

Case study: Low Vit. D

Joan is a 90-year-old Caucasian woman who has recently been diagnosed with osteoporosis after a fall that broke her hip. She is 64 inches tall and weighs 115 pounds. Lately, she has been complaining about muscle pain in her legs. She eats a limited diet due to a chronic low appetite. A recent blood test shows Joan's serum vitamin D level is below normal. Her daily diet includes juice or fruit and toast with butter for breakfast, cheese sandwich and fruit for lunch, and salad or a frozen vegetable with meat or poultry for dinner. She dislikes most fish except canned tuna, and she often drinks a glass of fortified milk before going to bed at night. She lives in Quebec City and she spends most days indoors..

- ▶ What promotes Vit. D deficiency in the elderly?
- ▶ Of the foods Joan eats, which is the best source of vitamin D?
- ▶ Because Joan is concerned about skin cancer, she uses a sunscreen when she is outside. At what SPF level will sunscreen start to interfere with vitamin D synthesis?
- ▶ Joan's low serum vitamin D levels and low dietary vitamin D intake indicate that she is vitamin D deficient. She needs a vitamin D supplement to raise blood vitamin D levels and to lower the risk of falls. Based upon her vitamin D RDA, what supplement dose should she take daily?

Alcohol Effects on Health



Module 9
Nov. 9
Mary Hendrickson

Myth or Fact?

**I can save up my alcohol units
for the weekend**

One drink = 13.6 g EtOH



Proof: equals twice the % of alcohol

<https://educalcoool.qc.ca/en/facts-and-consequences/alcohol-and-health/low-risk-drinking/>

https://educalcoool.qc.ca/wp-content/uploads/2019/11/standard_drinks.pdf

<https://www.collegedrinkingprevention.gov/specialfeatures/calculators/alcoholcaloriecalculator.aspx>

Articles

Alcohol use and burden for 195 countries and territories, 1990–2016: a systematic analysis for the Global Burden of Disease Study 2016

Findings:

- The risk of all-cause mortality, and of cancers specifically, rises with increasing levels of alcohol consumption.
- The level of consumption that minimises health loss is zero.

Drinking guidelines in Québec

“2 • 3 • 4 • 0

- The recommended number of drinks – 2, 3, 4 or 0 – varies primarily according to sex.
 - **WOMEN WHO WANT TO DRINK MODERATELY** should have no more than **2 DRINKS A DAY OR 10 DRINKS A WEEK.**
 - **MEN WHO WANT TO DRINK MODERATELY** should have no more than **3 DRINKS A DAY OR 15 DRINKS A WEEK.**
 - **TO AVOID INTOXICATION AND THE ASSOCIATED COMPLICATIONS**, women should have no more than **3 DRINKS ON A SINGLE OCCASION.**
 - **MEN WHO WISH TO AVOID INTOXICATION AND THE ASSOCIATED COMPLICATIONS** should have no more than **4 DRINKS ON A SINGLE OCCASION.**
 - **TO AVOID ANY KIND OF HABITUATION OR DEPENDENCY**, it is recommended that everyone – men and women – choose **NOT TO DRINK AT ALL AT LEAST ONE OR TWO DAYS A WEEK.**
 - **IT IS INAPPROPRIATE TO DRINK ALCOHOL UNDER CERTAIN CIRCUMSTANCES**, such as:
 - When you have important decisions to make
 - When you are engaged in dangerous physical activity
 - When you are operating a motor vehicle, machinery, or mechanical or electrical equipment
 - When you are responsible for the safety of others
 - When you take medication that is affected by alcohol
 - When you have mental or physical health problems
 - When you have a problem with alcohol dependence
 - **WHILE THE RISKS OF LIGHT DRINKING** during pregnancy are considered minimal, no safe limit has been established. Therefore, if you are pregnant or trying to become pregnant, it is recommended that you do not drink at all. Nursing mothers should not drink before nursing.”

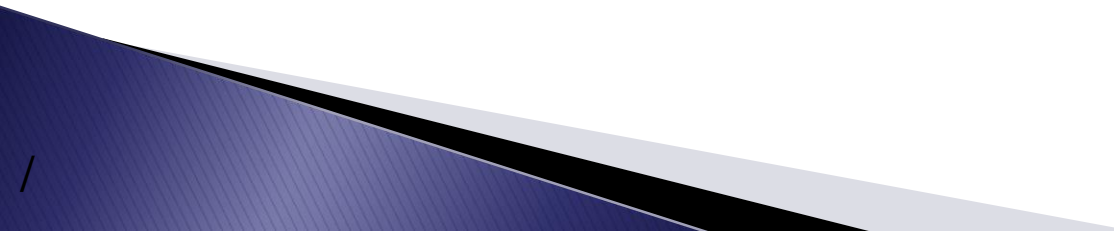
<https://educalcoool.qc.ca/en/facts-and-consequences/alcohol-and-health/low-risk-drinking/>

Defining Drinks and Drinking

- ▶ Defining moderation
 - Difficulties with defining due to individual alcohol tolerance
 - Health authority definition set as daily MAXIMUMs
- ▶ Alcoholism
 - Brings about irrational and dangerous behaviours
 - Health effects include depression, severe malnutrition, physical illness, and more
- ▶ Binge drinking
 - Four+ drinks in a row (women)
Five+ drinks in a row (men)

Myth or Fact?

- ▶ **Alcohol requires digestion**



Alcohol in GIT and Liver

GIT:

- ▶ Stomach releases Alcohol dehydrogenase
- ▶ Small intestine treats as absorption as priority

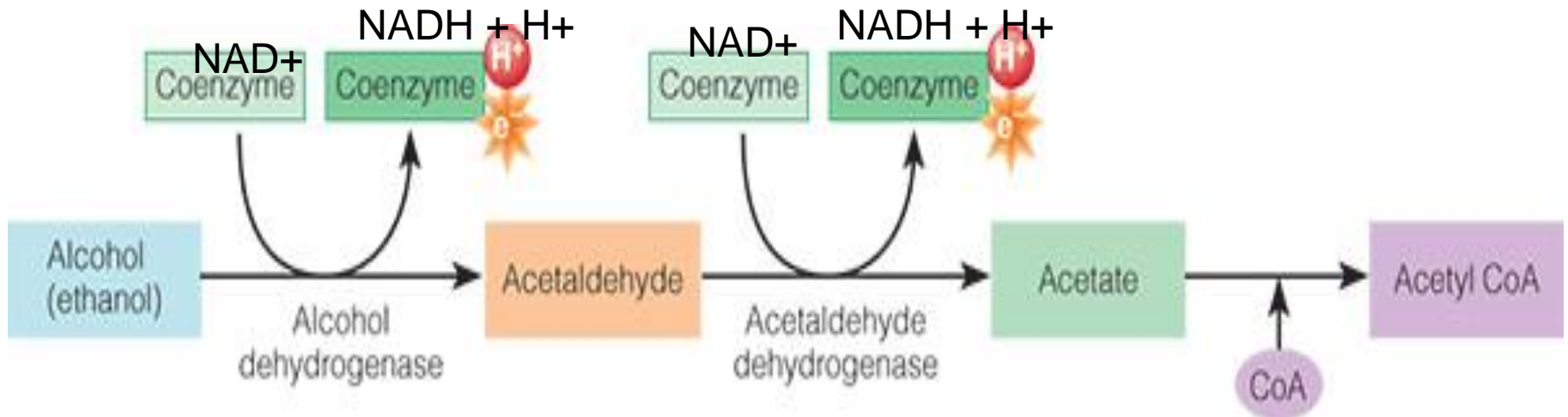
Liver

- ▶ Cells are the first to receive alcohol-laden blood
- ▶ Disrupts liver activity
- ▶ Can permanently change liver cell structure
- ▶ Rate of alcohol metabolism
 - Acetaldehyde
 - Acetate

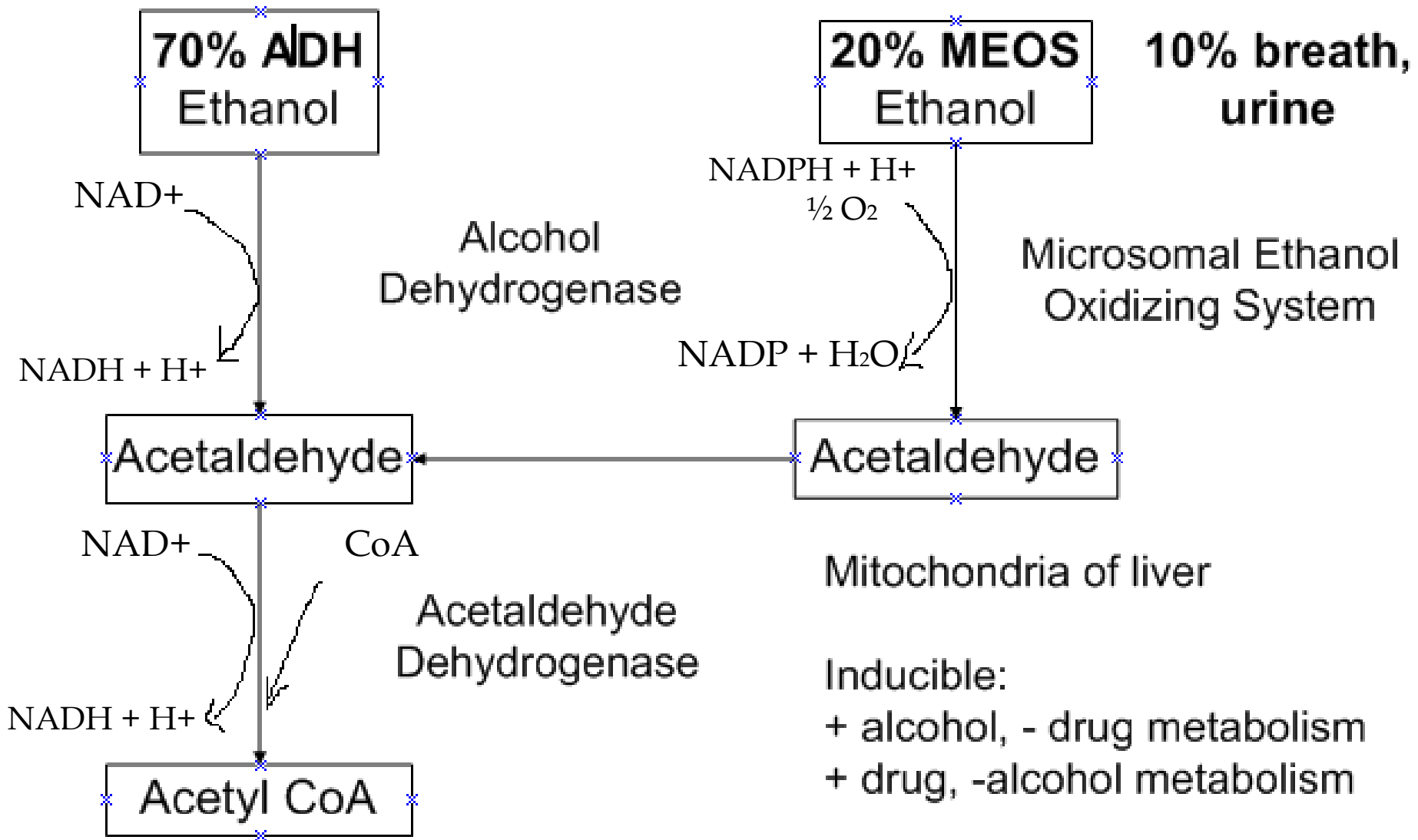
Alcohol Arrives in the Liver

- ▶ The liver processes most of the body's alcohol
- ▶ Two main liver enzymes break down alcohol
 - Alcohol dehydrogenase (ADH)
 - MEOS
- ▶ Amount of ADH enzymes available depends on
 - Alcoholism
 - Gender
 - Presence of food

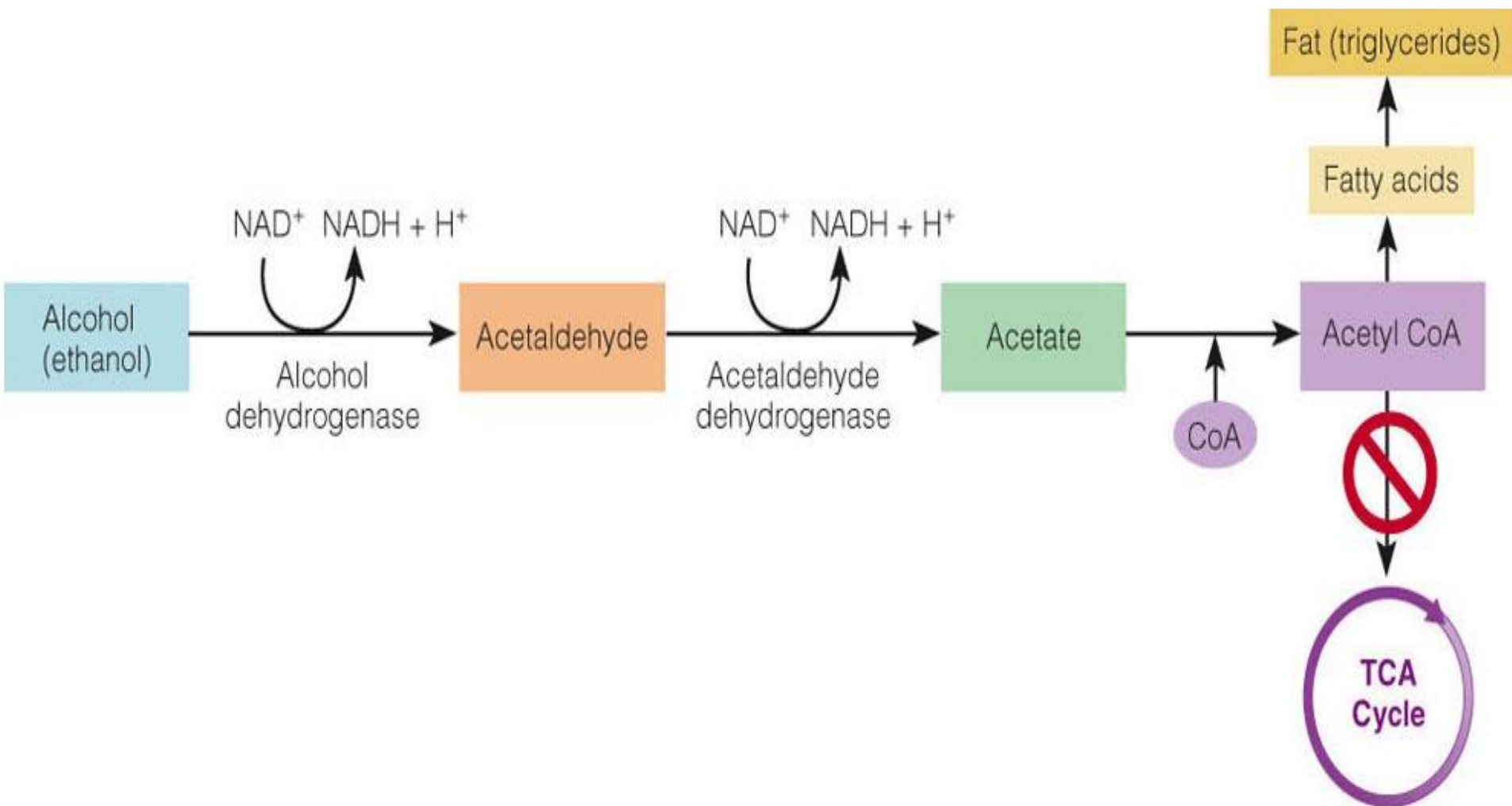
Alcohol Metabolism



Ethanol – absorbed quickly from stomach and duodenum



Alcohol dehydrogenase – located in liver & (in men) in stomach
- not inducible



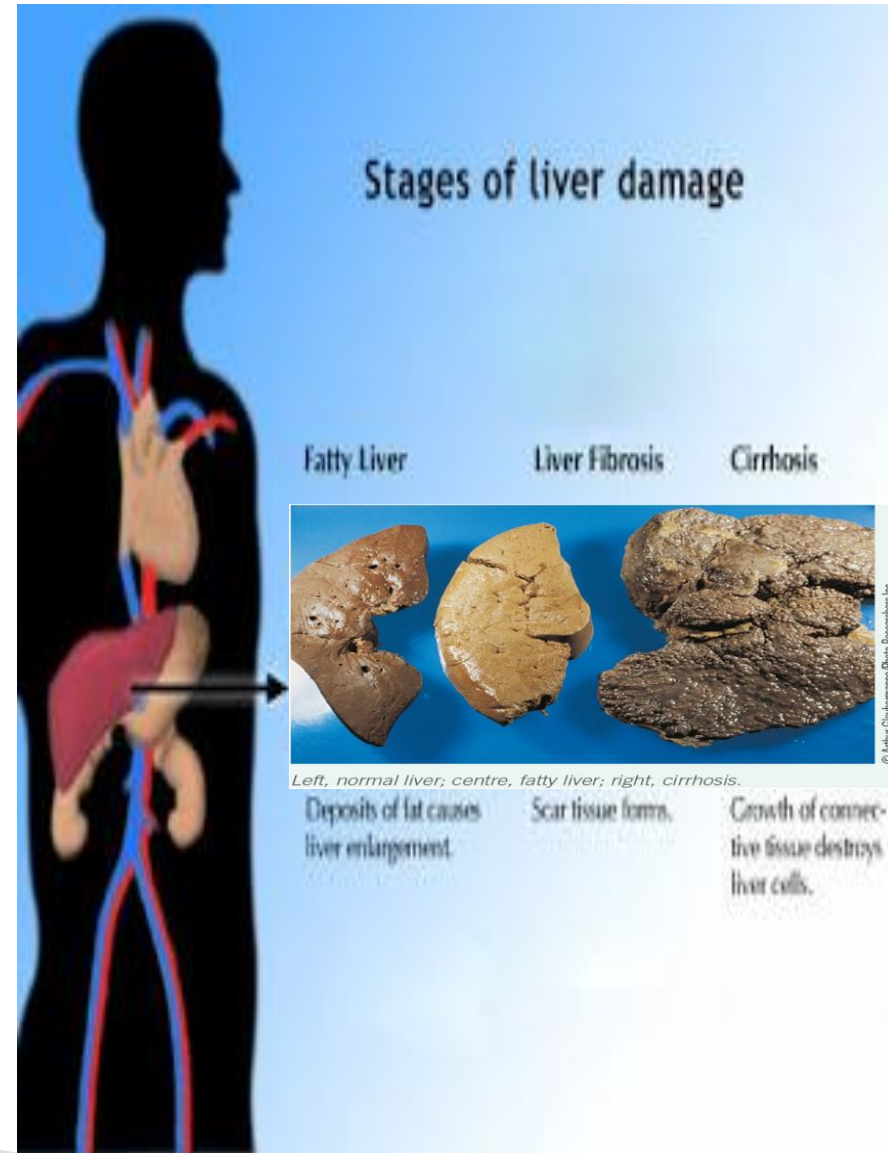
Acetyl CoA molecules are blocked from getting into the TCA cycle by the high level of NADH. Instead of being used for energy, the acetyl CoA molecules become building blocks for fatty acids.

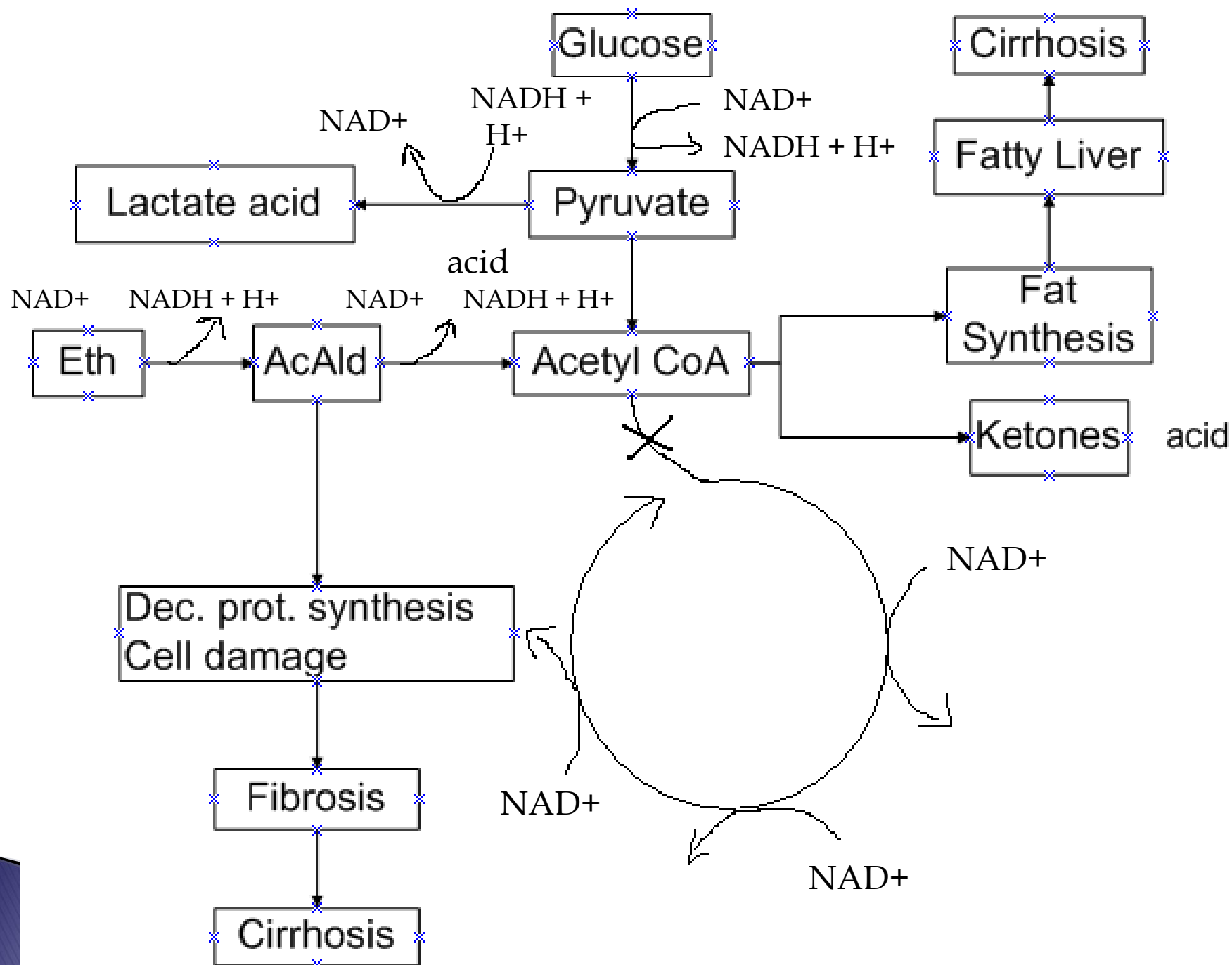
A photograph of a heart-shaped arrangement of fresh green lettuce leaves, set against a white background and enclosed in an orange border.



Effects on the Liver

- ▶ Niacin (NAD⁺) coenzyme cause changes to normal processes
 - Glycolysis
 - TCA cycle
 - Electron transport chain
 - Protein synthesis
 - Decreases gluconeogenesis
- ▶ Side effects of these changes
 - Fat accumulates in the liver
 - Even after one night of heavy drinking
 - Chronic abuse: Fatty liver → fibrosis → Cirrhosis
 - **Cirrhosis is irreversible**





Alcohol's Influence in the Brain

- ▶ Sedates inhibitory nerves
 - Central nervous system depressant
- ▶ Blood alcohol levels and brain responses
- ▶ Brain cell death
 - Brain tissue shrinks, creating brain damage
 - Irreversible with continued heavy drinking for few years
- ▶ Depression of antidiuretic hormone (ADH)
 - Kidney: Loss of body water, thirst...
 - Loss of important minerals



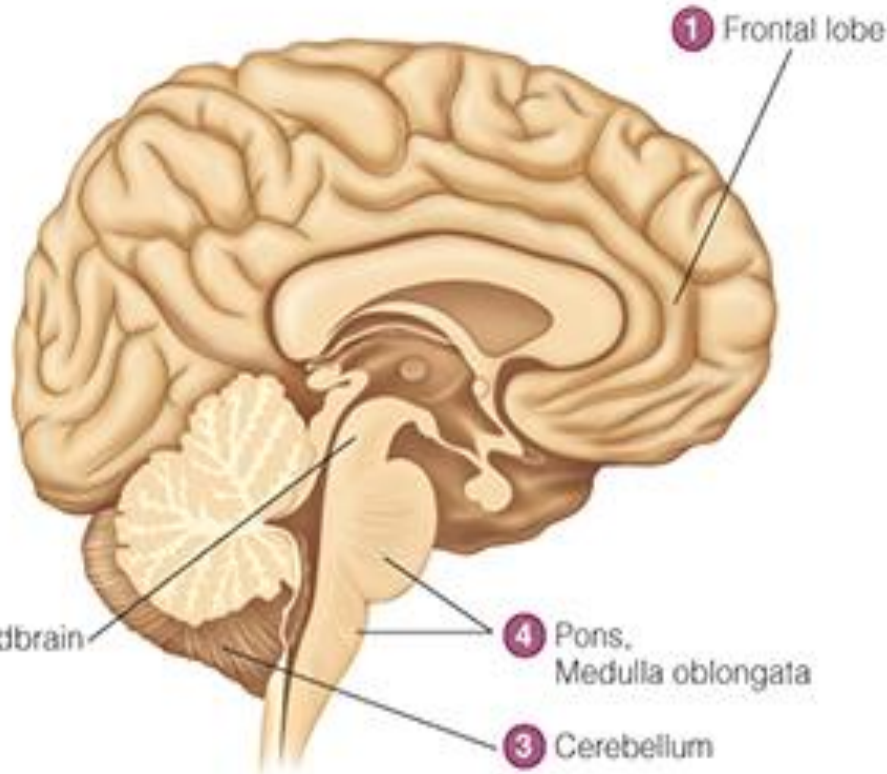
Alcohol's Effects on the Brain

1 Judgment and reasoning centers are most sensitive to alcohol. When alcohol flows to the brain, it first sedates the frontal lobe, the center of all conscious activity. As alcohol diffuses into the cells of these lobes, it interferes with reasoning and judgment.

2 Speech and vision centers in the midbrain are affected next. If the drinker drinks faster than the rate at which the liver can oxidize the alcohol, blood alcohol concentrations rise; the speech becomes challenging and vision becomes blurry.

3 Voluntary muscular control is then affected. At still higher concentrations, the cells in the cerebellum responsible for coordination of voluntary muscles are affected, including those used in speech, eye-hand coordination, and limb movements. At this point people under the influence stagger or weave when they try to walk, or they may slur their speech.

4 Respiration and heart action are the last to be affected. Finally, the conscious brain is completely subdued, and the person passes out. Now the person can drink no more; this is fortunate because higher doses would anesthetize the deepest brain centers that control breathing and heartbeat, causing death.



Alcohol Blood Levels and Brain Responses

NOTE: Blood alcohol concentration depends on a number of factors, including alcohol in the beverage, the rate of consumption, the person's gender, and body weight. For example, a 100-pound female can become legally drunk (≥ 0.10 concentration) by drinking three beers in an hour, whereas a 220-pound male consuming that amount at the same rate would have a 0.05 blood alcohol concentration.

| Blood Alcohol Concentration (%) | Typical Effects |
|---------------------------------|--|
| .02 | Loss of judgment, altered mood |
| .05 | Exaggerated behavior, loss of small muscle control, impaired judgment, lowered alertness |
| .08 | Poor muscle coordination; impaired selfcontrol, reasoning, and memory |
| .10 | Deterioration of reaction time and control, slurred speech, poor coordination, slowed thinking |
| .15 | Minimal muscle control, loss of balance |
| .20 | Confusion, disorientation, possible blackouts |
| .30 | Stupor, minimal comprehension |
| .40 | Lethal dose (heart beat and respiration slow down dramatically and may stop) |

Alcohol Affects Body Functions

- ▶ Amino acid metabolism is altered by alcohol
 - Weakens the body's defences against infection
- ▶ Blood lipid synthesis speeds up
- ▶ Alcohol adds to the body's acid burden
- ▶ Affects reproductive health
 - Infertility or spontaneous abortion in women
 - Suppressed male reproductive hormone (testosterone)

Alcohol's Effects on Nutrition

- ▶ Causes disturbances in nutrition
 - Provides empty Calories: 7 kcal/g
 - Wt gain– central adiposity
 - Can displace food... malnutrition
- ▶ Intestinal cells fail to absorb some vitamins
 - B vits – eg: B6 loss from binding protein
- ▶ Liver cells lose efficiency in activating vitamin D
- ▶ Reduced capacity to process and use vitamin A
- ▶ Dehydration
- ▶ Kidneys excrete minerals

Alcohol's Effects on Nutrition

- ▶ Wernicke–Korsakoff syndrome
 - Inadequate food intake
 - Impaired nutrient absorption
 - Deficiency of **thiamin** occurs
 - Physical symptoms:
 - Paralysis of eye muscles, poor muscle coordination, impaired memory, damaged nerves, altered mental state
 - Might respond to thiamin supplements

Alcohol's Effects on Nutrition

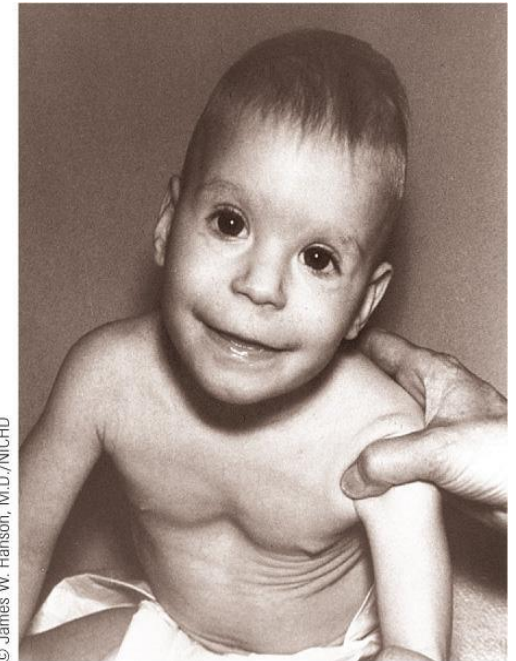
- ▶ **Folate** is most dramatically affected by alcohol
 - Expelled from all the body's sites, increasing blood folate
 - Kidneys falsely think folate is present in excess and begin to excrete folate
 - Intestines become so damaged that they do not absorb folate
 - Megaloblastic anemia risk (B12/Folate)

Alcohol's Long-Term Effects

- ▶ Effects on the heart
 - Heart disease
- ▶ Effects on the brain
 - Dementia
- ▶ Cancers
 - Breast, mouth, throat, esophagus, rectum, lungs
- ▶ Pregnancy
- ▶ All alcohol consumed by the mother is consumed by the fetus
- ▶ Pregnant women should NOT drink ANY amount of alcohol

Fetal Alcohol Spectrum Disorder – Fetal Alcohol Syndrome

- ▶ Incidence 1 to 9 per 1 000 live births
- ▶ Alcohol crosses the placenta freely & is directly toxic
- ▶ Drinking alcohol during pregnancy threatens the fetus with:
 - Irreversible brain damage
 - Growth restriction
 - Cognitive impairment
 - Facial abnormalities
 - Vision abnormalities



© James W. Hanson, M.D./NICHD

Experts' Advice

- ▶ Researchers have looked for a “safe” alcohol intake limit during pregnancy & have found none
- ▶ Health Canada & the Canadian Paediatric Society :
 - Women should **stop** drinking as soon as they *plan* to become pregnant

Alcohol Consumption

If you drink alcohol, do so in moderation

- ▶ Males – 15 drinks per wk NO more than 3 drinks a day
- ▶ Females – 10 drinks/wk NO more than 2 drinks per day
- ▶ Plan 2 **nondrinking** days/week to avoid developing a habit
- ▶ Drink with food and water
 - Caffeine amplifies dangers
- ▶ Avoid if planning to conceive, pregnant, operating machinery, medications, can't control intake

BUT even moderate alcohol consumption:

- ▶ Obesity
- ▶ Hypertension
- ▶ Stroke, CHD, A fib
- ▶ Altered BG
- ▶ Malnutrition
- ▶ Cirrhosis, Liver disease
- ▶ Cancer – oral, stomach, colon, breast, prostate
- ▶ Ulcers
- ▶ Arthritis
- ▶ Osteoporosis
- ▶ Psychological depression
- ▶ Fetal alcohol syndrome
- ▶ Drunk driving, Falls
- ▶ Insomnia
- ▶ Alcoholism
- ▶ Costs to society....

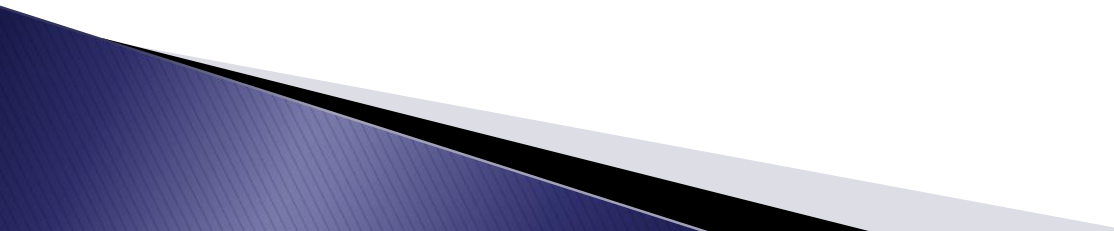
Impact of Alcohol in Canada

Third leading cause of preventable death

Economic cost of alcohol-related harm across Canada is \$14.6 billion per year

- ▶ \$7.1 billion for lost productivity owing to illness and premature death
- ▶ \$3.3 billion for direct health care costs
- ▶ \$3.1 billion for enforcement costs

Personal Strategies

- ▶ Drink non-alcoholic beverages
 - ▶ Drink in moderation
 - ▶ Nondrinking days!
 - ▶ Drink slowly
 - ▶ Drink with food
 - ▶ Don't drive
 - ▶ Seek help if needed
- 

Alcohol Abuse

CAGE

- ▶ Cut down?
- ▶ Annoyed by criticism?
- ▶ Guilty about drinking?
- ▶ Eye-opener?

https://www.ccsa.ca/sites/default/files/2019-08/CCSA-Knowing-Your-Limits-with-Alcohol-Guide-2019-en_0.pdf

Treatment

- ▶ Abstinence
- ▶ AA – support
- ▶ Medication
 - Antabuse (blocks AcAld DH)
 - Revia (↓ craving and the high)

Signs of Alcoholism (1 of 2)

- ▶ Tolerance: the person needs higher and higher intakes of alcohol to achieve intoxication.
- ▶ Withdrawal: the person who stops drinking experiences
- ▶ Anxiety, agitation, increased blood pressure, or seizures, or seeks alcohol to relieve these symptoms.
- ▶ Impaired control: the person intends to have 1 or 2 drinks, but has many more instead, or the person tries to control or quit drinking, but efforts are unsuccessful.
- ▶ Disinterest: the person neglects important social, family, job, or school activities because of drinking.
- ▶ Time: the person spends a great deal of time obtaining and drinking alcohol or recovering from excessive drinking.

Signs of Alcoholism (2 of 2)

- ▶ Cravings: the person has strong urges to use alcohol.
- ▶ Impaired ability: the person's intoxication or withdrawal symptoms interfere with work, school, or home.
- ▶ Problems: the person continues drinking despite physical hazards or medical, legal, psychological, family, employment, or school problems caused or exacerbated by alcohol.


These conditions suggest that a person may have an alcohol problem and might benefit from an abstinence program or professional help.

Source: Adapted from *Diagnostic and Statistical Manual of Mental Disorders*, 5th ed. (Washington, D.C.: American Psychiatric Association, 2013).

McGill Wellness Hub


Student Wellness Hub - McGill U

mcgill.ca/wellness-hub/





Student Wellness Hub
Brought to you by [McGill Student Services](#)

Quick Links ▾

Search 

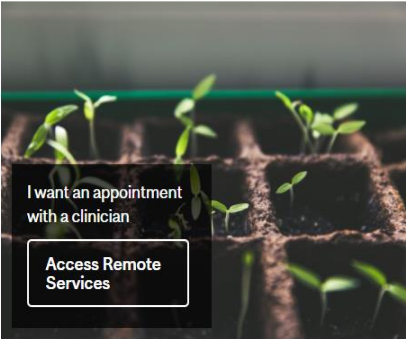
[Home](#) [About](#) [Access Care](#) [Urgent Care](#) [Get Support](#) [Self-Help](#) [Support Others](#) [FAQs](#) [Faculty/Staff Resources](#) [Contact/Hours](#)




Student Services is here for you!

McGill offers a wide variety of services to support student success and well-being. Due to the COVID-19 alert level in Montreal, some of our services will return to remote delivery until further notice. For details, click visit the "[How to Access Student Services](#)" page. In all cases, access is by appointment only, so please contact us for an appointment.

[Coronavirus Updates](#) [How to Access Student Services](#) [Remote Student Life Portal](#)



I want an appointment with a clinician
[Access Remote Services](#)



I want faculty-specific support
[Book online with a Local Wellness Advisor](#)

Important Announcements

[COVID-19 Updates](#)

[2020 Flu Vaccine Update](#)

Are you in quarantine after arriving in Montreal? Join our [Quarantine Support Group!](#)