

## IS ALCOHOLISM A DISEASE?

We have an estimated 300,000 working alcoholics in Finland, but how well do we understand this disease or whether it is even a disease?

According to the American Medical Association, alcoholism is a primary, chronic, and incurable disease characterised by loss of self-control. The Finnish Medical Society Duodecim defines alcoholism as a chronic and recurring brain disease.

### WHAT IS A DISEASE?

A disease could in short be defined as an abnormal vital or mental function that is harmful to a person or people close to him or her.

For example, are lactose intolerance or celiac disease actually diseases? Their symptoms and recovery are understood, and we know that if we expose the body to lactose (lactose intolerance) or, for example, wheat flour (celiac disease), symptoms will appear and the disease 'wakes up'. Not everyone suffers from these two diseases, and they can thus consume products that cause symptoms in other people.

Upon general examination of any disease, we can identify symptoms characteristic of that disease and recovery from it, which also follows a certain pattern. There are also diseases that cannot be treated and diseases upon which medications have an effect. The symptoms of alcoholism and recovery from this disease have been described for many years using the Jellinek curve. When examining whether alcoholism is a disease or whether some people have different opportunities to consume alcohol without becoming ill, we have to understand **what chemical dependence is**.

According to modern knowledge, alcoholism, drug abuse, mixed use, and other substance-related dependencies are classified as chronic brain diseases. For example, dependence can be defined using the World Health Organization's ICD-10 criteria for the dependence syndrome, which is defined as follows:

Three or more of the following manifestations should have occurred together for at least one month or, if persisting for periods of less than one month, should have occurred together repeatedly over the past 12 months.

1. ***A strong desire or sense of compulsion to take the substance.***
2. ***Difficulties in controlling substance-taking behaviour in terms of its onset, termination, or levels of use.***
3. ***A physiological withdrawal state when substance use has ceased or has been reduced, as evidenced by:***
  - a) ***the characteristic withdrawal syndrome for the substance***
  - b) ***or use of the same (or closely related) substance with the intention of relieving or avoiding withdrawal symptoms***

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4. *Evidence of tolerance such that increased doses of the psychoactive substance are required in order to achieve effects originally produced by lower doses (clear examples of this are found in alcohol and opiate-dependent individuals who may take daily doses sufficient to incapacitate or kill non-tolerant users)*
5. *Progressive neglect of alternative pleasures or interests because of psychoactive substance use, increased amount of time necessary to obtain or take the substance or to recover from its effects.*
6. *Persisting with substance use despite clear evidence of overtly harmful consequences, such as harm to the liver through excessive drinking, depressive mood states consequent to periods of heavy substance use, or drug-related impairment of cognitive functioning; efforts should be made to determine that the user was actually, or could be expected to be, aware of the nature and extent of the harm.*

The criteria for the syndrome provide an identifiable picture of the disease. This can be reflected on a person's or their intimates' behaviour or feelings, but it does not illustrate the **dependencedisease mechanism, where the disease resides** and how it is treated, or how it absolutely should not be treated.

When describing chemical dependence, we end up examining the neurobiological process, in other words, what happens at the brain cell level when a person suffers from substance dependence.

## HEREDITY

Hereditary factors leading to alcoholism have been proven to exist with the progress of gene research. The most recognized deviations causing alcoholism lie in the **GABRA2** and **ADH4** genes. So, what are these 'alcoholism genes', what is their purpose, and, above all, **how do people with gene deviations experience intoxicating substances in comparison to people with so-called normal genes?**

As a result of a mutation in the **GABRA2** gene, alcohol has a stronger effect on the brain, meaning that an emotional dependence develops quickly. Regardless of whether such a person gets drunk for the first time at the age of 12 or 50, the obsession with this substance begins to control life.

A deviation in the **ADH4** gene results in a better than average tolerance for alcohol. This makes it possible to consume increasingly large amounts of the substance 'without losing control'.

The hereditary nature of alcoholism has been studied for decades, but only recently we beginning to see clear results. The studies that led to the identification of **GABRA2** and **ADH4** lasted more than 10 years and involved more than 12,000 subjects. Now we know that there are many 'alcoholism genes' rather than just a few. The genes do not actually cause disease or affect a person's destiny but act as a kind of 'prescription' when building the central nervous system. Genes are intended to provide codes for building tissue, and they should react to evolutionary challenges in order to allow a person or plant to survive in the environment in which it lives. The decoding or function of genes can change due to influence from their immediate

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environment even if the structure of the DNA itself would not be altered. Reference is made to epigenetics.

A person inherits many absolute genes (for example, five fingers/hand), but also the genetic flexibility to react to the environment or hereditary factors. When we take a closer look at the genes that cause alcoholism, we find that **existing, inherited gene deviations alter the neuron structures of our brain so that they are ready to accept the influences of substances 'as a natural element'**. This means that we not only inherit the external features of our parents and grandparents but also their internal structures (including the size and activity of internal organs).

So, how can we define when a person is chemically dependent? Are certain people born to be alcoholics or do they become alcoholics simply by drinking liquor? This could be answered by saying that even the strongest genetic vulnerability always requires a substance to make it reality. Such people do not differ from so-called normal people in any other way, except that substance use triggers a disease, which sooner or later becomes chronic.

About 70% of people with a chronic substance dependence report experiencing a strong sense of gratification upon first trying alcohol. Almost without exception, they have alcoholics in their close family, and it has been proven that a predisposed nervous system lies behind the gratifying reaction to substances. It's not unusual for chronic alcoholics to have had a secure, good childhood and solid position in our social hierarchy. The disease is very arbitrary in terms of where it strikes. One of its symptoms, the disintegration of social position, is often a consequence of substance use.

**The hereditary nature of alcoholism is stronger than that of schizophrenia or diabetes**, but many authorities groundlessly classify the disease as 'spinelessness' or a mental health problem. Upon starting to use substances, roughly one in ten Finns experience this disease involuntarily, and another 10% are at risk. The other 80% have 'difficulty' in achieving a nervous state in which drinking becomes compulsive.

In such cases, the vulnerability and nervous system's ability to accept substances do not exceed the **chronic limit**, which is also referred to as 'the invisible line'. People that cross that line can never return to so-called social, controlled drinking. **Drinking becomes alcoholic, a state that is characterised by denial and secrecy. The ability to control the amount, time, or place of substance use is impaired or even completely non-existent.** Alcoholism always results in a certain type of behaviour, meaning that certain people and the disease can be diagnosed on the basis of behavioural symptoms. A person that has attained a state of sobriety can only be distinguished from other people in terms of their life experience.

## **NERVOUS SYSTEM DEPENDENCE**

Neurobiological dependence exists when the nervous system has been exposed to a substance for so long that changes occurring at the neuron level are chronic and permanent. This type of nervous system can be inherited, but it can also result from drinking alcohol, often aided by

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hereditary factors. The brain contains about 100 billion neurons, with one of their tasks being to transport neurotransmitters such as dopamine (reward and gratification), GABA (calmness), serotonin (mood), and glutamate (activation).

One of the metabolic functions of neurons is to ignite and extinguish genes, which subsequently provide codes for building our nervous system. Our brains enter a state of crisis when we drink alcohol, because it disturbs normal neurotransmitter activity. There's no need to look farther than the neuron level for environmental factors leading to alcoholism, because the 'immediate environment' of the neuron is alcohol. Even people with a weaker inherited vulnerability exceed the chronic limit when the normal metabolism of the neurons is repetitively blocked by alcohol, placing the nervous system in an evolutionary 'live or die' situation.

In such cases, the genes are programmed to react in order to adapt and maintain life. Thus, continuous cell-level stress may give cause to genetic/epigenetic alterations, after which the nervous system becomes dependent upon the substance. This is when alcoholism becomes chronic, meaning that a drinking person no longer drinks to achieve gratification but to attain a normal (nervous system) state. This kind of alcoholic drinking causes depression and anxiety in that person and in the people close to him/her. Every time a dependent person exposes him/herself to the smallest amount of the substance, the nervous system is activated and begins to demand more. Dipsomania is a typical example: for example, a person can (must) refrain from using alcohol for six months, but if he/she has a single drink, all sense of control is lost.

The brain is able to and must continuously adapt in adulthood as well. The genes of people with even the slightest degree of genetic vulnerability to alcoholism are far more susceptible to change for the worse than those without such vulnerability. As early as the 1960s, rat populations, identified as AA-rats and ANA-rats, were developed in the laboratories of Finland's state-owned Alko. AA-rats were conditioned to alcohol use and their descendents began to select wine instead of water. The ANA-rats tried to avoid wine. The AA-rats are designated as rats with a **genetic tendency to favor alcohol**. The AA-rats did not have an existing genetic heredity but now they do, and a very strong one at that. It's good to remember that, just like 80% of the human race, members of the first AA rat population certainly wouldn't have voluntarily started to drink themselves into 'alcoholics'.

Thus, in terms of future generations, it's good to know that even without the presence of alcoholic genes, excess use of alcohol prior to fertilization or during pregnancy can cause some degree of genetic vulnerability in a child. This can subsequently influence that child's descendents, meaning that understanding of the disease should be intergenerational. As a result of its strong heredity, alcoholism is referred to as being no one's fault. People shouldn't feel responsible for getting sick, but they must take responsibility for recovery.

## **THE SYMPTOMS OF AN ALL-ENCOMPASSING DISEASE**

Even if we know that alcoholism is basically a neuron-level disease, what are the symptoms of this chronic brain disease? The following outlines a few symptoms that illustrate how alcoholism is an all encompassing disease affecting all areas of humanity.

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### Physical symptoms

- Strong withdrawal symptoms, need for the substance - Bruises, fractures, sprains, etc.
- Stomach disorders, esophageal inflammation, diabetes
- Skin symptoms, rashes
- Numbness, seizures, arrhythmia, high blood pressure - Cosmetic and external injuries, swelling, etc. - Nerve damage, tremors
- Memory disturbances and other brain injuries

### Psychological symptoms

- Depression
- Symptoms of affective syndrome
- Craving for the substance (addiction)
- Sleeplessness
- Panic disorder
- Anxiety
- Personality changes - Tremors, etc.

### Social symptoms

- Abnormal relations with intimate persons
- Relationships based on maintaining a facade
- Looking for drinking enablers outside him/herself
- Problems with drinking at work, sick leave
- Social network that is supports substance abuse (work, friends)
- Divorce, separation from children
- Financial symptoms

### Spiritual symptoms

- Selling one's soul to the substance
- 'Living through the bottle'
- Moral decay
- Self-accusation: 'can't anyone help me?'
- Collapse of personal values
- A feeling of complete ruin

### Emotional life

In addition to the above-mentioned symptoms, **an alcoholic's emotional life is chemical in nature and involves defence of this chemical element.** Externally, the person appears to be a huckster with no sense of morality and no desire to take responsibility for his/her words or actions. Internally, this person is consumed by pain, anxiety, guilt, shame, anger, a feeling of incompetence, and fear, because the denial that is part of this disease makes it impossible to understand his/her behaviour. Such a person hides drinking rather than talking about it. He/she lives in a state of illusion, where all problems and difficulties are completely unrelated to drinking. He/she has no idea why others can drink, but he/she can't. Such a person feels like a victim and is searching for an understanding person who will enable continued drinking. That person could be a close relation, co-worker, or professional with no understanding of the nature of the disease.

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## Behaviour

In order to hide his/her emotions and confusion, an alcoholic behaves like a mentally ill person. He/she acts compulsively, is critical, demanding, denies, withdraws, blames others, lies, and manipulates in order to get what he/she needs most – the substance. The substance fulfils a need, which is all-consuming due to its link to the nervous system. For example, the nervous system can activate established behaviour, known as brain engrams, a nervous (physical) need, the desire for self-gratification (dopamine), and the so-called 'dry drunk' state.

Even small amounts of alcohol or medications that primarily affect the central nervous system are enough to activate the nervous system. Once such activation has occurred, the body begins to demand the substance. This need disappears only after a person understands the countless problems – emotional and intellectually – that the substance causes in his/her life, and stays away from it. This often requires quality, long-term care to help the alcoholic break down the wall of denial and learn to view life realistically with the help of knowledge and therapy.

## CONCEPTS

**Heavy drinker** is a term generally used in our society to refer to a consumer of alcohol who drinks amounts of alcohol that exceed 'normal social' or 'healthy' drinking. Unfortunately this term includes all groups from the chemically dependent to those that drink more than 'normal'.

The term **alcoholic** refers to a person who has a chronic neuron-level disease. He/she might not drink often, but on those occasions is unable to properly stop drinking regardless of the extreme problems that drinking causes. Thus, the substance affects an alcoholic regardless of whether he/she is under its influence or not.

The name **derelict alcoholic** is used when a person has gone 'over the edge'. He/she has been socially excluded and unable to hide the drinking, using substances and substitutes in parks and other public places. Treatment of a derelict alcoholic always involves a long period of rehabilitation prior to starting the actual treatment. Many such people suffer from neurological damage and organ malfunction.

Alcoholism is characterized by much ignorance and shame. When our society discusses alcoholism, it is often automatically linked to social exclusion and derelict alcoholics. However, derelict alcoholics only account for about 3-4% of all alcoholics. A heavy drinker can easily consume much more alcohol than an alcoholic without actually being an alcoholic. **Alcoholism cannot be measured in terms of quantitative principles; it must be assessed qualitatively**, in other words, what happens when an alcoholic consumes liquor and what happens when he/she doesn't consume it despite a desire to do so.

## MEDICATION

When administered to alcoholics, medications that primarily cause central nervous system dependence **act as intoxicating drugs that lead to a chronic state**, and may not be used with alcoholics. As mentioned above, alcoholism, drug abuse, and mixed use are all the same

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problem in the long run. This is also the case in terms of the nervous system, in which case we usually talk about chemical dependence. When treating chemical dependence, we cannot replace alcohol with, for example, benzodiazepine or opioids if the desired treatment outcome is complete substance independence. The brain is unable to differentiate between intoxicants in a solid or liquid form. Independence from substances is the most important factor in terms of improving the quality of life for a person with substance dependence. The starting point for treatment is for the person involved to receive information and therapy when sober, not when intoxicated.

Avoiding substance abuse and improving the quality of life are most successful in a treatment program that understands the nature of the disease, often through personal experience. If a substance-dependent person does not receive proper treatment for the disease (information and therapy), the medication prescribed – disulfiram (Antabuse) and naltrexone (Revia) – will be ineffective.

In terms of medication for alcoholism or drug dependence, the only medical method is to ensure that the brain reaches a state in which the central nervous system is no longer under the influence of substances. In view of this fact, gene treatment could be considered a treatment for the future. The person's own stem cells could be used to repair the damage to the central nervous system. The next question for that person would be whether to start over and allow the substances to once again provide immense gratification (greater than normal), followed by another trip through substance hell, or to take life as it comes. It would be unethical to repair brain damage using stem cells from a 'normal person'.

Why would an emotionally sober alcoholic ever need alcohol or medication again if he/she were grateful for never having to drink again as the methods for achieving sobriety have already been invented.

Mika Arramies April 12, 2006 (updated 9.4.2008)

Avominne Oy  
[www.avominne.fi](http://www.avominne.fi)

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