FACT #1 WELLNESS & FITNESS-BODY OPTIMIZATION

INCREASE FITNESS ENDURANCE UP TO 32%*

*Scoon, G. S., Hopkins, W. G., Mayhew, S. & Cotter, J. D. *Effects of post-exercise sauna bathing on the endurance performance of competitive male runners.* Journal of science and medicine in sport / Sport Medicine Australia 10, 259-262, (2007)*

Abstract

The physiological adaptations to sauna bathing could enhance endurance performance. We have therefore performed a cross-over study in which six male distance runners completed 3 wk of post-training sauna bathing and 3 wk of control training, with a 3 wk washout. During the sauna period, subjects sat in a humid sauna at 89.9+/-2.0 degrees C (mean+/-standard deviation) immediately post-exercise for 31+/-5 min on 12.7+/-2.1 occasions. The performance test was a approximately 15 min treadmill run to exhaustion at the runner's current best speed over 5 km. The test was performed on the 1st and 2nd day following completion of the sauna and control periods, and the times were averaged. Plasma, red-cell and total blood volume were measured via Evans blue dye dilution immediately prior to the first run to exhaustion for each period. Relative to control, sauna bathing increased run time to exhaustion by 32% (90% confidence limits 21-43%), which is equivalent to an enhancement of approximately 1.9% (1.3-2.4%) in an endurance time trial. Plasma and red-cell volumes increased by 7.1% (5.6-8.7%) and 3.5% (-0.8% to 8.1%) respectively, after sauna relative to control. Change in performance had high correlations with change in plasma volume (0.96, 0.76-0.99) and total blood volume (0.94, 0.66-0.99), but the correlation with change in red cell volume was unclear (0.48, -0.40 to 0.90). We conclude that 3 wk of post-exercise sauna bathing produced a worthwhile enhancement of endurance running performance, probably by increasing blood volume.

FACT #2 WELLNESS & FITNESS-BRAIN OPTIMIZATION

STIMULATE & IMPROVE CENTRAL NERVOUS SYSTEM

Penzes P, Johnson RC, Sattler R, Zhang X, Huganir RL, Kambampati V et al. (2001). "The neuronal Rho-GEF Kalirin-7 interacts with PDZ domain-containing proteins and regulates dendritic morphogenesis". Neuron 29 (1): 229–42

Abstract

Spine function requires precise control of the actin cytoskeleton. Kalirin-7, a GDP/GTP exchange factor for Rac1, interacts with PDZ proteins such as PSD-95, colocalizing with PSD-95 at synapses of cultured hippocampal neurons. PSD-95 and Kalirin-7 interact in vivo and in heterologous expression systems. In primary cortical neurons, transfected Kalirin-7 is targeted to spines and increases the number and size of spine-like structures. A Kalirin-7 mutant unable to interact with PDZ proteins remains in the cell soma, inducing local formation of aberrant filopodial neurites. Kalirin-7 with an inactivated GEF domain reduces the number of spines below control levels. These results provide evidence that PDZ proteins target Kalirin-7 to the PSD, where it regulates dendritic morphogenesis through Rac1 signaling to the actin cytoskeleton.

FACT #3 WELLNESS & FITNESS-BODY OPTIMIZATION

INCREASE DELIVERY OF NUTRIENTS & PERFORMANCE OF MUSCLE GLYOGEN BY UP TO 50%*

Glycon reserves provide energy to power the muscles

King, D. S., Costill, D. L., Fink, W. J., Hargreaves, M. & Fielding, R. A Muscle metabolism during exercise in the heat in unacclimatized humans. J Appl Physiol 59, 1350-1354 (1985).

Abstract

The effect of heat acclimatization on aerobic exercise tolerance in the heat and on subsequent sprint exercise performance was investigated. Before (UN) and after (ACC) 8 days of heat acclimatization, 10 male subjects performed a heat-exercise test (HET) consisting of 6 h of intermittent submaximal [50% of the maximal O2 uptake] exercise in the heat (39.7 degrees C dB, 31.0% relative humidity). A 45-s maximal cycle ride was performed before (sprint 1) and after (sprint 2) each HET. Mean muscle glycogen use during the HET was lower following acclimatization [ACC = 28.6 +/- 6.4 (SE) and UN = 57.4 +/- 5.1 mmol/kg; P less than 0.05]. No differences were noted between the UN and ACC trials with respect to blood glucose, lactate (LA), or respiratory exchange ratio. During the UN trial only, total work output during sprint 2 was reduced compared with sprint 1 (24.01 +/- 0.80 vs. 21.56 +/- 1.18 kJ; P less than 0.05). This

reduction in sprint performance was associated with an attenuated fall in muscle pH following sprint 2 (6.86 vs. 6.67, P less than 0.05) and a reduced accumulation of LA in the blood. These data indicate that heat acclimatization produced a shift in fuel selection during submaximal exercise in the heat. The observed sparing of muscle glycogen may be associated with the enhanced ability to perform highly intense exercise following prolonged exertion in the heat.

FACT #4 WELLNESS & FITNESS-BODY OPTIMIZATION

REDUCE RISK OF DIABETES*

Reduce blood sugar level and increases insulin sensitivity by 30%

*Kokura, S. et al. International journal of hyperthermia: the official journal of European Society for Hyperthermic Oncology. Whole body hyperthermia improves obesity-induced insulin resistance in diabetic mice. North American Hyperthermia Group 23, 259-265 doi:10, 1080/ 02656730601176824 (2007).

Abstract

AIM:

In this study, we examined the efficacy of whole body hyperthermia (WBH) on obesity-induced insulin resistance in diabetic mice.

METHODS:

Male db/db mice were treated with WBH 3 times per week for 12 weeks. The rectal temperature of mice reached 38.0 degrees C 5 min after heating, and was kept at 38.0 degrees C for 30 min. At the end of each week, tail snip glucose levels were determined under fasting conditions. The GLUT-4 gene expression of muscle tissue was analyzed by real-time PCR.

RESULTS:

(1) WBH-treated db/db mice showed a significant decrease in fasting blood glucose level as compared with untreated db/db mice ($p < 0.01$). (2) Plasma insulin levels in untreated db/db mice at the age of 10 weeks were significantly increased compared with those of db/+ mice ($p < 0.0001$). On the other hand, the reduction (31%) in insulin levels in WBH-treated mice indicated improved insulin sensitivity. (3) The ability of WBH to increase insulin sensitivity was further established in glucose tolerance tests and insulin tolerance tests. (4) Urine albumin of db/db mice significantly increased compared with those of db/+ mice at 18 weeks of age ($p < 0.001$). This increase in urinary albumin was significantly inhibited by WBH ($p < 0.01$). (5) WBH up-regulated the expression of GLUT4 mRNA in skeletal muscle.

CONCLUSION:

Although the mechanisms have not yet been completely investigated, WBH may provide a new therapeutic or preventive modality against obesity-related diseases such as T2DM and metabolic or insulin resistance syndrome.

FACT #5 WELLNESS & FITNESS-BRAIN REPAIR & RESTORE

INCREASE GROWTH OF NEW BRAIN CELLS

Increase synthesis of brain-drived neurotrophic factor (BDNF) by over 300%

* *Influence of citalopram and environmental temperature on exercise-induced changes in BDNF, Maaike Goekint, Bart Roelands, Elsa Heyman, Rose Njemini, Romain Meeusen* Neuroscience letters 494, 150- 154, doi:10.1016/ j.neulet.2011.03.001 (2011) & Psychoneuroendocrinology 35, 1553-1564, doi:10.1016/j.psyneuen.2010.05.012 (2010).

Abstract

Purpose: Serum brain-derived neurotrophic factor (BDNF) is known to increase with exercise. This increase is believed to originate from the brain and it is suggested that monoamines are involved in BDNF regulation. Heat exposure could influence the supposed BDNF output from the brain. Therefore, we hypothesized that administration of a selective serotonin reuptake inhibitor could influence the exercise-induced increase in BDNF, and that peripheral BDNF will be higher when exercise is performed in the heat.*Methods*: Eleven well-trained males performed 4 experimental trials on a cycle ergometer with citalopram or placebo treatment (20 mg in 12 h)

in an environmental temperature of 18 °C or 30 °C. Blood samples (BDNF and cortisol) were taken at 4 time points: at rest, after 60 min at 55% W_{max}, after a time trial of 30 min at 75% W_{max} and following 15 min of recovery. Heart rate and core temperature were measured. *Results*: Performance on the time trial was 20% worse in 30 °C compared to 18 °C ($p < 0.01$), without influence of citalopram. Serum BDNF was found to be lower under citalopram treatment, while basal cortisol levels were increased ($p < 0.05$). Exercise triggered an increase in both BDNF and cortisol ($p < 0.001$). BDNF followed the same pattern as core temperature during exercise, with higher levels of both variables in 30 °C. Cortisol was also increased in 30 °C compared to temperate conditions ($p < 0.01$). *Conclusion*: Exercise caused a rise in serum BDNF and cortisol. This increase was enhanced with exercise in the heat. Since permeability of the blood–brain barrier increases with exercise in the heat, the hypothesis was raised that this causes a higher cerebral output of BDNF. Serotonergic stimulation did not increase peripheral BDNF, which was even lower with citalopram administration. Future research should focus on mechanisms behind BDNF increase with exercise.

FACT #6 WELLNESS & FITNESS-BRAIN REPAIRE & RESTORE

RESTORE YOUNG LEVELS OF BDNF IN THE AGING BRAIN UP TO 300%*

Brain-derived neurotrophic factor (BDNF) supports growth of existing brain cells and decreases brain cell atrophy and helps in Anorexia and Bulimia , Obsessive-Compulsive Disorder, and Depression.

**Goekint, M., Roelands, B., Heyman, E., Njemini, R. & Meeusen, R. Influence of citalopram and environmental temperature on exercise-induced changes in BDNF. Neuroscience letters 494, 150-154, doi:10.1016/j.neulet.2011.03.001 (2011).*

Abstract

PURPOSE:

Serum brain-derived neurotrophic factor (BDNF) is known to increase with exercise. This increase is believed to originate from the brain and it is suggested that monoamines are involved in BDNF regulation. Heat exposure could influence the supposed BDNF output from the brain. Therefore, we hypothesized that administration of a selective serotonin reuptake inhibitor could influence the exercise-induced increase in BDNF, and that peripheral BDNF will be higher when exercise is performed in the heat.

METHODS:

Eleven well-trained males performed 4 experimental trials on a cycle ergometer with citalopram or placebo treatment (20 mg in 12 h) in an environmental temperature of 18°C or 30°C. Blood samples (BDNF and cortisol) were taken at 4 time points: at rest, after 60 min at 55% W(max), after a time trial of 30 min at 75% W(max) and following 15 min of recovery. Heart rate and core temperature were measured.

RESULTS:

Performance on the time trial was 20% worse in 30°C compared to 18°C ($p<0.01$), without influence of citalopram. Serum BDNF was found to be lower under citalopram treatment, while basal cortisol levels were increased ($p<0.05$). Exercise triggered an increase in both BDNF and cortisol ($p<0.001$). BDNF followed the same pattern as core temperature during exercise, with higher levels of both variables in 30°C. Cortisol was also increased in 30°C compared to temperate conditions ($p<0.01$).

CONCLUSION:

Exercise caused a rise in serum BDNF and cortisol. This increase was enhanced with exercise in the heat. Since permeability of the blood-brain barrier increases with exercise in the heat, the hypothesis was raised that this causes a higher cerebral output of BDNF. Serotonergic stimulation did not increase peripheral BDNF, which was even lower with citalopram administration. Future research should focus on mechanisms behind BDNF increase with exercise.

FACT #7 WELLNESS & FITNESS-BRAIN OPTIMIZATION

PROTECT AGAINST NEURODEGENERATIVE DISEASES* *such as Alzheimer's, Parkinsons, Huntington, Dementia

Help prevent protein aggregation & boost repair of damaged proteins

**J Cell Commun Signal. 2014 Dec; 8 (4): 293-310. doi: 10.1007/s12079-014-0243-9. Epub 2014 Sep 11. Heat shock proteins in neurodegenerative disorders and aging.*

Abstract

Many members of the heat shock protein family act in unison to refold or degrade misfolded proteins. Some heat shock proteins also directly interfere with apoptosis. These homeostatic functions are especially important in proteinopathic neurodegenerative diseases, in which specific proteins misfold, aggregate, and kill cells through proteotoxic stress. Heat shock protein levels may be increased or decreased in these disorders, with the direction of the response depending on the individual heat shock protein, the disease, cell type, and brain region. Aging is also associated with an accrual of proteotoxic stress and modulates expression of several heat shock proteins. We speculate that the increase in some heat shock proteins in neurodegenerative conditions may be partly responsible for the slow progression of these disorders, whereas the increase in some heat shock proteins with aging may help delay senescence. The protective nature of many heat shock proteins in experimental models of neurodegeneration supports these hypotheses. Furthermore, some heat shock proteins appear to be expressed at higher levels in longer-lived species. However, increases in heat shock proteins may be insufficient to override overwhelming proteotoxic stress or reverse the course of these conditions, because the expression of several other heat shock proteins and endogenous defense systems is lowered. In this review we describe a number of stress-induced changes in heat shock proteins as a function of age and neurodegenerative pathology, with an emphasis on the heat shock protein 70 (Hsp70) family and the two most common proteinopathic disorders of the brain, Alzheimer's and Parkinson's disease.

FACT #8 WELLNESS & FITNESS-BRAIN OPTIMIZATION

INCREASE BETA-ENDORPHINS, HELP DRUG ADDICTION & PSYCHOLOGICAL DEPENDENCE

Induce dynorphin, beta endorphin interaction and a natural mu opioid reward state

**Narita, M et al. Heterologous mu-opiod receptor adaptation by repeated stimulation of kappa-opiod receptor: upregulation ,of G-protein activation and antinociception. Journal of neurocemistr 85, 1171-1179 (2003).*

*Vargas-Perez H, Ting-A Kee R, Walton CH, Hansen DM, Razavi R, Clarke L et al. (June 2009)."Ventral Tegmental Area BDNF Induces an Opiate-Dependent–Like Reward State in Naïve Rats"

Abstract

The present study was designed to investigate the effect of repeated administration of a selective j-opioid receptor agonist (1S-trans)-3,4-dichloro-N-methyl-N-[2-(1-pyrrolidinyl)-cyclohexyl]-benzeneacetamide hydrochloride [(–)U-50,488H] on antinociception and G-protein activation induced by l-opioid receptor agonists in mice. A single s.c. injection of (–)U- 50,488H produced a dose-dependent antinociception, and this effect was reversed by a selective j-opioid receptor antagonist nor-binaltorphimine (nor-BNI). Furthermore, a single s.c. pre-treatment with (–)U-50,488H had no effect on the l-opioid receptor agonist-induced antinociception. In contrast, repeated s.c. administration of (–)U-50,488H resulted in the development of tolerance to (–)U-50,488H-induced antinociception. Under these conditions, we demonstrated here that repeated s.c. injection of (–)U-50,488H significantly enhanced the antinociceptive effect of selective l-opioid receptor agonists endomorphin-1, endomorphin-2 and [D-Ala2,N-MePhe4,Glyol5] enkephalin (DAMGO). Using the guanosine-5¢-o-(3- [35S]thio) triphosphate ([35S]GTPcS) binding assay, we found that (–)U-50,488H was able to produce a nor-BNI-reversible increase in [35S]GTPcS binding to membranes of the mouse thalamus, which has a high level of j-opioid receptors. Repeated administration of (–)U-50,488H caused a significant reduction in the (–)U-50,488H-stimulated [35S]GTPcS binding in this region, whereas chronic treatment with (–)U-50,488H exhibited the increase in the endomorphin-1-, endomorphin-2- and

DAMGO-stimulated [35S]GTPcS bindings in membranes of the thalamus and periaqueductal gray. These results suggest that repeated stimulation of j-opioid receptors leads to the heterologous up-regulation of l-opioid receptor functions in the thalamus and periaqueductal gray regions, which may be associated with the supersensitivity of l-opioid receptormediated antinociception.

FACT #9 WELLNESS & FITNESS-BRAIN REPAIR & RESTORE

REPAIR CANCER CAUSING DNA MUTATIONS*

**J Cell Commun Signal. 2014 Dec; 8 (4): 293-310. doi: 10.1007/s12079-014-0243-9. Epub 2014 Sep 11. Heat shock proteins in neurodegenerative disorders and aging.*

Abstract

Many members of the heat shock protein family act in unison to refold or degrade misfolded proteins. Some heat shock proteins also directly interfere with apoptosis. These homeostatic functions are especially important in proteinopathic neurodegenerative diseases, in which specific proteins misfold, aggregate, and kill cells through proteotoxic stress. Heat shock protein levels may be increased or decreased in these disorders, with the direction of the response depending on the individual heat shock protein, the disease, cell type, and brain region. Aging is also associated with an accrual of proteotoxic stress and modulates expression of several heat shock proteins. We speculate that the increase in some heat shock proteins in neurodegenerative conditions may be partly responsible for the slow progression of these disorders, whereas the increase in some heat shock proteins with aging may help delay senescence. The protective nature of many heat shock proteins in experimental models of neurodegeneration supports these hypotheses. Furthermore, some heat shock proteins appear to be expressed at higher levels in longer-lived species. However, increases in heat shock proteins may be insufficient to override overwhelming proteotoxic stress or reverse the course of these conditions, because the expression of several other heat shock proteins and endogenous defense systems is lowered. In this review we describe a number of stress-induced changes in heat shock proteins as a function of age and neurodegenerative pathology, with an emphasis on the heat shock protein 70 (Hsp70) family and the two most common proteinopathic disorders of the brain, Alzheimer's and Parkinson's disease.

FACT #10 WELLNESS & FITNESS-BODY REPAIR & RESTORE

INCREASE MUSCLE RE-GROWTH OVER 30%*

**Sesby, J T. et al. Intermittent hyperthermia enhances skeletal muscle regrowth and attenuate oxidative damage following , reloading. J Appl Physiol (1985) 102, 1702-1707, dol: 10. 1152/japplphysiol.00722.2006 (2007).*

Abstract

Skeletal muscle reloading following disuse is characterized by profound oxidative damage. This study tested the hypothesis that intermittent hyperthermia during reloading attenuates oxidative damage and augments skeletal muscle regrowth following immobilization. Forty animals were randomly divided into four groups: control (Con), immobilized (Im), reloaded (RC), and reloaded and heated (RH). All groups but Con were immobilized for 7 days. Animals in the RC and RH groups were then reloaded for 7 days with (RH) or without (RC) hyperthermia (41-41.5 degrees C for 30 min on alternating days) during reloading. Heating resulted in approximately 25% elevation in heat shock protein expression ($P < 0.05$) and an approximately 30% greater soleus regrowth ($P < 0.05$) in RH compared with RC. Furthermore, oxidant damage was lower in the RH group compared with RC because nitrotyrosine and 4-hydroxy-2-nonenol were returned to near baseline when heating was combined with reloading. Reduced oxidant damage was independent of antioxidant enzymes (manganese superoxide dismutase, copper-zinc superoxide dismutase, catalase, glutathione peroxidase, glutathione reductase). In summary, these data suggest that intermittent hyperthermia during reloading attenuates oxidative stress and improves the rate of skeletal muscle regrowth during reloading after immobilization.

FACT #11 WELLNESS & FITNESS-BRAIN OPTIMIZATION

HELP BRAIN FUNCTION FASTER, INCREASE FOCUS & ATTENTION*

Increase norepinephrine by 310%, & prolactin levels by as much as 1000%*

** Hannuksela, M. L. & Ellahham, S. Benefits and risks of sauna bathing. The American journal of medicine 110, 118-126 (2001).*

Abstract

Although sauna bathing causes various acute, transient cardiovascular and hormonal changes, it is well tolerated by most healthy adults and children. Sauna bathing does not influence fertility and is safe during the uncomplicated pregnancies of healthy women. Some studies have suggested that long-term sauna bathing may help lower blood pressure in patients with hypertension and improve the left ventricular ejection fraction in patients with chronic congestive heart failure, but additional data are needed to confirm these findings. The transient improvements in pulmonary function that occur in the sauna may provide some relief to patients with asthma and chronic bronchitis. Sauna bathing may also alleviate pain and improve joint mobility in patients with rheumatic disease. Although sauna bathing does not cause drying of the skin-and may even benefit patients with psoriasis-sweating may increase itching in patients with atopic dermatitis. Contraindications to sauna bathing include unstable angina pectoris, recent myocardial infarction, and severe aortic stenosis. Sauna bathing is safe, however, for most people with coronary heart disease with stable angina pectoris or old myocardial infarction. Very few acute myocardial infarctions and sudden deaths occur in saunas, but alcohol consumption during sauna bathing increases the risk of hypotension, arrhythmia, and sudden death, and should be avoided.

** Kukkonen-Harjula, K. et al. Haemodynamic and hormonal responses to heat exposure in a Finnish sauna bath. European journal of applied physiology and occupational physiology 58, 543-550 (1989).*

Abstract

Eight healthy young men were studied during three periods of heat exposure in a Finnish sauna bath: at 80° C dry bulb (80 D) and 100° C dry bulb (100 D) temperatures until subjective discomfort, and in 80° C dry heat, becoming humid (80 DH) until subjective exhaustion. Oral temperature increased 1.1° C at 80 D, 1.9° C at 100 D and 3.2° C at 80 DH. Heart rate increased about 60% at 80 D, 90% at 100 D and 130% at 80 DH. Plasma noradrenaline increased about 100% at 80 D, 160% at 100 D and 310% at 80 DH. Adrenaline did not change. Plasma prolactin increased 2-fold at 80 D, 7-fold at 100 D and 10-fold at 80 DH. Blood concentrations of the beta-endorphin immunoreactivity at 100 D, adrenocorticotropic hormone (ACTH) at 100 D and 80 DH, growth hormone at 100 D and testosterone at 80 DH also increased, but cortisol at 80 D and 100 D decreased. The plasma prostaglandin E_2 and serum thromboxane B_2 levels did not change. Patterns related to heat exposure were observed for heart rate, plasma noradrenaline, ACTH and prolactin in the three study periods.

FACT #12 WELLNESS & FITNESS-BODY OPTIMIZATION

180% GREATER WEIGHT LOSS & 460% GREATER BODY FAT LOSS*

** Winterfeld HJ, Siewert J, Strangfeld D, et al. Die [Effects of saunatherapy on patients with coronary heart disease with hypertension after bypass operation, after heart aneurysm operation and essential hypertonia]. Z Gesamte Inn Med. 1993; 48:247–250.*

Abstract

It is reported about the influence of the sauna therapy on blood pressure, heart frequency, peripheric hemodynamics (Xenon-133-muscle-clearance) and the reaction of the cardiac output or left ventricular ejection fraction with hypertonia patients, patients with coronary heart disease (CHD) and hypertension and after aneurysm resection after heart infarction. It was shown that sauna therapy has a positive effect on hypertonic regulations troubles. One of the reasons of lowering blood pressure is the significant improvement of the peripheral hemodynamics. Sauna therapy does not result in any improvement of the left ventricles

pumping function after operation. All described groups of patients showed a good tolerance and compliance with sauna therapy.

*Winterfeld HJ, Siewert H, Strangfeld D, Warnke H, Kruse J, Engelmann U. Potential use of the sauna in the long-term treatment of hypertensive cardiovascular circulation disorders--a comparison with kinesiotherapy, Schweiz Rundsch Med Prax. 1992 Aug 25;81(35):1016-20.

Abstract

The authors report about the long-term response (one and three years) of blood pressure and heart frequency under rest and load (50 W) in patients with hypertension, coronary heart disease, essential hypertension and after aortocoronary venous-bypass operation (ACVB) (n = 65) under regular visits (twice a week) to the Finnish sauna. In comparison, 68 hypertensive patients who took a regular kinesiotherapy (running and swimming) were studied. Besides the parameters of heart circulation mentioned above, peripheric microcirculation (M. tibialis anterior) by means of xenon-133 muscle clearance and central hemodynamics by means of LVEF (single probe with In 113) were studied in CHD-patients. Cardiac output at rest and under 50 W load was recorded in hypertensive patients. It was shown that regular balneotherapy had a positive effect on regulation of blood pressure and hemodynamics in patients with hypertension or CHD with hypertension, as had kinesiotherapy in hypertensive patients.

FACT #13 WELLNESS & FITNESS-LONGEVITY & LIFE EXTENSION

INCREASE YOUR CHANCES BY 270% TO LIVE TO BE 100 YEARS OLD*

** FOXO3A genotype is strongly associated with humans longevity vol. 105 no. 37 > Bradley J. Willcox, 13987-13992*

Abstract

Human longevity is a complex phenotype with a significant familial component, yet little is known about its genetic antecedents. Increasing evidence from animal models suggests that the insulin/IGF-1 signaling (IIS) pathway is an important, evolutionarily conserved biological pathway that influences aging and longevity. However, to date human data have been scarce. Studies have been hampered by small sample sizes, lack of precise phenotyping, and population stratification, among other challenges. Therefore, to more precisely assess potential genetic contributions to human longevity from genes linked to IIS signaling, we chose a large, homogeneous, long-lived population of men well-characterized for aging phenotypes, and we performed a nested-case control study of 5 candidate longevity genes. Genetic variation within the *FOXO3A*gene was strongly associated with human longevity. The OR for homozygous minor vs. homozygous major alleles between the cases and controls was 2.75 (P = 0.00009; adjusted P = 0.00135). Long-lived men also presented several additional phenotypes linked to healthy aging, including lower prevalence of cancer and cardiovascular disease, better self-reported health, and high physical and cognitive function, despite significantly older ages than controls. Several of these aging phenotypes were associated with *FOXO3A*genotype. Long-lived men also exhibited several biological markers indicative of greater insulin sensitivity and this was associated with homozygosity for the *FOXO3A* GG genotype. Further exploration of the*FOXO3A* gene, human longevity and other aging phenotypes is warranted in other populations.

FACT #14 WELLNESS & FITNESS-BODY OPTIMIZATION

INCREASE FLEXIBILITY BY 205%*

The warmer the muscles, connectives tissues and tendons, the greater the performance flexibility

**Auburn University Montgomery Kinesiology Laboratory, study by Michele Olson, PhD, on Infrared heat and stretching*

Abstract

Uncovered! The secret to touching your toes: Stretching in the sauna. The medical community has known for years that deep, penetrating heat can help transform your stiff muscles into bendy rubber bands—and now a new study shows just how incredibly effective it can be. [sidebar] While any sauna will do, this particular case was made with research performed using a far infrared sauna (think of the ultrasound heat therapy physical therapists use, just without as

deep of a penetration into the muscles). Michele Olson, PhD, a principal researcher at the Auburn University Montgomery Kinesiology Laboratory, had 12 volunteers sit in a far infrared sauna for 10-15 minutes, and then do typical stretches, like hamstring stretches, in the sauna. For comparison, the same 12 people also relaxed in a standard gym environment (which is usually 70° F, 50% humidity) for 10-15 minutes, then did the same stretches.
The results? Stretching in the sauna led to a 205% improvement in flexibility. These triple digit gains jive with previous research suggesting that the more deeply penetrated the heat, the better your flexibility will be…

FACT #15 WELLNESS & FITNESS-BODY REPAIR & RESTORE

DECREASE CARDIOVASCULAR DISEASE UP TO 50%*

Association Between Sauna Bathing and Fatal Cardiovascular and All-Cause Mortality Events. JAMA Intern Med. 2015; 175(4):542-48. doi:.1001/jamainternmed.2014.8187.

Abstract

Importance: Sauna bathing is a health habit associated with better hemodynamic function; however, the association of sauna bathing with cardiovascular and all-cause mortality is not known.

Objective: To investigate the association of frequency and duration of sauna bathing with the risk of sudden cardiac death (SCD), fatal coronary heart disease (CHD), fatal cardiovascular disease (CVD), and all-cause mortality.

Design, Setting, and Participants: We performed a prospective cohort study (Finnish Kuopio Ischemic Heart Disease Risk Factor Study) of a population-based sample of 2315 middle-aged (age range, 42-60 years) men from Eastern Finland. Baseline examinations were conducted from March 1, 1984, through December 31, 1989.

Exposures: Frequency and duration of sauna bathing assessed at baseline.

Results: During a median follow-up of 20.7 years (interquartile range, 18.1-22.6 years), 190 SCDs, 281 fatal CHDs, 407 fatal CVDs, and 929 all-cause mortality events occurred. A total of 601, 1513, and 201 participants reported having a sauna bathing session 1 time per week, 2 to 3 times per week, and 4 to 7 times per week, respectively. The numbers (percentages) of SCDs were 61 (10.1%), 119 (7.8%), and 10 (5.0%) in the 3 groups of the frequency of sauna bathing. The respective numbers were 89 (14.9%), 175 (11.5%), and 17 (8.5%) for fatal CHDs; 134 (22.3%), 249 (16.4%), and 24 (12.0%) for fatal CVDs; and 295 (49.1%), 572 (37.8%), and 62 (30.8%) for all-cause mortality events. After adjustment for CVD risk factors, compared with men with 1 sauna bathing session per week, the hazard ratio of SCD was 0.78 (95% CI, 0.57-1.07) for 2 to 3 sauna bathing sessions per week and 0.37 (95% CI, 0.18-0.75) for 4 to 7 sauna bathing sessions per week (*P* for trend = .005). Similar associations were found with CHD, CVD, and all-cause mortality (*P* for trend ≤.005). Compared with men having a sauna bathing session of less than 11 minutes, the adjusted hazard ratio for SCD was 0.93 (95% CI, 0.67-1.28) for sauna bathing sessions of 11 to 19 minutes and 0.48 (95% CI, 0.31-0.75) for sessions lasting more than 19 minutes (*P* for trend = .002); significant inverse associations were also observed for fatal CHDs and fatal CVDs (*P* for trend ≤.03) but not for all-cause mortality events.

Conclusions and Relevance: Increased frequency of sauna bathing is associated with a reduced risk of SCD, CHD, CVD, and all-cause mortality. Further studies are warranted to establish the potential mechanism that links sauna bathing and cardiovascular health.

FACT #16 WELLNESS & FITNESS -BODY REPAIR & RESTORE

HELP ASTHMA,BRONCHITIS & COPD*

**Kiss D, Popp W, Wagner C, et al. Effects of the sauna on lung capacity, pulmonary function and cardiac output in healthy subjects. Respiration 1994;61:86-88.*

Abstract

The present study examined possible short-term effects of the heat stress during sauna bathing on gas exchange, especially in correlation with changes in cardiac output. The results obtained

are as follows: (1) The heat stress of sauna bathing caused a slight but not significant increase in diffusion capacity (p = 0.239) and no change in other pulmonary function parameters. (2) Cardiac output and cardiac index increased slightly but not significantly (p = 0.2455 and p = 0.2719). We conclude that heat stress in sauna neither influences gas exchange nor does it cause a significant increase in cardiac output.

FACT #17 WELLNESS & FITNESS-LONGEVITY & LIFE EXTENSION

EXTEND YOUR LIFESPAN UP TO 30%*

*The genetics of aging by Cynthia J. Kenyon, NATURE | Vol464 |25 March 2010

Abstract

The nematode Caenorhabditis elegans ages and dies in a few weeks, but humans can live for 100 years or more. Assuming that the ancestor we share with nematodes aged rapidly, this means that over evolutionary time mutations have increased lifespan more than 2,000-fold. Which genes can extend lifespan? Can we augment their activities and live even longer? After centuries of wistful poetry and wild imagination, we are now getting answers, often unexpected ones, to these fundamental questions.

FACT #18 WELLNESS & FITNESS-BODY OPTIMIZATION

REDUCE BLOOD PRESSURE UP TO 15%*

*Winterfeld HJ, Siewert J, Strangfeld D, et al.[Effects of saunatherapy on patients with coronary heart disease with hypertension after bypass operation, after heart aneurysm operation and essential hypertonia]. Z Gesamte Inn Med. 1993; 48: 247–250.

Abstract

It is reported about the influence of the sauna therapy on blood pressure, heart frequency, peripheric hemodynamics (Xenon-133-muscle-clearance) and the reaction of the cardiac output or left ventricular ejection fraction with hypertonia patients, patients with coronary heart disease (CHD) and hypertension and after aneurysm resection after heart infarction. It was shown that sauna therapy has a positive effect on hypertonic regulations troubles. One of the reasons of lowering blood pressure is the significant improvement of the peripheral hemodynamics. Sauna therapy does not result in any improvement of the left ventricles pumping function after operation. All described groups of patients showed a good tolerance and compliance with sauna therapy.

FACT #19 WELLNESS & FITNESS-BODY OPTIMIZATION

INCREASE GROWTH HORMONE UP TO 1600%*

STIMULATE GROWTH OF MUSCLE, LEAN BODY MASS & DECREASE BODY FAT

*Leppaluoto, J. et al. Endocrine effects of repeated sauna bathing. Acta physiologica Scandinavica 128, 467-470

Abstract

Ten healthy male and seven female volunteers were exposed to dry heat (in a Finnish sauna 80 degrees C) 1 h twice a day for 7 days. The levels of ACTH in plasma, cortisol, TSH, thyroid hormones, testosterone, gonadotropins, prolactin and GH in serum and urinary excretion of catecholamines were determined before the experiment, and on the first, third and seventh days. Females participated only in prolactin studies. During the experiments there were no statistically significant changes in serum thyroid hormones, TSH, testosterone, FSH and LH levels. Serum cortisol and plasma ACTH decreased and urinary catecholamine increased slightly at the end of the experiment (P less than 0.05). Serum GH and prolactin in males exhibited 16- and 2.3-fold increases (P less than 0.01), respectively. In females serum prolactin rose over four-fold (P less than 0.01). The GH rise in response to hyperthermia declined after the third day but prolactin remained elevated at the end of the experiments in males. The release of prolactin in females was also high and may be associated with the transient amenorrhoea that occurred in five out

of seven subjects after the experiment. The increased release of prolactin and perhaps that of GH may be associated to the heat-exposure-induced dehydration.

FACT #20 WELLNESS & FITNESS-BRAIN OPTIMIZATION

STRESS CAUSES PHYSICAL SYMPTOMS IN 74% OF PEOPLE

PHYSICAL ACTIVITY REDUCE STRESS & INCREASE THE PRODUCTION OF YOUR BRAIN'S NEUROTRANSMITTERS, ENDORPHINS.

**Statistic Brain Research Institute, American Institute of Stress, NY & Exercise and stress: Get moving to manage stress By Mayo Clinic Staff*

Abstract

You know that exercise does your body good, but you're too busy and stressed to fit it into your routine. Hold on a second — there's good news when it comes to exercise and stress. Virtually any form of exercise, from aerobics to yoga, can act as a stress reliever. If you're not an athlete or even if you're out of shape, you can still make a little exercise go a long way toward stress management. Discover the connection between exercise and stress relief — and why exercise should be part of your stress management plan.

FACT #21 WELLNESS & FITNESS-BRAIN REPAIR & OPTIMIZATION

SLEEP IS SUGGESTED TO REPAIR FATIGUE & TO ENHANCE MEMORY CONSOLIDATION*

40 MILLION AMERICANS SUFFER FROM OVER 70 DIFFERENT SLEEP DISORDERS

**Department of Psychology, Trent University, Peterborough, Canada. Be caught napping: you're doing more than resting your eyes, Pierre Maquet, Philippe Peigneux, Steven Laureys, & Carlyle Smith. **The National Sleep Foundation*

ABSTRACT

Sleep is suggested to repair fatigue or to enhance memory consolidation. A new paper shows that the beneficial effect of sleep is specific to the task and the brain regions engaged by it. *Be caught napping: you're doing more than resting your eyes - ResearchGate.*

FACT #22 WELLNESS & FITNESS-BODY OPTIMIZATION

37% OF WOMEN, 35% OF MEN ARE OBESE* 2 IN 3 ADULTS ARE OVERWEIGHT OR OBESE**

Being overweight or obese increases the risk of chronic health conditions, such as diabetes and cardiovascular disease

**Prevalence of Overweight and Obesity in the United States, 2007-2012 ONLINE FIRST Lin Yang, PhD; Graham A. Colditz, MD, DrPH, JAMA Intern Med. Published online June 22, 2015. doi:10.1001/jamainternmed.2015.2405*
***National Institute of Diabetes and Digestive and Kidney diseases*

Abstract

Overweight and obesity are associated with various chronic conditions.[1] These conditions are considerable health care and societal burdens, yet could potentially be averted by preventing weight gain and obesity. In a prior analysis, now almost 20 years old, Must et al[2] used a nationally representative data set from 1988 through 1994 and reported the US chronic disease burden associated with body mass index (BMI), thus informing clinical practice and the priorities for cost-effective prevention strategies. Using the most recent data in the National Health and Nutrition Examination Survey (NHANES, 2007-2012), we updated the prevalence of overweight and obesity by sex, age, and race/ethnicity and compared the values with those of the earlier study.[2]

FACT #23 WELLNESS & FITNESS-BODY REPAIR & OPTIMIZATION

QUICK WEIGHT LOSS IS AS GOOD AS GOING SLOW*

**The Lancet Diabetes & Endocrinology, Weight loss: slow and steady does not win the race*
Corby K Martin, Kishore M Gaddeemail Published Online: 15 October 2014

Abstract

In *The Lancet Diabetes & Endocrinology*, Katrina Purcell and colleagues[1] report the results of a trial showing that weight regain is similar after gradual or rapid weight loss. Their study has

implications for people seeking weight loss treatment and professionals who provide such treatment. In this two-part trial done in Australia, 200 obese individuals were randomly assigned to one of two diets in phase 1. The rapid weight loss group used a very low calorie diet (total 450–800 kcal/day) for 12 weeks.

FACT #24 WELLNESS & FITNESS-BRAIN OPTIMIZATION

BDNA STIMULATION REDUCES OBESITY & DECREASES APPETITE

LACK OF BDNF CAN CAUSE SIGNIFICANT PROBLEMS, INCLUDING DRAMATICALLY INCREASED APPETITE (HYPERPHAGIA) AND SEVERE OBESITY.

**Baoji Xu (Scripps Research Institute), Guey-Ying Liao, Clint E. Kinney of TSRI, and Niaz Sahibzada (Georgetown University Medical) "Discrete BDNF Neurons in the Paraventricular Hypothalamus Control Feeding and Energy Expenditure," June 2015*

Abstract

While it is well-known that weight gain results from an imbalance between what we eat and our energy expenditure, what is not obvious is the role that the nervous system plays in controlling that energy balance. Now scientists from the Florida campus of The Scripps Research Institute (TSRI) have shed light on that question.

"Our new study has identified novel populations of nerve cells that regulate appetite, thermogenesis and physical activity," said TSRI Professor Baoji Xu, who led the research. "We think these neurons could be targets for drug development."

The findings were published by the journal *Cell Metabolism* online ahead of print on June 11.

In the new study, Xu and his colleagues examined several groups of neurons that express a substance called "brain-derived neurotrophic factor" (BDNF) within a small brain region called the paraventricular hypothalamus.

FACT #25 WELLNESS & FITNESS-BODY REPAIR & OPTIMIZATION

THE BEST DIET IS THE ONE YOU CAN FOLLOW

THERE'S RELATIVELY LITTLE DIFFERENCE IN THE EFFECTIVENESS OF VARIOUS LOW-FAT OR LOW-CARB DIETS*

**Journal of the American Medical Association, Comparison of Weight Loss Among Named Diet Programs in Overweight and Obese Adults-A Meta-analysis. JAMA. 2014;312(9):923-933. doi:10.1001/jama.2014.10397.*

Abstract

Importance: Many claims have been made regarding the superiority of one diet or another for inducing weight loss. Which diet is best remains unclear.

Objective: To determine weight loss outcomes for popular diets based on diet class (macronutrient composition) and named diet.

Study Selection: Overweight or obese adults (body mass index ≥25) randomized to a popular self-administered named diet and reporting weight or body mass index data at 3-month follow-up or longer.

Conclusions and Relevance: Significant weight loss was observed with any low-carbohydrate or low-fat diet. Weight loss differences between individual named diets were small. This supports the practice of recommending any diet that a patient will adhere to in order to lose weight.

FACT #26 WELLNESS & FITNESS-BODY OPTIMIZATION

CORE BODY TEMPERATURE is ASSOCIATED WITH WEIGHT MANAGEMENT, WEIGHT GAIN and/or OBESITY

INCREASED/HYPERTHERMIC CORE BODY TEMPERATURE HELPS REGULATE BODY WEIGHT

**Science Daily, 18 March 2015, "Body Temperature and Obesity: New Study Suggests Connection".*
Chronobiology International, Evidence of a diurnal thermogenic handicap in obesity, Daniela Grimaldi, et al, 2015; 32(2):

Abstract

Importance: A new study suggests that a biological inability to create sufficient core body heat, i.e. evidence of a thermogenic handicap, is associated with obesity and could be linked to obesity epidemic. It could be inferred that reduced body temperature, or inability to raise the

core body temperature, is much more prevalent in obese individuals and this handicap predisposes subjects to becoming obese.
Objective: To determine weight management protocols and achievement of weight loss goals and outcomes for obese persons.popular diets based on diet class (macronutrient composition) and named diet.
Study Selection: To consider the role of hyperthermic conditioning and/or active thermal exercise as a tool in weight management.
Conclusions and Relevance: The relationship of core body temperature to obesity and the advent of hyperthermic conditioning suggests another means of natural physiologic stimulation and non-drug methodology for weight management.

FACT #27 WELLNESS & FITNESS-BODY OPTIMIZATION

BDNF REGULATES THERMOGENESIS, WEIGHT LOSS, WEIGHT GAIN, APPETITE & PHYSICAL ACTIVITY

BRAIN CHEMISTRY PLAYS A KEY ROLE IN CONTROLLING CALORIC ENERGY IMBALANCES

**Science Daily,Unique role of nerve cells in body's use of energy. June 11, 2015, Scripps Research Institute.*

Abstract

Importance: While it is well-known that weight gain results from an imbalance between what we eat and our energy expenditure, not so obvious is the role the nervous system plays in controlling energy balance.
Objective: To assist and determine weight loss outcomes by controlling thermogenesis through hyperthermic conditioning as a form of physical stimulation for managing energy imbalances.
Study Selection: Isolation and identification of several groups of neurons (brain-derived neurotropic factor (BDNF)) within a small brain region called the paraventricular hypothalamus. Insufficient/decreased BDNF can cause significant problems, among them, dramatically increased appetite (hyperphagia), causing weight gain and/or severe obesity. BDNF also was/is shown to be located in two different sections of the brain, which is not yet fully understood and requires more study related to the intercommunication of these geographically-distinct BDNF clusters and the control of body weight.
Conclusions and Relevance: The study suggests that lack of BDNF can also impair thermogenesis – the ability of cells to burn fact to produce heat – which suggests hyperthermic conditioning should be considered as a means to raise core body temperature and increase BDNF for weight management protocols and weight loss goals.