sulphide Sb_2S_3 used as an antiseptic and eyeliner.

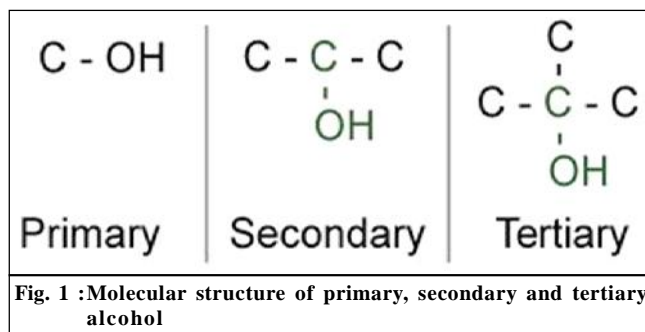
Originally the powder is prepared by sublimation of the natural mineral stibnite in a closed vessel. In 18th century the word meaning of ethanol became restricted to "spirit of wine" and was again extended to the family of substances

so called in modern chemistry in 1850.

Classification of alcohol :

According to book "The basics of general, organic and biological chemistry" alcohol is classified into three major subsets of alcohol those are:

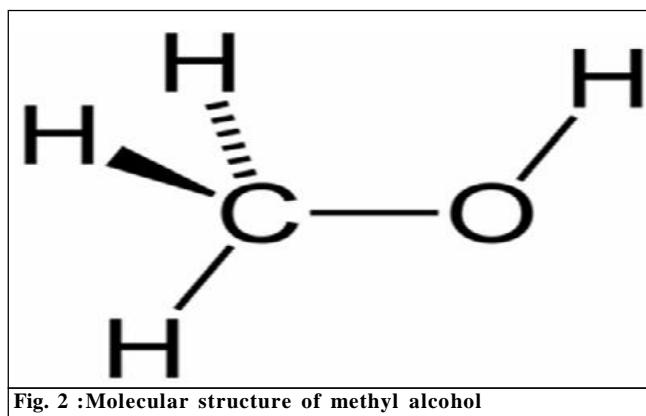
- Primary alcohol (1°)
- Secondary alcohol (2°)
- Tertiary alcohol (3°) (Fig. 1).



This classification is based upon the number of carbon atom present in an alkyl group or substituted alkyl group. Ethanol is the simplest 'primary' alcohol. Whereas, isopropyl alcohol (propan-2-ol) is the simplest secondary alcohol, and a simple tertiary alcohol is tert-butyl alcohol (2-methylpropan-2-ol).

The simplest and most commonly used alcohols are methanol and ethanol.

Methanol was formerly obtained by the distillation of wood and called 'wood alcohol.' It is now a cheap commodity, the chemical product of carbon monoxide reacting with hydrogen under high pressure. Methanol is intoxicating but not directly poisonous. It is toxic due to its breakdown by the enzyme called alcohol dehydrogenase found in the liver by forming formic acid and formaldehyde



which cause permanent blindness by destruction of the optic nerve (Fig. 2).

Ethanol is also called as ethyl alcohol, pure alcohol, and grain alcohol or drinking alcohol, having the structural formula $\text{CH}_3\text{CH}_2\text{OH}$, often abbreviated as $\text{C}_2\text{H}_5\text{OH}$ or $\text{C}_2\text{H}_6\text{O}$. It is also used as a psychoactive drug and one of the oldest recreational drugs still used by humans. Ethanol can cause alcohol intoxication when consumed. Best known as the type of alcohol found in alcoholic beverages, it is also used in thermometers, as a solvent and as a fuel (Fig. 3).

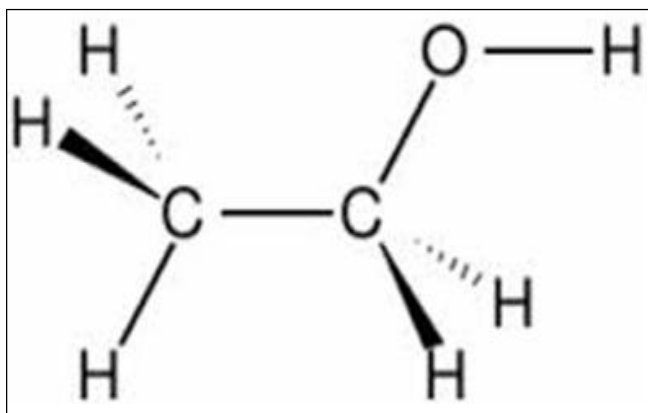


Fig. 3 :Molecular structure of ethyl alcohol

In common usage, it is often referred simply as alcohol or spirits.

Sources of alcohol :

Ethyl alcohol is one of the products of the distillation of fermented grains, fruit juices, sugar, dry date's, beets, starch and molasses (molasses are the deep brown or black coloured honey like substances, made from beet sugar and used as a sweetener in many countries).

It is made by the help of enzymes from Yeast cells. It is principal constituent and the intoxicating principle of wines.



Alcohol is made synthetically from ethylene or acetylene by hydration.

Synthesis of alcohol :

Ethyl alcohol can be derived mainly from two processes and those are:-

Hydration of ethylene or acetylene :

It is the primary method for production of alcohols

in industries. It is nothing but a process of adding water molecules, or the equivalent of water molecules, to substances which are mentioned above. The catalyst that is most commonly used in the process is phosphoric acid, which is adsorbed on a porous support such as silica gel or diatomaceous earth. This catalyst was first used for large-scale ethanol production by the Shell Oil Company in 1947. The reaction is carried out with an excess of high pressure steam at 300 °C. In the U.S., this process was used on an industrial scale by Union Carbide Corporation and others; but now only Lyondell Basell uses it commercially.

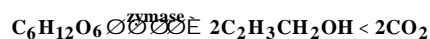
Ethylene can be hydrated to produce ethanol when heated with a sulphuric acid catalyst.



Fermentation of sugar :

It is the primary method for the production of beverage alcohol. Fermentation is the process of culturing yeast under favourable thermal conditions to produce alcohol. This process is carried out at around (35–40)° C. Toxicity of ethanol to yeast limits the ethanol concentration obtainable by brewing; higher concentrations, therefore, are usually obtained by fortification or distillation. The most ethanol-tolerant strains of yeast can survive up to approximately 18 per cent ethanol by volume.

To produce ethanol from starchy materials such as cereal grains, the starch must first be converted into sugars. In brewing beer, this has traditionally been accomplished by allowing the grain to germinate, or malt, which produces the enzyme amylase. When the malted grain is mashed, the amylase converts the remaining starches into sugars. For fuel ethanol, the hydrolysis of starch into glucose can be accomplished more rapidly by treatment with dilute sulphuric acid, fungally produced amylase.



Application of alcohol :

From the book "ALCOHOLS MENU" 2003, by Jim Clark, I found that alcohol is not always harmful to us but sometime useful too.

Alcohol can be used as a beverage that is ethanol only, as a fuel and for many scientific, medicinal and industrial utilisations.

Beverage :

Ethanol in the form of alcoholic beverages has been consumed by humans since pre-historic times.

Automotive :

A 50 per cent v/v solution of ethanol glycol in water is commonly used as antifreeze. Some alcohols, mainly ethanol and methanol, can be used as an automotive fuel. Performance can be increased in forced induction internal combustion engines by injecting alcohol into the air intake after turbocharger or supercharger has pressurized the air. This cools the pressurized air, providing a denser air change, which allows for more and, therefore, more power.

Scientific, medical and industrial :

Alcohols have applications in industry and science as reagents or solvents. Because of its low toxicity and ability to dissolve non polar substances, ethanol can be used as a solvent in medical drugs, perfumes and vegetable essences such as vanilla. In organic synthesis, alcohols serve as versatile intermediates.

Ethanol can be used as an antiseptic to disinfect the skin before injections are given, often along with iodine. Ethanol based soaps are becoming common in restaurants and are convenient because they do not require drying due to volatility of the compound. Alcohol is also used as a preservative for specimen. Ethanol is sometimes used to treat poisoning as it is more toxic in nature, particularly methanol and ethylene glycol.

Nature of alcohol :

- Alcohol burns with a smokeless blue flame,
- It is volatile in nature and colourless,
- Having molecular weight $46.06844 \text{ g mol}^{-1}$
- Slight odour: Alcohols have an odour that is often described as "biting" and as "hanging" in the nasal passages. Ethanol has a slightly sweeter or more fruit like odour than the other alcohols.
- More refractive than water *i.e.*, $n=1.36168$
- A versatile solvent, and miscible with H_2O and organic solvents
- Melting point is -1150°C and boiling point is 78°C .
- The hydroxyl group makes the alcohol molecule polar. Those groups can form hydrogen bonds to one another and to other compounds. This hydrogen bonding means that alcohols can be used as protic solvents. Two opposing solubility

trends in alcohols are: the tendency of the polar OH to promote solubility in water, and the tendency of the carbon chain to resist it.

Alcoholism :

According to "Medical Dictionary by Stedman's" Definition of alcoholism is "Chronic alcohol abuse, dependence, or addiction; chronic excessive drinking of alcoholic beverages resulting in impairment of health or of social or occupational functioning, and increasing tolerance requiring increasing doses to achieve and sustain the desired effect. Symptoms of withdrawal may occur on sudden cessation of alcohol intake". It's a broad term for problems with alcohol and is generally used to mean compulsive and uncontrolled consumption of alcoholic beverages, usually to the detriment of the drinker's health, personal relationships, and social standing. It is medically considered a disease, specifically an addictive illness. In psychiatry several other terms are used, specifically "alcohol abuse" and "alcohol dependence."

Effects of alcohol :

As per the books "Responsible drinking: a moderation management approach for problem drinkers" and "Alcohol and Human Health" it is concluded that, Drinking too much of alcohol on a single occasion or over time, can take a serious toll on your health. It can affect the body in many ways. These effects can lead to physical and mental changes that can put alcohol users and others at risk of injury or death.

It is the dirtiest drug we have. It permeates and damages all tissue. No other drug can cause the same degree of harm that it does.

Alcohol is very harmful for our health because it acts as a poison, and drinking it up to any level of consumption may lead to death. And it is very well known to us that alcohol is toxic. The effects of alcohol on men some time may be- change in hormone levels, causing lower sex drive and enlarged breasts. It can also cause deterioration of the heart muscles.

A drink of alcohol stays in the body for about 2 hours after being consumed. This period of time can vary depending on the person's weight, gender, and other factors. When a person drinks, the concentration of alcohol in the blood builds to a peak and then goes down. At first, alcohol often makes people feel relaxed and

happy but later it can make them feel sleepy or confused too.

Effect on brain :

Alcohol interferes with the brain's communication pathways, and can affect the way the brain looks and works. These disruptions can change mood and behaviour and make it harder to think clearly and move with coordination. Difficulty in walking, blurred vision, slurred speech, slowed reaction times, impaired memory are few mentioned effects of alcohol on the brain. Some of these symptoms are detectable after taking only one or two drinks and quickly resolve when drinking stops. At the same time, if a person who drinks heavily over a long period of time may have brain deficits that persist well after he or she achieves sobriety. This is how exactly

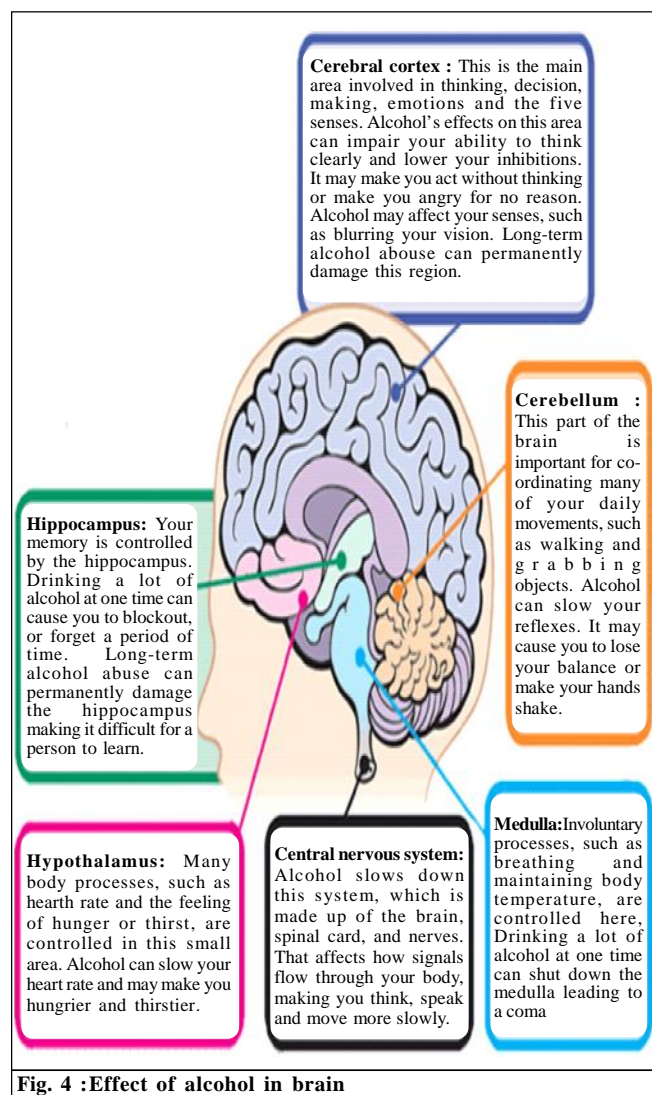


Fig. 4 :Effect of alcohol in brain

alcohol affects the brain and the likelihood of reversing the impact of heavy drinking on the brain remaining hot topics in alcohol research today (Fig. 4).

Effect on liver :

Heavy drinking takes a toll on the liver, and can lead to a variety of problems and liver inflammation including:

- Fatty liver
- Alcoholic hepatitis
- Cirrhosis

One of the primary harmful effects on the human body of the consumption of beverage alcohol is its damaging and destructive impact on the liver. Along with those of the central nervous system, this is the human organ most negatively affected.

The amount of alcohol consumed is clearly related to the incidence of cirrhosis. Chronic alcohol use can lead to the development of liver injury, even when the diet contains all required nutrients in recommended amounts.

Effect on kidney :

“Alcohol” can cause all kind of damages to the kidneys. These effects can range from cell damage and enlargement of the kidneys that is nothing but ‘inflammation’, impact of the various hormones that control kidney function. It also creates an ionic imbalance in the body that can affect many metabolic processes. Alcohol destroys this delicate balance of the ions and water in the body by altering the filtering ability of the kidney.

Although the exact mechanisms for how alcohol changes the kidney's ability to function are not clearly known till now.

Effect on pancreas :

Alcohol causes the pancreas to produce toxic substances that can eventually lead to pancreatitis, a dangerous inflammation and swelling of the blood vessels in the pancreas that prevents proper digestion.

Inflammation of the pancreas that is nothing but pancreatitis which resembles the pancreatitis seen in individuals who consume an excessive amount of alcohol.

Effect on skin :

Skin dehydration is an extremely important effect to the health. Alcohol also dehydrates the skin, causing it

to lose its dewy appearance and magnifying any pre-existing skin irregularities, such as fine lines and wrinkles. Alcohol is a diuretic, which means it draws water from the body; thereby lowering the body's water level takes place and causes dehydration. And as a result of dehydration, skin looks dry and unhealthy by both in means of colour and texture.

Cancer :

Drinking too much of alcohol can increase the risk of developing certain cancers, including cancers of the:

- Mouth
- Oesophagus
- Throat
- Liver
- Breast

Metabolism of alcohol :

Drinking heavily puts people at high risk for many adverse health consequences that we have already discussed above. But some people appear to be at greater risk than others for developing these problems (Fig. 5).

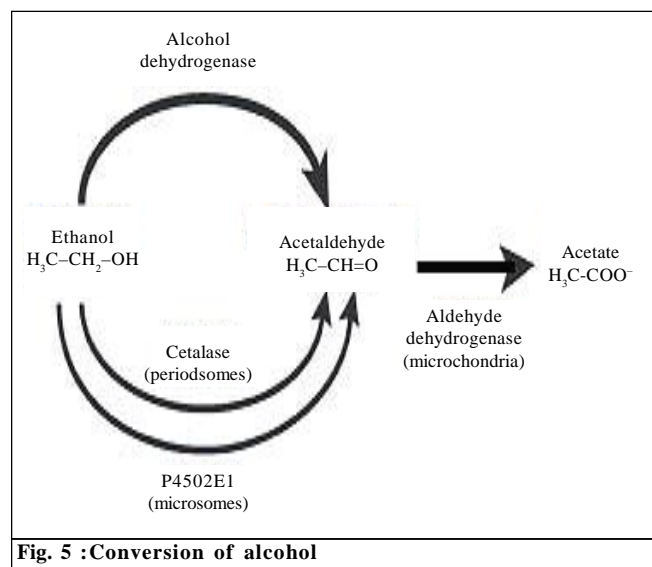


Fig. 5 : Conversion of alcohol

A research done by NIAAA (National Institute on Alcohol Abuse and Alcoholism) published on July 2007, number 72, shows that alcohol-related problems are influenced by individual variations in alcohol metabolism, or the way in which alcohol is broken down and eliminated by the body. Alcohol metabolism is also controlled by genetic factors, such as variations in the

enzymes that break down alcohol; and sometime environmental factors too, such as the amount of alcohol an individual consumes for nutrition in his diet. Differences in alcohol metabolism may put some people at greater risk for alcohol problems, whereas others may be at least somewhat protected from alcohol's harmful effects, in short it varies as per the person's immunity system. This is a brief describes about the basic process involved in the breakdown of alcohol, including how toxic by-products of alcohol metabolism which may lead to problems such as alcoholic liver disease, cancer, pancreatitis and so on (Fig. 6).

When someone drinks beverage alcohol around 2 per cent to 8 per cent is lost through urine and sweat. The other 92 per cent to 98 per cent is metabolized by our body.

All ethyl alcohol which is broken down in the human body is first covered to acetaldehyde and then this acetaldehyde is converted into acetic acid radicles, this are the combined form of acetic acid. Then this acetic acid combines with Coenzyme A to form acetyl-CoA. The acetyl-CoA then enters into the Krebs cycle, which is the basic powerhouse of human body. Inside the Krebs cycle acetyl radical is eventually broken into CO_2 and H_2O .

Action of alcohol :

From a blog "The brain from top to bottom blog". on 'How drug effects the Neurotransmitters'. I concluded that alcohol exerted its effects on CNS by non-selectivity disrupting the lipid bilayers of neurons. Actually alcohol passes directly from the digestive tract into the blood vessels. Within minutes, the blood transports the alcohol to all parts of the body, including the brain. And it affects the brain's neurons in several ways. It also alters their membranes as well as their ion channels, enzymes and receptors. Alcohol also binds directly to the receptors for acetylcholine, serotonin, GABA and the NMDA receptors for glutamate.

GABA's effect is to reduce neural activity by allowing chloride ions to enter the post-synaptic neuron. These ions have a negative electrical charge, which helps to make the neuron less excitable. This physiological effect is amplified when alcohol binds to the GABA receptor, because it enables the ion channel to stay open longer and thus, let more Cl^- ions into the cell.

The neuron's activity would thus, be further diminished, thus, explaining the sedative effect of alcohol.

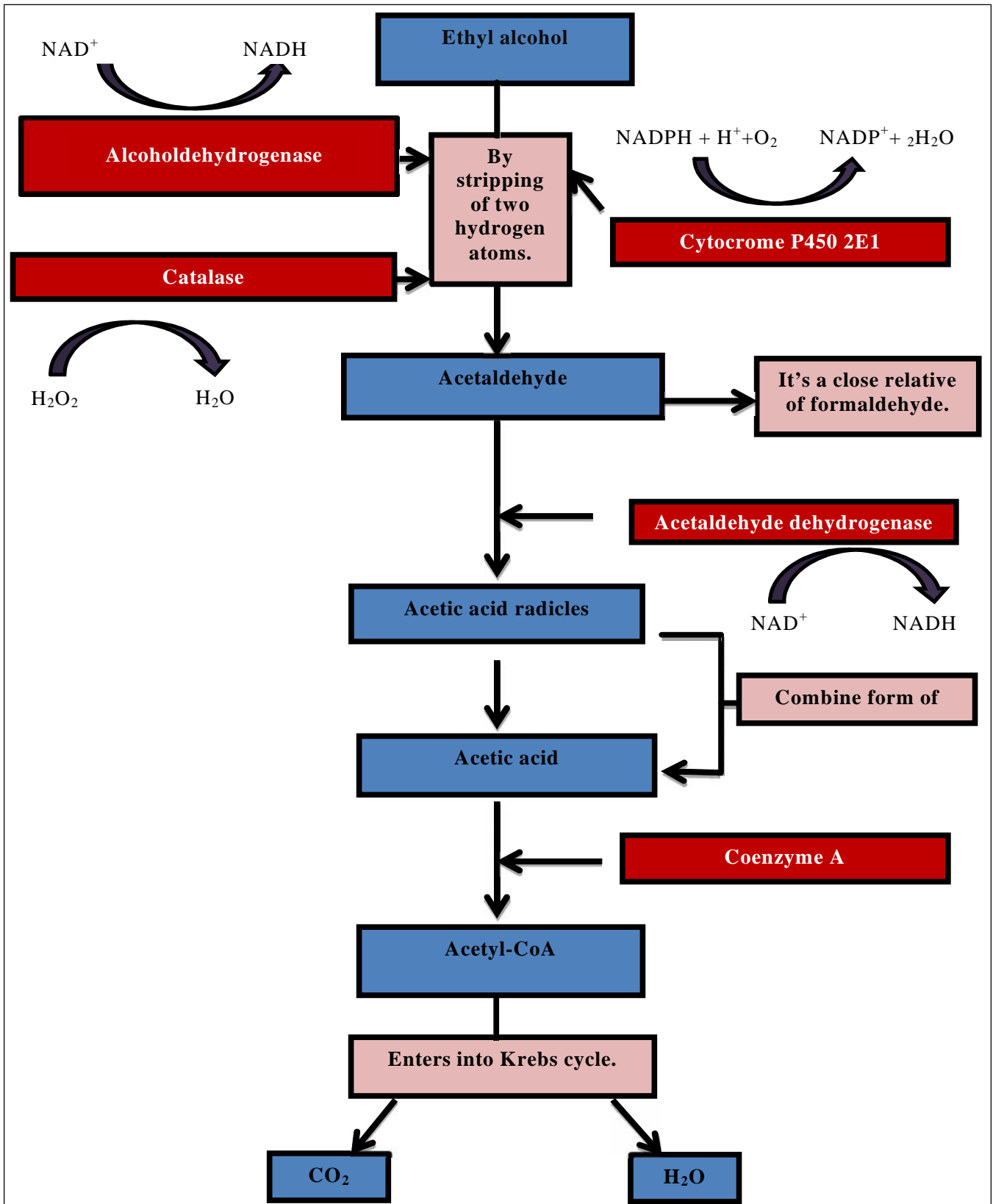


Fig. 6 :Flow chart of metabolism of alcohol inside our body. Made by Debasish kumar dey, (Me, Myself)

This effect is accentuated because alcohol also reduces glutamate's excitatory effect on NMDA receptors.

However, chronic consumption of alcohol gradually makes the NMDA receptors hypersensitive to glutamate while desensitizing the GABAergic receptors. It is this sort of adaptation that would cause the state of excitation characteristic of alcohol withdrawal. At the same time alcohol also helps to increase the release of dopamine, but the whole process is still not understood but that appears to involve curtailing the activity of the enzyme that breaks down dopamine slowly.

It is very well known that alcohol act as a CNG depressant, but it works only when it's concentration in the blood is relatively high that is $5-10 \text{ m mol L}^{-1}$ but at it's lower concentration there is a feeling of "euphoria". As the concentration increases the motor function is impaired and speech becomes slurred. With blood alcohol concentration between 200 mg dL^{-1} and 300 mg dL^{-1} vomiting can occur. Blood concentration higher than this can result in coma and at higher boiling point there is the potential for respiratory failure and death.

GABA is a trans-membrane ligand gated ion channel. GABA-A occurs in post-synaptic membrane. These receptors are site of action of number of drugs. The GABAA receptor is pentameric, having 5 subunits.

Each subunit has an extra-cellular N-terminal domain that contains ligand recognition sites and four membrane spanning domains. Out of these four-mem-span-domains the second mem-span-domains forms the lining of the ion-channel. The subunits are arranged in a radial fashion such that they surround two central ion pore that opens in the presence of ligand. Once the channel opens, ion transports take place according to the electrochemical gradient that is established across the neuronal membrane.

In case of GABA-A receptors, the ion pore conducts Cl^- ions. GABA is classified as an inhibitory amino acid neurotransmitter because of the influx of Cl^- ion into the post-synaptic receptors, the post-synaptic membrane potential further moves away from its firing threshold. When GABA is present, then these GABA receptor increases the probability of channel opening, thus, leading to a greater hyperpolarisation of the post-synaptic membrane and a further decrease in neuronal excitability.

As the number of carbon-chain length increases, then alcohols strength increases to activate GABA-A receptors increases.

The ethanol when induces potentiation of GABA-

gated currents is due to increase in the frequency and duration of channel opening and as increase in channel bursts and burst duration. Additionally the amount of time that the channel spends in the closed state is decreased.

Withdrawal symptoms of alcohol :

According to the book "Alcohol Health and Research World" by Hugh Myrick and Raymond F Anton. (1998)-Studies in humans say that, during intoxication the NMDA receptors are activated and mediate tonic inhibition. In withdrawal, a rebound activation of these receptors occurs. Both GABA-A and GABA-B receptors, being very specific, especially the $\alpha 2$ subunit of GABA-A receptors, is also involved. Homocysteine increases with active

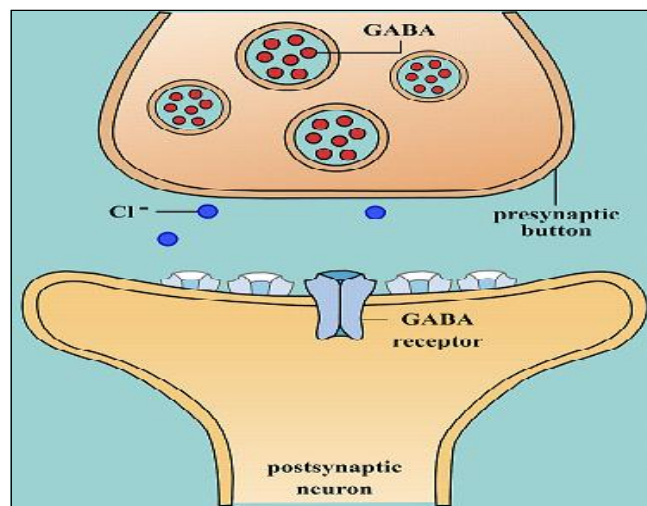


Fig. 7a: In general case

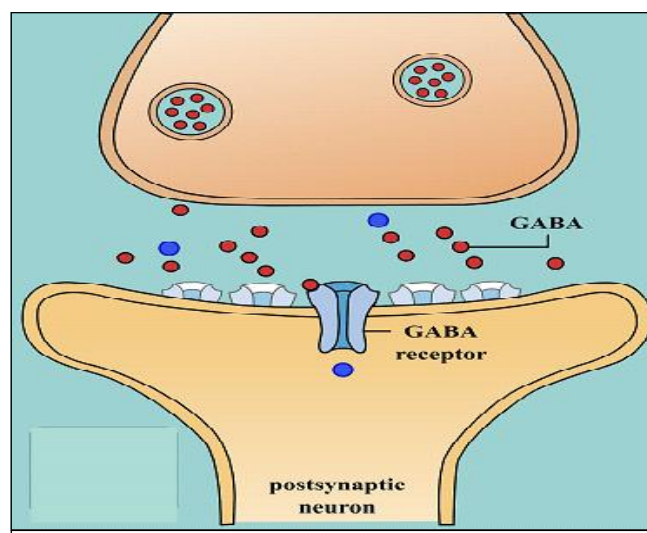


Fig. 7b: Absence of alcohol in blood

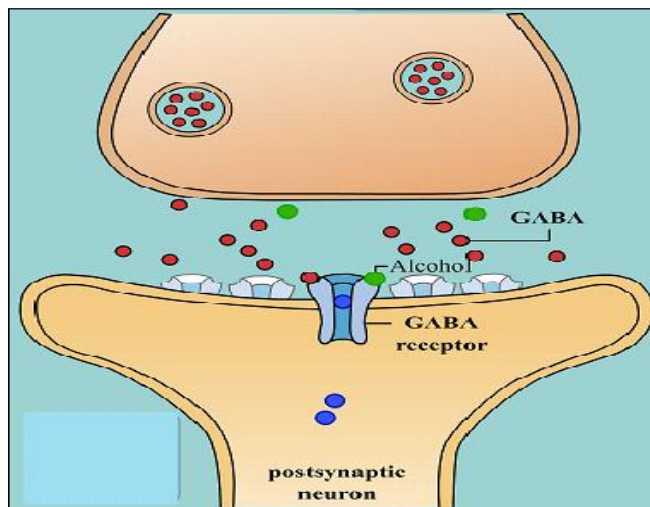


Fig. 7c: Presence of alcohol in blood

drinking, and in withdrawal, excitotoxicity likely is induced by a further increase in homocysteine, Which is viewed as a risk factor for alcohol withdrawal symptoms and also as a screening tool. At the same time the dopamine transporter gene is also associated with alcohol withdrawal symptoms (Fig. 7a, b and c).

- Uncontrolled shaking of the hands
- Sweating, even in cold conditions
- Extreme anxiety
- Vomiting
- Hallucinations
- Persistent insomnia.

These are the few withdrawal symptoms mentioned above that are generally seen in a person addicted with alcohol.

Treatment approaches :

For an individual who is diagnosed with alcohol dependence, treatment should be appropriate and in various form. Appropriate treatment of alcohol withdrawal can relieve the patient's discomfort, it can prevent from the development of more serious symptoms and forestall cumulative effects that might worsen future withdrawals. Hospital admission provides the safest setting for the treatment of alcohol withdrawal, although many patients with mild to moderate symptoms can be treated successfully as well on an outpatient basis. Sometime alcohol withdrawal requires pharmacological intervention.

Although a wide variety of medications have been used for this purpose, clinicians disagree on the optimum medications and prescribing schedules. The treatment of specific withdrawal can be carried. But the first and last

treatment approach is nothing but self-awareness. And more over followings are the few approaches can be taken a head.(which are according to the principle 8 and 9 of National Institute on Drug Abuse, August 2011) Such as,

- Early identification and brief intervention
- Motivation interview
- The community reinforcement approach
- Psychological therapy or Pharmacotherapy
- Implications for policy and prevention
- Self-control
- Emotional awareness
- Social problem-solving
- Academic support, especially in reading
- Communication
- Peer relationships
- Reinforcement of anti-drug attitudes
- Strengthening of personal commitments

Conclusion :

“Alcohol may be man’s worst enemy, but the bible says love your enemy.”– Frank Sinatra

There is nothing bad to take anything which let you feel good, but remember don’t let it be in your habit. Those substances which comes into your habits are called “habit forming substances” doesn’t matter whether it has any beneficial health properties or not, Because somewhere it effects to our CNS and as a result it effects on our moods, perceptions, bodily functions or consciousness.

I think moderation is the biggest key of one’s life. Nothing will act as a drug until and unless one will addicted to it. And it is same here with alcohol, we often use alcohol in medicines to heal our body, at the same time it is one of the most toxic and damaging substance commonly used in this modern world. According to a report by “National Drug Research Institute” (2003), Non-metropolitan areas of Australia have higher relative rates of hospitalisation for injuries and diseases caused by risky and high risk drinking than metropolitan areas. Because in this todays modern world most of the drinkers belongs to youth, who want to have a drink for their fun, latter on which leads to a habit of drinking, and the person is called as addicted to drink.

If it is taken moderately (according to the book “Beyond hangovers”) *i.e.*, three drink per day for women and up to four drinks per day for men, (as women generally have a smaller body mass than man and are, therefore, less able to tolerate the same amount of alcohol), than it will not cause any harm, in fact helpful than not to drink

at all.

It is a serious issue and it should be taken seriously,
because if we all work together we can build a healthy

global society for every buddy, it's a responsibility to all
of us.

Good luck and be loyal with your responsibly.

LITERATURE CITED

- Agrawal, Rashmi (EN 1995).** *Drug abuse*. Socio-psychological perspectives and intervention strategies. pp 300 pp. 16 + 205 HC, ISBN 10: 8185402647.
- Bruno Dubuc (2014).** *How drug effects the Neurotransmitters*. "The brain from top to bottom blog".
- Daniel, A. Girdano and Dorothy, Dusek (1980).** *Drug education*. ISBN-13: 978-0-201-02963-5, ISBN: 0-201-02963-4. 3rd Edition. Pages up to 338.
- David, W. Ball (2014).** Chapter 14. *The basics of general, organic and biological chemistry*. Alcohols: Nomenclature and Classification. Version. 1.0
- Department of health and human services, USA (NIH). (2010). Beyond hangovers, effect on brain, heart, liver pancreas, cancer risks. pp 2-19.
- Dorothy, Dusek Girdano (1973).** *Drugs*. ISBN-13: 978-0-201-02373-2, ISBN: 0-201-02373-3. pp. 1-224.
- Frederick, Rotgers (2002).** *Alcohol's effect. Responsible drinking: a moderation management approach for problem drinkers*". pp. 15-26
- Guyton, C. and Hall, John E. (2006).** Transmitter Substances. Organization of the Nervous System, Basic Functions of Synapses., *Textbook of Medical Physiol.*, (11th Ed.), ISBN 0-7216-0240-1, International Edition ISBN 0-8089-2317-X. pp. 555-571.
- Harper and Douglas (2001-2014). *Drug*. Online Etymology Dictionary.
- Howard Abadinsky (2013). *An introduction to drug use and abuse*, Depressant. Drug Use and Abuse. 3 customer reviews. ISBN-13: 978-1285070278, ISBN-10: 1285070275 .Edition: 8th. pp 1- 19 and 39-67.
- Hughes, J.R. (2009).** Alcohol withdrawal seizures. *Epilepsy Behav.*, 15 (2): 92–97. doi:10.1016/j.yebeh.2009.02.037. PMID19249388.
- Kenneth. Anderson G. Alan Marlatt and Patt Denning (2010).** Everything you always want to know about alcohol. How to change your drinking: A harm reduction guide to alcohol. ISBN-13: 978-1453830604, ISBN-10: 145383060X. Edition: 2nd. pp. 133-171.
- Lesley, Smart (2007).** Alcohol and its effects on health, the chemistry of alcohol: introduction, Alcohol - link to brain, behaviour and mind: alcohol and brain. *Alcohol & Human Health. Chapter; 1, 2.1,4.3.*
- McNaught, A.D. and Wilkinson, A. (1997).** *IUPAC, Compendium of chemical terminology*. The "Gold Book". 2nd Edition. Blackwell Scientific Publications. pp 53.
- Myrick, Hugh and Anton, Raymond, F. (1998).** Treatment of alcohol withdrawal. *Alcohol Health & Research World*. pp 38- 42.
- Mosby (2009).** *Definition of drug*. Mosby's *Medical Dictionary*. (8th Ed.). ISBN: 978-0-323-05290-0.
- National Institute on Drug Abuse. (2013). Answers teens' most frequently asked questions about drugs and abuse with scientific facts and engaging images. *Drugs: Shatter the Myths*, pp12,13, 16-21, NIH Pub Number: 10-7589.
- National Institute on Drug Abuse. (2011). *Drug Facts. Lessons from Prevention Research* . Principle 7 and Principle 8, pp. 2 and 3.
- NIAAA Publication of Alcohol Research & Health (2006-2007). Alcohol alert. Volume **29**, chapter no. 72.
- Saunders (2011).** *Definition of drug*. *Dorland's Illustrated Medical Dictionary*. Deluxe Edition. (32nd Ed.). ISBN: 9781416062561.

Stedman (1911). *Medical Term of drug. Stedman's Medical Dictionary.* (28th Ed.). Drugs.com.

Stephen K. Talpins (2004). *The drug evaluation and classification.* NTLC Publications. pp 6-7.

The House of Commons (2006). *Drug classification: making a hash of it.* 5th Report of Session (2005–06) pp. 7 and 8.

WEBLIOGRAPHY

Barbara Ann Kipfer, and Robert L. Chapman (2007). Drug.The Dictionary of American Slang. (4th Ed.) <http://dictionary.reference.com/browse/drug>.

Clark, Jim (2003). Alcohols menu manufacture and uses of alcohols., www.chemguide.co.uk/organicprops/alcoholmenu.html.

Provophys (C) *et al.* (2006–2007). The Nervous System. Humanman physiologysiology. Published by Wikibooks contributors. Pp54-80.http://en.wikibooks.org/wiki/Human_Physiology.

10th
Year
★★★★★ of Excellence ★★★★★