

# Obesity and taurine

**Abbreviations:** BMI, body mass index; TC, total cholesterol; MSG, monosodium glutamate

## Editorial

Obesity is a medical condition in which excess body fat has accumulated to the extent that it may have a negative effect on health, leading to reduced life expectancy and/or increased health problems. In Western countries, people are considered obese when their body mass index (BMI), exceeds 30kg/m<sup>2</sup>.<sup>1</sup> Taurine (2-aminoethane sulfonic acid) is a  $\beta$ -amino acid that differs from other amino acids by having a sulfonic acid group instead of a carboxylic acid group. It is known as a conditionally essential amino acid, which is present in the brain, heart, liver, neutrophils, retina and kidneys of mammals in high concentrations.<sup>2-4</sup> It acts as an antioxidant, xenobiotic conjugant, osmoregulator, intracellular calcium flux regulator, bile acid conjugator, neuromodulator, cell membrane stabilizer and plays an important role in cell proliferation and viability.<sup>3-5</sup> Taurine is known to have regulatory activities in gastrointestinal tract including modulation of acid secretion and gastric motility;<sup>6</sup> besides, it protects the gastrointestinal mucosa from the injuries.<sup>7</sup>

Taurine plays an important role in reducing physiological stress. Recent studies indicated that taurine might serve as an anti-obesity agent at the cellular level. Taurine plays an important role in reducing fat deposition by modulating cellular pathways for lipid accumulation and stimulating mobility, but not the pathways for lipid biosynthesis and food intake.<sup>8</sup>

In a study, taurine was effective in treating fatty liver of children with simple obesity regardless of the success/failure of weight control.<sup>9</sup> In another study, dietary intake of taurine and glycine correlated negatively with body mass gain and total fat mass, while intake of all other amino acids correlated positively. Furthermore taurine and glycine intake correlated positively with improved plasma lipid profile, i.e., lower levels of plasma lipids and higher HDL-to-total cholesterol ratio.<sup>10</sup>

You et al.,<sup>11</sup> demonstrated that, the serum taurine level was negatively correlated with serum total cholesterol (TC) level and positively correlated with serum adiponectin level. Authors suggested that dietary taurine supplementation has beneficial effects on total cholesterol and adiponectin levels in high-fat diet-induced obesity rats.

In a study, dietary taurine supplementation prevented high fat diet-induced obesity with increased resting energy expenditure in rats.<sup>12</sup> Lin et al.,<sup>13</sup> indicated that taurine treatment attenuates the infiltration of adipose tissue by macrophages and modulates the phenotype of macrophages, which suggest that taurine is a valuable food constituent with a potential to attenuate chronic inflammation in adipose tissue and improve obesity-related insulin resistance. Cao et al.,<sup>14</sup> suggested that taurine prevents obesity in monosodium glutamate (MSG)-treated rats and may be closely associated with energy metabolism.

Maternal obesity is another dilemma with women. Maternal obesity increases the risk of poor pregnancy result including stillbirth, pre-eclampsia, fetal growth restriction and fetal overgrowth.

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These pregnancy complications are associated with dysfunctional syncytiotrophoblast, the transporting epithelium of the human placenta. Ditchfield et al.,<sup>15</sup> showed that taurine uptake into placental syncytiotrophoblast by the taurine transporter protein (TauT) is lower in obese women (BMI $\geq$ 30kg/m) than in women of ideal weight (BMI 18.5-24.9kg/m) and explored potential regulatory factors. They proposed that the reduction in placental TauT activity in maternal obesity could lower syncytiotrophoblast taurine concentration, compromise placental development and function and reduce the driving force for taurine efflux to the fetus thereby increasing the risk of poor pregnancy outcome.

Taurine has many different biological and physiological functions, including bile salt conjugation, osmoregulation, membrane stabilization, calcium modulation, antioxidation and immunomodulation. Obesity is associated with a higher risk of metabolic and cardiovascular diseases, cancer and other clinical conditions. Ingestion of taurine has been shown to alleviate metabolic diseases such as hyperlipidemia, diabetes, hypertension and obesity in animal models. Synthetic activity and concentration of taurine in adipose tissues and plasma have been shown to decrease in humans and animals during the development of obesity, suggesting a relationship between taurine deficiency and obesity.<sup>16</sup>

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## Conflict of interest

The author declares no conflict of interest.

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