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What Alcohol Does to Your Body, Brain & Health

from the Huberman Lab

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How Much is Too Much

- It has been known for some time that excessive drinking – 12-24 drinks/week, (3-4 drinks per night) causes neuro-degeneration
- This is especially true in the neocortex, that governs thinking/planning and regulation of primitive drives.

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How Much is Too Much

- Recent study looked at low – moderate amounts of alcohol intake to see if that had damaging effects – (studied 35,000 average adults in UK who were drinking varying amounts of alcohol)
- What they found was that even those who were drinking only 1-2 drinks/day, there was evidence of "thinning of the neocortex" = loss of neurons: and in other brain regions.

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What Most People Want to Know

- It's important data because it answers a burning question for so many people – that in fact, chronic alcohol intake, even if it is very low, causes damage.
- **Chronic** does not mean every night – it is defined, not as a huge amount, but as a constant or habitual pattern – could be 1 per night, could be 5-6 drinks on weekend, but the important feature is that **it recurs frequently**

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Why We Drink

- Alcohol has been used for many purposes, including medicinally. But mostly it has been used throughout time to change our internal state.
- Most people seem to enjoy the feeling of being inebriated or tipsy, even though it leaves one feeling of being less happy, less happy, more stressed once the alcohol wears off.
- Think about this – we pursue it and spend money on it, even though it makes us feel good then lousy.

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Why Alcohol Is Such a Toxin

- Because of the structure of Alcohol, it is both water and fat soluble. That means it can pass into all the tissues of your body.
- Ethyl alcohol or ethanol is the type we consume. It produces substantial damage to the cells. It is toxic to the body.

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Why Alcohol Is Such a Toxin

- When we ingest alcohol, it breaks down in the liver into acetyl aldehyde – which is an even worse toxin that kills cells.
- Then the body converts it to acetate which is not toxic. If your body doesn't complete this process fast enough, then the more damage you experience.
- It is this worse poison – acetyl aldehyde, which leads to the feeling of being drunk. Being drunk is a poison-induced change.

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We Become More Impulsive

- What alcohol is doing in all cases - it goes into the gut and then to the liver to convert, and then a certain amount of the acetyl aldehyde and acetate make their way into the brain (crosses the blood brain barrier BBB),
- Although it can go anywhere it the brain, it has a propensity to certain areas - the prefrontal cortex, where there is suppression of impulsive behaviour. That's why people talk louder the more they drink. They don't realize they are talking louder, as they stop modulating their level of speech.

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We Become Less Flexible

- Areas of the brain involved in flexible behaviour – shut down entirely. Impulsive and habitual behaviour increase.
- What is more important is that those who drink habitually, experience changes in the brain that strengthen the habitual and impulsive behaviours, even when they are not drinking; by an increase the number of synapses that control habitual behaviour and by a reduction in the synapses that control more flexible behaviour.
- It is reversible – if abstinence for 2-6 months, it can be returned to normal. Except in those cases where people have been chronically drinking large volumes of alcohol for years. There is some recovery of brain circuits, but there remain some ongoing issues.

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The Abnormal Drinker

- Dramatic change in the neurons that control the release of serotonin – a neuro modulator involved in mood and feelings of well-being. At first alcohol makes them hyper-active – people start talking a lot, feeling good. Then it drops off.
- So we go and get another drink hoping to get that mood back. But you can never get it back because of the changes in neuro circuitry.
- If you are a chronic drinker, you become more alert – more aware and more hyper., the more you drink. You do not get the sedated effect that other people experience who drink occasionally.
- These are the future/present alcoholics. Their threshold for passing out exists, but it is much higher.

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There are Only Two Categories of Drinkers

Blackout is not a pass out -While we are doing things in a blackout, the neurons in the hippocampus, which are involved in memory, are completely shut off. That's why the next day we don't remember anything at all.

How you can tell if you are in this category – there are just two groups:

1. Those who after a few drinks begin to feel sedated.
2. And those who after a few drinks do NOT feel sedated.

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Other Significant Changes

- Alcohol also changes the relationship between the hypothalamus, pituitary and adrenals. The HPA axis maintains our balance of what we perceive as stressful or not.
- Those who drink average of 1-2 drinks/night, have more cortisol released at baseline (when they are not drinking) – that means people feel more stressed, generally speaking.
- Its ironic, because people generally believe that having a drink, relaxes them – but it's the opposite.

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Overall Detriment to our Health & Well-Being

- Those who are genetically prone to alcoholism or those who drink often and therefore experience the alertness as they drink more during the night create changes in neuro circuitry and not just when we are drinking.
- The overall change include:

1) increased stress when not drinking
2) diminished mood and feelings of well-being when not drinking
3) changes in the neuro circuitry that cause people to drink even more to get back to the baseline before they ever started drinking

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Long Term Effects

- The conclusion that the neuroscience predicts is that there are long-term plastic changes in the brain when people drink regularly.
- The changes are in neuro circuitry and hormone circuitry – that result in people being less resilient to stress and have a lower mood overall.
- This is not in any way to demonize the use of alcohol, but simply to educate people on the truths of ingesting this toxin, which interestingly enough, has been used since the beginning of time.

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