Cardiovascular diseases and treatment methods

Umutcan Hendekci *1 , **Furkan Ayaz** 1,2

¹Mersin University, Biotechnology Department, Türkiye, 19133005@mersin.edu.tr
²Mersin University, Biotechnology Research and Application Center, Türkiye, furkanayaz@mersin.edu.tr

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Abstract
Cardiovascular diseases (CVD) are responsible for the majority of deaths globally and national scale. The risk factors of the disease can be examined under two groups. Among the modifiable risk factors, cigarette-alcohol use plays a major role. Some of the non-modifiable risk factors can be listed as gender, aging and genetic factors. The main ways to prevent CVD are increasing physical activity and quitting smoking and alcohol. There are new RNA-based approaches as well as biotechnology-based treatment methods for CVD.

Introduction

Cardiovascular diseases are the disease group with the highest mortality rate, especially in middle and advanced ages, and are responsible for approximately 33% of deaths in the world. Although it is 47.3% in Turkey, this rate is increasing day by day. Cerebrovascular diseases, coronary heart diseases, peripheral artery disease, hypertension, congenital heart diseases, rheumatic heart diseases, cardiomyopathies and heart failure are in the CVD group [1].

The main causes of cardiovascular diseases can be examined under two groups as modifiable and non-modifiable risk factors. Modifiable risk factors are cigarette-alcohol use, hypertension, obesity, diabetes mellitus (DM), low physical activity, psychosocial factors, and insufficient consumption of fruits and vegetables. Non-modifiable risk factors are gender, age and genetic factors [2].

Thanks to regular physical activity, a decrease in weight can be observed, a decrease in LDL cholesterol levels and an increase in HDL cholesterol levels. There are studies showing that changes in LDL and HDL cholesterol levels are associated with CVD, and it has been observed that physical activity reduces the risk of CVD. In addition, physical activity plays a positive role in smoking cessation. Studies have shown that the desire to smoke can be eliminated with physical activity. In order to reduce the risk of CVD, there are approaches such as not starting smoking or quitting smoking, weight control, increasing the consumption of fruits and vegetables, and doing sports [3].

Biotechnology based treatment methods are also available in the treatment of CVD. Melatonin level decreases with increasing age. The risk of CVD increases with age. As a result of the studies, it has been observed that melatonin affects the cardiovascular system [4]. Coenzyme Q is a molecule found in all cells that has an important role in mitochondrial respiration and cell metabolism. It is an antioxidant thanks to its membrane regulating property. In studies, positive results of Coenzyme Q supplementation have been observed in the CVD treatment process [4,5]. Studies have suggested that vitamin D deficiency is effective in cardiovascular diseases. In another study, it was determined that cholesterol accumulated in the arteries was associated with vitamin D deficiency [6]. Omega-3 and omega-6 fatty acids are vital for a healthy body. Studies have shown that omega fatty acids reduce CVD mortality. However, these oils should be used to a certain extent and the balance between them should not be

disturbed [7]. Other recent studies have been on netrin-1. However, using Netrin-1 in treatments is quite risky because it can be beneficial as well as harmful. Therefore, it is very important to choose the treatment method according to the patient [8]. Another natural compound used in the treatment of CVD is resveratrol. Resveratrol can be produced by a limited number of plants, some of which are; grapes, peanuts and strawberries. It is produced by the plant's protection mechanism as a result of plants being stressed. Since resveratrol is found in grapes, it is found in significant amounts in red wine. Therefore, an inverse correlation was found between CVD and wine consumption, and this paradox is called the French paradox. There are opinions that resveratrol can prevent CVD and can be used as a treatment [9,10].

Many studies are ongoing to learn the cause of CVD and to develop new treatment methods. A relationship was found between gut microbiota and CVD. It is thought that it may cause disease as a result of the deterioration of the microbiota. Modification of the intestinal microbiota can be achieved with products such as symbiotics, probiotics and prebiotics, and this method can be used as a treatment [11]. Another study is on Rho Kinase (ROCK) and it has been observed that it plays an imperative role in CVD. ROCK plays a role in the functions of cells that are effective in pathogenesis such as smooth muscle contraction, cell adhesion. Positive effects have been observed with prolonged inhibition of ROCK. It is thought that ROCK inhibitors can be used as a treatment method in CVD [12]. Angiotensin converting enzyme (ACE) maintains circulating homoestasis. The polymorphism in the ACE gene causes a change in the expression level and this change is thought to be the cause of CVD. If the correctness of this idea is confirmed, the usability of appropriate treatment methods such as ACE inhibitors is discussed [13]. In recent years, studies have focused on the relationship between long non-coding RNA (lncRNA) and CVD, and in this way, it is aimed to learn the CVD molecule mechanism and to develop treatment for it. A direct correlation was determined between atherosclerosis and the level of ANRIL expression. The ANRIL gene encodes a lncRNA. Knockdown studies have been performed on this gene and it is thought to have a significant relationship with CVD [14]. RNA-based therapies are also being studied. The cancer drug Doxorubicin is thought to cause mitochondrial breakdown and cause CVD diseases. The BRCA1 gene can induce Circ-INSR and increase its expression level, and mitochondrial fragmentation is reduced by the DNA-binding protein SSBP1, thereby protecting the heart from damage [15].

Results

The necessity of a healthy lifestyle to protect CVD has been proven by studies. Deficiency of biotechnology-based nutrients has been associated with CVD [1-15]. These deficiencies should be consumed in the right proportion as a method of protection or treatment from the disease. Although new treatment approaches are not definite yet, they are promising for the future. These methods should be studied more and more precisely [1-15].

Discussion

At global scale, cardiovascular diseases are the leading cause of death [1]. The society's taking into account the modifiable risk factors and living accordingly reduces the risk at a significant level [2,3]. The application of biotechnology-based treatment methods in the diet has a very high effect in the prevention and treatment of CVD. There are many studies on treatment methods [4-11]. Learning the effect that causes the disease at the molecular level will accelerate the finding of a treatment method. In view of the inconsistency of the obtained data, it is necessary to carry out more studies and focus on it [12-15].

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