Boston Therapeutics' sugardown(R) Significantly Reduces Glucose, Fructose and Insulin Levels in Sugary Soft Drinks

sugardown(R) Reduces Total Glycemic Index Including Fructose by up to 28 Percent and Insulin Levels by up to 18 Percent; Every Subject Had a Reduction Response

MANCHESTER, NH -- (Marketwired) -- 01/20/15 -- Boston Therapeutics, Inc. (OTCQB: BTHE) released additional trial results from its Sydney University study that showed consumption of sugardown® tablets prior to sugary beverages was found to significantly reduce the postprandial glucose, fructose and insulin responses to the sugary soft drink beverage. Every subject had a reduction response. Specifically, two sugardown® tablets were found to reduce glucose and fructose levels by up to a total of 20 percent and insulin levels by up to 14 percent. Four sugardown® tablets were found to reduce total glucose and fructose levels by up to 28 percent and insulin levels by up to 18 percent. These new data, which includes fructose levels, are in addition to the topline study results that were announced earlier this month that there was an average reduction in glycemic index (GI) of approximately 10 percent following soft drink consumption with two sugardown® tablets.

David Platt, Ph.D., Chief Executive Officer of Boston Therapeutics, said, "These study results provide additional support that sugardown® can be effective in reducing glucose, fructose and insulin levels when consumed with sugary beverages. The consumption of sugary soft drink beverages can lead to a wide range of health problems that affect the body's total glycemic index, including obesity, type 2 diabetes and fatty liver disease. We now have valid data on sugardown's effects with sugary beverages and solid food, which are supportive of its benefits as a dietary supplement that helps people manage their blood sugar."

The single-center, randomized, controlled, crossover study was conducted at Sydney University's Glycemic Index Research Service (SUGiRS) and co-sponsored by Boston Therapeutics and SugarDown Co Ltd (Hong Kong). A total of 10 healthy, overweight adults were enrolled in the study. This evaluation is carried out by SUGiRS and is validated through the use of thousands of reference foods and glucose directly. The evaluation is carried out through the well documented use of subjects who were administered three test portions: a serving of Sprite® soft drink containing 50 grams of carbohydrate; an equal portion of Sprite® with two sugardown® tablets; and an equal
portion of Sprite® with four sugardown® tablets. Blood samples were collected at regular intervals both before and after first ingestion of the soft drink. Each subject completed a total of six test sessions over four weeks. The primary outcomes of the study were postprandial incremental glucose area under the curve (iAUC) and postprandial incremental insulin area under the curve. These evaluations are directly measured against the response to a glucose load.

Glycemic Index represents the rise in a person's blood sugar level following consumption of a food or drink. Blood samples are used to construct a blood sugar response curve for a period of time following consumption. This time is critical to reducing the amplitude of the sugar rise. One may consume sugar but if spread over hours with no excursions outside the normal ranges, the HbA1c will not be increased. The iAUC over a defined period is calculated to reflect the rise (load) in blood glucose levels after eating the test food. The GI value is calculated by dividing the iAUC for a test food by the iAUC for a reference food. In this case it is directly measured to a glucose load and multiplied by 100. The average of the GI ratings from all subjects tested is published as the GI for that food.

**Obesity and Fructose**

Obesity is a major epidemic and excessive consumption of high-fructose corn syrup (HFCS) in beverages plays a role. According to the Department of Agriculture statistics, the consumption of HFCS increased 1,000 percent between 1970 and 1990, far exceeding the changes in intake of any other food or food group. Today, HFCS represents more than 40 percent of caloric sweeteners added to foods and beverages and is a caloric sweetener used in soft drinks in the United States. Fructose is part glucose and part fructose. These are two "sugars", one the body uses for energy and the other is made into fat if not utilized and converted into glucose. The digestion, absorption, and metabolism of fructose differ from the metabolism of glucose. In addition, unlike glucose, fructose does not stimulate insulin secretion or enhance leptin production (the hormone that signals us to stop eating). Because insulin and leptin act as key afferent signals in the regulation of food intake and body weight, this suggests that fructose may contribute to increased energy intake and weight gain. Furthermore, calorically sweetened beverages may enhance caloric overconsumption. Thus, the increase in consumption of HFCS has a temporal relation to the epidemic of obesity, and the overconsumption of HFCS in calorically sweetened beverages may play a role in the epidemic of obesity.

Fructose is a monosaccharide, a simple sugar. It is much sweeter than other forms of sugar. Refined cane sugar is essentially half fructose and half glucose. Honey is typically higher in fructose which is why it's so sweet. And high fructose corn syrup is about 55 percent fructose.

**What Makes Fructose So Dangerous?**

After eating fructose, 100 percent of the metabolic burden rests on the liver. But with glucose, the liver has to break down only 20 percent. Every cell in the body, including the brain, utilizes glucose. Therefore, much of it can be "burned up" immediately after it being consumed. By contrast, fructose is turned into free fatty acids (FFAs), VLDL (the damaging form of cholesterol), and triglycerides, which get stored as fat. The fatty acids
created during fructose metabolism (lipogenesis) accumulate as fat droplets in the liver and skeletal muscle tissues, causing insulin resistance and non-alcoholic fatty liver disease (NAFLD). Insulin resistance progresses to metabolic syndrome and type 2 diabetes.

Fructose is the most lipophilic carbohydrate. In other words, fructose converts to activated glycerol, which is directly used to turn FFAs into triglycerides. The more glycerol you have, the more fat you store. Glucose does not do this.

When we eat 120 calories of glucose, less than one calorie is stored as fat. 120 calories of fructose results in 40 calories being stored as fat. Consuming fructose is essentially consuming fat. The metabolism of fructose by the liver creates a long list of waste products and toxins, including a large amount of uric acid, which drives up blood pressure and causes gout.

Glucose suppresses the hunger hormone ghrelin and stimulates leptin, which suppresses appetite. Fructose has no effect on ghrelin and interferes with the brain's communication with leptin, resulting in overeating.

On the same note, more excessive fructose dangers stem from its particularly strong level of sweetness. A beverage high in fructose, such as soda or fruit juice, stimulates the pleasure centers of the brain so powerfully that it may lead to increased hunger, cravings, and eventually to an increased body weight set point. In this way, fructose in a concentrated, easily absorbed form (like high-fructose beverages) can impact the body's weight beyond what calories alone can explain.

As obesity has escalated to epidemic proportions around the world, many causes, including dietary components, have been suggested. Excessive caloric intake has been related to high-fat foods, increased portion sizes, and diets high both in simple sugars such as sucrose and in HFCS as a source of fructose.

Added sweeteners are important components of our diet. Sweet corn-based syrups were developed during the past three decades and now represent close to one-half of the caloric sweeteners consumed by Americans. The hydrolysis of sucrose produces a 50:50 molar mixture of fructose and glucose. The development of these inexpensive, sweet corn-based syrups made it profitable to replace sucrose (sugar) and simple sugars with HFCS in our diet, and they now represent 40% of all added caloric sweeteners. Fructose is sweeter than sucrose. In comparative studies of sweetness, in which the sweetness of sucrose was set at 100, fructose had a sweetness of 173 and glucose had a sweetness of 74.

HFCS has become a favorite substitute for sucrose in carbonated beverages, baked goods, canned fruits, jams and jellies, and dairy products. The major user of HFCS in the world is the United States; however, HFCS is now manufactured and used in many countries throughout the world. In the United States, HFCS is the major source of caloric sweeteners in soft drinks and many other sweetened beverages and is also included in numerous other foods; therefore, HFCS constitutes a major source of dietary fructose.

**Absorption of Fructose**
The digestive and absorptive processes for glucose and fructose are different. When disaccharides such as sucrose or maltose enter the intestine, they are cleaved by disaccharides. Fructose, in contrast, is absorbed further down in the duodenum and jejunum by a non-sodium-dependent process. After absorption, glucose and fructose enter the portal circulation and either are transported to the liver, where the fructose can be taken up and converted to glucose, or pass into the general circulation. The addition of small, catalytic amounts of fructose to orally ingested glucose increases hepatic glycogen synthesis in human subjects and reduces glycemic responses in subjects with type 2 diabetes mellitus, which suggests the importance of fructose in modulating metabolism in the liver. However, when large amounts of fructose are ingested, they provide a relatively unregulated source of carbon precursors for hepatic lipogenesis.

**Fructose and Insulin Release**

Circulating glucose increases insulin release from the pancreas. Fructose does not stimulate insulin secretion in vitro, probably because the β cells of the pancreas lack the fructose transporter, thus, when fructose is given in vivo as part of a mixed meal, the increase in glucose and insulin is much smaller than when a similar amount of glucose is given. However, fructose produces a much larger increase in lactate and a small (1.7%) increase in diet-induced thermogenesis (17), which again suggests that glucose and fructose have different metabolic effects.

**Fructose and Metabolism**

The metabolism of fructose differs from that of glucose in several other ways as well. Glucose enters cells by a transport mechanism that is insulin dependent in most tissues. In contrast with glucose, fructose enters cells via a transporter that does not depend on insulin. This transporter is absent from pancreatic β cells and the brain, which indicates limited entry of fructose into these tissues. Glucose provides "satiety" signals to the brain that fructose cannot provide because it is not transported into the brain.

**Overconsumption of Sweetened Beverages**

One model for producing obesity in rodents is to provide sweetened (sucrose, maltose, etc) beverages for them to drink. In this setting, the desire for the calorically sweetened solution reduces the intake of solid food, but not by enough to prevent a positive caloric balance and the slow development of obesity. Adding the same amount of sucrose or maltose as of a solid in the diet does not produce the same response. Thus, in experimental animals, sweetened beverages appear to enhance caloric consumption.

**Fructose and Soft Drinks**

A similar argument about the role of overconsumption of calorically sweetened beverages may apply to humans. When humans ingest energy-containing beverages, energy compensation is less precise than when solid foods are ingested. In a study in humans, healthy men and women were given a carbohydrate load as a calorically sweetened soda for four weeks. They gained significantly more weight than when the same carbohydrate load was given in a solid form as jelly beans.
sugardown®
sugardown® in its present formulation is a new natural dietary supplement product that can help people maintain healthier blood sugar levels and is the first chewable tablet of its kind. It was designed for people who are committed to a balanced diet and exercise to help keep their blood sugar levels healthy. In a previous study, sugardown® demonstrated up to a 60 percent reduction of glucose and insulin AUC when taken with rice (more complex polysaccharide), a food with a 100 percent glycemic index. Sugary soft drinks that also have high glycemic index, include disaccharides such as sucrose and maltose which is also found in beer.

According to the U.S. Centers for Disease Control and Prevention (CDC), one-half of the U.S. population consumes sugar drinks on any given day, and 25 percent consumes at least 200 kcal (more than one 12-oz can of cola). Each can of Cola that is non-diet may contain over 36 teaspoons of sugar, an amount that is three times the daily limit recommended by the American Heart Association in its recent guidance regarding sugar consumption. The CDC reports that sugar drinks have been linked to poor diet quality, weight gain, obesity, and, in adults, type 2 diabetes.

About SugarDown Co Ltd

SugarDown Co Ltd (Hong Kong) is an affiliate of Advance Pharmaceuticals Company (APC), organized under the laws of Hong Kong. Boston Therapeutics has entered into an agreement with APC to develop markets for sugardown® in Hong Kong, China and Macau in addition to 12 other countries in Asia.

About Boston Therapeutics, Inc.

Boston Therapeutics, headquartered in Manchester, NH, (OTCQB: BTHE) is an innovator in designing compounds using complex carbohydrate chemistry. The company’s product pipeline is focused on developing and commercializing therapeutic molecules that address diabetes and inflammatory diseases, including: BTI-320, a non-systemic chewable therapeutic compound designed to reduce post-meal glucose elevation, and IPOXYN, an injectable anti-necrosis drug designed initially to treat lower limb ischemia associated with diabetes. The company also developed and markets sugardown®, a non-systemic complex carbohydrate-based dietary food supplement designed to support healthy blood glucose. More information is available at www.bostonti.com.

Cautionary Note Regarding Forward Looking Statements

This press release contains, in addition to historical information, forward-looking statements within the meaning of the Private Securities Litigation Reform Act of 1995. These statements relate to future events or future financial performance, and use words such as "may," "estimate," "could," "expect" and others. They are based on our current expectations and are subject to factors and uncertainties which could cause actual results to differ materially from those described in the statements. Factors that could cause our actual performance to differ materially from those discussed in the forward-looking statements include, among others, that our plans, expectations and goals regarding our
clinical development of BTI-320 are subject to factors beyond our control. We can provide no assurance we or our commercial partner will be able to generate market demand for sugardown®, and thus we may not be able to generate revenue from sugardown® sales.

Moreover, we have incurred operating losses since our inception, and our ability to successfully develop, market, manufacture, distribute and sell drugs or over-the-counter products may be affected by our ability to manage costs and finance our continuing operations. For a discussion of additional risk and other factors affecting our business, see our Annual Report on Form 10-K for the year ended December 31, 2013, and our subsequent filings with the SEC.

You should not place undue reliance on forward-looking statements, and actual results may differ materially from the results anticipated in our forward-looking statements. Although subsequent events may cause our views to change, we disclaim any obligation to update forward-looking statements.

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