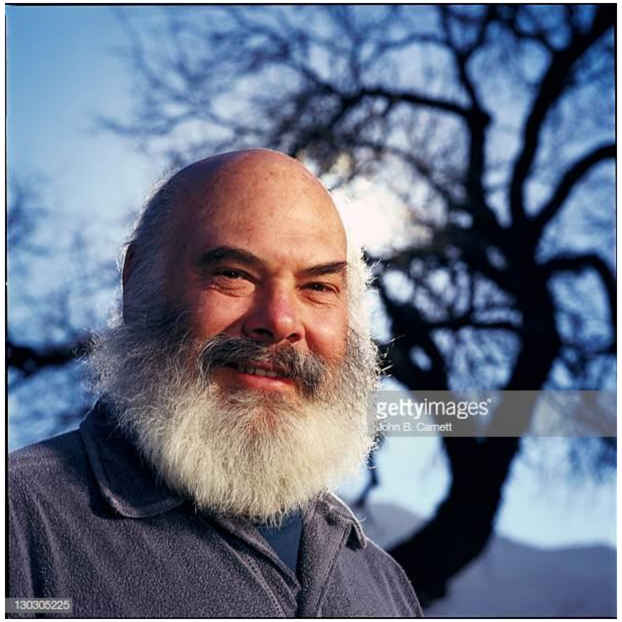
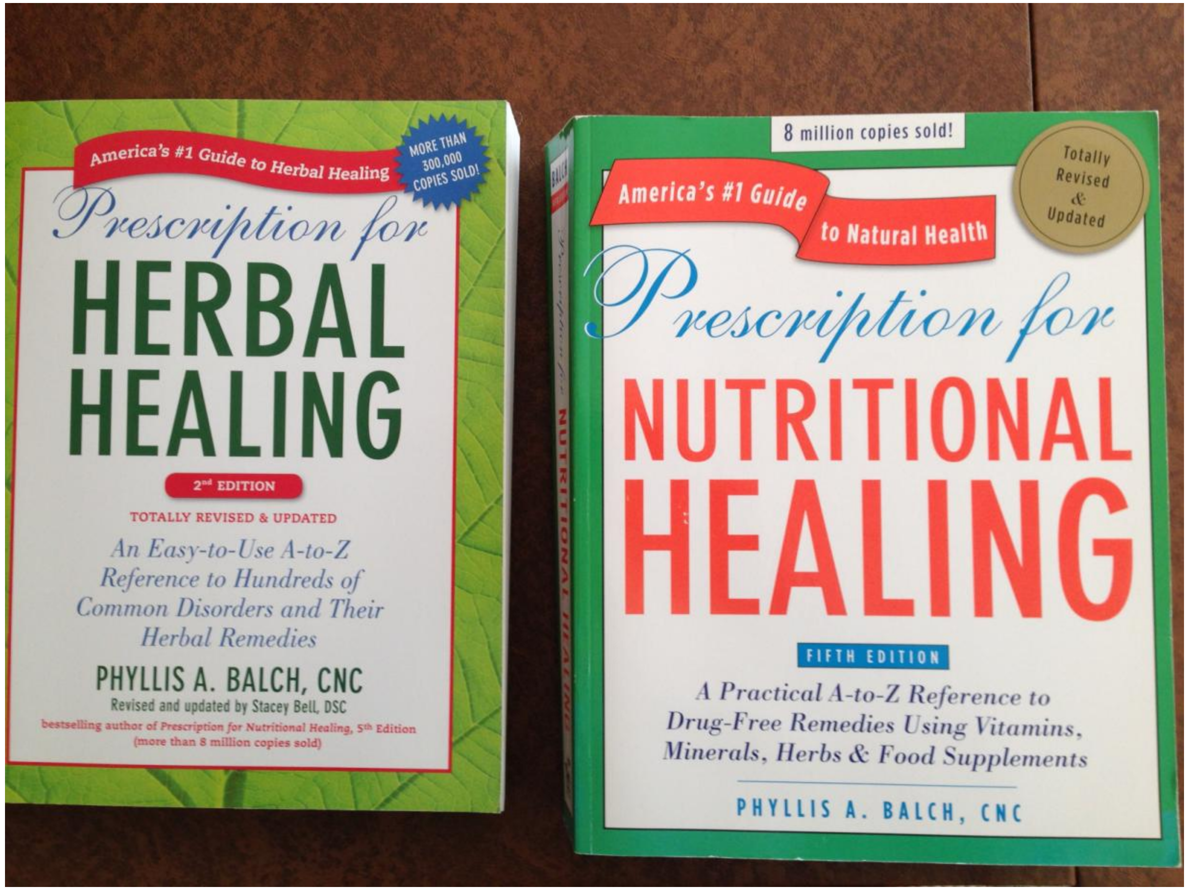
Use of nutrient-dense foods to treat reduced libidos in overweight and obese males

Dr. Stacey J. Bell
Chief Science Officer
Nutrient, Reno, Nevada
Stacey.bell@nutrientfoods.com

BACKGROUND

- Doctorate in nutrition
- Registered dietitian nutritionist
- Formerly on faculty at Harvard Medical School, where I conducted nutritional studies
- Published more than 100 scientific articles; presented over 100 scientific lectures around the world
- Developed dietary supplements for Dr. Weil, Tony Robbins, Twinlab
- Former member, Board of Directors, a public company, Wild Oats, later sold to Whole Foods Markets
- Chief Science Officer, Nutrient


gettyimages
John B. Carnett
130305225


America's #1 Guide to Herbal Healing
MORE THAN 300,000 COPIES SOLD!
Prescription for
HERBAL HEALING
2nd EDITION
TOTALLY REVISED & UPDATED
An Easy-to-Use A-to-Z Reference to Hundreds of Common Disorders and Their Herbal Remedies
PHYLLIS A. BALCH, CNC
Revised and updated by Stacey Bell, DSC
bestselling author of Prescription for Nutritional Healing, 5th Edition
(more than 8 million copies sold)
8 million copies sold!
America's #1 Guide to Natural Health
Totally Revised & Updated
Prescription for
NUTRITIONAL HEALING
FIFTH EDITION
A Practical A-to-Z Reference to Drug-Free Remedies Using Vitamins, Minerals, Herbs & Food Supplements
PHYLLIS A. BALCH, CNC

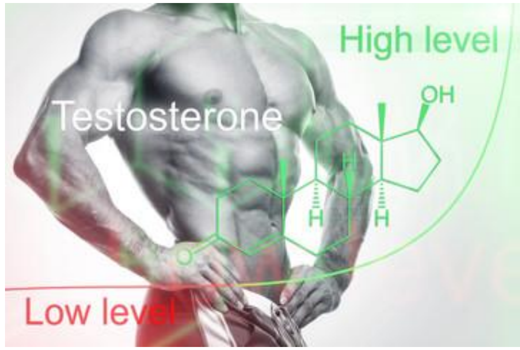
Full disclosure: I am not….

Dr. Ruth

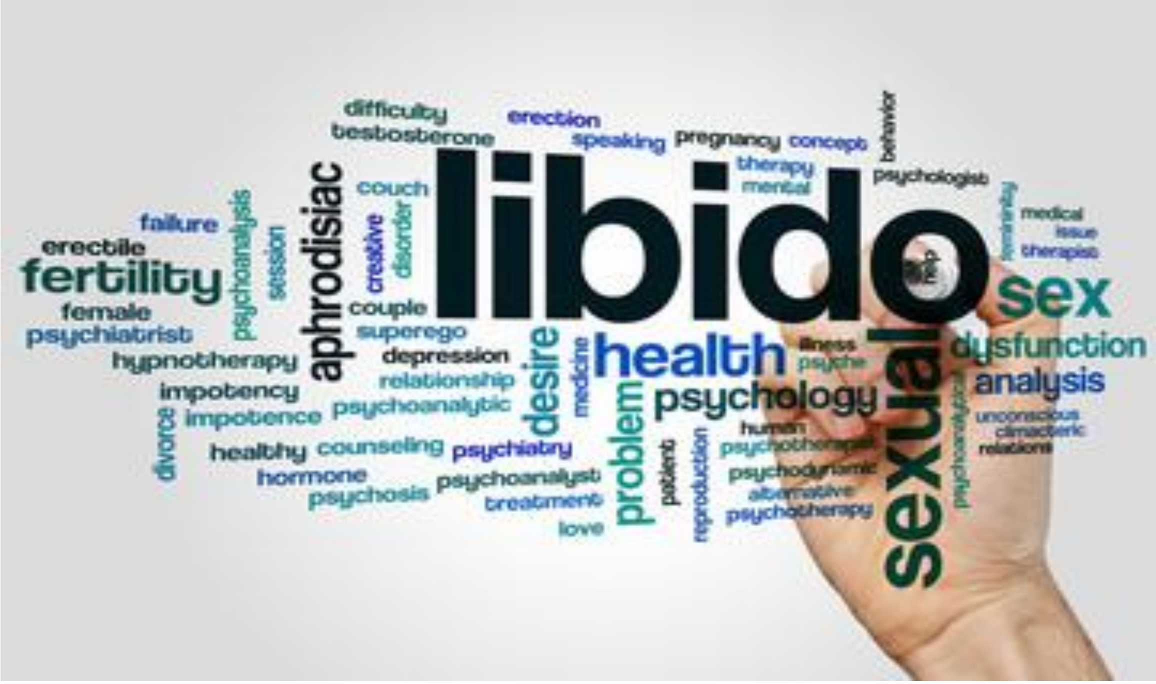
An endocrinologist

A urologist

Today's talk



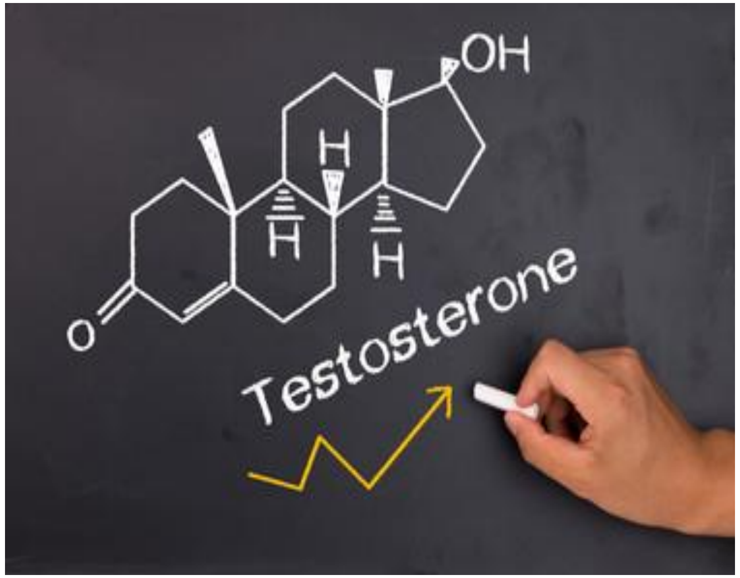
Low libido and fertility: not the same



Overview

- Background
  - Androgen deficiency (testosterone)
  - Sub-fertility, changes in sperm counts
  - Diet and sub-fertility
- Study using nutrient-dense foods
  - Effect on semen/sperm and testosterone
  - Assess quality of life, anthropometry
- Conclusions about nutrient-dense foods and libido

Testosterone: declines mostly related to age and not lifestyle (e.g., body weight)



Definition of androgen deficiency by the Endocrine Society (expert consensus)

- **Group 1**: specific issues
  - Incomplete or delayed sexual development
  - Eunuchoidism
  - Reduced sexual desire (libido)
  - Erectile dysfunction
  - Gynecomastia
  - Decreased axillary, facial and pubic hair
  - Small testes (i.e., volume < 5 mL)
  - Infertility
  - Low-trauma fracture
  - Low bone mineral density
  - Hot flushes (mostly younger men)

Definition (cont.)

- **Group 2**: more general and includes few specific signs and symptoms
  - Decreased energy and motivation
  - Depressed mood, poor concentration and memory
  - Sleep disturbance
  - Mild anemia
  - Reduced muscle bulk and strength
  - Increased body fat or body mass index
  - Diminished physical performance (mostly older men)

As expected: inverse relationship between age and testosterone levels

0021-972X/07/$15.00/0
Printed in U.S.A.

The Journal of Clinical Endocrinology & Metabolism 92(11):4241–4247

doi: 10.1210/jc.2007-1245

Prevalence of Symptomatic Androgen Deficiency in Men

Andre B. Araujo, Gretchen R. Esche, Varant Kupelian, Amy B. O'Donnell, Thomas G. Travison, Rachel E. Williams, Richard V. Clark, and John B. McKinlay

Testosterone decline with age

- 20-50% of males have sub-optimal testosterone levels
- Serum testosterone declines gradually after age 40 between 0.4 and 2.6% per year
- This decline is associated with decreases in: bone mass, muscle mass/strength, physical function/frailty, and sexual function
- Also low testosterone is associated with metabolic changes such as abdominal obesity, diabetes, and markers of prediabetes (insulin resistance, impaired glucose tolerance, and metabolic syndrome)
- **Study purpose**: review incidence of androgen deficiency in 1,375 males

Results

- 24% of subjects had sub-optimal total testosterone (< 300 ng/dL)
- Prevalence of symptoms were as follows: low libido (12%), erectile dysfunction, (16%), osteoporosis/fracture (1%), and two or more of the nonspecific symptoms (20%)
- **Low testosterone levels were associated with symptoms, but many men with low testosterone levels were asymptomatic** (mainly in their 50s)
- Population prevalence of symptomatic androgen deficiency was 5.6%, and increased with age (less than 70 years – 7%; over 70 years of age, 18%)
- **Summary**: Projection to the 2025 suggests that there will be as many as 6.5 million American men ages 30–79 year with symptomatic androgen deficiency, an increase of 38% from 2000 population estimates.

Testosterone decreases with age

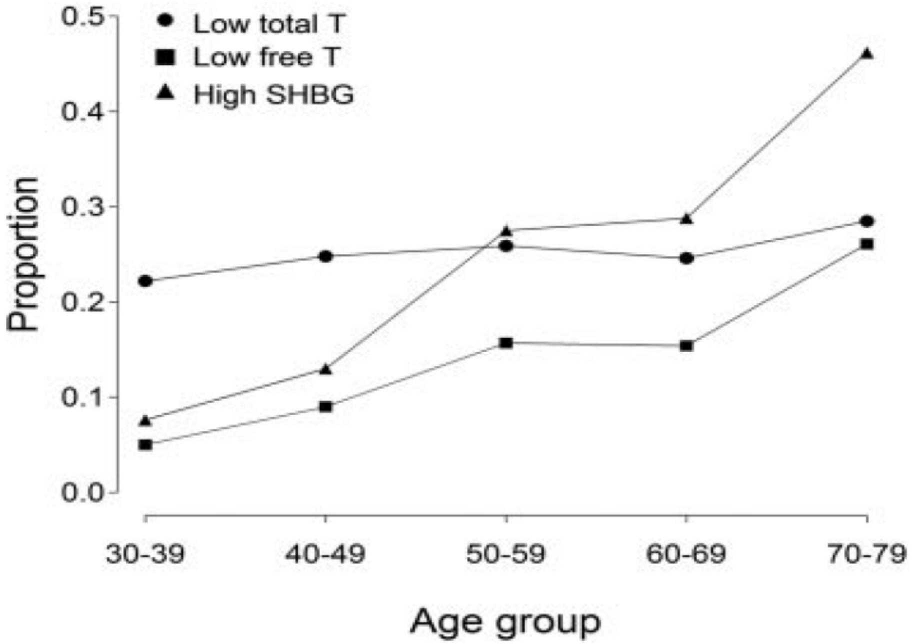


FIG. 2. Proportion of men with low total testosterone [<300 ng/dl (10.4 nmol/liter)], low free testosterone [<5 ng/dl (0.17 nmol/liter)], and high SHBG (>46.25 nmol/liter, defined as highest quintile of SHBG) by 10-yr age group. T, Testosterone. SHBG=sex hormone binding globulin

This is surprising

0021-972X/07/$15.00/0
Printed in U.S.A.

The Journal of Clinical Endocrinology & Metabolism 92(1):196–202

doi: 10.1210/jc.2006-1375

A Population-Level Decline in Serum Testosterone Levels in American Men

Thomas G. Travison, Andre B. Araujo, Amy B. O'Donnell, Varant Kupelian, and John B. McKinlay

New England Research Institutes, Watertown, Massachusetts 02472

Study overview and results

- Healthy males: 45-79 years of age
- Three data collection waves: baseline (testosterone 1: 1987–1999) and two follow-ups over 20 years
- **Results**
  - Age-independent decline in testosterone that is not related to lifestyle (e.g., obesity, smoking)
- **Conclusions**: Recent years have seen a substantial, and as yet unrecognized, age-independent population decrease in testosterone in American men, **potentially attributable to birth cohort differences** or **to health or environmental effects** not captured in observed data.

Testosterone decline with aging

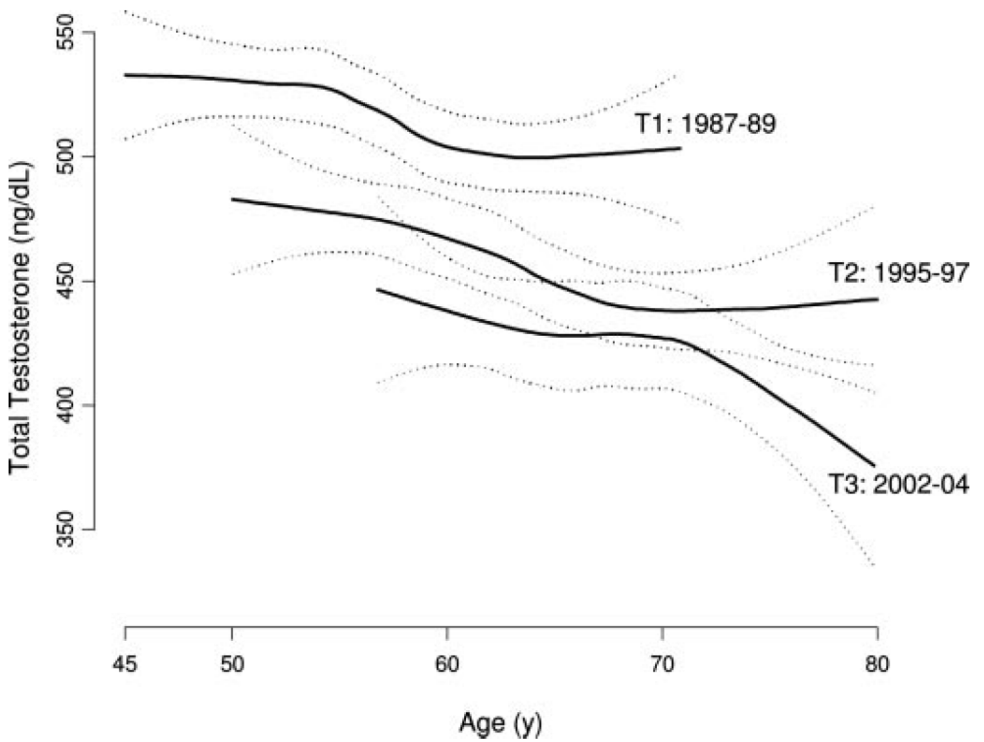


FIG. 1. Crude mean TT concentrations, by MMAS study wave (T1, T2, T3) with confidence bands (*dotted lines*). Estimates are obtained from a generalized additive model with a lowess smoothing term.

Hard to predict treatments for pathologic hypogonadism for older men based on younger ones

CMAJ RESEARCH

Predicting low testosterone in aging men: a systematic review

Adam C. Millar MD MScCH, Adrian N.C. Lau MD, George Tomlinson PhD, Alan Kraguljac MSc,
David L. Simel MD MHS, Allan S. Detsky MD PhD, Lorraine L. Lipscombe MD MSc

The facts: data about low testosterone

- Low testosterone is found in 2% to 77% of 40 studies included in this meta-analysis
- Testosterone levels decline 1-3% per year
  - Not everyone experiences reduced libido or erectile dysfunction
- Testosterone levels are sub-optimal in 20% of men in their 60s and 50% in men in their 80s
  - However, only 2% are symptomatic to low testosterone (hypogonadism)
- Lots of noise surrounding low testosterone
  - 40% of men over 50 years of age have vascular insufficiency due to CVD, diabetes, or both, interfering with sexual performance and not related to low testosterone levels

Systematic review of 42 articles

- Tried to rectify the current lack of clarity regarding the definition and management of age-related declines in testosterone levels.
- **Weak correlations among signs, symptoms and testosterone levels, leading to uncertainty about what threshold testosterone levels should be considered low for aging men.**
- **Key finding**: Wide variation in prevalence low testosterone make it difficult to extrapolate the method of diagnosing pathologic hypogonadism in younger men to clinical decisions regarding age-related testosterone decline in aging men.

Body size and hormone levels

Sex Steroid Hormone Levels and Body Composition in Men

Margaret A. Gates, Rania A. Mekary, Gretchen R. Chiu, Eric L. Ding, Gary A. Wittert, and Andre B. Araujo

New England Research Institutes, Inc. (M.A.G., G.R.C., A.B.A.), Watertown, Massachusetts 02472; Department of Nutrition (R.A.M., E.L.D.), Harvard School of Public Health, Boston, Massachusetts 02115; Channing Laboratory (E.L.D.), Brigham and Women's Hospital and Harvard Medical School, Boston, Massachusetts 02115; and Discipline of Medicine (G.A.W.), University of Adelaide, Adelaide, South Australia 5005, Australia

Study overview including 821 men

- Measurements: testosterone, calculated free testosterone, and sex hormone binding globulin (SHBG) were inversely correlated with fat mass, weight, body mass index, waist/hip circumference, and waist-to-hip ratio (measures of obesity)
- Calculated free estradiol was positively correlated with percentage total (r = .13) and trunk (r = .15) fat mass, and estradiol/testosterone was positively correlated with all measures examined (r = .13–.40).
- There were no significant associations between baseline hormone levels and change in weight, body mass index, waist/hip circumference, or waist-to-hip ratio after an average follow-up of 5 years.
- **Conclusions**: Body composition is related to hormone levels. Body composition affects hormone levels and not the reverse (hormone levels don’t dictate weight gain).

Body composition (excess fat) dictates hormone levels and not the reverse

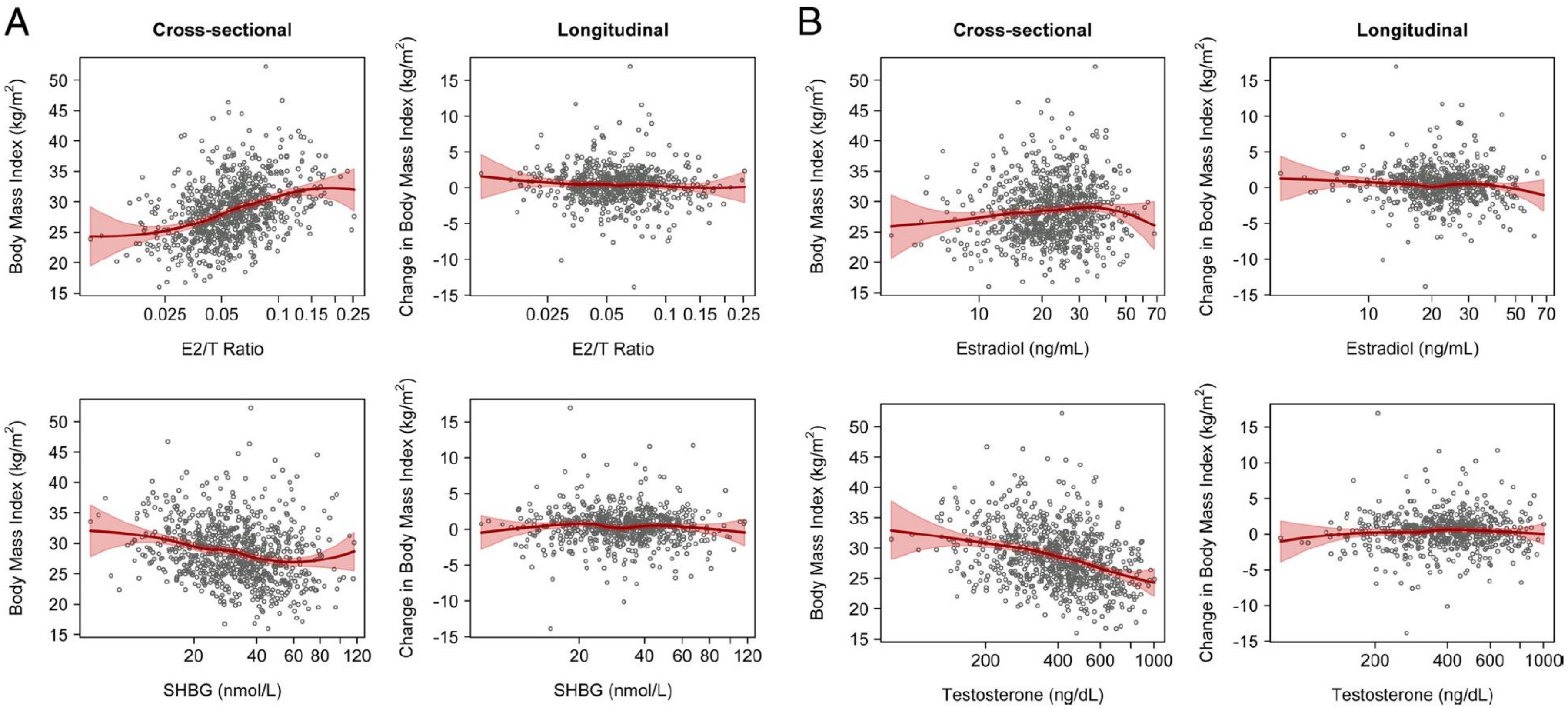
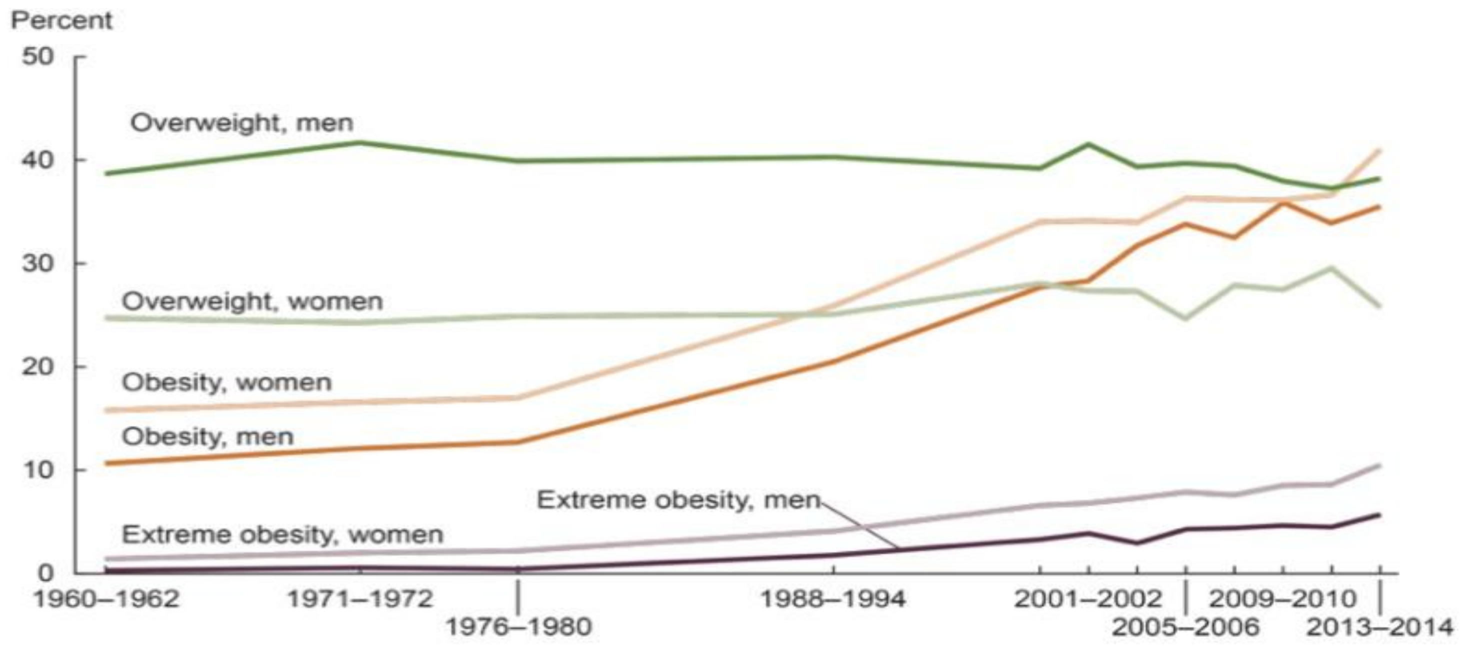


Figure 1. Associations between baseline hormone levels (log-transformed) and baseline BMI or absolute change in BMI over time in men.

Sub-fertility studies: something's up (or down, so to speak)

Sub-fertility related to increase numbers of men, who are overweight and obese



NOTES: Age-adjusted by the direct method to the year 2000 U.S. Census Bureau estimates using age groups 20–39, 40–59, and 60–74. Overweight is body mass index (BMI) of 25 kg/m² or greater but less than 30 kg/m²; obesity is BMI greater than or equal to 30; and extreme obesity is BMI greater than or equal to 40. Pregnant females were excluded from the analysis.
SOURCES: NCHS, National Health Examination Survey and National Health and Nutrition Examination Surveys.

What defines overweight? Body Mass Index (BMI)

Body weight category	Body Mass Index	Obesity Class	Disease risk (relative to normal weight and waist circumference)	
			Men < 102 cm Women < 88 cm	Men >102 cm Women >88 cm
Underweight	<18.5			
Normal	18.5–24.9			
Over weight	25.0–29.9		Increased	High
Obesity	30.0–34.9	I	High	Very High
	35.0–39.9	II	Very High	Very high
Extreme obesity	>40.0	III	Extremely High	Extremely High

REPRODUCTION
REVIEW

Obesity, a serious etiologic factor for male subfertility in modern society

Yue Liu and Zhide Ding

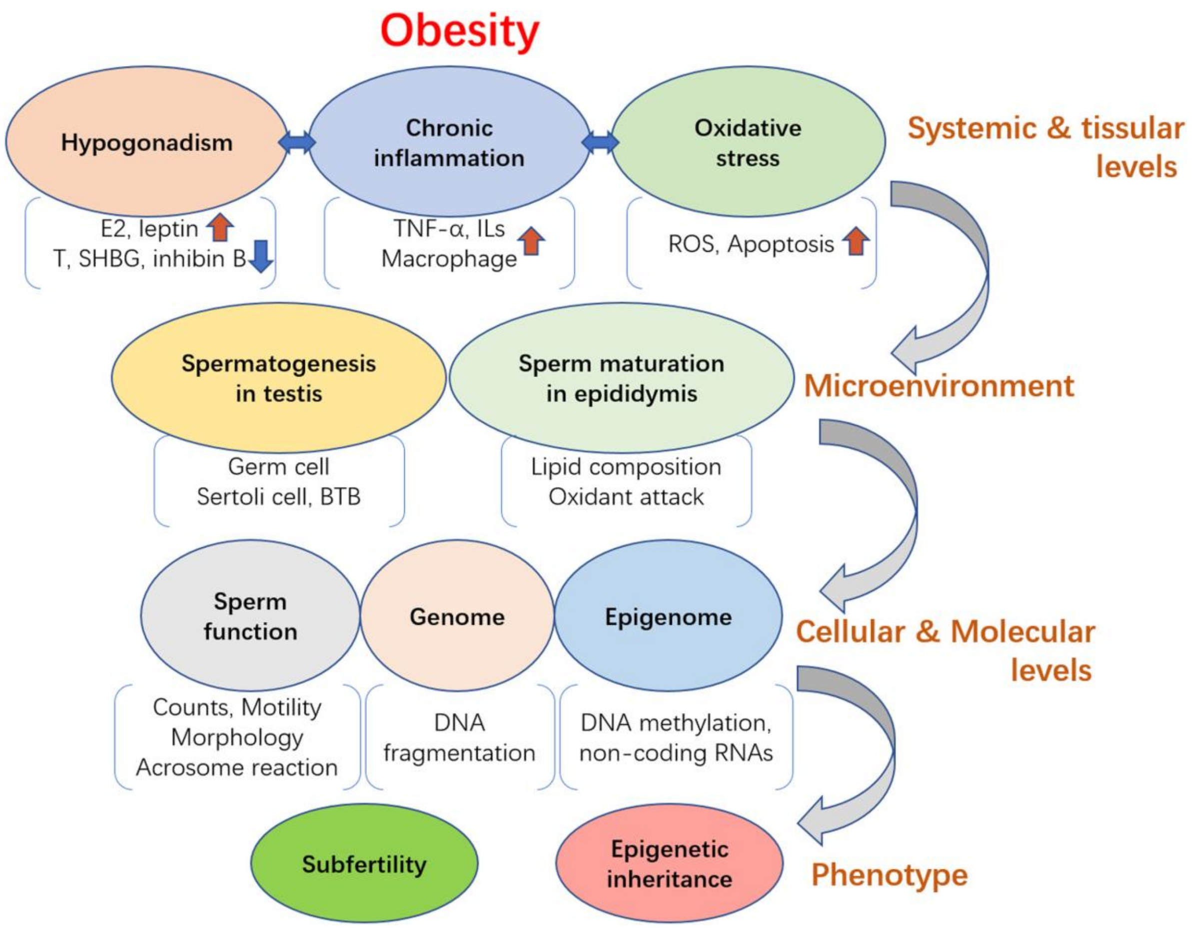
Department of Histology, Embryology, Genetics and Developmental Biology, Shanghai Key Laboratory for Reproductive Medicine, School of Medicine, Shanghai Jiao Tong University, Shanghai, China

Correspondence should be addressed to Z Ding; Email: zding@shsmu.edu.cn

Obesity and sub-fertility: newly recognized

- Well-known: obesity increases the risks of hypertension, diabetes, cardiovascular disease, sleep apnea, respiratory problems, osteoarthritis and cancer.
- Newly discovered: obesity is correlated with
  - Reductions in sperm concentration and motility, increase in sperm DNA damage and changes in reproductive hormones.
  - Excessive conversion of androgens into estrogens in adipose tissue causes sexual hormone imbalance, resulting in hypogonadism.
  - Adipokines produced by fat cells induce severe inflammation and oxidative stress in male reproductive tract, directly impairing testicular and epididymal tissues.
  - Increased scrotal adiposity leads to increase gonadal heat, continuously hurting spermatogenesis.

Obesity and sub-fertility



Human Reproduction Update, Vol.19, No.3 pp. 221–231, 2013
Advanced Access publication on December 12, 2012 doi:10.1093/humupd/dms050

human reproduction update

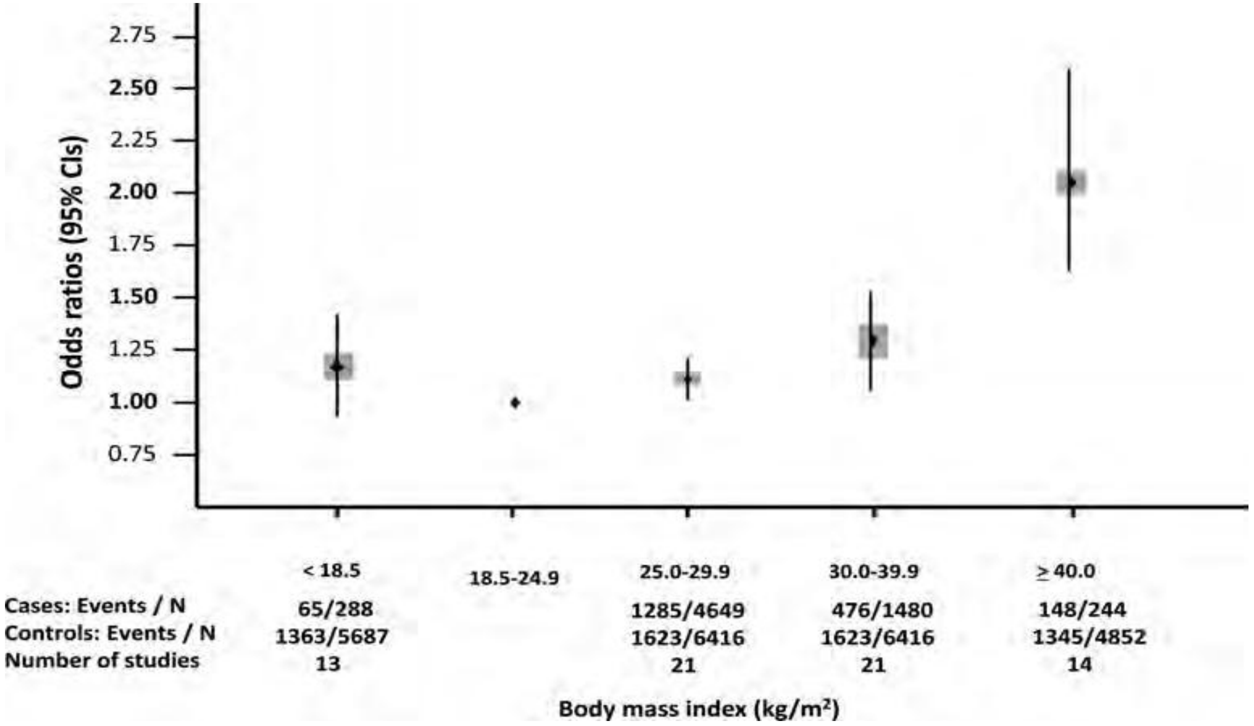
BMI in relation to sperm count: an updated systematic review and collaborative meta-analysis

N. Sermondade[1,2], C. Faure[1,2], L. Fezeu[2], A.G. Shayeb[3], J.P. Bonde[4],

Body weight and sperm count

- Subfertility affects 15-25% of couples who seek to obtain a pregnancy, and a male contribution is identified in 20–50% of the cases
- A systematic review of the published literature was performed to investigate the impact of BMI on sperm count (13,000+ men). Also included unpublished data (n=717 men) obtained from an infertility clinic.
- Overweight and obesity were associated with an increased prevalence of azoospermia or oligozoospermia.
- Main limitation: included varied populations of men recruited from both the general population and infertile couples

Relationship between BMI and sperm count



Real changes over the past four decades

Human Reproduction Update, Vol.23, No.6 pp. 646–659, 2017
Advanced Access publication on July 25, 2017 doi:10.1093/humupd/dmx022

human
reproduction
update

Temporal trends in sperm count: a systematic review and meta-regression analysis

Hagai Levine[1,2,*], Niels Jørgensen[3], Anderson Martino-Andrade[2,4], Jaime Mendiola[5], Dan Weksler-Derri[6], Irina Mindlis[2], Rachel Pinotti[7], and Shanna H. Swan[2]

Decline in sperm counts

- Significant declines in sperm counts (measured from total sperm counts and sperm concentration) between 1973 and 2011
- A decline of 50-60% in men, unselected by fertility from North America, Europe, Australia, and New Zealand
- Results represent a significant public health problem, and more research is needed to explain these findings

Decline in sperm concentration and total sperm count over 40 years

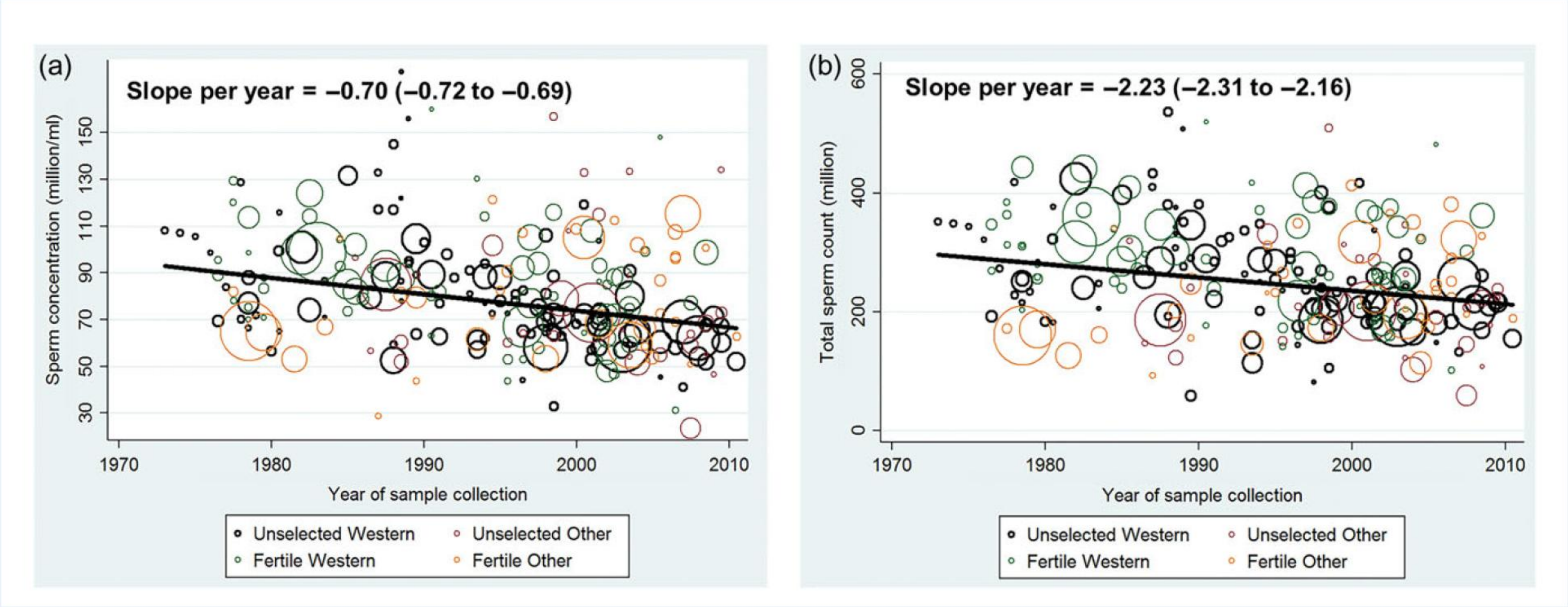


Figure 2 (**a**) Mean sperm concentration by year of sample collection in 244 estimates collected in 1973–2011 and simple linear regression. (**b**) Mean total sperm count by year of sample collection in 244 estimates collected in 1973–2011 and simple linear regression.

www.impactjournals.com/oncotarget/ Oncotarget, 2017, Vol. 8, (No. 30), pp: 48619-48634

Research Paper: Pathology

The impact of BMI on sperm parameters and the metabolite changes of seminal plasma concomitantly

Dan Guo[1,2,*], Wei Wu[1,2,3,*], Qiuqin Tang[4,*], Shanlei Qiao[1,2], Yiqiu Chen[1,2], Minjian Chen[1,2], Mengying Teng[1,2], Chuncheng Lu[1,2], Hongjuan Ding[4], Yankai Xia[1,2], Lingqing Hu[3], Daozhen Chen[3], Jiahao Sha[5] and Xinru Wang[1,2]

1

Study overview

- Male infertility is increasing rapidly worldwide, and coinciding with the epidemic of obesity.
- This meta-analysis included 42 articles and looked at the correlation between BMI and sperm parameters (i.e., total sperm count, concentration, semen volume and sperm motility).
- **Results**: using standardized weighted mean differences (SMD) in sperm parameters (total sperm count, sperm concentration, and semen volume) of abnormal weight groups decreased to different degree compared to normal weight.

Percentage decrease according to body weight

- **Being overweight** decreased the quality of total sperm count and semen volume (*P* = 0.000 and 0.002)
- **Obesity** decreased the quality of total sperm count, sperm concentration, and semen volume (*P* = 0.001, 0.006 and 0.000, respectively); worse than being overweight
- **Dose-response analysis: sperm count, sperm concentration and semen volume respectively fell 2.4%, 1.3% and 2.0% compared with normal weight for every 5-unit increase in BMI (about 10 pounds).**
- No change of sperm motility according to body weight

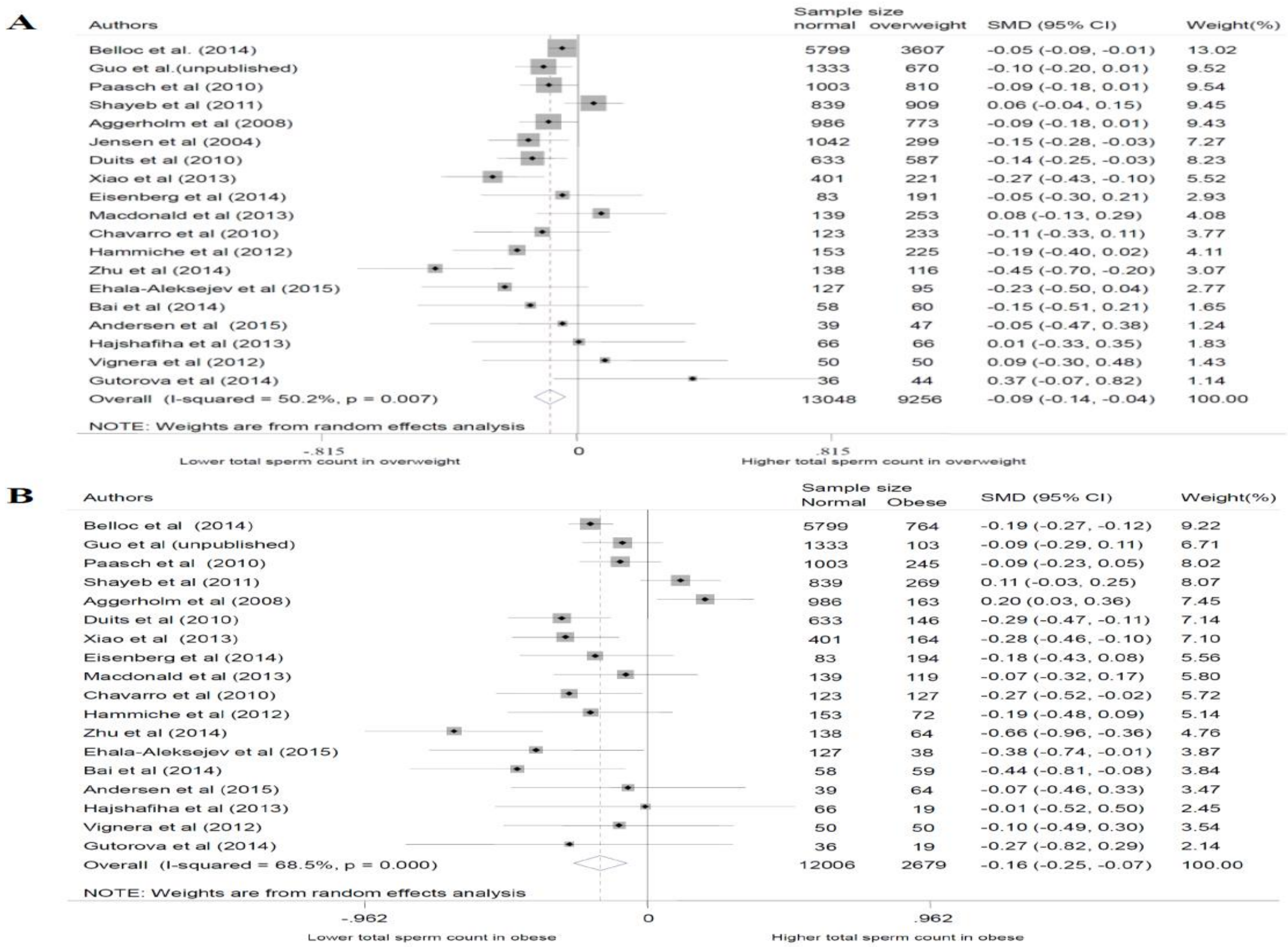
Standardized weighted mean differences according to weight category: body weight matters

Table 3: SMD and 95% CI of sperm parameters in abnormal weight groups

	Overweight		Obese	
	SMD (95% CI)	*P*	SMD (95% CI)	*P*
Total sperm count	-0.093 (-0.142, -0.043)	<0.001	-0.162 (-0.254, -0.070)	0.001
Sperm concentration	-0.038 (-0.084, 0.007)	0.098	-0.118 (-0.202, -0.034)	0.006
Semen volume	-0.095 (-0.156, -0.033)	0.002	-0.182 (-0.275, -0.088)	<0.001
Sperm motility	0.015 (-0.057, 0.086)	0.691	-0.108 (-0.234, 0.018)	0.092
Sperm progressive motility	0.004 (-0.090, 0.097)	0.939	-0.089 (-0.227, 0.050)	0.211

All SMD are relative to normal weight (BMI between 18.5-25.0).

Sub-fertility explained by high body weight in most studies



Human Reproduction, Vol.29, No.2 pp. 193–200, 2014
Advanced Access publication on December 4, 2013 doi:10.1093/humrep/det428

human reproduction
ORIGINAL ARTICLE *Andrology*

The relationship between male BMI and waist circumference on semen quality: data from the LIFE study

Michael L. Eisenberg[1,*], Sungduk Kim[2], Zhen Chen[2], Rajeshwari Sundaram[2], Enrique F. Schisterman[2], and Germaine M. Buck Louis[2]

Semen parameters and waist circumference

- Conducted in 468 men living in the U.S.
- Waist circumference of > 100 cm (> 40 inches) are at high risk for CVD, hypertension, and type 2 diabetes
- With higher BMIs
  - Ejaculate volume showed a linear decline with increasing BMI and waist circumference ($P < 0.01$).
  - Total sperm count showed a negative linear association with waist circumference ($P < 0.01$).
- First study showing a relationship between waist circumference and semen parameters in men without known infertility

Waist circumference relates to sperm count and semen volume

Table II Anthropometric measurements and physical activity by semen quality parameters—continuous outcomes, LIFE study.

Characteristic	Category	Volume (ml) median (IQR) ($n = 468$)	Concentration (M/ml) median (IQR) ($n = 468$)	Sperm count (M) median (IQR) ($n = 468$)	% Vitality median (IQR) ($n = 466$)	% WHO normal morphology median (IQR) ($n = 436$)	% Strict morphology median (IQR) ($n = 436$)	% DFI median (IQR) ($n = 459$)
BMI (kg/m^2)	<25.00	3.3 (2.5, 4.6)	55.6 (33.5, 94.4)	9.0 (3.0, 20.0)	197.6 (107.1, 301.9)	69.0 (61.2, 74.7)	31.8 (21.0, 39.3)	21.3 (12.5, 27.5)
	25.00–29.99	3.4 (2.2, 4.6)	64.5 (36.1, 97.5)	9.0 (3.0, 17.0)	196.8 (101.6, 342.1)	67.3 (59.8, 73.4)	30.0 (22.0, 39.0)	19.3 (12.5, 25.5)
	30.00–34.99	3.1 (2.2, 4.1)	60.9 (32.0, 100.5)	9.0 (3.0, 18.0)	168.5 (100.7, 294.0)	66.7 (59.8, 72.8)	32.5 (23.5, 40.0)	20.5 (14.5, 29.0)
	≥35.00	2.8 (1.8, 3.8)	60.6 (29.4, 103.7)	7.0 (2.0, 21.0)	153.0 (56.6, 308.8)	70.0 (62.1, 75.3)	29.5 (21.0, 37.0)	17.0 (12.5, 24.0)
	P-trend*	0.005	0.564	0.344	0.986	0.607	0.534	0.116
Waist circumference (cm)	<93.99	3.4 (2.4, 4.6)	62.3 (35.7, 104.3)	10.0 (12.0, 20.0)	209.0 (110.9, 356.0)	67.6 (60.4, 74.6)	31.8 (22.0, 39.0)	20.5 (12.0, 27.0)
	94.00–101.59	3.4 (2.2, 4.5)	64.8 (36.0, 96.1)	8.0 (3.0, 17.0)	196.0 (104.0, 312.0)	67.3 (60.1, 72.7)	29.5 (21.0, 40.5)	19.5 (12.5, 28.5)
	≥101.60	2.9 (2.1, 3.9)	56.2 (30.4, 97.0)	8.0 (2.0, 19.0)	156.0 (85.4, 281.1)	68.1 (61.0, 73.8)	30.5 (22.0, 38.5)	19.5 (13.5, 25.0)
	P-trend*	0.003	0.228	0.004	0.834	0.524	0.635	0.692
Vigorous weekly activity	<1	3.2 (2.2, 4.2)	63.0 (32.7, 104.6)	9.0 (2.0, 19.0)	182.4 (97.8, 305.1)	67.6 (60.2, 73.8)	30.5 (22.5, 39.3)	20.0 (13.8, 27.0)
	≥1	3.3 (2.4, 4.3)	58.7 (34.7, 92.4)	9.0 (3.0, 17.0)	189.2 (98.1, 324.9)	67.7 (60.4, 73.7)	30.0 (20.5, 38.8)	19.8 (12.0, 27.0)
	P-trend*	0.235	0.213	0.978	0.481	0.141	0.207	0.188

DFI, DNA fragmentation index.

Q1 and Q3 denote the first and third quartiles, respectively.

**P*-values of trend test based on linear models. In particular, linear mixed effects models were used for end-points measured in two semen samples, including volume, concentration, motility, total sperm count and vitality, while linear regression models were used for % WHO normal and the DFI. All models adjusted for age (≤24, 25–29, 30–34, ≥35 years), college education (yes/no) and serum cotinine (non-smoker/active smoker).

Diet, libido, and infertility

Yes, diet matters

Expert Reviews ajog.org

Diet and fertility: a review

CrossMark

Audrey J. Gaskins, ScD; Jorge E. Chavarro, MD, ScD

Diet and human fertility: knowledge expanded over the past decade

- Women:
  - Folic acid, particularly at doses higher than those recommended for the prevention of neural tube defects, has been consistently related to lower frequency of infertility, lower risk of pregnancy loss, and greater success in infertility treatment.
  - Anti-oxidants: no effect if under-going fertility treatment
  - Omega-3s from fish, yet contamination may negate the effect
  - Soy helps overcome infertility
- Men
  - Anti-oxidants during fertility treatment of partner (i.e., specific antioxidants are unknown)
- Both genders
  - Vitamin D not important role in human fertility in the absence of deficiency
  - Adherence to healthy diets favoring seafood, poultry, whole grains, fruits, and vegetables are related to better fertility in women and better semen quality in men.
  - Soy and dairy are not reproductive toxicants
  - Moderate alcohol and caffeine have minimal impact on becoming pregnant
- New research should focus on jointly considering female and male diets

What to eat to prevent infertility

Variables	What is the bottom line?
Antioxidant supplements	Supplementing men in couples undergoing ART with antioxidants may increase live birth rates
Diet patterns	Healthy diets have been consistently related to better semen quality across a wide range of populations. Unhealthy diets have consistently had the opposite relationship
Dietary fats	Intake of saturated and *trans* fats has consistently been related to lower semen quality and other markers of poor testicular function.
Alcohol, caffeine	Alcohol and caffeine do not have an important impact on semen quality within usual ranges of intake. The exception is alcohol intake at levels associated with liver disease

ART, assisted reproductive technologies.

Protein really matters in terms of fertility for women

Intake of protein-rich foods in relation to outcomes of infertility treatment with assisted reproductive technologies

Feiby L Nassan,[1,1,2] Yu-Han Chiu,[1] Jose C Vanegas,[1] Audrey J Gaskins,[1,1,5] Paige L Williams,[1,3,1,4] Jennifer B Ford,[1] Jill Attaman,[1,6] Russ Hauser,[1,2,1,3,1,6] Jorge E Chavarro,[1,1,3,1,5] and for the EARTH Study Team

What women should eat to reproduce

- Of 351 women in a fertility clinic, the average total meat intake was 1.2 servings/d
  - Poultry (35%), fish (25%), processed meat (22%), and red meat (17%)
- Fish intake was positively related to live births (P-trend=0.04)
- Results of consuming 2 servings of fish weekly to produce live births
  - Increase 54%
  - Increase 50% if fish replaces other meats
  - Increase 64% when fish replaces processed meats
- **Conclusions**: Fish consumption is related to a higher probability of live birth following infertility treatment with ART.

Yes, men – it matters what you eat

Diet and men's fertility: does diet affect sperm quality?

Feiby L. Nassan, Sc.D., M.B.B.C.H., M.Sc.,[a,b] Jorge E. Chavarro, M.D., Sc.D.,[b,c,d] and Cigdem Tanrikut, M.D.[e]

Departments of [a] Environmental Health, [b] Nutrition, and [c] Epidemiology, Harvard T.H. Chan School of Public Health, Boston, Massachusetts; [d] Channing Division of Network Medicine, Harvard Medical School and Brigham and Women's Hospital, Boston, Massachusetts; and [e] Department of Urology, Shady Grove Fertility, Baltimore, Maryland

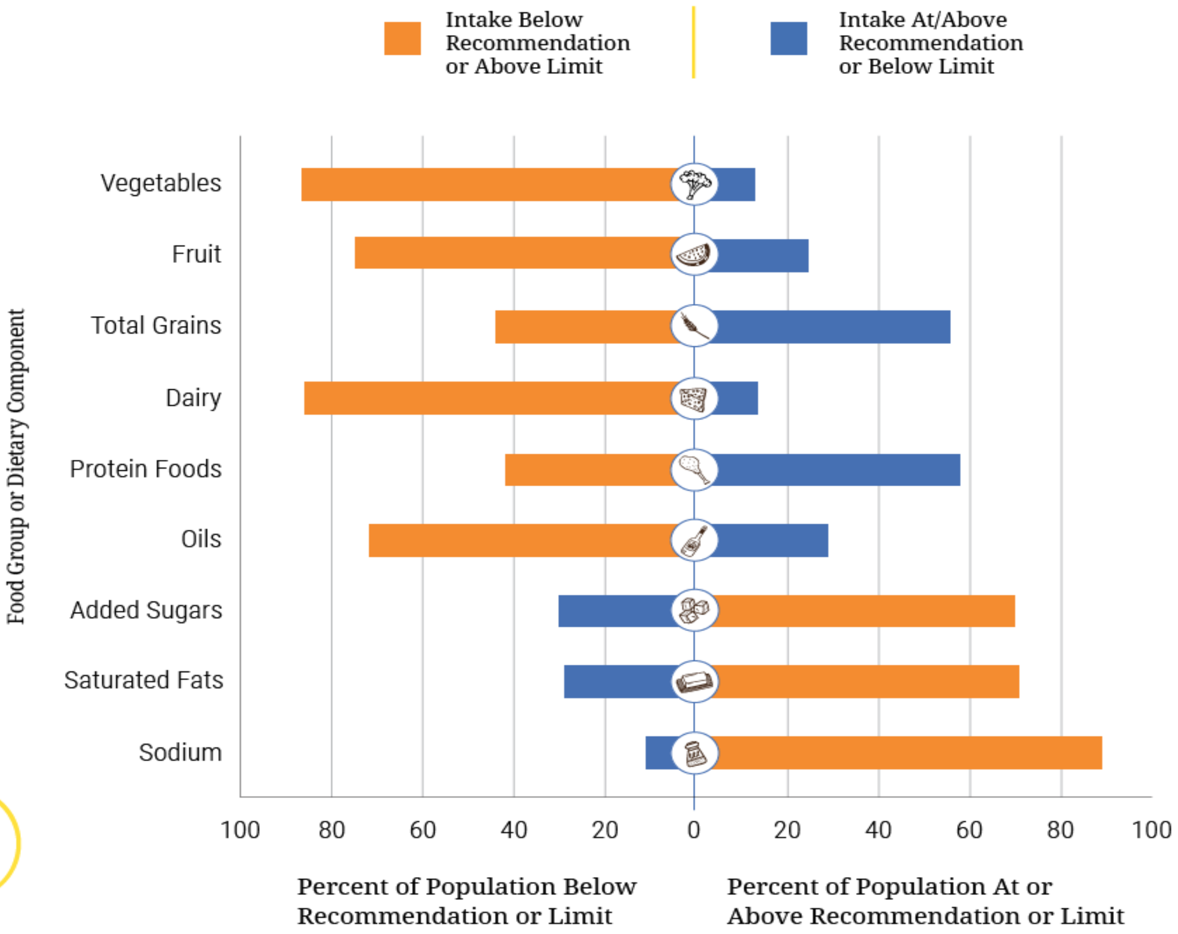
Male diet to support reproduction

Nutrient(s)	Comment
Fish oil; benefit	Low mercury fish is best
Omega-3-rich oils, very beneficial	Flax, canola, soy oils
Saturated fats, harm	From meat and dairy
Anti-oxidants, very beneficial	Not clear as to which are best
Folic acid, beneficial	Improves sperm number
Meat, dairy, limit	Vegetarian proteins are better
Soy, mixed results	Males
Pesticides, could be harmful	Limit strawberries, spinach, apples (high pesticide fruits and vegetables)

Summary for men: what to eat to have optimal semen quality

- Good dietary pattern
  - Seafood, poultry, legumes
  - Whole grains
  - Skimmed milk
  - Fruit and vegetables
- Poor dietary pattern, which is high in
  - Fat
  - Meat and processed meats
  - Refined grains
  - Sweets and sugar-sweetened beverages

American men eat a diet that worsens semen quality

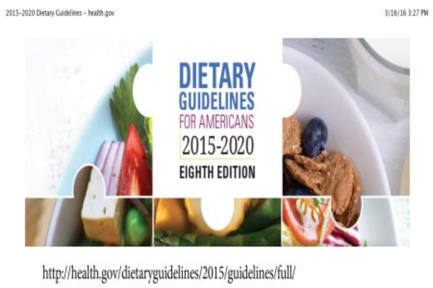


Should consume nutrient-rich foods

-Fruits, vegetables, whole grains, low-fat dairy, seeds/nuts

Should limit inflammatory ingredients

-Rich is salt, sugar, saturated fat



Late breaking: 25 February 2020

JAMA Network Open™

Original Investigation | Urology

Association of Dietary Patterns With Testicular Function in Young Danish Men

Feiby L. Nassan, ScD, MBBCh, MSc; Tina K. Jensen, PhD; Lærke Priskorn, PhD; Thorhallur I. Halldorsson, PhD, MSc;
Jorge E. Chavarro, MD, ScD, ScM; Niels Jørgensen, MD, PhD

Study overview

- 3,000 Danish men
- Median age 20 years; most had a normal body weight
- Fit into four dietary patterns
  - Western (US diet)
  - Prudent (unprocessed, low red meat)
  - Open-sandwich (Danish-type diet)
  - Vegetarian
- **Conclusion**: adherence to healthy diet patterns, a potentially modifiable lifestyle factor, is associated with better semen quality and potentially more favorable fertility potential among young men.

Figure 1. Food Group Factor Loadings for Dietary Patterns Identified From Food-Frequency Questionnaire Data

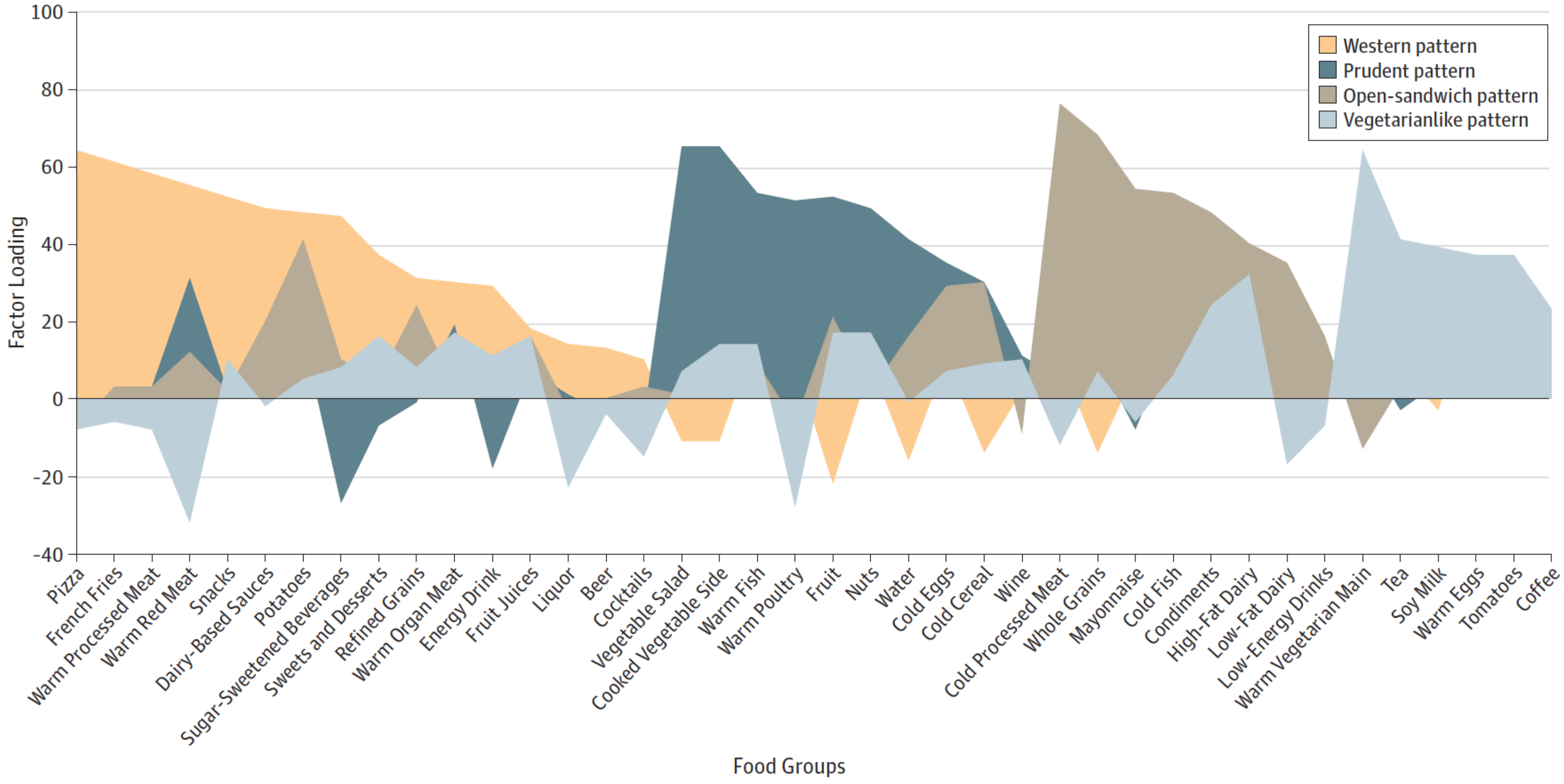
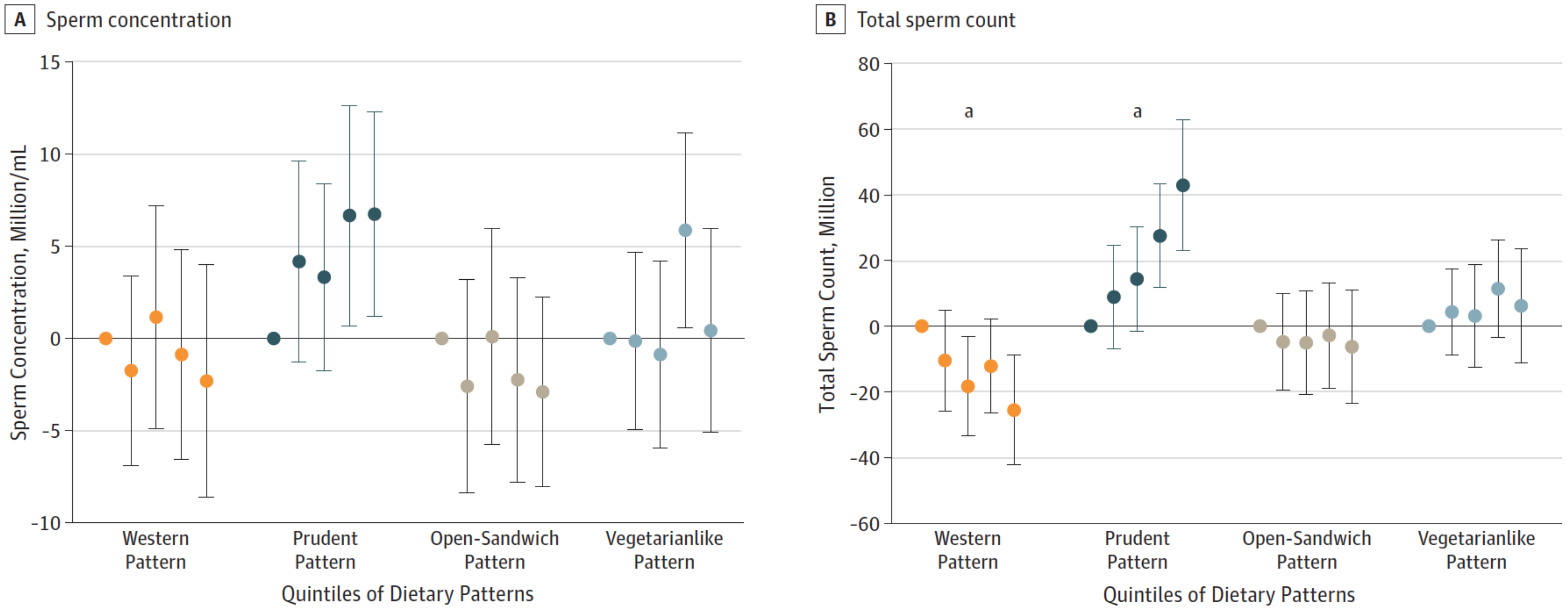


Figure 2. Adjusted Median Differences in Semen Quality Parameters According to Quintiles of Adherence to Data-Derived Dietary Patterns



Men, be careful what you eat…..

Sexual Function/Infertility

The Association between Popular Diets and Serum Testosterone among Men in the United States

Richard J. Fantus, Joshua A. Halpern, Cecilia Chang, Mary Kate Keeter, Nelson E. Bennett, Brian Helfand and Robert E. Brannigan*

From the Section of Urology, Department of Surgery, University of Chicago Medicine (RJF) and Department of Urology, Northwestern University Feinberg School of Medicine (JAH, MKK, NEB, REB), Chicago and Department of Surgery, NorthShore University Health System (RJF, CC, BH), Evanston, Illinois

Two diets: Low Fat and Mediterranean

Table 1. *Popular diet macronutrient parameters*[1–4]

	Diet		
	Low Fat	Low Carbohydrate	Mediterranean
Calories (kcal)	1,800 or Less	Not applicable	1,800 or Less
Carbohydrates (gm)	Not applicable	20 or Less	Not applicable
Fat (% total calories)	30 or Less	Not applicable	40
Saturated fat (% total calories)	10 or Less	Not applicable	
Cholesterol (mg)	Less than 300	Not applicable	

Results

- 3,128 men: 15% on low-fat diets and 24% followed a Mediterranean diet
- Mean serum testosterone was 435.5 6.7 ng/dl.
- Mean testosterone was lower among men with a low-fat diet (410.8 ± 8.1; $P=0.005$) and a Mediterranean diet (412.9 ± 9.1; $P=0.002$)
- **Summary**: Be careful what you eat. Losing weight helps increase testosterone levels, but not all diets are good choices. Low-fat and calorie-restricted diets may not allow for proper androgen production.

TALKING TO THE PRIMARY CARE DOCTOR

- Diseases of the male sex organs are not identified as often as they should be for several reasons.
- Does not tell the GP
  - Patient may have symptoms but is embarrassed and reluctant to disclose the facts (e.g.. testicular swelling, loss of libido, urinary symptoms or erectile difficulty)
- Doctors do not routinely ask for symptoms of male reproductive system diseases when taking a history because doctors
  - Believe (especially in older male patients) that a sexual history is unimportant
  - Asking intimate questions may offend the patient
  - Feel embarrassed to talk about these personal matters
  - They themselves are not confident about their knowledge on these issues.
- For a useful consultation to occur, it is important that the GP is comfortable with both the patient and the problem – and vice versa.

Current Research in
Diabetes & Obesity Journal
ISSN: 2476-1435

Juniper Publishers
key to the Researchers

Research Article
Volume 12 Issue 3 - December 2019
DOI: 10.19080/CRDOJ.2019.12.555841

Curr Res Diabetes Obes J

The Effect of Nutrient-Dense, Portion-Controlled Functional Foods in Overweight Men with Reduced Libidos: A Prospective, Pilot Study

Kate Bauer[1], Greg J Sommer[2], Marra S Francis[3], Vasuki Wijendran[1], Charles Marsland[4] and Stacey J Bell[5]

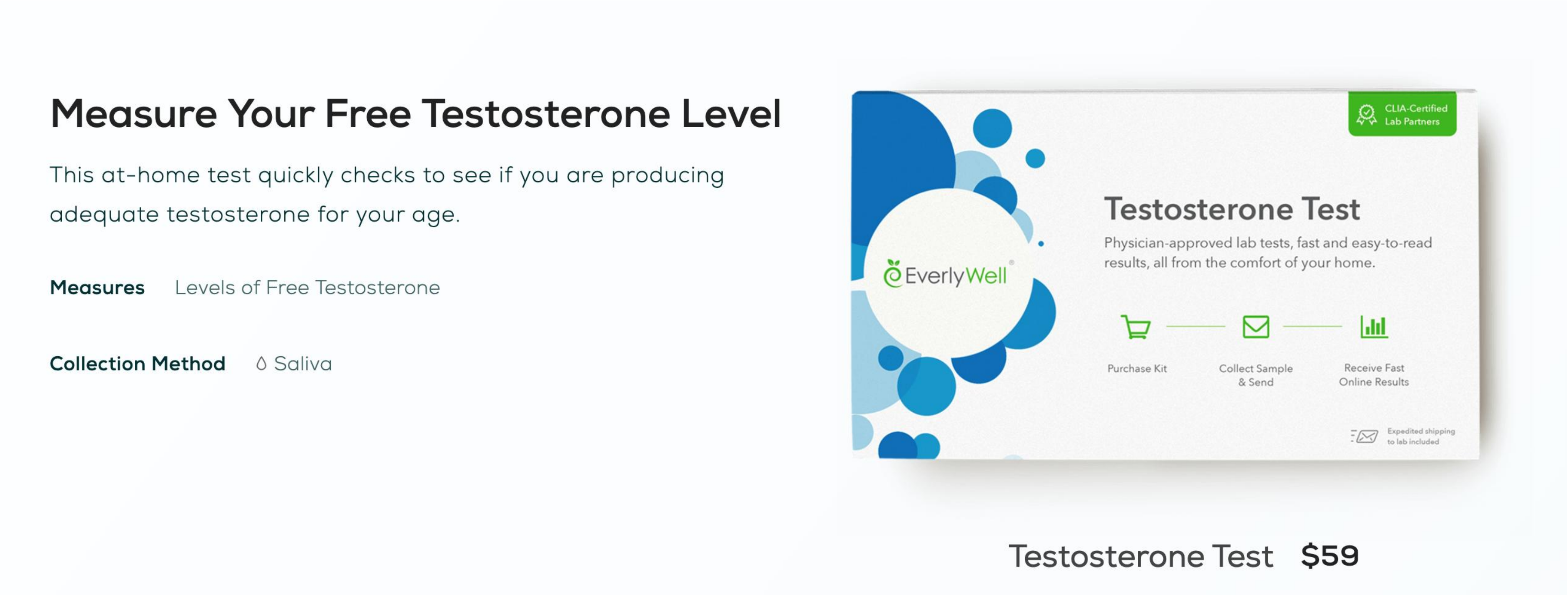
Purpose

- Aging and weight gain often lead to reduced male libido, testosterone levels, and reproductive health functions.
- Younger men, who have reduced libido due to no under-lying medical or environmental cause, are often prescribed medications. Non-pharmacological treatment usually includes weight loss.
- The aim of this prospective, single-arm, four-month study was to evaluate the effect of a nutrient-dense diet on body weight, sexual performance, free testosterone, semen volume, and sperm concentration in overweight men aged 20-50 years of age.

Methods

- Recruitment: Facebook, Instagram, and https://www.dontcookyourballs.com/
  - May not have any of these conditions: (1) a vasectomy, (2) been diagnosed as azoospermic, (3) having hypogonadism, or (4) on testosterone-replacement therapy
- Diet
  - Five, nutrient-rich, portion-controlled functional foods
  - Most men consumed 4-5 daily over 4 months
- Measurements at baseline and monthly
  - Testosterone (salivary)
  - Semen volume, semen concentration, and total sperm count
- Quality of life
  - Sexual health was assessed via a questionnaire (Sexual Health Inventory for Men [SHIM])
  - General questions using a scale of 1 (worst) to 5 (best)

Home testing of salivary testosterone



- https://www.everlywell.com/products/testosterone-test/

Validation of salivary testosterone testing

Europe PMC Funders Group
Author Manuscript
Ann Clin Biochem. Author manuscript; available in PMC 2016 September 20.

Published in final edited form as:
Ann Clin Biochem. 2014 May ; 51(Pt 3): 368–378. doi:10.1177/0004563213506412.

Salivary Testosterone Measurement by Liquid Chromatography Tandem Mass Spectrometry in Adult Males and Females

BG Keevil[1], **P MacDonald**[1], **W Macdowall**[3], **DM Lee**[2], **FCW Wu**[2], and **the NATSAL Team**

[1]Department of Clinical Biochemistry, University Hospital of South Manchester, Southmoor Road, Manchester M13 9WL, , Manchester Centre for Endocrinology & Diabetes, Manchester Academic Health Science Centre, The University of Manchester, Manchester

[2]Andrology Research Unit, Old St Mary's Building, Hathersage Road, Manchester M13 9WL, , Manchester Centre for Endocrinology & Diabetes, Manchester Academic Health Science Centre, The University of Manchester, Manchester

[3]Centre for Sexual and Reproductive Health Research Department of Social and Environmental Health Research London School of Hygiene and Tropical Medicine London, United Kingdom

Home testing of sperm count and volume

Trak System includes ($89.99):

The Trak Engine
Sperm Count Tests
Semen Volume Cups
Man's Guide to Reproductive Health.

Validation of semen measurements

CrossMark

Novel centrifugal technology for measuring sperm concentration in the home

Ulrich Y. Schaff, Ph.D.,[a] Laura L. Fredriksen, M.S.,[a] Jon G. Epperson, B.S.,[a] Tiffany R. Quebral, B.A.,[a] Sara Naab, M.S.I.,[a] Mark J. Sarno, E.J.D.,[b] Michael L. Eisenberg, M.D.,[c] and Greg J. Sommer, Ph.D.[a]

[a] Sandstone Diagnostics, Inc., Livermore; [b] Vision Biotechnology Consulting, Escondido; and [c] Department of Urology and Department of Obstetrics & Gynecology, Stanford University School of Medicine, Palo Alto, California

Study overview

- 16 males enrolled in the 4-month study (5 dropped out at baseline; 4 did not respond to the coaches, and 1 was due to GI issues)
- 11 males completed
- Average age of 36±6 years
- One was classified as being Overweight and the remaining were Obese.
- Participants had other co-morbidities:
  anxiety, depression, PTSD, ADHD, sleep apnea, hypothyroidism, and fatigue.
- Two reported using a medication for erectile dysfunction.
- The use of illicit drugs, smoking, and excessive alcohol use was non-existent at baseline and throughout the study.

Table 1: Baseline demographics.

Attribute	Number or Mean±Standard Deviation
Number of subjects	11
Age (years)	36±6
Body Mass Index (kg/m^2)	34±4
Classification of BMI	1=Overweight; 7=Obese (class 1); 1=Obese (class 2); 2=Obese (class 3)
Waist Circumference (cm)	115±11 (high risk≥ 102 cm) (9/11 were high risk)
Disease Risk*	3=High; 6=Very High; 2=Extremely High

*Disease risk for type 2 diabetes, cardiovascular disease, and hypertension [18].

Table 2: Changes in anthropometry.

	Weight (kg)	Body Mass Index (kg/m²)	Waist Circumference (cm)
Baseline	107±21	33±5	112±13
Week 4	98±25	31±7	109±14
Week 8	97±24	31±7	110±12
Week 12	101±24	31±5	108±12
Week 16	104±19	33±4	108±11

Table 3: Changes in salivary free testosterone concentrations*.

pg/mL	Baseline	Week 4	Week 8	Week 12	Week 16
Participant 1	38	78	85	54	56
Participant 2	87	160	64	84	174
Participant 3	47	60	169	N/A	102
Participant 4	73	73	109	75	133

*Normal salivary testosterone: 49-185 pg/mL

Salivary testosterone changes: all increased

Semen volume, sperm concentration, total sperm counts

Semen Volume (mL) Sperm Concentration (M/mL) Total Sperm Count (millions)	Base-line	Week 4	Week 8	Week 12	Week 16
Participant 1	1.9	1.5	1.8	2.2	2.8
	52	48	45	55	62
	99	72	81	121	174
Participant 2	5	2.5	7	6	7
	60	55	30	25	36
	300	138	210	150	252
Participant 3	1.5	2.5	1.5	3	2.5
	93	20	21	55	98
	140	50	32	165	254
Participant 4	1	1	0.7	1	0.7
	72	15	32	30	33
	72	15	22	30	23
Participant 5	5	5	4.9	4	4
	18	15	50	80	38
	90	75	245	320	152

*≥ 55 M/mL, Optimal; 16-54 M/mL inclusive, Moderate; and ≤ 15 M/mL, Low and may want to consult a physician

Semen measurements

- At baseline and throughout the study, all but one person had normal semen volumes (i.e., at least 1.5mL).
- Sperm concentrations were Optimal at baseline for three participants (i.e., $\geq$ 55 M/mL), and the remaining two had Moderate values (16-54 M/mL, inclusive).
  - Sperm concentrations varied throughout the study with three men experiencing Moderate concentrations at week 4, and two had Low concentrations (i.e., $\leq$ 15 M/mL).
  - At week 8, all five subjects had Moderate sperm concentrations.

Semen measurements (cont.)

- Sperm concentration (cont.)
  - By week 12, four had Moderate readings and one had an Optimal sperm concentration
  - At week 16, this improved to three with Moderate readings and two had Optimal concentrations.
- Total sperm counts (semen volume x sperm concentration [in millions]) varied among the participants. Between baseline and week 16
  - Two participants had a lower total sperm count (decrease of 16% and 68%)
  - Three had increased counts (all had 69-76% increases).

SHIM questionnaire

Table 5: Changes in sexual health inventory for men (SHIM) (n=6).

	Mean±S.D.	Number of subjects with abnormal values (£ 21)
Baseline	19±1	6
Week 4	17±6	5
Week 8	17±7	4
Week 12	15±9	5
Week 16	21±2	3

General quality of life questions

- All quality of life parameters improved over time except gastrointestinal issues, but there were not severe enough to interfere with compliance.
- The greatest improvements (at least 20%) were seen in general feeling of wellbeing, energy level, and passion.

General quality of life changes

Table 6: General quality of life questionnaire*.

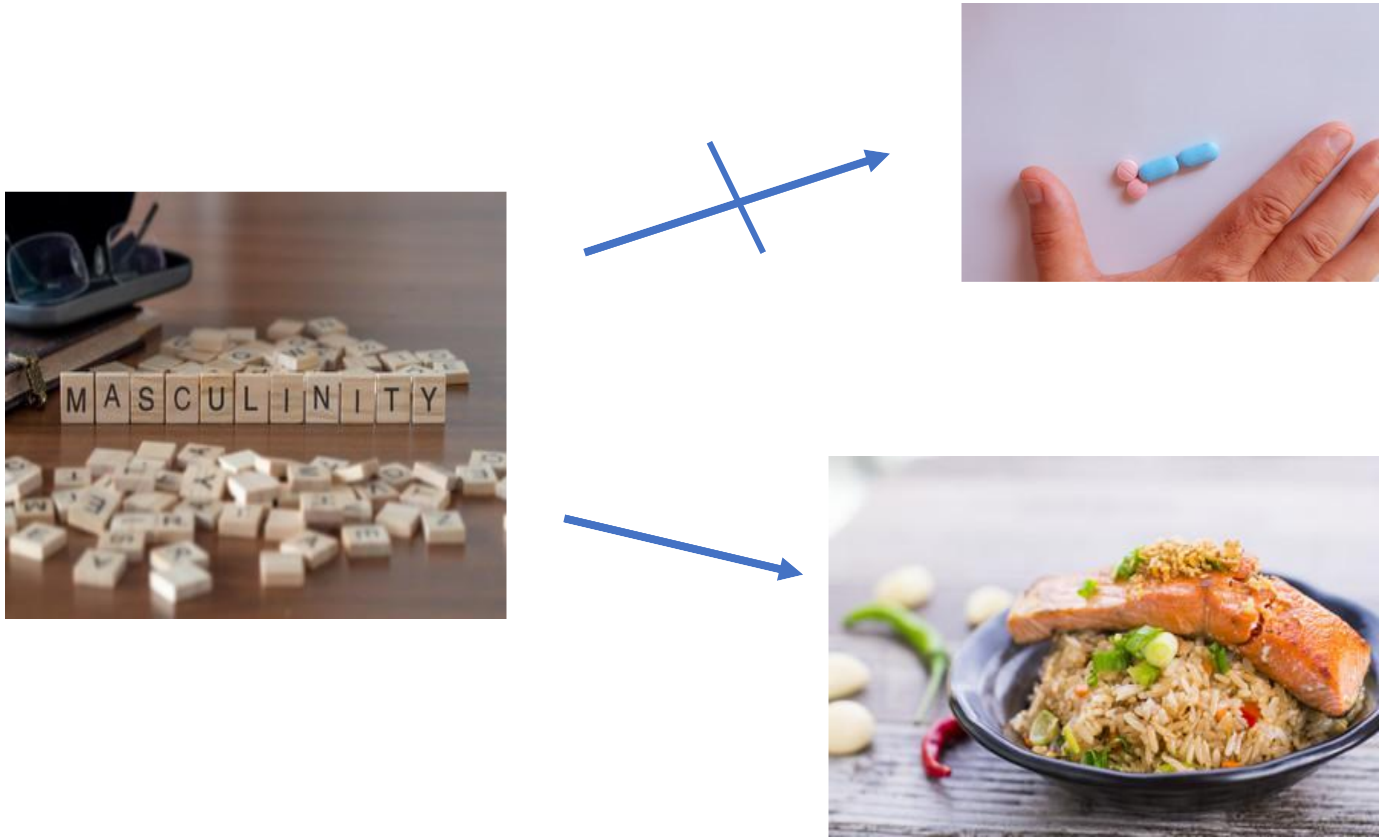
	Baseline	Week 4	Week 8	Week 12	Week 16
General feeling	2.8±0.8	3.0±0.6	3.3±1.0	3.7±0.5	3.5±0.6 (20%)
Feel full	3.3±0.8	3.5±0.6	3.8±0.4	3.7±0.5	3.5±0.6 (6%)
Mood	3.5±0.6	3.5±0.6	3.7±0.5	4	4.0 (12%)
Energy level	3.0±0.6	3.3±0.5	3.3±0.8	3.7±0.5	4.0 (25%)
Gastroin-testinal disturbanc-es	4.3±0.5	4.0±1.1	3.7±0.8	3.7±0.5	3.2±1.0 (26%)
Sleep	3	3.5±0.6	3.5±0.6	3.5±0.6	3.5±0.6 (14%)
Appear-ance	3.3±0.5	3.7±0.5	3.2±0.8	3.7±0.5	3.7±0.5 (11%)
Diet quality	2.3±0.5	3.8±0.8	3.7±0.8	3.8±0.4	3.4±0.8 (12%)
Passion	2.8±1.0	3.7±1.0	3.3±0.8	4	3.7±0.5 (24%)

*Responses were one to five, with five being the best. At week 16, the percentage change from baseline is presented. Of the percent change, only gastrointestinal disturbances worsened.

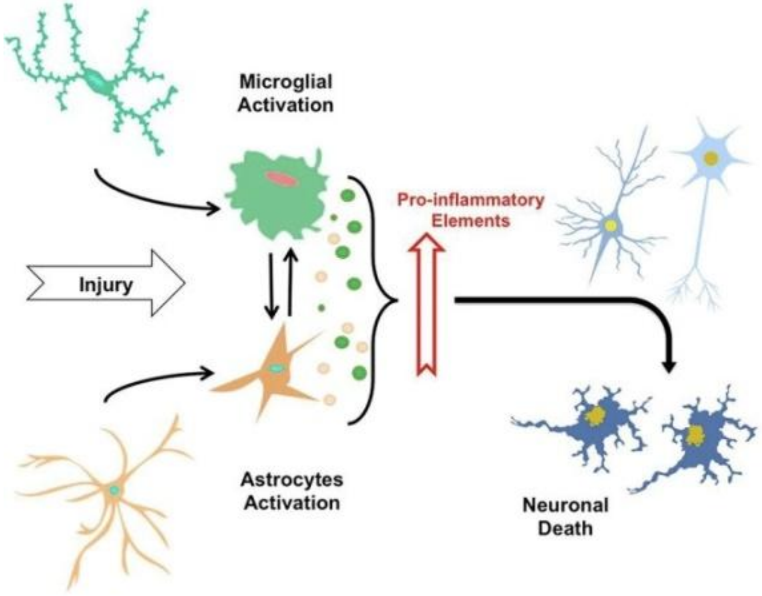
Summary: nutrient-dense foods work

- Testosterone results
  - Increased in 100% of participants
    - 32% or higher increase
- Sperm Count Results
  - All had normal sperm count to begin with, yet…still big increase
  - Sperm count improved in 60% of participants
    - Increased by ~70%
- Quality of Life Results
  - Improve by more than 20% for:
    - Sex Drive
    - Energy
    - General Feeling

Consider nutrient-dense foods as a treatment of reduced libido



Leaving Virility and going to the Brain



Healthy brain

Neuroinflammation

Correct with diet

Some have tried to treat neuroinflammation with diet

www.impactaging.com AGING, September 2014, Vol 6 N 9

Review

Reversal of cognitive decline: A novel therapeutic program

Dale E. Bredesen[1, 2]

[1] Mary S. Easton Center for Alzheimer's Disease Research, Department of Neurology, University of California, Los Angeles, CA 90095;
[2] Buck Institute for Research on Aging, Novato, CA 94945.

Some have tried to treat neuroinflammation with diet (cont.)

HHS Public Access

Author manuscript

Alzheimers Dement. Author manuscript; available in PMC 2016 September 01.

Published in final edited form as:

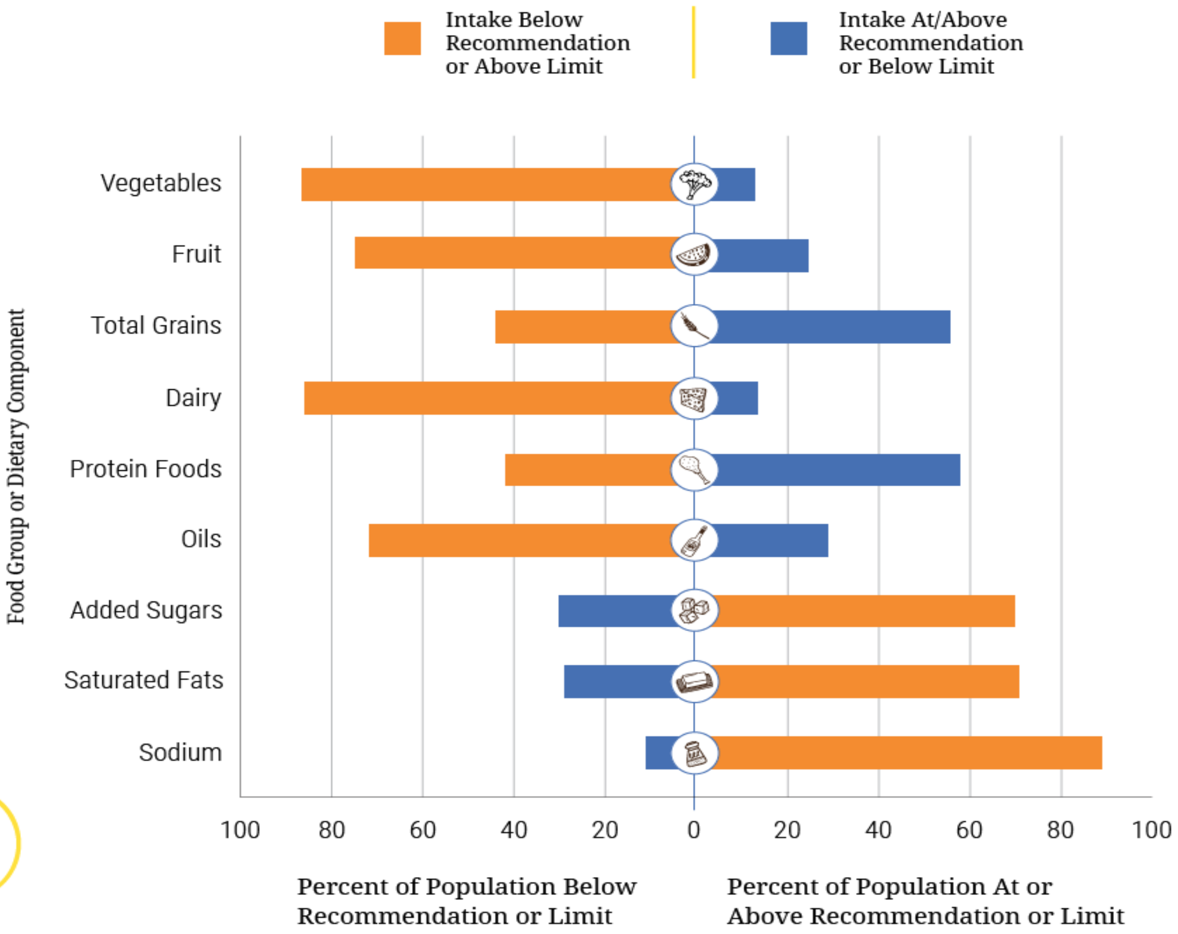
Alzheimers Dement. 2015 September ; 11(9): 1007–1014. doi:10.1016/j.jalz.2014.11.009.

MIND Diet Associated with Reduced Incidence of Alzheimer's Disease

Martha Clare Morris, S.D.[1], **Christy C. Tangney, Ph.D.**[2], **Yamin Wang, Ph.D.**[1], **Frank M. Sacks, M.D.**[5], **David A Bennett, M.D.**[3,4], and **Neelum T. Aggarwal, M.D.**[3,4]

[1]Department of Internal Medicine, Rush University Medical Center

Problem: Americans consume a diet that increases neuroinflammation

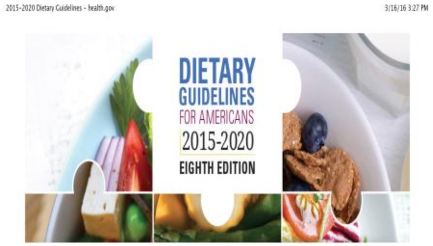


Should consume nutrient-rich foods

-Fruits, vegetables, whole grains, low-fat dairy, seeds/nuts

Should limit inflammatory ingredients

-Rich is salt, sugar, saturated fat



http://health.gov/dietaryguidelines/2015/guidelines/full/

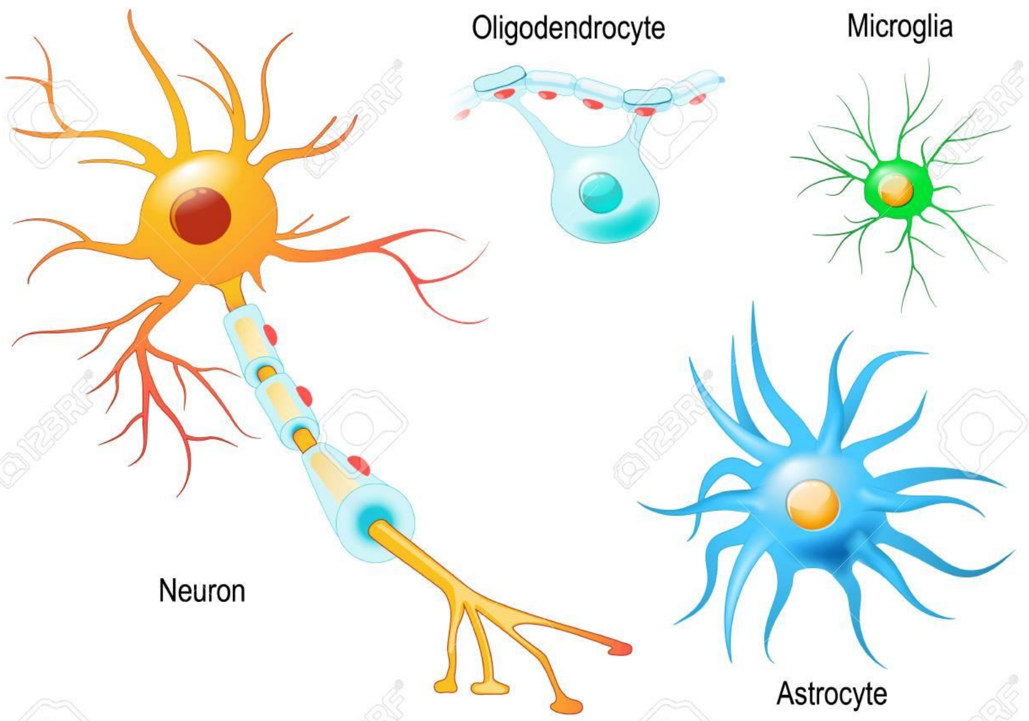
Dietary options to decrease neuroinflammation

- Nutrient-dense foods containing bio-active compounds (e.g., phosphatidylserine)

	Total CFQ score*	Forgetfulness	Distractibility	False triggering
Baseline	28.43 ± 18.20	11.57 ± 5.86	9.29 ± 6.21	8.14 ± 6.59
Week 3 **vs. Baseline**	22.86 ± 10.76 20% lower	10.00 ± 2.89 14% lower	6.86 ± 4.14 26% lower	6.57 ± 4.28 19% lower
Week 6 **vs. Baseline**	18.43 ± 11.89 36% lower	7.71 ± 4.92 33% lower	6.00 ± 3.51 35% lower	4.57 v 4.35 44% lower

*Lower score is better

NEURON and GLIAL SELLS



Intense interest on microglia cells

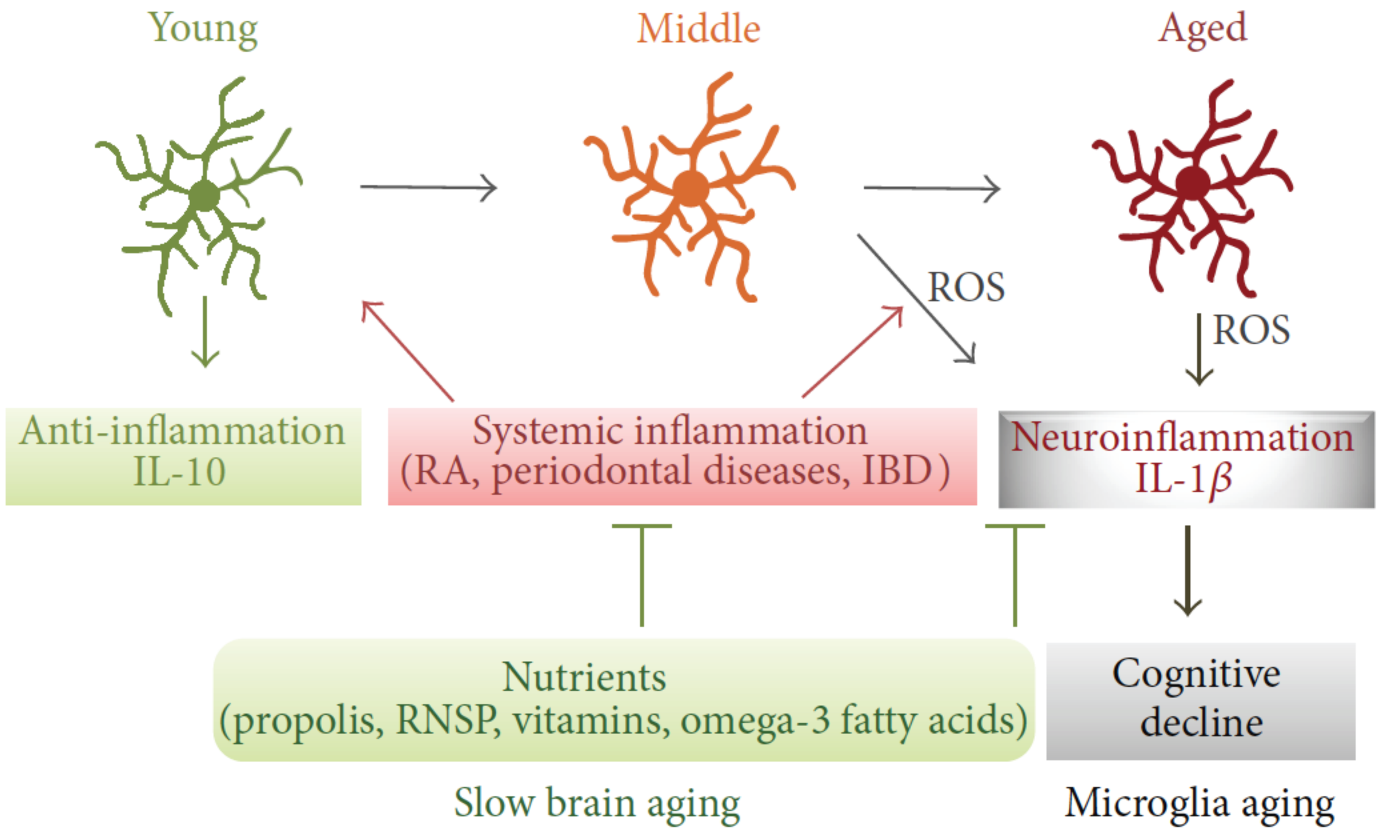
Hindawi Publishing Corporation
Oxidative Medicine and Cellular Longevity
Volume 2016, Article ID 7498528, 9 pages
http://dx.doi.org/10.1155/2016/7498528

Review Article

Nutrients, Microglia Aging, and Brain Aging

Zhou Wu,[1] Janchun Yu,[2] Aiqin Zhu,[3] and Hiroshi Nakanishi[1]

Nutrients can reduce neuroinflammation



Omega-3s from seafood

1521-0081/70/1/12–38$25.00
PHARMACOLOGICAL REVIEWS

https://doi.org/10.1124/pr.117.014092
Pharmacol Rev 70:12–38, January 2018

ASSOCIATE EDITOR: ROBERT DANTZER

Anti-Inflammatory Effects of Omega-3 Fatty Acids in the Brain: Physiological Mechanisms and Relevance to Pharmacology

Sophie Layé, Agnès Nadjar, Corinne Joffre, and Richard P. Bazinet

Institut National pour la Recherche Agronomique and Bordeaux University, Nutrition et Neurobiologie Intégrée, UMR 1286, Bordeaux, France (S.L., A.N., C.J.); and Department of Nutritional Sciences, University of Toronto, Ontario, Canada (R.P.B.)

Chocolate polyphenols called flavanols

AJCN. First published ahead of print December 17, 2014 as doi: 10.3945/ajcn.114.092189.

Cocoa flavanol consumption improves cognitive function, blood pressure control, and metabolic profile in elderly subjects: the Cocoa, Cognition, and Aging (CoCoA) Study—a randomized controlled trial[1–4]

Daniela Mastroiacovo, Catherine Kwik-Uribe, Davide Grassi, Stefano Necozione, Angelo Raffaele, Luana Pistacchio, Roberta Righetti, Raffaella Bocale, Maria Carmela Lechiara, Carmine Marini, Claudio Ferri, and Giovambattista Desideri

Cannabinoids

- CB2 receptors are low on normal microglia
- CB2 receptors are up-regulated on activated microglia
- Stimulating CB2 receptors makes active microglia return to normal state
- Foods that stimulate CB2: black pepper, cloves, hemp

Stay tuned for more on ingredients for treating neuroinflammation