Journal of Genetics and Genetic Engineering
Volume 1, Issue 1, 2017, PP 9-15

Study of Genetic Mutations in, DRD2, GABRG3ADH1B3, ALDH, ADH1B2, CHRNA5, CHRNA3, CHRNA6, Genes to Induce Alcoholism Syndrome

Shahin Asadi, Hamideh Mohammadzadeh, Manoush Tohidirad, Mahsa Jamali

Molecular Genetics, Director of the Division of Medical Genetics and Molecular Research, Tabriz - Iran.

***Corresponding Author:** Shahin Asadi, Molecular Genetics, Director of the Division of Medical Genetics and Molecular Research,*

ABSTRACT

In this study we have analyzed 220 people. 100 patients Alcoholism disease and 120 persons control group. The genes DRD2, GABRG3ADH1B3, ALDH, ADH1B2, CHRNA5, CHRNA3, CHRNA6, analyzed in terms of genetic mutations made. In this study, people who have genetic mutations were targeted, with nervous disorders and Alcoholism disease. In fact, of all people with Alcoholism disease.100 patients Alcoholism disease had a genetic mutations in the genes DRD2, GABRG3ADH1B3, ALDH, ADH1B2, CHRNA5, CHRNA3, CHRNA6 Alcoholism disease. Any genetic mutations in the target genes control group, did not show.

Keywords: *Genetic study, Alcoholism disease, Mutations The genes DRD2, GABRG3ADH1B3, ALDH, ADH1B2, CHRNA5, CHRNA3, CHRNA6, RT-PCR.*

INTRODUCTION

Alcoholism, also known as alcohol use disorder (AUD), is a broad term for any drinking of alcohol that results in problems.[1] It was previously divided into two types: alcohol abuse and alcohol dependence.[2][3] In a medical context, alcoholism is said to exist when two or more of the following conditions is present: a person drinks large amounts over a long time period, has difficulty cutting down, acquiring and drinking alcohol takes up a great deal of time, alcohol is strongly desired, usage results in not fulfilling responsibilities, usage results in social problems, usage results in health problems, usage results in risky situations, withdrawal occurs when stopping, and alcohol tolerance has occurred with use.[3] Risky situations include drinking and driving or having unsafe sex among others.[3] Alcohol use can affect all parts of the body but particularly affects the brain, heart, liver, pancreas, and immune system. This can result in mental illness, Warnock – Korsak off syndrome, an irregular heartbeat, liver failure, and an increase in the risk of cancer, among other diseases.[4][5] Drinking during pregnancy can cause damage to the baby resulting in fetal alcohol spectrum disorders.[6] Generally women are more sensitive to alcohol's harmful physical and mental effects than men.[7]

Both environmental factors and genetics are associated with alcoholism with about half the risk attributed to each. A person with a parent or sibling with alcoholism is three to four times more likely to be alcoholic themselves.[4] Environmental factors include social, cultural, and behavioral influences.[8] High stress levels, anxiety, as well as inexpensive easily accessible alcohol increases risk.[4][9] People may continue to drink partly to prevent or improve symptoms of withdrawal. A low level of withdrawal may last for months following stopping.[4] Medically, alcoholism is considered both a physical and mental illness.[10][11] Both questionnaires and certain blood tests may detect people with possible alcoholism. Further information is then collected to confirm the diagnosis.[4]

Prevention of alcoholism is possible by regulating and limiting the sale of alcohol, taxing alcohol to increase its cost, and providing inexpensive treatment.[12] Treatment may take several steps. Because of the medical problems

that can occur during withdrawal, alcohol detoxification should be carefully controlled. One common method involves the use of benzodiazepine medications, such as diazepam. This can be either given while admitted to a health care institution or occasionally while a person remains in the community with close supervision.[13] Other addictions or mental illness may complicate treatment.[14] After detoxification support such as group therapy or support groups are used to help keep a person from returning to drinking.[15][16] One commonly used form of support is the group Alcoholics Anonymous.[17] The medications acamprosate, disulfiram, or naltrexone may also be used to help prevent further drinking.[18]

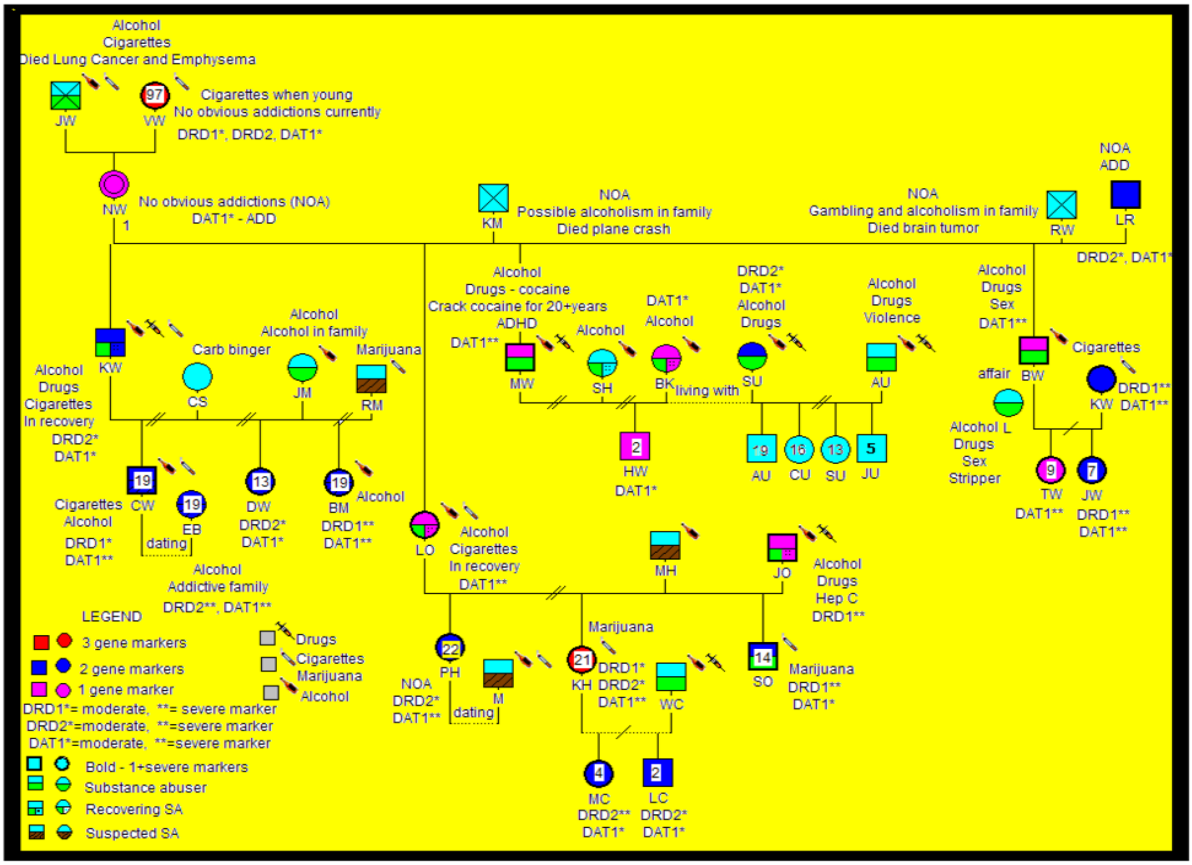


Fig1. *Important biomarker chart for the induction of alcoholism syndrome with inheritance patterns for future human generations.*

The World Health Organization estimates that as of 2010 there were 208 million people with alcoholism worldwide (4.1% of the population over 15 years of age).[7][19] In the United States about 17 million (7%) of adults and 0.7 million (2.8%) of those age 12 to 17 years of age are affected.[20] It is more common among males and young adults, becoming less common in middle and old age.[4] It is the least common in Africa at 1.1% and has the highest rates in Eastern Europe at 11%.[4] Alcoholism directly resulted in 139,000 deaths in 2013 up from 112,000 deaths in 1990.[21] A total of 3.3 million deaths (5.9% of all deaths) are believed to be due to alcohol.[20] It often reduces a person's life expectancy by around ten years.[22] In the United States it resulted in economic costs of $224 billion USD in 2006.[20] Many terms, some insulting and others informal, have been used to refer to people affected by alcoholism including: tippler, drunkard, dipsomaniac, and souse.[23] In 1979, the World Health Organization discouraged the use of "alcoholism" due to its inexact meaning, preferring "alcohol dependence syndrome".[24].

Early Signs

The risk of alcohol dependence begins at low levels of drinking and increases directly with both the volume of alcohol consumed and a pattern of drinking larger amounts on an occasion, to the point of intoxication, which is sometimes called "binge drinking". Young adults are particularly at risk of engaging in binge drinking.

Long-Term Misuse

Some of the possible long-term effects of ethanol an individual may develop. Additionally, in pregnant women, alcohol can cause fetal alcohol syndrome.

Alcoholism is characterized by an increased tolerance to alcohol–which means that an individual can consume more alcohol–and physical dependence on alcohol, which makes it hard for an individual to control their consumption. The physical dependency caused by alcohol can lead to an affected individual having a very strong urge to drink alcohol. These characteristics play a role decreasing an alcoholic's ability to stop drinking.[25] Alcoholism can have adverse effects on mental health, causing psychiatric disorders and increasing the risk of suicide. A depressed mood is a common symptom of heavy alcohol drinkers.[26][27]

Warning Signs

Warning signs of alcoholism include the consumption of increasing amounts of alcohol and frequent intoxication, preoccupation with drinking to the exclusion of other activities, promises to quit drinking and failure to keep them, the inability to remember what was said or done while drinking (colloquially known as "blackouts"), personality changes associated with drinking, denial or the making of excuses for drinking, the refusal to admit excessive drinking, dysfunction or other problems at work and/or school, the loss of interest in personal appearance or hygiene, marital and economic problems, and the complaint of poor health, with loss of appetite, respiratory infections, or increased anxiety.[28]

MATERIALS AND METHODS

In this study, 100 patients with Alcoholism disease and 120 persons control group were studied. Peripheral blood samples from patients and parents with written permission control were prepared. After separation of serum, using Real Time-PCR technique of t RNA molecules was collected. To isolate Neuralgia cells erythrocytes were precipitated from hydroxyethyl starch (HES) was used. At this stage, HES solution in ratio of 1to5with the peripheral blood of patients and controls were mixed. After 60 minutes of incubation at room temperature, the supernatant was removed and centrifuged for 14 min at 400 Gera. The cells sediment with PBS (phosphate buffered saline), pipe age and slowly soluble carbohydrate ratio of 1to2 on ficole (Ficol) was poured in the 480G was centrifuged for 34 minutes. Mono nuclear Neuralgia cells also are included, has a lower density than ficole and soon which they are based. The remaining erythrocytes have a molecular weight greater than fico le and deposited in test tubes[29].

The supernatant, which contained the mono nuclear cells, was removed, and the 400 Gera was centrifuged for 12 minutes. Finally, the sediment cell, the antibody and Neuralgia cells was added after 34 minutes incubation at 5 °C, the cell mixture was passed from pillar LSMACS. Then the cells were washed with PBS and attached to the column LSMACSS Pam Stem cell culture medium containing the transcription genes DRD2, GABRG3ADH1B3, ALDH, ADH1B2, CHRNA5, CHRNA3, CHRNA6, and were kept.

To determine the purity of Neuralgia cells are extracted, flow cytometry was used. For this purpose, approximately 4-5 × 10^3 Neuralgia cells were transfer red to1.5ml Eppendorf tube and then were centrifuged at 2000 rpm for 7minutes at time. Remove the supernatant culture medium and there mining sediment, 100µl of PBS buffer was added. After adding 5-10µl PE monoclonal anti body to the cell suspension for 60 min at 4°C, incubated and readme diately by flow cytometry. For example, rather than control anti body Neuralgia cells PE, IgG1 negative control solution was used.

Total mRNA Extraction Procedure Includes

1 1ml solution spilled Qiazolon cells, and slowly and carefully mixed and incubated at room temperature for 5 minutes. Then 200µl chloroform solution to target mix, then transfer the micro tubes were added, and the shaker well was mixed for 15 seconds. The present mix for 4 minutes at room temperature and then incubated for 20 min at 4°C an was centrifuged at 13200 rpm era. Remove the upper phase product were transfer reeducates new micro tube and to the one times the volume of cold ethanol was added. The resulting mixture for 24 hours at -20°C was incubated[30].

2 Then for 45 min at 4°C an was centrifuged at 12000 rpm era. Remove the super natantand the white precipitate, 1ml of cold 75% ethanol was added to separate the sediment

from micro tubes were vortex well. The resulting mixture for 20 min at 4°C an by the time we were centrifuged 12000 rpm. Ethanol and the sediment was removed and placed at room temperature until completely dry deposition. The precipitate was dissolved in 20µl sterile water and at a later stage, the concentration of extracted mRNA was determined.

3 To assessment the quality of mi-RNAs, the RT-PCR technique was used. The c DNA synthesis in reverse transcription reaction (RT) kit (Ferments K1622) and 1µl oligoprimers 18 (dT) was performed. Following the PCR reaction 2µM d NTP, 1µg c DNA, Ferments PCR buffer 1X, 0 / 75µM MgCl2, 1.25 U / µL Tag DN At 95°C for 4min, 95°C for 30s, annealing temperature 58°C for 30s, and72 °C for30 seconds, 35 cycles were performed. Then 1.5% agarose gel, the PCR product was dumped in wells after electrophorus is with ethidium bromide staining and color was evaluated.

RESULTS

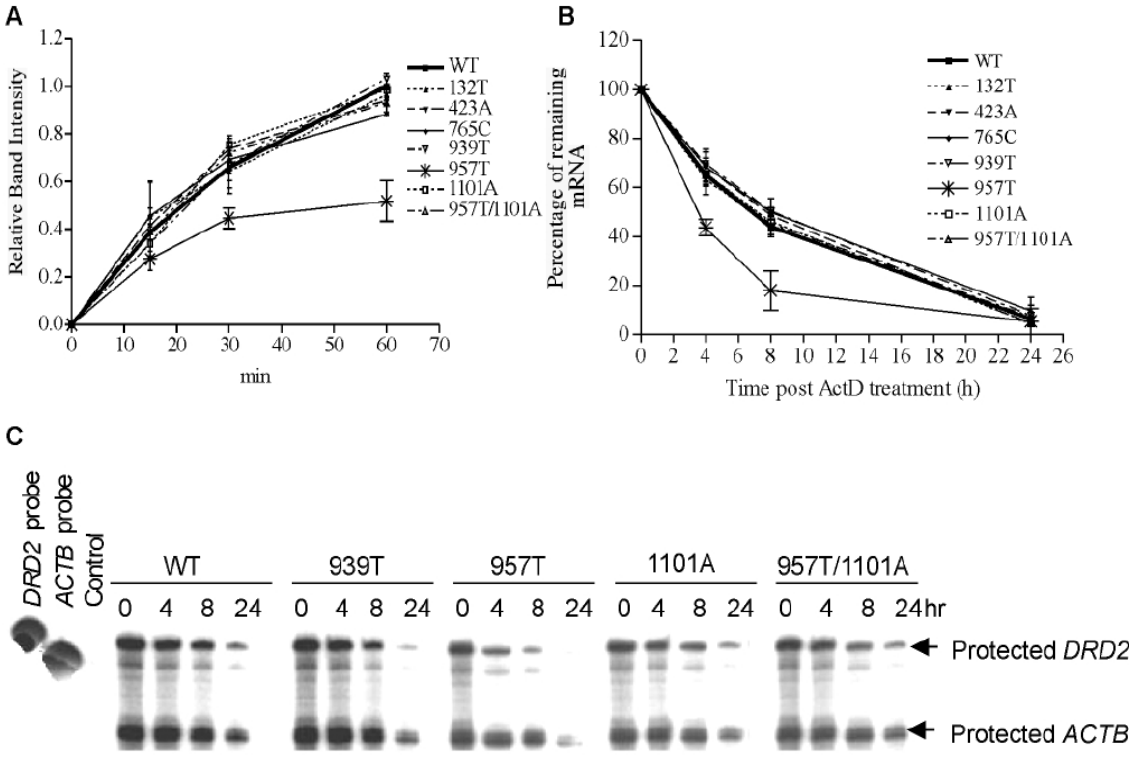
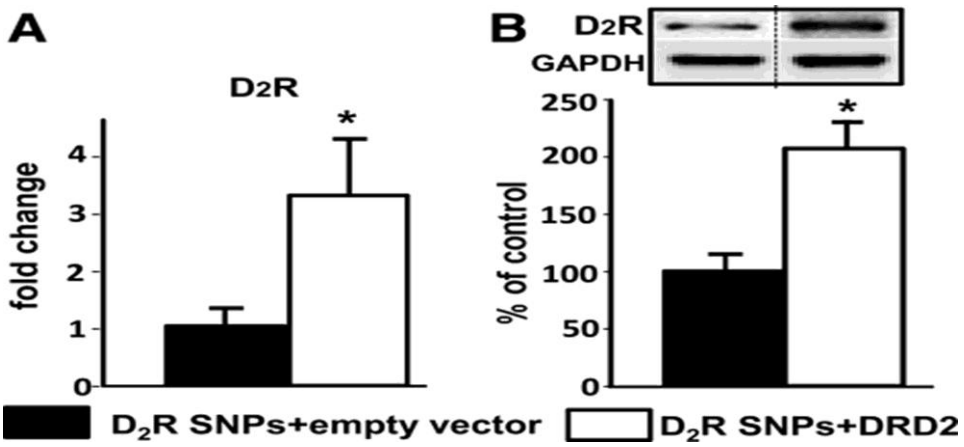


Fig2. *Schematic representation of the pattern of bond formation in the DRD2 gene.*



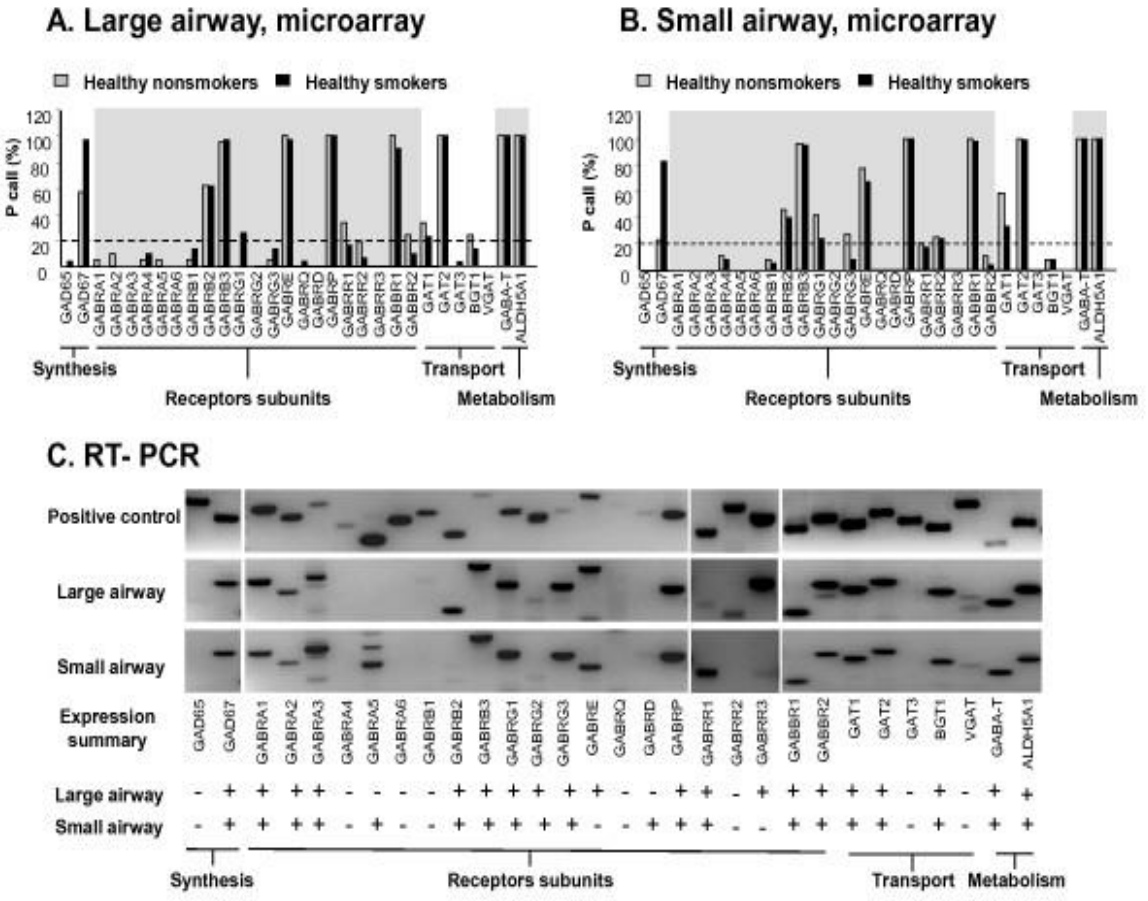


Fig3. *Schematic representation of the bond formation pattern in the intervening genes to induce alcoholism syndrome in RT-PCR.*

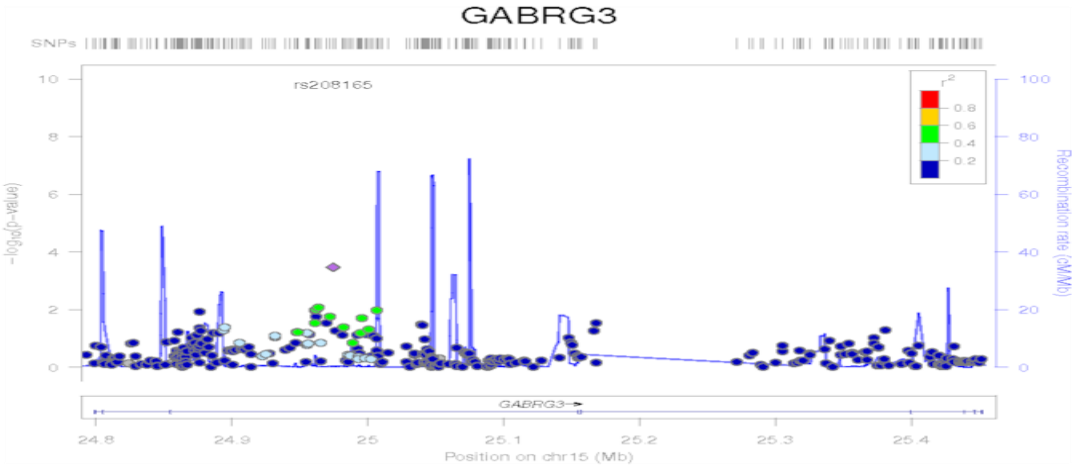


Fig4. *Schematic representation of single nucleotide polymorphism dispersion in the GABRG3 gene.*

DISCUSSION AND CONCLUSION

According to the results of sequencing the genome of patients with Alcoholism disease, and the genetic mutations DRD2, GABRG3 ADH1B3, ALDH, ADH1B2, CHRNA5, CHRNA3, CHRNA6 genes found that about 100% of patients with Alcoholism disease, they have these genetic mutations. Patients with Alcoholism disease, unusual and frightening images in the process of Alcoholism disease, experience. Lot epigenetic factors involved in Alcoholism disease. But the most prominent factor to induce Alcoholism disease, mutations

is DRD2, GABRG3ADH1B3, ALDH, ADH1B2, CHRNA5, CHRNA3, CHRNA6 genes. This gene can induce the birth and can also be induced in the adulthood.

REFERENCES

[1] Jill Littrell (2014). Understanding and Treating Alcoholism Volume I: An Empirically Based Clinician's Handbook for the Treatment of Alcoholism: volume Ii: Biological, Psychological, and Social Aspects of Alcohol Consumption and Abuse. Hoboken: Taylor and Francis. p. 55.

[2] Hasin, Deborah (December 2003)."Classification of Alcohol Use Disorders". http://pubs.niaaa.nih.gov/. Retrieved 28 February 2015.

[3] Association, American Psychiatric (2013). Diagnostic and statistical manual of mental disorders: DSM-5. (5 ed.). Washington, D.C.: American Psychiatric Association. pp. 490–497.

[4] Agarwal-Kozlowski K, Agarwal DP (April 2000). "[Genetic predisposition for alcoholism]". Ther Umsch. 57 (4): 179–84.

[5] Moonat, S; Pandey, SC (2012). "Stress, epigenetics, and alcoholism.". Alcohol research : current reviews. 34 (4): 495–505.

[6] Mersy, DJ (1 April 2003). "Recognition of alcohol and substance abuse.". American family physician. 67 (7): 1529–32.

[7] Blondell RD (February 2005). "Ambulatory detoxification of patients with alcohol dependence". Am Fam Physician. 71 (3): 495–502.

[8] DeVido, JJ; Weiss, RD (December 2012). "Treatment of the depressed alcoholic patient.". Current psychiatry reports. 14 (6): 610–8.

[9] Morgan-Lopez AA, Fals-Stewart W (May 2006). "Analytic complexities associated with group therapy in substance abuse treatment research: problems, recommendations, and future directions". Exp Clin Psychopharmacology. 14 (2): 265–73.

[10] Albanese, AP (November 2012). "Management of alcohol abuse.". Clinics in liver disease. 16 (4): 737–62.

[11] Tusa, AL; Burgholzer, JA (2013). "Came to believe: spirituality as a mechanism of change in alcoholics anonymous: a review of the literature from 1992 to 2012.". Journal of addictions nursing. 24 (4): 237–46.

[12] Testino, G; Leone, S; Borro, P (December 2014). "Treatment of alcohol dependence: recent progress and reduction of consumption.". Minerva medical. 105 (6): 447–66.

[13] Schuckit, MA (27 November 2014). "Recognition and management of withdrawal delirium (delirium tremens).".The New England Journal of Medicine. 371 (22): 2109–13.

[14] Hoffman PL, Tabakoff B (July 1996). "Alcohol dependence: a commentary on mechanisms". Alcohol. 31 (4): 333–40.

[15] Dunn N, Cook CC (March 1999). "Psychiatric aspects of alcohol misuse". Hospital medicine (London, England: 1998). 60 (3): 169–72.

[16] Biology ".The Volume Library. 1. Nashville, TN: The Southwestern Company. 2009. p. 29.

[17] O'Keefe, JH; Bhatti, SK; Bajwa, A; DiNicolantonio, JJ; Lavie, CJ (March 2014). "Alcohol and cardiovascular health: the dose makes the poison ... or the remedy.". Mayo Clinic Proceedings. 89 (3): 382–93.

[18] Testino G (2008). "Alcoholic diseases in hepato-gastroenterology: a point of view". Hepato gastroenterology. 55 (82–83): 371–7.

[19] Walter H, Gutierrez K, Ramskogler K, Hertling I, Dvorak A, Lesch OM (November 2003). "Gender-specific differences in alcoholism: implications for treatment". Archives of Women's Mental Health. 6 (4): 253–8.

[20] Sibaï K, Eggimann P (September 2005). "[Alcoholic ketoacidosis: not rare cause of metabolic acidosis]". Rev Med Suisse. 1 (32): 2106, 2108–10, 2112–5.

[21] Oscar-Berman M, Marinkovic K (2003). "Alcoholism and the brain: an overview". Alcohol Res Health. 27 (2): 125–33.

[22] Uekermann J, Daum I (May 2008). "Social cognition in alcoholism: a link to prefrontal cortex dysfunction?". Addiction. 103 (5): 726–35.

[23] Wetterling T, Junghanns K (September 2000). "Psychopathology of alcoholics during withdrawal and early abstinence". Eur Psychiatry. 15 (8): 483–8.

[24] Schuckit MA (November 1983). "Alcoholism and other psychiatric disorders". Hosp Community Psychiatry. 34 (11): 1022–7.

[25] Cowley DS (24 January 1992). "Alcohol abuse, substance abuse, and panic disorder". Am J Med. 92 (1A): 41S–

[26] 31.48S.

[27] Karol Brad R. (2002). "Women and alcohol use disorders: a review of important knowledge and its implications for social work practitioners". Journal of social work. 2 (3): 337–356.

[28] Jones AW (2006). "Urine as a biological specimen for forensic analysis of alcohol and variability in the urine-to-blood relationship". Topical Rev. 25 (1): 15–35.

[29] Berggren U, Fahlke C, Aaronson E, Karanti A, Eriksson M, Blennow K, Thelle D, Zetterberg H, Balldin J (September 2006).

[30] Das SK, Dhanya L, Vasudevan DM (2008). "Biomarkers of alcoholism: an updated review". Scand J Clin Lab Invest. 68 (2): 81–92.

[31] Crews F, He J, Hodge C (February 2007). "Adolescent cortical development: a critical period of vulnerability for addiction". Pharmacology Biochem Behave. 86 (2): 189–99.