The Sprint 8 exercise protocol is a novel approach to fighting obesity efficiently among middle-aged females by substantially increasing GH serum levels naturally

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ABSTRACT

Background: The Sprint 8 exercise protocol described in Ready, Set, Go! Synergy Fitness for Time-Crunched Adults [7] has shown to fight obesity economically and time-efficiently by naturally invoking significant growth hormone (GH) release. GH serum levels are known to increase substantially after exercise, where it initiates lipolysis, inhibits the uptake and storage of other lipids, and induces muscle hypertrophy.

Objectives: The goal of this novel approach to fighting obesity was to efficiently maximize natural GH release among middle-aged African-American and Caucasian females [mean age = 45.9 (±7.7 yrs)] to metabolize adipose tissue and reduce hyperlipidemia by utilizing the Sprint 8 protocol. By documenting pre- and post-trial GH and lipid serum values, body fat %, and BMI, the correlated health benefits produced by each subgroup were established for future studies.

Method: This 8-week, free-living, Sprint 8 trial required 8 hours of exercise (20 min, 3 days/week), without dieting. The protocol intermittently incorporates intermediate fast-twitch (type IIA) and fast-twitch (type IIB) muscle fibers with their associated aerobic and anaerobic metabolic processes, substantially increasing body temperature and lactic acid production, which lowers blood pH, affording significant GH release.

Results: Among 22 participants, GH serum values increased 603% following the initial bout and 426% final bout. Post-Sprint 8 trial afforded reductions in body fat (-27.4%), BMI (-3.9%), cholesterol (-9.6%), LDLs (-12.4%), triglycerides (-16.1%), and HDLs increased 2.0%.

Conclusions: The Sprint 8 shows to be a natural, economical, and efficacious obesity-reduction strategy among middle-aged females. These individuals benefit socially and physically, while healthcare systems benefit financially.

INTRODUCTION AND BACKGROUND

Obesity

It is well documented that obesity is a major problem in the U.S. and other countries. It is associated with many diseases, disabilities, discriminations, and financial hardships.[1] Obesity is correlated with hyperlipidemia or elevated blood cholesterol, LDL, and triglycerides, accompanied with low HDL serum levels.[2] Hyperlipidemia leads to many cardiovascular diseases (CVDs), particularly atherosclerosis, which is the leading cause of death for men and women not only in the U.S., but in the world.[3,4] Additionally, the healthcare industry is burdened with the billions of dollars spent on the many ensuing chronic diseases derived from the over-shadowing obesity epidemic. Some of the diseases and problems evolving from obesity include: hyperlipidemia, diabetes, hypertension, coronary heart disease, osteoarthritis, gall bladder disease, impaired fertility, complications during pregnancy, breathlessness, sleep apnea, gout, low-back pain, and cancer. Indeed, the highest utilization costs in the healthcare industry belong to CVDs. [5,6] In order to reduce patient suffering, as well as alleviating the financial burden carried by the healthcare industry, the need for an efficacious intervention is crucial.

Indeed, these health complications and financial burdens derived from obesity plague the U.S., where Mississippi is consistently ranked as the most obese state. King's Daughters Medical Center (KDMC) in Brookhaven, MS has an interest in fighting obesity in our state and beyond by employing the Sprint 8 exercise protocol, as described in the book, Ready, Set, Go! Synergy Fitness for Time-Crunched Adults [7]. The Sprint 8 protocol shows here to be time-saving, financially efficient, and extremely effective at naturally inducing the release of growth hormone (GH) in significant amounts, which is known to be a major factor in triggering lipolysis.

Exercise and Growth Hormone

While obesity is the root of innumerable complications, exercise defends the body against just as many impediments. Furthermore, exercise as a drug of choice for personal health and wellness is monetarily free. It is also well documented that any exercise regimen is a major component to having a healthy lifestyle, and that growth hormone (GH) release and exercise are correlated. The National Institutes of Health reports that exercise-induced GH, when released, can increase up to 500% and stay significantly elevated beyond two hours.[8] During this time, GH is known to have multiple functions and produce numerous benefits, including playing a role in muscle hypertrophy and targeting the metabolism of triglycerides, the foundation of not only obesity and hyperlipidemia, but the other ensuing diseases previously noted.[9,10] It is generally accepted that anaerobic exercise shows to increase GH levels far more than aerobic activities alone; [10,11] however, research is scarce when studying intermediate fast-twitch (type IIA) and fast-twitch (type IIB) muscle fibers with their associated anaerobic metabolic processes and the resulting effect of GH release during exercise. What is understood is that when undertaking anaerobic activity, such as sprinting, lactic acid builds in the muscular system and ultimately the blood, where blood pH is lowered. Body temperature is also dramatically elevated during anaerobic exercise. Increased body temperature and the declining pH of blood induces GH release from the anterior pituitary gland, possibly for the purpose of repairing muscles by way of elevating amino acid uptake within muscle cells, increasing muscle cell protein synthesis, [12] and also increasing sweat release to cool the body.[3]

In turn, increased GH values trigger insulin-like growth factor 1 (IGF-1) release from the liver, as well as from other tissues, including muscle tissue. IGF-1 is known to be a potent anabolic hormone. GH and IGF-1 synergistically increase

muscle cell protein synthesis leading to muscle hypertrophy. [14,15] At the same time, GH initiates lipolysis within adipose tissue for energy. Adipose cell membranes contain GH-binding protein receptors. When binding to adipose receptors, GH stimulates the metabolism of triglycerides while inhibiting the uptake and accumulation of other circulating lipids.[16] Therefore, when utilizing types IIA and IIB muscle fibers intermittently during exercise (sprints), exceptionally high GH serum levels are produced, which direct the building of muscle mass that ultimately feeds on adipose for maintenance and increases the metabolic rate of fatty tissue. It is apparent that obesity is attacked far more efficiently than with the utilization of type I muscle fiber alone and that elevated exercise-induced GH serum levels show to have promising effects for the growing problem of obesity and associated hyperlipidemia.

However, most popular anti-obesity programs today only utilize slow-twitch (type I) muscle fibers, which include mostly aerobic physiological processes, such as walking, jogging, or the like. These programs do not take advantage of the surplus of GH that could be produced by incorporating type IIA and IIB muscle fibers, such as intermittent sprints, or other intensive bursts of activity. Furthermore, these popular programs focus on a calories-in, calories-out diet, accompanied with other lifestyle changes, and the recommended time necessary (30 minutes per exercise, 5 days a week) on the exercise component is daunting, while results are slow to develop. These low intensity and lengthy aerobic exercises, coupled with a strict diet, tend to reduce participant adherence to a program, and therefore often fail. [7, 17]

The Sprint 8 Protocol
The underlying thesis behind the Sprint 8 protocol is to optimally and efficiently maximize exercise-induced GH release by exercising under intermittent anaerobic conditions to intentionally and substantially elevate body temperature and induce lactic acid accumulation to subsequently reduce body fat.[7] As previously described, both of these processes are known to naturally induce the anterior pituitary gland to release significant quantities of GH into blood serum where it initiates lipolysis. Along with the common utilization of type I muscle fibers, the Sprint 8 intermittently incorporates types IIA and IIB muscle fibers, engaging anaerobic metabolism to continue muscle function. This produces large amounts of lactic acid and increases body temperature substantially, which stimulates GH release from the anterior pituitary gland into blood serum, where it then initiates adipose lipolysis and promotes muscle cell anabolism.[12,13] The abundant release of GH produced by the Sprint 8 regimen promotes major fitness-improving benefits, as well as time-saving benefits in regard to exercise, that are realistic and achievable by most healthy adolescents and adults. The Sprint 8 requires 20 minutes per bout, 3 times per week, totaling 8 hours of exercise per 8 weeks. Additionally, there is no diet required, and the muscular system benefits. The Sprint 8 exercise protocol was developed by a healthcare professional who is a certified trainer with the American College of Sports Medicine with 37 years of experience. It was created in the 1990s and is published in the 384-page book entitled Ready, Set, Go! Synergy Fitness for Time-Crunched Adults, by Campbell, (2001, 2010).[7] The protocol is consistent with the latest cardiovascular guidelines (2007) established by the American Heart Association and the American College of Sports Medicine for vigorous intensity cardiovascular exercise.[7] In this novel approach to finding relief for the obesity crisis, preliminary studies of the Sprint 8 protocol indicate that GH is released naturally and abundantly during the program and produces a wealth of promising data in dealing with not only reducing body fat and increasing muscle mass, but with the obesity and hyperlipidemia epidemic.

MATERIALS AND METHODS

Subjects (Pre-Sprint 8 trial)

Twenty-two (22) females, aged 30-57 [mean age (±SD)] = 45.9 (±7.7 yrs.), mean mass 97.3 kg (214 ±48.2 lbs.), mean body fat % = 40.2 (±7.2%), mean BMI = 36.0 (±7.6 kg/m2), mean GH baseline level = 0.94 (±1.2 ng/mL), mean blood cholesterol level = 207.6 (±39.8 mg/dL), mean blood LDL level 136.8 (±35.5 mg/dL), mean blood triglyceride level = 93.0 (±54.4 mg/dL), mean blood HDL level = 51.5 (±9.6 mg/dL), participated in this eight-week, free-living, Sprint 8 trial.

The 22 participants were composed of eleven (11) African-American females, mean age = 46.2 (±6.9 yrs), mean mass 106 kg (233 ±49.0 lbs.), mean body fat % = 43.1 (±6.2%), mean BMI = 39.5 (±6.9 kg/m2), mean GH baseline value = 0.72 (±1.1 ng/mL), mean blood cholesterol level = 196.8 (±31.6 mg/dL), mean blood LDL level 130.0 (±27.2 mg/dL), mean blood triglyceride level = 77.8 (±37.1 mg/dL), mean blood HDL level = 51.0 (±10.1 mg/dL); and eleven (11) Caucasian females, mean age = 45.6 (±8.7 yrs), mean mass 87.9 kg (194 ±40.0 lbs.), mean body fat % = 37.0 (±7.1%), mean BMI = 32.6 (±6.9 kg/m2), mean GH baseline value = 1.16 (±1.1 ng/mL), mean blood cholesterol level = 218.3 (±45.6 mg/dL), mean blood LDL level 143.6 (±42.5 mg/dL), mean blood triglyceride level = 113.4 (±61.7 mg/dL), mean blood HDL level = 52.0 (±9.5 mg/dL).

Before the initial blood work and first Sprint 8 bout, a KDMC, Sprint 8-certified trainer held a 45-minute preparatory session with all participants to explain the physiological concepts and protocol of the Sprint 8 program, as outlined in Campbell's book entitled Ready, Set, Go! Synergy Fitness for Time-Crunched Adults [7]. This project was free-living, where participants received no KDMC oversight during the eight-week program, as to represent a realistic setting, and their project adherence was strictly voluntary. Participants were asked to continue their usual, daily routines, with no dietary or prescribed medication changes. During this eight-week trial, the only variable on health measures was the impact of the Sprint 8 protocol.

Sprint 8 Trial

The Sprint 8 trial (2012) was conducted over an eight-week period, three Sprint 8 bouts per week, 20 minutes per bout, totaling 8 hours of exercise during the 8-week trial period, and with no specific diet. Participants were free to choose among stationary-upright or recumbent bikes, treadmills, and/or elliptical trainers as their exercise equipment at any given session. Individual Sprint 8 bouts were held at KDMC's Fitness Center, Brookhaven, MS. In any given bout, participants began with a 2.5-minute warm-up period, also known as the "active recovery pace" (ARP), followed by 30 seconds of full-sprint cardiovascular activity to increase body temperature and induce anaerobic metabolism with associated lactic acid build-up and elevated body temperature. Because fitness levels are different among participants, when gauging a "sprint" vs. an ARP, the sprint component should maintain a minimum of 40 RPMs higher than the ARP for the duration of the 30 second sprint. After the initial 30-second sprint component, subjects returned to their ARP for 1.5 minutes. After the 1.5-minute ARP, subjects repeated the sprint component for 30 seconds. This process continued until eight sprints were performed, with a final three-minute cool-down period, totaling 20 minutes per bout.

Blood Sampling and Analysis

A panel of lab tests indicative of health and wellness were conducted pre- and post-Sprint 8 trial for baseline measurements. Cholesterol, triglyceride, LDL, HDL, and GH serum levels were obtained from each participant to determine the impact of the program on basic health and wellness. Blood lipids (cholesterol, triglycerides, LDL, and HDL) were analyzed by a Siemens Dade Dimension® ExL™ integrated chemistry system at King's Daughters Medical Center, Brookhaven, MS. GH level assays were performed by Laboratory Corporation of America® Reference Laboratory (LabCorp) in Birmingham, AL, which analyzes GH by the immunochemiluminometric (ICMA) assay method. Initial 10 hour fasting blood tests were conducted pre-Sprint 8 trial to establish a baseline measurement. A total of 16.0 mL of whole blood was drawn from each subject, with 4.0 mL of plasma used for the basic metabolic and lipid panel measures, 5.0 mL of ethylenediaminetetraacetic acid (EDTA) plasma used to test glycated hemoglobin (A1C) levels, and 2.5 mL of serum sent to LabCorp for GH measure. Additionally, 7.0 mL of blood was drawn within 30 minutes of the initial bout of the Sprint 8 program with 2.5 mL of serum sent to LabCorp for another GH post-exercise measure. Final blood labs identical to those measured in week one were performed at the end of week eight, both fasting for a post-trial baseline, and within 30 minutes of the final bout of the program for a final GH measure.

Weight, Body Fat %, and BMI

Weight, body fat percentage, and BMI data were obtained pre- and post-Sprint 8. Weight measurements were obtained utilizing a Rice Lake® medical scale. Body fat percentage results were obtained by employing a Futrex-5000Ai® body fat analyzer which uses IR light refraction. The measurements were taken on the dominate bicep of test subjects. BMI measurements were acquired using the Body Mass Index Calculator of the U.S. Department of Health and Human Services National Heart, Lung, and Blood Institute. These measurements were obtained from participants pre- and post-Sprint 8 trial.

RESULTS

GH Values

The collective mean GH serum value of the 22 participants was 6.6 (±10.8 ng/mL) and was obtained within 30 minutes of finishing the initial bout, day 1. Here, GH levels increased 603% from the collective pre-trial baseline value (0.94 ng/mL). Additionally, the collective mean baseline GH serum level obtained pre-exercise, post-Sprint 8 trial was 0.76 (±0.86 ng/mL). When compared to 4.0 (±4.8 ng/mL), the collective mean GH serum level taken within 30 minutes of the post-final bout, post-Sprint 8 trial, the data affords a 426% increase of GH serum levels.

When observing the African-American group, the initial-bout GH serum value increased 263% from the pre-trial baseline value (0.72 ±1.0 ng/mL), where the African-American collective mean was 2.61 (±2.9 ng/mL), post-initial bout. The collective African-American post-trial, post-final exercise GH level was 1.3 (±0.7 ng/mL) and elevated 141% when compared to the collective mean baseline obtained pre-exercise, post-trial (0.54 ±0.51 ng/mL).

The Caucasian group increased GH serum values 814% during the initial bout, where the collective Caucasian mean GH serum level was 10.6 (±14.3 ng/mL) post-initial bout, increasing from the pre-trial baseline value of 1.16 (±1.3 ng/mL). The post-trial baseline GH value was 0.97 (±1.0 ng/mL) and increased 580%, where the post-trial, final-bout GH value

was 6.6 (±5.8 ng/mL). Collective, African-American subgroup, and Caucasian subgroup comparisons of GH serum values pre-Sprint 8 baselines to post-initial Sprint 8 bouts are represented in Graph 1. Subgroup and individual GH data are presented in Table 1 and Table 2.

Body Mass (Post-Sprint 8 trial)

The 22 participants collectively lost 67.3 kg (148 lbs.) of adipose tissue. On average, each subject lost 3.0 kg (6.8 lbs.) of fatty tissue. Post-trial mean body mass = 93.6 kg (206 ±48.2 lbs.). Post-trial mean body fat % = 29.2 (±5.3%), where mean body fat % reduction = 27.4%. Post-trial mean BMI = 34.6 (±7.7 kg/m2), and post-trial mean BMI reduction percentage = 3.9%.

The African-American group collectively metabolized 24.5 kg (54 lbs.) of adipose tissue. On average, each subject lost 2.23 kg (4.9 lbs.) of fatty tissue. The post-trial mean mass = 103.5 kg (228.4 ±48.1 lbs.). Post-trial mean body fat % = 31.5 (±4.2%), mean body fat % reduction = 27.0%, post-trial BMI = 38.1 (±7.3 kg/m2), post-trial mean BMI percentage reduction = 3.5%.

The Caucasian group collectively metabolized 42.7 kg (94 lbs.) of adipose tissue. On average, each subject lost 3.88 kg (8.5 lbs.) of fatty tissue. The post-trial mean mass = 84.0 kg (184.9 ±39.0 lbs.). Post-trial mean body fat % = 26.7 (±5.5%), mean body fat % reduction = 28.0%, post-trial BMI = 31.1 (±6.7 kg/m2), post-trial mean BMI percentage reduction = 4.6%. Individual and subgroup body mass data are represented in Table 3, Table 4, Table 5, and Table 6. Body fat percentage reductions are depicted in Graph 2.

Lipid Levels (Post-Sprint 8 trial)

Collective mean cholesterol serum level = 187.8 (±30.9 mg/dL), mean blood cholesterol % loss = 9.6%, mean blood LDL level = 120.5 (±28.6 mg/dL), mean blood LDL % loss = 12.4%, mean blood triglyceride level = 93.0 (±54.4 mg/dL), mean blood triglyceride % loss = 16.1%, mean blood HDL level = 52.0 (±9.9 mg/dL), mean HDL % increase = 2.0%.

The African-American subgroup cholesterol serum value = 180.3 (±24.3 mg/dL), mean blood cholesterol % loss = 8.4%, mean blood LDL level = 115.9 (±20.7 mg/dL), mean blood LDL % loss = 10.9%, mean blood triglyceride level = 74.5 (±38.1 mg/dL), mean blood triglyceride % loss = 4.3%, mean blood HDL level = 49.5 (±8.9 mg/dL), mean HDL % decrease = 2.9%.

The Caucasian subgroup cholesterol serum value = 195.4 (±35.9 mg/dL), mean blood cholesterol % loss = 10.5%, mean blood LDL level = 125.1 (±35.2 mg/dL), mean blood LDL % loss = 13.2%, mean blood triglyceride level = 82.3 (±26.4 mg/dL), mean blood triglyceride % loss = 27.4%, mean blood HDL level = 54.6 (±10.7 mg/dL), mean HDL % increase = 5.8%. Table 7 and Table 8 identify lipid value data. Graph 3 exhibits the changes of these lipid serum values in mg/dL among the African-American and Caucasian female subgroups, pre- and post-Sprint 8 trial.

DISCUSSION AND CONCLUSIONS

In this realistic-representative, free-living study with no specific diet, where Sprint 8 adherence was entirely voluntary, the 22 participants produced a collective body fat reduction of 27.4%, a BMI decrease of 3.9%, and metabolized 67.3 kg (148 lbs.) of adipose tissue, all within 8 hours of exercise during the 8-week trial. Among the African-American and Caucasian subgroups, body fat % reductions were remarkably similar, within 1.0% difference. The African-American subgroup pre-trial BMI value was substantially higher than the Caucasian subgroup pre-trial BMI value and appears not to have diminished as significantly as the Caucasian subgroup post-trial. However, that knowledge itself indicates that the declining African-American subgroup post-trial BMI value is as equally impressive as the Caucasian subgroup post-trial BMI value. BMI and body fat percentage of all African-American participants were found to be at unhealthy ranges pre-Sprint 8 trial. Furthermore, this is where their greatest results were produced, with a 27% reduction in body fat and BMI decreasing 3.5 %.

The collective GH value increased 603% after the initial bout, and 426% after the final bout of the trial. The Caucasian subgroup increased GH serum values substantially more so than the African-American subgroup. A possible explanation for this lies within the equipment utilized. In this study, participants were free to choose among stationary upright bicycles, stationary recumbent bicycles, treadmills, or elliptical trainers. The African-American subgroup tended to employ the upright and recumbent bicycles, where the Caucasian subgroup exploited the elliptical trainers and treadmills. Compared with the elliptical trainer and treadmill, the recumbent and upright bicycles show to be the least intensive of the Sprint 8 equipment options for this study, where no substantial upper-body activity assists during any given bout with the utilization of the bicycles. This could explain the reduced GH serum values presented with the African-American subgroup because body temperature and lactic acid production would be somewhat diminished without major upper body involvement. This possibly leads to an entirely separate study involving the psychology associated with how individuals wish to exercise, and perhaps their adherence to any given exercise program.

For both subgroups, the changes in serum lipid values were surprisingly unexpected, where the Sprint 8 protocol appears to mimic cholesterol-lowering medications. This demands further investigation. As previously discussed, this free-living study required participants to adhere to their daily lives as usual, including no changes in diet or prescribed medications. A number of the Sprint 8 test subjects described after the brief eight-week trial that they no longer required various medications that they were previously prescribed, most of which were high blood pressure or cholesterol-reducing medications. While not all participants were at risk for CVDs, cholesterol lowered 9.6%, LDL dropped 12.4%, triglycerides decreased 16.1%, while HDLs increased 2.0%, all within 8 weeks. Although body fat percentage and BMI values of the African-American subgroup were initially unsuitable, serum lipid values were in healthy ranges pre-trial. However, with the utilization of the least-intensive Sprint 8 equipment, this subgroup decreased its serum lipid value further into the healthy range, indicating the efficacy of the Sprint 8 protocol.

It is well known that GH has been touted as a miracle drug and an anti-aging medication. It has been banned from organized competitive athletics due to the anabolic effects and resulting unfair advantages it produces. Because of the many other positive physiological effects GH is known to produce, billions of dollars are spent annually on artificial and supplemental GH therapy, both legally and illegally. However, side effects are associated with artificial GH injections,

and they include: hyperlipidemia, arthritis, cardiomegaly, impotence, weakened glucose regulation and possibly type 1 diabetes. Research indicates that exercise-induced GH release is natural, more potent, and much safer than artificial injections. [10,16,18] However, past research has acknowledged the beneficial results exercise-induced GH produces and has proposed that finding the optimal factors in obtaining the greatest natural GH release remains elusive. These Sprint 8 trial results indicate that exceptionally high amounts of exercise-induced GH are released during this exercise protocol, and these elevated GH levels show to combat obesity. Due to the lack of research involving types IIA and IIB muscle fibers coupled with GH release during exercise, more studies are necessary regarding the Sprint 8. For example, studies involving other specific population groups, with a primary focus on childhood obesity; changes that may occur in naturally GH deficient patients; the health-related effects produced among participants undertaking long-term Sprint 8 activity; the Sprint 8 program linked with a diet; strength training with naturally elevated GH levels; the effects to those who have high blood pressure and/or taking prescribed cholesterol-lowering medications; participants with various hormonal imbalances, such as dysfunctional thyroid glands, declining testosterone levels, or depression; among others.

In a quest to fight obesity and all of these underlying problems within our state and beyond, King's Daughters Medical Center (KDMC) has a significant interest in exploring and utilizing the natural production of exercise-induced growth hormone (GH) in this contest. By tracking GH blood serum levels and corresponding changes in body fat percentage, BMI, and lipid values, and other measures as warranted, KDMC wishes to continue studying the health benefits produced by the Sprint 8 program on these various populations.

The Sprint 8 program is a novel approach to potentially fighting the obesity epidemic and the many health and financial problems stemming from it. Beyond improving patient health, the Sprint 8 program has the potential to relieve the burden placed on the health care industry by the innumerable diseases and disabilities derived from obesity and hyperlipidemia. Billions of dollars could be saved in health care expenses. As an alternative to the popular aerobic activities that require 30 minutes of exercise 5 days per week to be minimally effective and coupled with diets that depend on counting calories, the Sprint 8 proves to be time-efficient, at 20 minutes per bout, 3 bouts per week, for 8 weeks, totaling a mere 8 hours of exercise per 8 weeks, and requires no specific diet due to the significant amounts of GH the program yields. Building from this trial, as well as from future findings, an entire better way of life can be found for so many, categorized as obese or not.

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DECLARATION OF CONFLICTING INTERESTS

The authors declare that there is no conflict of interest.

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GRAPHS AND TABLES

Graph 1. Results of the Sprint 8 showing the increase in GH serum values (ng/mL) when comparing pre-Sprint 8 trial baseline and post-initial bout. Depicted are the participants collectively, the African-American subgroup, and the Caucasian subgroup, where GH values increased 603%, 263%, and 814%, respectively.

A comparison of increasing GH Serum Values among the collective group, African-American sub-group, and the Caucasion sub-group
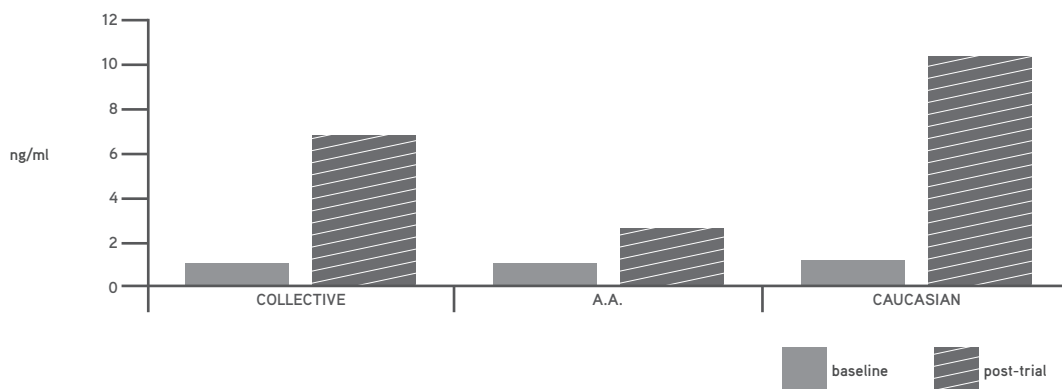
Graph 2. Results of the Sprint 8 showing the decrease in body fat % when comparing pre-Sprint 8 trial baseline body fat percentages and post- eight-week trial baseline body fat percentages. Depicted are the participants collectively, the African-American subgroup, and the Caucasian subgroup, where body fat percentages decreased 27.4%, 27.0%, and 28.0%, respectively.

A comparison of decreasing body fat % among the collective group, african-american sub-group, and the caucasion sub-group
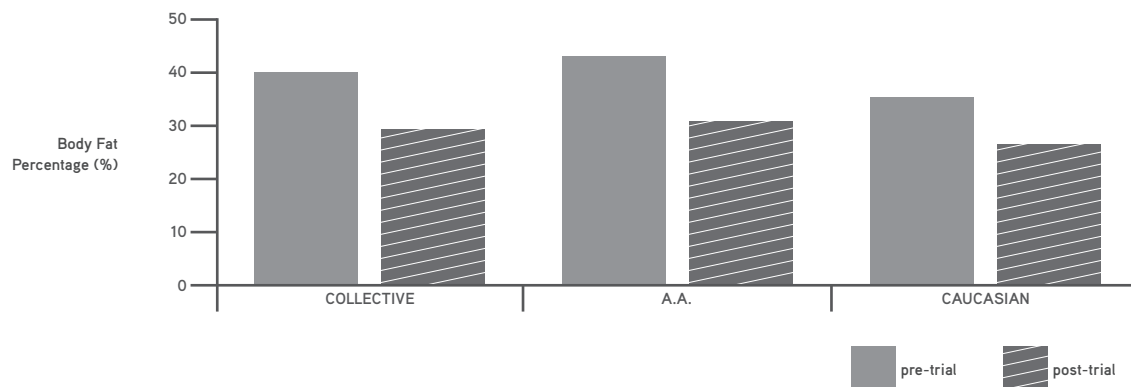
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Graph 3. Results of the Sprint 8 trial, comparing points (mg/dL) of cholesterol, LDL, and triglycerides, pre-Sprint 8 (baseline) and post-Sprint 8, among the African-American and Caucasian female subgroups.

A comparison of changing lipid values among Sprint 8 subgroups
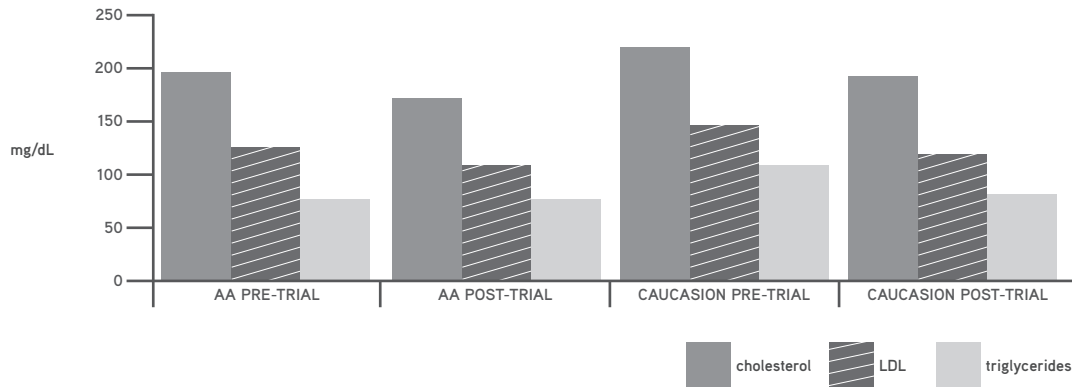
Table 1. Collected Sprint 8 data showing the increase in GH serum levels (ng/mL and % increase) from pre- and post-Sprint 8 baselines to post-initial and post-final bouts among the African-American subgroup.

| Participant/ Age	Pre-Sprint 8 Baseline GH (ng/mL)	Post-Initial Bout (ng/mL)	% GH Increase	Post-Sprint 8 Baseline GH (ng/mL)	Post-Final Exercise (ng/mL)	% GH Increase
A / 56	0.1	0.4	300%	0.3	0.7	133%
B / 43	1.1	5.3	382%	1.6	1.7	6%
C / 43	0.1	0.3	200%	0.1	0.6	500%
D / 51	0.1	0.2	100%	0.1	1.2	1,100%
E / 50	0.4	0.6	50%	1.1	1.3	18%
F / 50	0.6	5.6	833%	0.9	1.9	111%
G / 50	0.1	0.2	100%	0.2	0.6	200%
H / 43	0.7	2.2	214%	0.1	1.2	1,100%
I / 30	0.8	6.2	675%	0.8	1.5	88%
J / 50	3.8	7.4	95%	0.7	2.7	286%
K / 42	0.1	0.4	300%	0.1	0.3	200%
Mean / 46.2	**0.72**	**2.61**	**263%**	**0.54**	**1.30**	**141%**

Table 2. Collected Sprint 8 data showing the increase in GH serum levels (ng/mL and % increase) from pre- and post-Sprint 8 baselines to post-initial and post-final bouts among the Caucasian subgroup.

Participant/ Age	Pre-Sprint 8 Baseline GH (ng/mL)	Post-Initial Bout (ng/mL)	% GH Increase	Post-Sprint 8 Baseline GH (ng/mL)	Post-Final Exercise (ng/mL)	% GH Increase
L / 40	0.4	2.6	550%	0.9	2.0	122%
M / 55	1.0	9.8	880%	0.6	10.4	1,633%
N / 57	0.8	2.2	175%	0.3	1.3	333%
O / 52	4.0	17.3	333%	3.0	19.6	553%
P / 34	2.5	50.8	1,932%	2.8	13.5	382%
Q / 31	0.6	3.1	417%	2.0	6.1	205%
R / 49	2.5	11.1	344%	0.1	6.4	6,300%
S / 52	0.1	2.1	2,000%	0.1	1.0	900%
T / 46	0.8	7.2	800%	0.5	5.8	1,060%
U / 38	0.1	9.4	9,300	0.2	4.8	2,300%
V / 48	0.1	0.5	400%	0.2	1.7	750%
Mean / 45.6	**1.16**	**10.6**	**814%**	**0.97**	**6.6**	**580%**

Table 3. Collected Sprint 8 data showing changes in body mass among the African-American female participants.

Participant	Pre Sprint 8 Mass (kg/lbs.)	Post Sprint 8 Mass (kg/lbs.)	Difference In Body Mass (kg/lbs.)	% Difference In Body Mass
A	87/192	84/185	-3.2/-7	-3.6
B	104/229	105/230	+0.5/+1	+0.4
C	131/289	130/286	-1.4/-3	-1.0
D	99/218	95/210	-3.6/-8	-3.7
E	89/196	85/187	-4.1/-9	-4.6
F	70/153	68/150	-1.4/-3	-2.0
G	128/281	127/279	-0.9/-2	-0.7
H	101/222	100/222	0/0	0.0
I	146/320	140/309	-5.0/-11	-3.5
J	95/208	95/209	+0.5/+1	+0.5
K	117/258	111/245	-5.9/-13	-5.0
Mean	**106kg / 233lbs.**	**103kg / 228lbs.**	**-2.2kg / -4.9lbs.**	**-2.2%**

Table 4. Collected Sprint 8 data showing changes in body mass among the Caucasian female participants.

Participant	Pre Sprint 8 Mass (kg/lbs.)	Post Sprint 8 Mass (kg/lbs.)	Difference In Body Mass (kg/lbs.)	% Difference In Body Mass
L	104/228	98/215	-5.9/-13	-5.7
M	79/174	75/166	-3.6/-8	-4.6
N	85/187	80/175	-5.9/-13	-6.4
O	65/144	65/144	0/0	0
P	74/162	67/147	-6.8/-15	-9.3
Q	115/252	108/238	-6.4/-14	-5.6
R	97/213	92/203	-4.5/-10	-4.7
S	70/155	67/148	-3.2/-7	-4.5
T	111/244	109/239	-2.3/-5	-1.8
U	66/146	63/139	-3.2/-7	-4.5
V	101/223	100/220	-1.4/-3	-1.0
Mean	**88kg / 194lbs.**	**84kg / 185lbs.**	**-3.9kg / -8.6lbs.**	**-4.6%**

Table 5: Collected Sprint 8 data showing changes in body fat % and BMI among the African-American female

Participant	Pre Sprint 8 Body Fat %	Post Sprint 8 Body Fat %	Percent Difference	Pre Sprint 8 BMI (kg/m2)	Post Sprint 8 BMI (kg/m2)	Percent Difference
A	39.6	28.8	-27.3	31.5	30.3	-3.8
B	35.6	32.9	-7.6	35.9	36.2	+0.8
C	47.2	35.4	-25.0	45.3	45.3	0
D	44.7	30.5	-31.8	38.0	36.6	-3.7
E	41.2	29.2	-29.1	32.6	32.9	+0.9
F	38.4	25.8	-32.8	38.9	28.9	-26.0
G	50.5	36.5	-27.8	46.0	45.7	-0.65
H	33.9	24.4	-28.0	31.9	31.9	0
I	54.1	37.7	-30.3	54.1	52.2	-3.5
J	43.7	32.6	-25.4	39.3	39.7	+1.0
K	45.5	32.6	-28.4	40.4	39.2	-3.0
Mean	**43.1%**	**31.5%**	**27.0%**	**39.5 kg/m2**	**38.1 kg/m2**	**-3.5%**

Table 6. Collected Sprint 8 data showing changes in body fat % and BMI among the Caucasian female participants.

Participant	Pre Sprint 8 Body Fat %	Post Sprint 8 Body Fat %	Percent Difference	Pre Sprint 8 BMI (kg/m2)	Post Sprint 8 BMI (kg/m2)	Percent Difference
L	45.4	30.4	33.0%	40.5	38.2	-5.7
M	33.3	22.6	-32.1	26.5	25.3	-4.5
N	37.6	25.9	-31.1	30.6	28.7	-6.2
O	25.6	25.2	-1.6	25.5	25.5	0
P	27.2	20.2	-25.7	26.2	23.8	-9.2
Q	44.4	32.2	-27.5	40.7	38.5	-5.4
R	41.9	30.0	-28.4	37.1	36.0	-3.0
S	40.1	26.1	-34.9	28.3	27.1	-4.2
T	42.8	36.0	-15.9	40.9	38.9	-4.9
U	31.8	18.5	-41.8	23.6	22.4	-5.1
V	n/a	n/a	n/a	38.4	37.8	-1.6
Mean	**37.0**	**26.7**	**28.0%**	**32.6**	**31.1**	**4.6%**

Table 7. Collected Sprint 8 data showing changes in serum lipid levels, with corresponding percent differences, among the African-American female participants.

Part.	Cholesterol Pre/Post Sprint 8 (mg/dL)	Cholesterol %Difference	LDL Pre/Post Sprint 8 (mg/dL)	LDL %Difference	Trig. Pre/Post Sprint 8(mg/dL)	Trig. %Difference	HDL Pre/Post Sprint 8 (mg/dL)	HDL %Difference
A	168/162	-3.6	105/98	-6.7	64/71	+10.9	50/50	0
B	174/163	-6.2	119/106	-11.0	74/77	+4.1	40/42	+5.0
C	189/166	-12.2	133/111	-16.5	88/58	-34.1	38/43	+13.2
D	258/198	-23.3	180/125	-30.6	105/152	+44.8	57/43	-24.6
E	219/191	-12.8	161/141	-12.4	38/33	-13.2	50/43	-14.0
F	168/183	+8.9	98/116	+18.4	82/58	-29.3	54/55	+1.9
G	200/192	-4.0	143/126	-11.9	75/110	+46.6	42/44	+4.8
H	199/193	-3.0	113/108	-4.4	60/67	+11.7	74/72	-2.7
I	159/150	-5.7	105/92	-12.4	26/15	-42.3	49/55	+12.3
J	189/153	-19.0	115/93	-19.1	76/67	-11.8	59/47	-20.3
K	242/232	-4.1	159/159	0	168/111	-34.0	49/51	+4.0
Mean	**196.8/180.3**	**-8.4%**	**130/115.9**	**-10.9%**	**77.8/74.5**	**-4.3%**	**51.0/49.5**	**-2.9%**

Table 8. Collected Sprint 8 data showing changes in serum lipid levels, with corresponding percent differences, among the Caucasian female participants.

Part.	Cholesterol Pre/Post Sprint 8 (mg/dL)	Cholesterol %Difference	LDL Pre/Post Sprint 8 (mg/dL)	LDL %Difference	Trig. Pre/Post Sprint 8(mg/dL)	Trig. %Difference	HDL Pre/Post Sprint 8 (mg/dL)	HDL %Difference
L	148/166	+12%	99/106	+7.1	37/59	+59.4	42/48	+14.3
M	212/169	-20%	144/105	-27.0	90/92	+2.2	50/46	-8.0
N	226/178	-21%	165/119	-27.9	47/68	+44.7	52/45	-13.4
O	247/251	+1.6%	155/161	+3.9	163/106	-35.0	59/69	+17.0
P	308/243	-21%	230/179	-11.8	74/42	-43.2	63/56	-11.1
Q	181/169	-6.6%	102/93	-8.8	130/92	-29.2	53/58	+9.4
R	222/188	-15%	159/127	-20.1	91/74	-18.7	45/46	+2.2
S	260/246	-5.3%	176/180	+2.3	257/130	-49.4	33/40	+21.2
T	157/147	-6.4%	77/70	-9.0	113/97	-14.2	57/64	+12.3
U	223/193	-13.5%	152/128	-15.8	93/49	+59.4	52/55	+5.8
V	217/200	-7.8%	121/108	-10.7	152/96	-36.8	66/73	+10.6
Mean	**218.3/195.4**	**-10.5%**	**143.6/125.1**	**-13.2%**	**113.4/82.3**	**-27.4%**	**52.0/54.6**	**+5.8%**