

At the birth of a child in maternity hospitals for 3–4 days, a blood test is taken and neonatal screening is performed to detect congenital metabolic diseases. At this stage, possible detection of phenylketonuria, and, as a consequence, the earliest possible start of treatment to prevent irreversible effects.

With the timely diagnosis of pathological changes can be completely avoided, if from birth to puberty to limit the intake of phenylalanine with food. The late start of treatment, although it does have a certain effect, does not eliminate the previously developed irreversible changes in the brain tissue. PKU can lead to intellectual disability, seizures, behavioral problems, and mental disorders. It may also result in a musty smell and lighter skin. Babies born to mothers who have poorly treated PKU may have heart problems, a small head, and low birth weight.

Treatment is carried out in the form of a strict diet from the discovery of the disease at least until puberty, many authors are of the opinion that a lifelong diet is necessary. The diet excludes meat, fish, dairy products and other products containing animal and, in part, vegetable protein. Protein deficiency is replenished by amino acid mixtures without phenylalanine. Breastfeeding of children with phenylketonuria is possible and can be successful with certain restrictions. The calculation of the diet for a patient with PKU is performed by a doctor taking into account the need for phenylalanine and its allowable amount.

## **ANTIOXIDANT AND ANTI-INFLAMMATORY EFFECTS OF RESVERATROL MAKE IT A PROMISING AGENT FOR TREATING OXIDATIVE STRESS-RELATED DISEASES**

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**Introduction.** There is strong evidence that resveratrol (RSV), a polyphenol found in many plants, including grapevines, berries, peanuts, pomegranate, has antioxidant, anti-inflammatory, and anti-proliferative properties. Initially, researches on this compound date back to 1990s when the reports concerning the French paradox appeared. The French paradox is an epidemiological observation of a relatively low incidence of cardiovascular diseases observed in French people despite the high consumption rate of saturated fats and cholesterol in diet. This observation was linked to the relatively high intake of RSV-containing red wine. However, recent researches have aimed at revisiting this concept, challenging the role of RSV. Nevertheless, numerous studies have demonstrated beneficial health-related effects of RSV, making it a promising therapeutic agent. Thus, the **aim** of our paper is to review effects of RSV and evaluate its therapeutic potential.

**RSV effects.** Given that RSV has a polyphenolic structure, it shows a direct intrinsic antioxidant activity. This substantiates the possibility of using it for the treatment of diseases associated with excessive generation of reactive oxygen

species (ROS) and subsequent development of oxidative stress. However, antioxidant effects of RSV are not limited to its ability to scavenge free radicals. In particular, it has been demonstrated that RSV negatively affects the activity of ROS-generating NADPH oxidase, reducing ROS production. Moreover, it has been reported that RSV has protective impact on DJ-1 whose function is to maintain the activity of mitochondrial complex I. Since mitochondrial ROS are primarily generated by complex I, the DJ1-mediated maintenance of its activity is crucial for RSV-induced antioxidant effects.

Antioxidant properties of RSV may directly affect the rate of inflammation. In addition, its anti-inflammatory action can be mediated by downregulating cyclooxygenase-2, a pro-inflammatory enzyme involved in regulation of numerous vital cellular functions such as apoptosis, proliferation and differentiation. RSV is also known to inhibit the NF- $\kappa$ B signaling pathway. Taking into account the fact that NF- $\kappa$ B is a crucial inflammation-associated transcription factor, its inhibition by RSV decreases the rate of inflammation. It is worth mentioning that RSV impact on the NF- $\kappa$ B pathway is dose-dependent.

**Conclusions.** Despite well-established antioxidant and anti-inflammatory properties of RSV, its implementation is restricted by unknown optimal doses, RSV-drug interactions, and poorly studied physiological responses to RSV among individuals.

## **A POSSIBLE CONTRIBUTION OF CARRAGEENAN TO DIABETES MELLITUS TYPE 2 DEVELOPMENT**

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**Introduction.** Carrageenan or food additive E407 is a naturally occurring biopolymer of polysaccharide nature commercially produced from red algae. This sulfated galactan is used in food industry as a gel-forming agent. Nowadays it is considered safe by the Food and Drug Administration and the European Food Safety Authority. Moreover, according to a report of the Joint FAO/WHO expert committee on food additives (2014), carrageenan may be used even in infant formulas. However, several papers have appeared where carrageenan safety is revisited. In particular, there is some evidence that dietary carrageenan used in food industry is able to promote intestinal inflammation in rats orally exposed to its solution. Some researchers have also reported that carrageenan may affect carbohydrate metabolism.

The **aim** of our mini-review was to analyze recent studies that describe effects of food additive E407 on carbohydrate metabolism, glucose tolerance, and insulin resistance in order to assess its role in the etiology of diabetes mellitus type 2 (DM).

**Carrageenan impact on carbohydrate metabolism.** Several experiments conducted recently have shown that exposure to carrageenan by laboratory