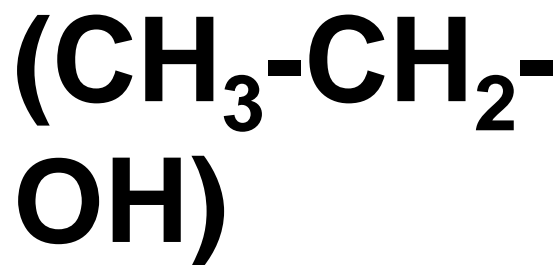
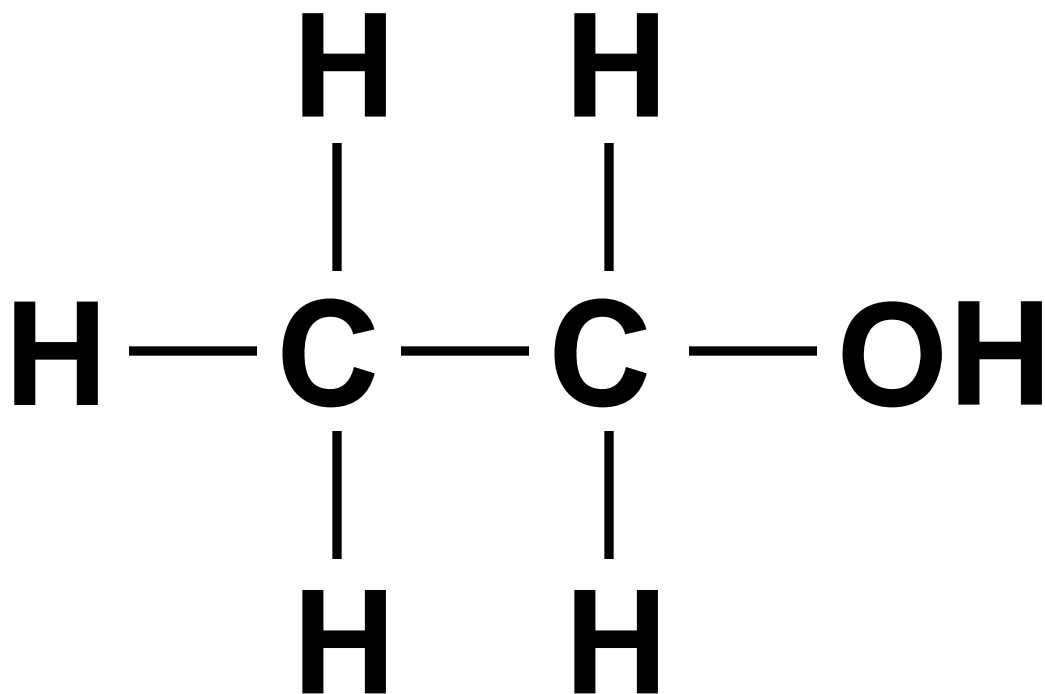
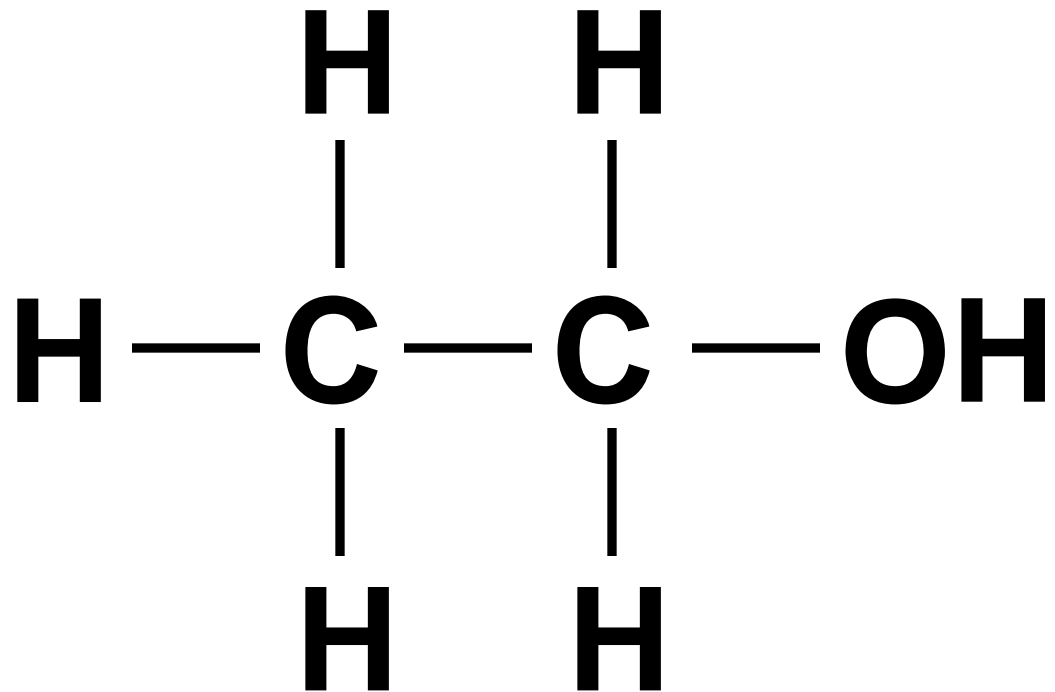


1. Alcohol

What Is This?

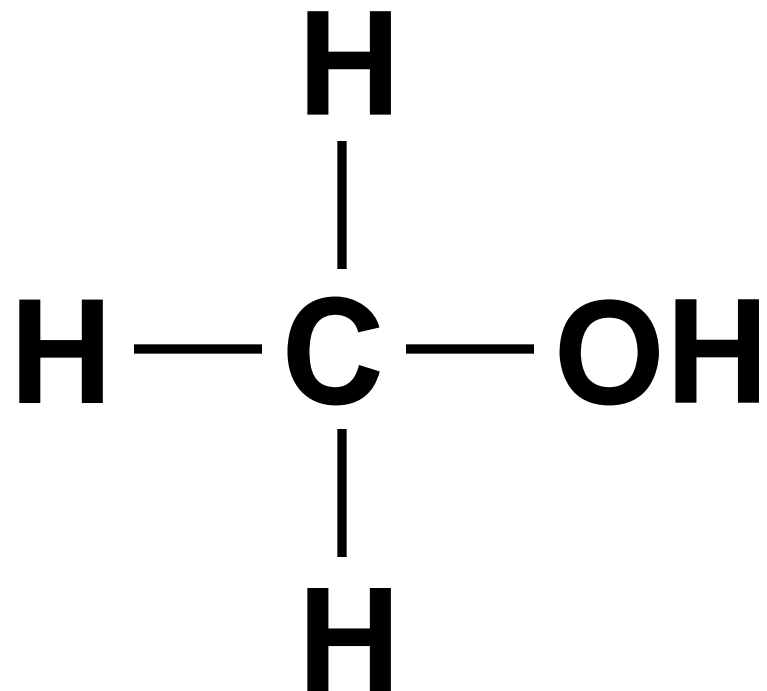


Ethanol



Ethyl Alcohol

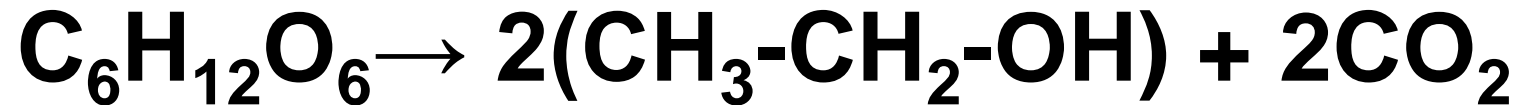
Methanol



Methyl Alcohol

Production of Alcohol

**Fermentation – Sugar to Alcohol
and Carbon dioxide**



What alcoholic beverages do you know?

Please list down what you know

What alcoholic beverages do you know?

Beer

Wine

Champaign

Local brews:

Tälla

korefefa

Areq.....

How and where is alcohol produced?

Why do people consume alcoholic beverages?

Why do people consume alcoholic beverages?

tastes good

elevates mood

lowers anxiety

social lubricant

improves appetite

improves tremors

helps to fall asleep (does not improve sleep)

but:

higher doses produce:

incoordination and sedation

removes the inhibitory effect of social controls on behavior

(eg. aggressive behaviour)

Where do you think alcohol consumed?

Where is alcohol consumed?

at home

in pubs

in restaurants

in trains

in planes

holiday

party

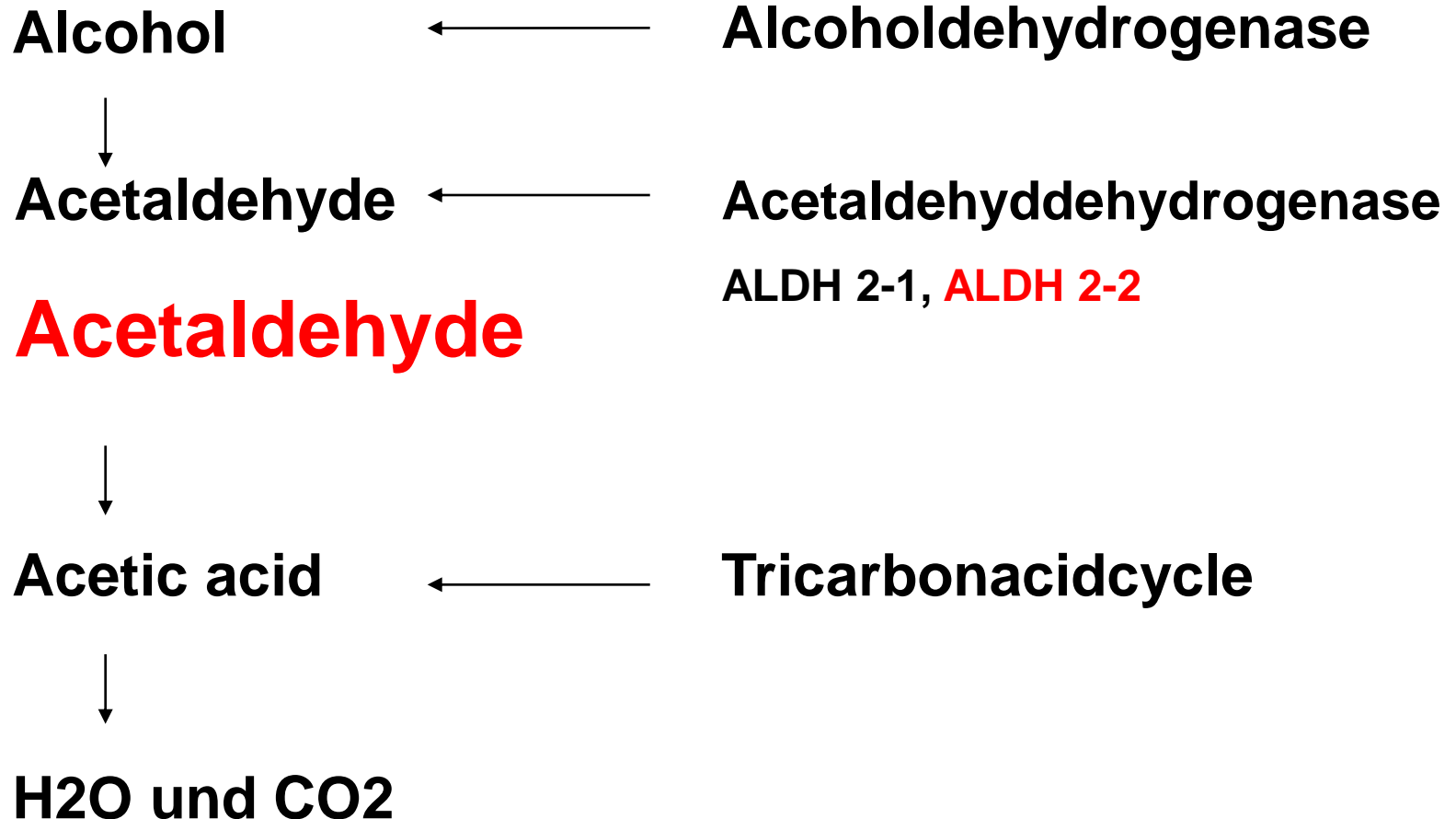
festivals

on the street



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How alcohol is metabolized



Approx. 50% of East-Asians (Chinese, Japanese, Koreans) have the **ALDH2-2 version of ALDH, a slow-working version.** *These individuals have much lower rates of alcoholism.*

Alcohol – harmful use

Alcohol is a significant contributor to the global burden of disease and is listed as the **third leading risk factor for premature deaths and disabilities in the world.**

It is estimated that 2.5 million people worldwide died of alcohol-related causes in 2004, including 320 000 young people between 15 and 29 years of age. Harmful use of alcohol was responsible for 3.8% of all deaths in the world in 2004 and 4.5% of the global burden of disease as measured in disability-adjusted life years lost. The harmful use of alcohol compromises both individual and social development. It can ruin the lives of individuals, devastate families, and damage the fabric of communities.

Consequences of Alcohol abuse

Alcohol abuse is also associated with several infectious diseases like HIV/AIDS, tuberculosis and pneumonia.

A significant proportion of the disease burden attributable to harmful drinking arises from unintentional and intentional injuries, including those due to road traffic crashes and violence, and suicides.

Fatal injuries attributable to alcohol consumption tend to occur in relatively young people.

Alcohol Physiology and Reward Pathways

Absorption

Rapidly absorbed from stomach, small intestine, and colon

Maximal blood concentration within 30 to 90 minutes

Can be absorbed through the lungs

Distribution

Uniformly distributed throughout tissues and body fluids

Readily crosses placenta, exposure to fetus

Elimination

About 90% of absorbed alcohol is metabolized through oxidation in the liver; the remaining 10% is excreted by the kidneys & lungs.

It is metabolized by two enzymes: Alcohol dehydrogenase (ADH) and Aldehyde dehydrogenase. ADH catalyzes the conversion of alcohol into acetaldehyde.

Gender Differences

Females have higher blood alcohol levels(intoxication) than males because

Males have higher stomach metabolism of alcohol than females

Females have a lower ADH content than men which may account for women's tendency to become more intoxicated.

Alcohol – action sites

Lab animals can be induced to become dependent on alcohol.

Most animals find the taste of alcohol to be aversive. However, supplements added to alcohol to get them to consume it (e.g. sugar, gelatin).

Alcohol has 2 primary sites of action:

Indirect **agonist** at **GABA_A** receptors

Indirect **antagonist** at **NMDA** (N-Methyl D-Aspartate) receptors

Increases activity of dopamine neurons in mesolimbic system and increases release of dopamine in NA(Nucleus Acumbens).

Like alcohol, NMDA antagonists produce sedative, hypnotic, and anxiolytic effects and interfere with cognitive performance.

Withdrawal from alcohol intake decreases activity of mesolimbic neurons and their **release of Dopamine in the NA**; can also cause seizures that may be mediated by activation of NMDA receptors.

These seizures can be blocked by NMDA receptor antagonists

The sedative effect of alcohol appears to be mediated by the GABA_A receptor.

Effects of Alcohol on Reward Pathways

Indirectly increases **dopamine** levels in the mesocorticolimbic system associated with positively reinforcing/rewarding effects

Indirect interaction with opioid receptors results in activation of opioid system

Associated with **Increases the effects of GABA**, the major inhibitory neurotransmitter in the brain

Inhibits the effects of glutamate, the major excitatory neurotransmitter in the brain

Contributes to decreased anxiety and increased sedation during acute alcohol intake

ALCOHOL

The VTA-nucleus accumbens pathway is activated by all drugs of dependence including alcohol

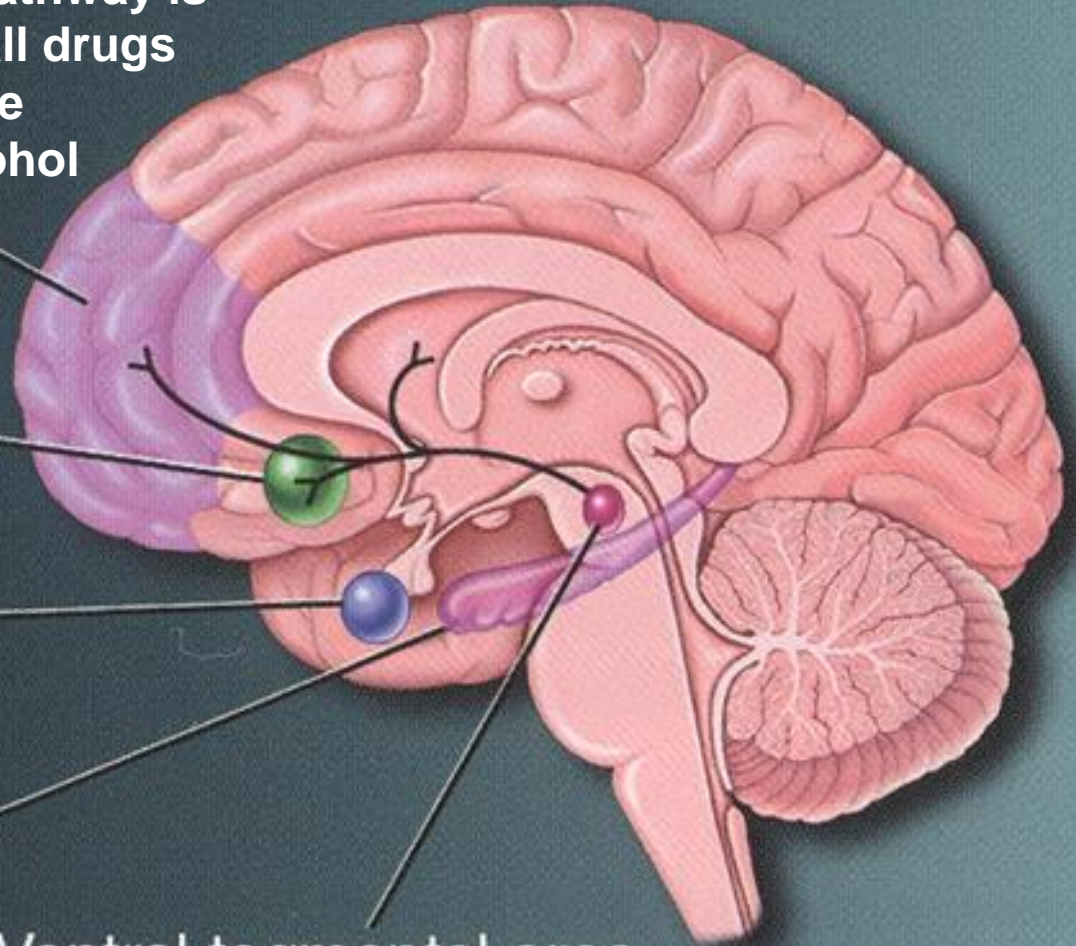
Prefrontal cortex

Nucleus accumbens

Amygdala

Hippocampus

Ventral tegmental area



Brain Reward Pathway

Positive reinforcement

Positive reinforcement refers to the effect that certain stimuli have on the behaviors that preceded them

Addictive drugs have reinforcing effects

The effectiveness of a reinforcing stimulus is greatest if it occurs immediately after a response occurs. This phenomenon explains why the most addictive drugs are those that have immediate effects (e.g. heroin is preferred over morphine because it has a more rapid effect)

Positive reinforcement cont...

Neural mechanisms:

All natural reinforcers cause the release of Dopamin in the Nucleus Accumbens (NA)

Addictive drugs (including **alcohol**, amphetamine, cocaine, opiates, nicotine, PCP, and cannabis) trigger the release of DA in the NA

Some do this by increasing the activity of DA neurons in mesolimbic system, some inhibit reuptake of DA by terminal buttons

Negative reinforcement

A behavior that stops or reduces an aversive stimulus will be reinforced. This phenomenon is called **negative reinforcement**

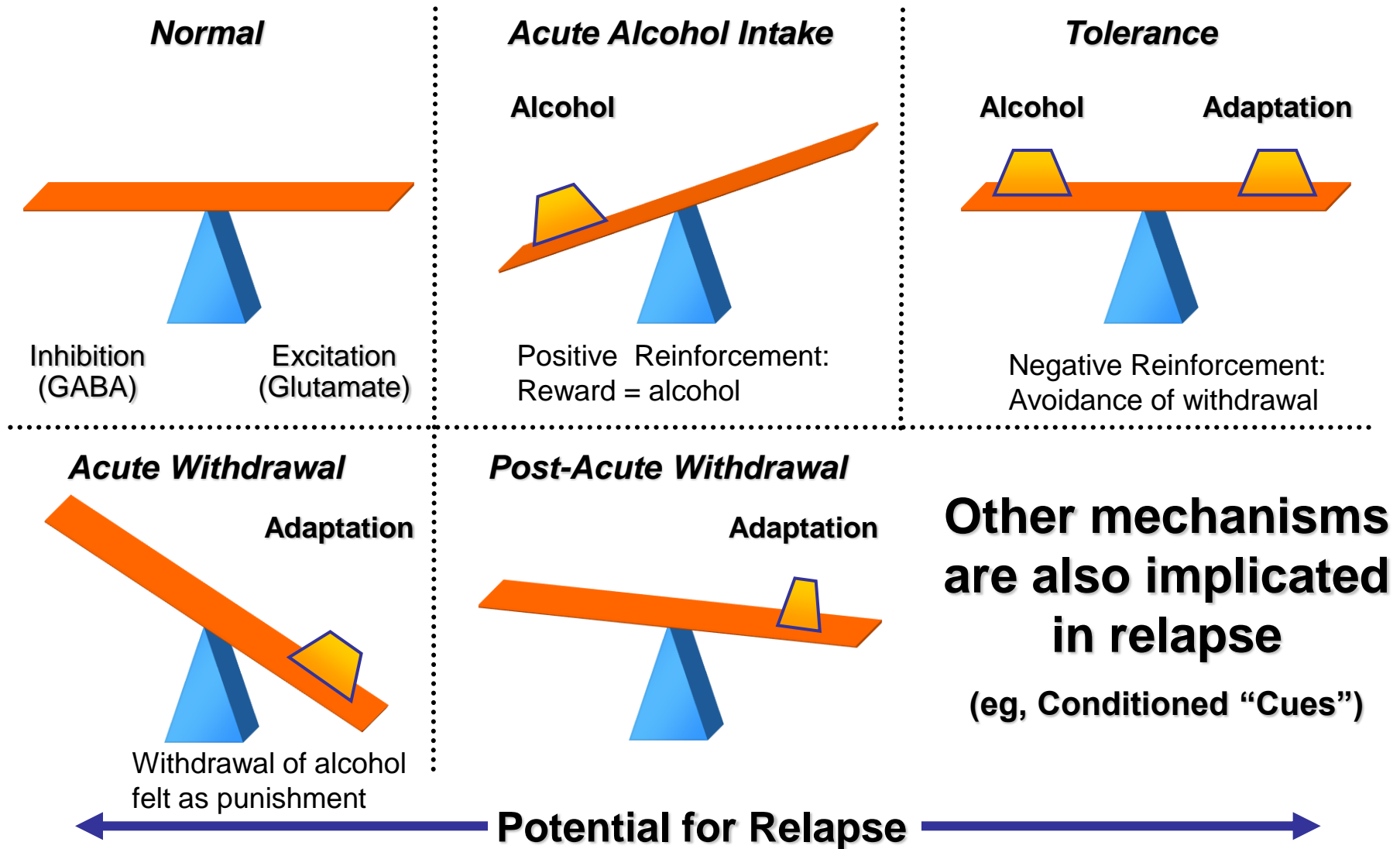
Do not confuse negative reinforcement with punishment

For neg. reinforcement – the response must make an aversive stimulus stop! Reduction of withdrawal effects (by taking the drug again) serve as negative reinforcement.

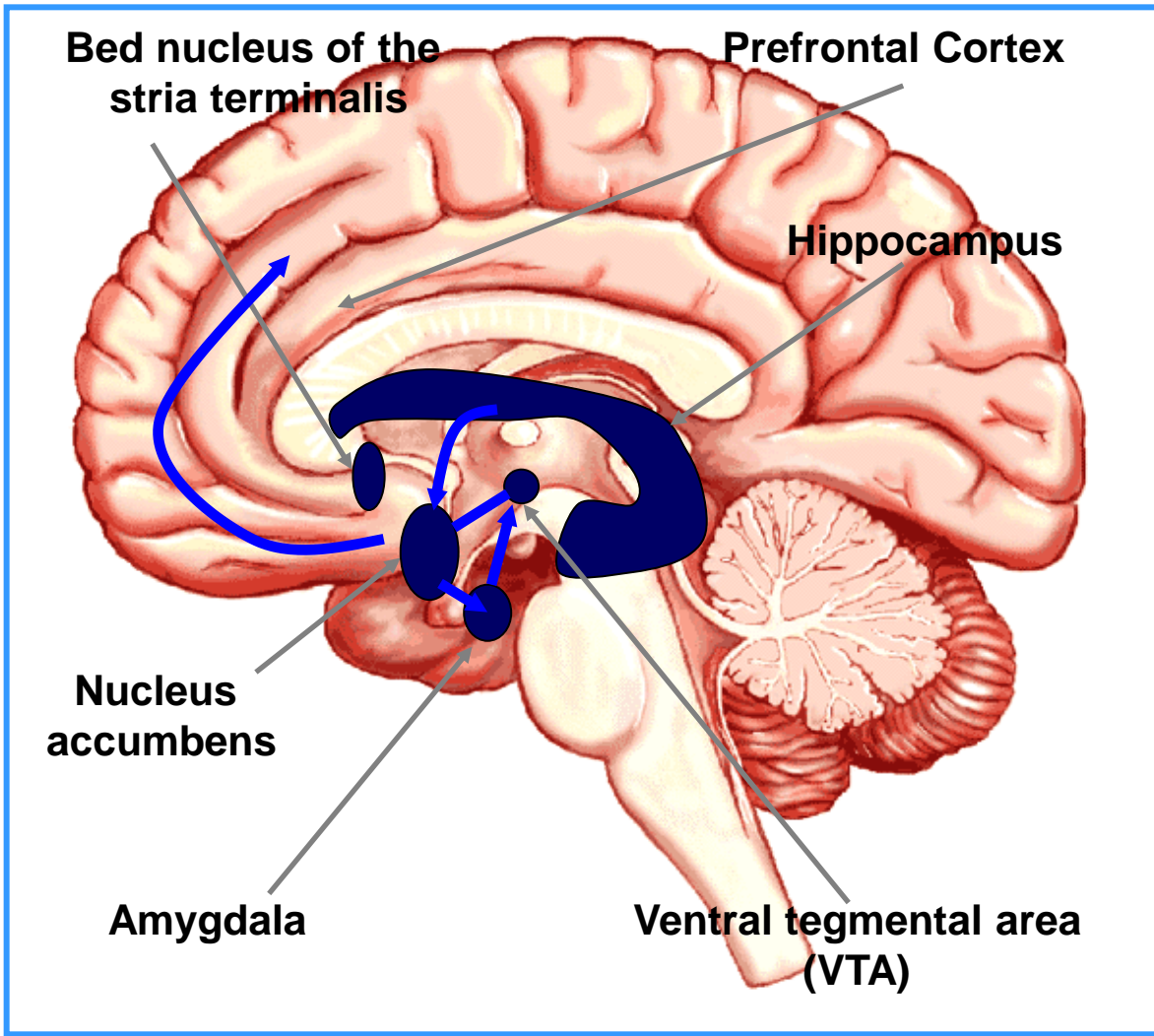
Substance effects may help relieve bad feelings that person may have (e.g. drink when feeling upset)

Punishment – the response must make the aversive stimulus occur. (eg. withdrawal symptoms)

Neuroadaptation in Alcohol Dependence



Relapse and Conditioning



Repeated alcohol use has caused “conditioning” to occur in related circuits

Now “cues” associated with alcohol use can activate the reward and withdrawal circuit

This can evoke anticipation of alcohol or feelings similar to withdrawal that can precipitate relapse in an abstinent patient. (Addiction Memory)

Can you drink alcohol without becoming dependent?

What is a standard drink?

1 standard drink =



middy of beer
(285mls)

OR



small glass of wine
(100 mls)

OR



nip of spirits
(30 mls)

**A standard drink = 10 g ethanol (WHO)
beer (5% alcohol) wine (12% alcohol) spirits/Araqi/ (40% alcohol)**

Instead of asking for a standard drink it is better to calculate roughly how many ml or grams of alcohol are consumed.

c

How to calculate?

You have to know the alcohol content of a beverage in % , then you can easily calculate how much alcohol a given quantity of drinks contains.

eg. 500ml of beer (5% alcohol content contain:
 $500 \times 0,05$ equals 25ml of alcohol.

$1000 \times 0,05$ equals 50ml of alcohol. (1l of Beer)

If we want the grams then we have to multiply the ml of alcohol with the factor 0,8.

eg 50ml alcohol equals $50 \times 0,8 = 40$ g alcohol

Please do this calculation

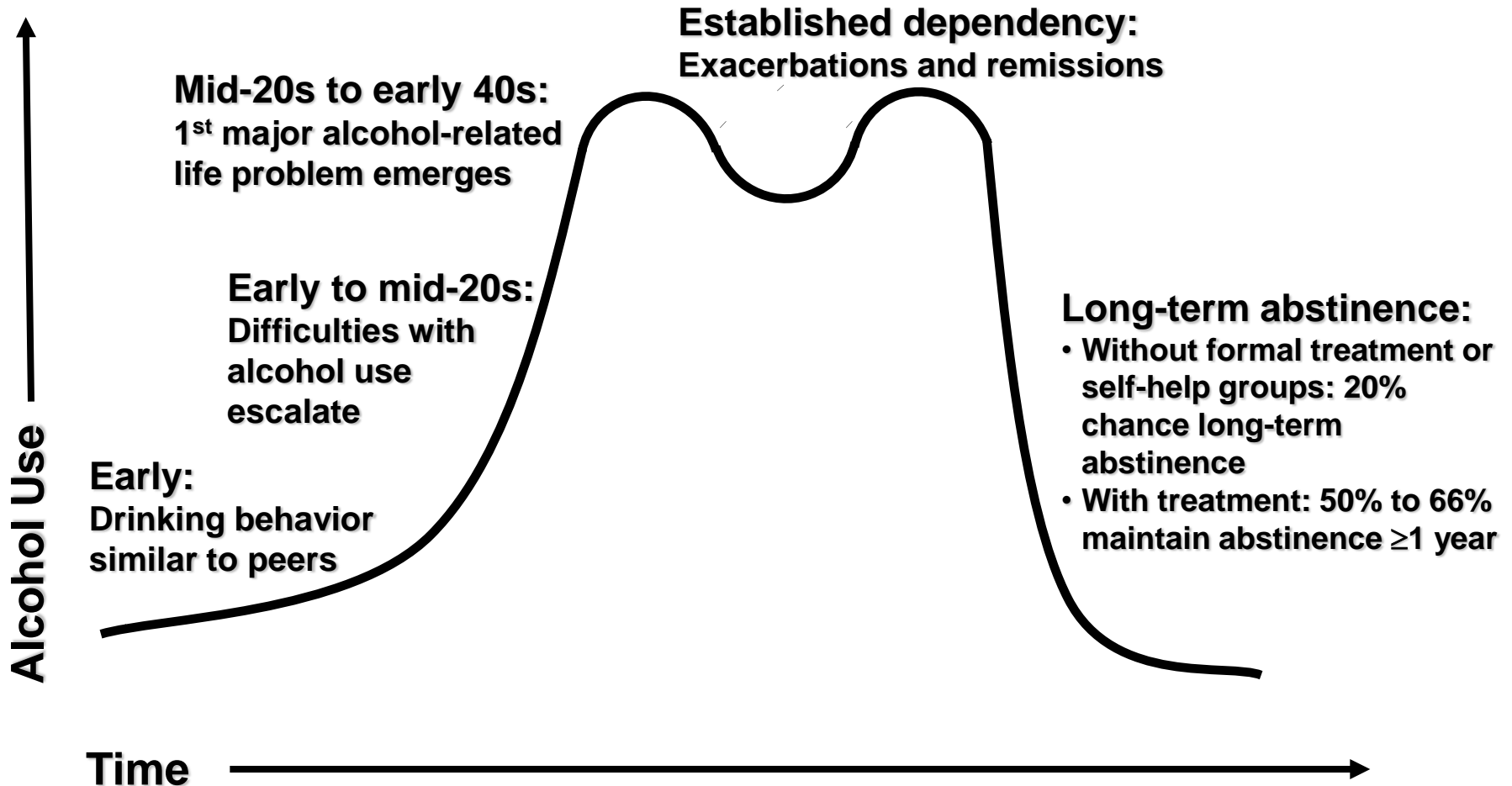
If beer contains 5% alcohol how many ml of alcohol are in 1l of beer?

If wine contains 12% alcohol how many ml of alcohol are in 100ml wine?

If araki contains 40% alcohol how many ml of alcohol are in 30ml of araqi?

How do people develop alcohol dependence?

People develop alcohol dependence



Factors Associated With Alcohol use disorder

Alcohol use disorder is a complex disorder in which many factors act together to produce the illness.

Approximately 50% of the risk is attributed to genetics
Genetic factors can act in combination with other biological or environmental factors.

Approx. 50% of East-Asians (Chinese, Japanese, Koreans) have a genetic variant in alcohol metabolizing enzymes (**ALDH2-2 version of ALDH, a slow- working version**), these individuals have much lower rates of alcoholism.

May arise in individuals without any apparent family history of alcohol dependence as a result of environmental and/or interpersonal factors

What effects you can get from alcohol?

Effects of Alcohol

Acute Effects:

CNS Depressant (overdose can lead to death)

Depression of inhibitory control

Vasodilation, warm, flushed, reddish skin

Emotional outbursts

Decreased memory & concentration

Poor judgment

Decreased reflexes

Decreased sexual response

Long Term Adverse Effects of Alcohol: Physical Consequences

Alcohol-induced pseudo-Cushing's syndrome

Wernicke's encephalopathy

Niacin/vitamine B complex deficiency/ [pellagra]

Mental and behavioural disorders due to use of alcohol

Degeneration of nervous system due to alcohol

Alcoholic polyneuropathy

Alcoholic myopathy

Alcoholic cardiomyopathy

Alcoholic gastritis

Alcoholic liver disease

Alcohol-induced chronic pancreatitis

Fetus and newborn affected by maternal use of alcohol

Fetal alcohol syndrome (dysmorphic)

What can be done for those alcoholics?

Interventions

Counseling:

individual

in group

brief and long-term

Withdrawal as in- or outpatient (if necessary)

Pharmacotherapy

Mutual support/ Self Help

e.g. Alcoholics Anonymous (AA)

Early and brief intervention

An intervention as short as five minutes can produce a sustained reduction in consumption

Early intervention leads to reduced consumption and related problems

Targets those at risk of harm, but typically not dependent

Useful in :

primary health care

all medical specialities

in for school-counsellors

in universities for student-counsellors

in public and private enterprises

Early and brief intervention

Proactive, opportunistic detection

Consists of brief advice or counseling at the point of detection

For users not ready to change:

may increase their motivation

For users wanting to change:

advising on appropriate goals and strategies, support

Early and brief intervention

Why intervene early?

Because;

There are more hazardous and harmful substance users than dependent users

Substance users don't tend to seek help unless they have advanced problems

Harder to treat once dependence is established

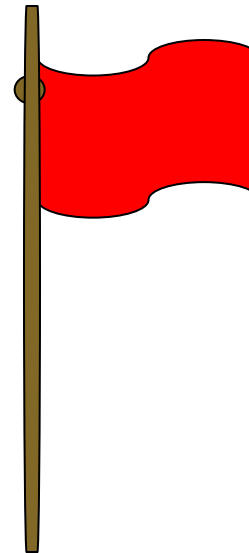
Early intervention is simple, acceptable and cost-effective

Early and brief intervention

Components of brief intervention

Use 'FLAGS':

- **F**eedback
- **L**isten
- **A**dvice
- **G**oals
- **S**trategies



A good out come from Early and brief intervention

Reduction or cessation of use (even temporary)

Starting to think about reducing

Agreeing to accept referral

Goal-Setting

Goals must be:

Realistic and achievable

Specific and observable

Client's goals rather than those of others

Whose goals?

Patient vs family vs therapist

short-term vs long-term

drug-specific vs other health and lifestyle issues

Look at the social context

Spouse told patient to come in, court-mandate, etc

Harm minimization as an short-term measure

Long term abstinence may not be achievable on the first episode of treatment.

Prevention of complications may lead to better health when the decision to stop drug use is finally taken

What if she/he doesn't want to change?

This is part of the change model (pre-contemplation)

Leave the door open for future contact

Agree to disagree

Need to accept patient autonomy

Consider any harm reduction strategies

Address presenting issue

Safe injecting or alternative routes e.g. nasally, orally (long evolutionary history of protection against pathogens)

wellbeing needs

Pharmacotherapy

Medications for Treatment of Alcohol Dependence to Prevent Relapse

Medication	Presumed Mechanism of Action	Side Effects
<p>DISULFIRAM Antabuse (Initial dose, 250 mg daily; therapeutic dose, 500 mg daily)</p>	<p>Blocks acetaldehyde dehydrogenase; blockade allows acetaldehyde to accumulate with alcohol consumption, causing unpleasant symptoms (e.g., flushing, headache, vomiting, dyspnea, confusion)</p>	<p>Idiosyncratic fulminant hepatitis, neuropathy (at doses >500mg), psychosis, and symptoms that generally resolve on discontinuation of drug (headache, drowsiness, fatigue, rash, pruritus, dermatitis, garlicky taste in mouth)</p> <p>Contraindications: wait 24 hours after drinking, elderly, varices, confusion, HTN Rx</p>

Medications for Treatment of Alcohol Dependence to Prevent Relapse

Medication	Presumed Mechanism of Action	Side Effects
<p><i>NALTREXONE</i> ReVia (initial dose 12.5 mg daily or 25 mg daily; therapeutic dose 50 mg daily)</p>	<p>Acts as an opiate agonist; decreases heavy drinking by blocking endogenous opioids, a process that attenuates craving and the reinforcing effects of alcohol</p>	<p>Nausea, headache, dizziness, nervousness, fatigue, insomnia, vomiting, anxiety, somnolence, dry mouth, dyspepsia, elevated liver-enzyme levels (dose-related), difficult pain management</p> <p>Contraindicated: opiate dependence, pregnancy, liver disease</p>
<p><i>ACAMPROSATE</i> Campral (666 mg 3 times a day)</p>	<p>Increases abstinence by stabilizing activity in the glutamate system, which is affected by long-term heavy consumption</p>	<p>Diarrhea</p> <p>Contraindications: Renal insufficiency</p>

Pharmacotherapy is not the solution!

Medication does not cure addictions.

But medication can help patient to stay in treatment, to stay clean and sober, and to profit from individual or group therapy.

For treating addictions - groups are very effective (also cost effective) and after initial resistance the groups are liked by the patients.

The combination of pharmacotherapy and psychotherapeutic techniques are very promising for “difficult cases”.

To have and to give hope it helps to know the following

Nearly one-quarter of alcoholics achieved natural recovery
(without treatment)

Natural recovery was stable (i.e., lasted for 5+ years) 20% of the
time

40-60% of treated alcohol dependent patients stay sober for many
years and lead a normal live.

In two studies, most change occurred before starting treatment

Last not least recommendations by the WHO regarding alcohol:Reducing alcohol abuse

WHO Recommendations:

- (a) leadership, awareness and commitment
- (b) health services' response
- (c) community action
- (d) drink-driving policies and countermeasures
- (e) availability of alcohol
- (f) marketing of alcoholic beverages
- (g) pricing policies
- (h) reducing the negative consequences of drinking
- (i) reducing the impact of illicit / informally produced alcohol
- (j) monitoring and surveillance.

Health services responsibility

Health services are central to tackling harm at the individual level and other health conditions caused by harmful use of alcohol.

Health services should provide prevention and treatment interventions to individuals and families at risk of, or affected by, alcohol-use disorders and associated conditions.

Another important role of health services and health professionals is to inform societies about the public health and social consequences of harmful use of alcohol, support communities in their efforts to reduce the harmful use of alcohol, and to advocate effective societal responses.

Stay home and safe