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-kB signaling pathway. Taking into account the fact that NF-kB 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-kB 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

animals leads to hyperglycemia, decreased glucose tolerance, and insulin resistance. Thus, carrageenan is able to induce changes that underlie the development of DM. It has been shown that food additive E407 inhibits insulin signaling in the mouse liver. In an *in vitro* experiment, it has been demonstrated that insulin signaling is also inhibited in human HepG2 cells exposed to carrageenan. Carrageenan-induced insulin resistance is aggravated due to high fat diet in mice. However, it is interesting to note that carrageenan is not digested in the gut and due to its high molecular weight it cannot be absorbed. Thus, its effects on carbohydrate metabolism are highly likely indirect and may be explained by carrageenan-induced inflammation.

Conclusions. Carrageenans might negatively affect glucose tolerance, promote insulin resistance and inhibit insulin signaling contributing to DM development. However, further investigation of carrageenan impact on carbohydrate metabolism is necessary to confirm this hypothesis.

CONSEQUENCE OF TRIHALOMETHANE ON INFANT GROWTH

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Introduction. Disinfection of drinking water results in the formation of numerous disinfection byproducts (DBPs). The trihalomethanes are typically the most prevalent class of DBPs found in treated water and include chloroform, bromodichloromethane, dibromochloromethane, and bromoform. In the present study, we evaluated the effect of maternal TTHM exposure on several indices of fetal development.

Aims. Investigate the effect of total trihalomethane (TTHM) exposure on infant birth weight, low birth weight, and intrauterine growth retardation in term births.

Methods. According to data recorded in the Massachusetts birth registry, cross sectional analysis of 56 513 singleton infants born to residents of Massachusetts during 1990. Total trihalomethane samples were collected weekly on Mondays in vials containing ascorbic acid as a preservative for the trihalomethane compounds.Trihalomethane concentrations were determined. The total trihalomethane exposure estimates on gestational age, and environmental sampling data were done. Relying on weekly total trihalomethane samples, calculated each mother's trimester-specific and pregnancy average exposure, assuming that the mothers lived at the residence reported on the birth certificate throughout pregnancy. Analytical variability or precision for the total trihalomethane sampling method is estimated at about 20 percent.

Results. The results indicate that exposure to high trihalomethane levels during pregnancy is associated with reductions in birth weight among term births. Reductions of 2.8 g for each 20 μg/l increase in pregnancy average TTHM concentration and 2.6 g for each 20 μg/l increase in second trimester TTHM concentration were observed. Increased pregnancy average and second