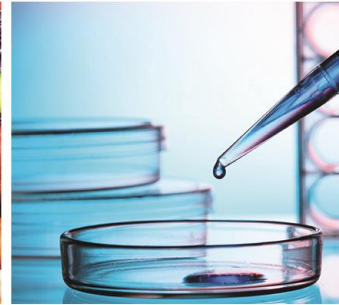


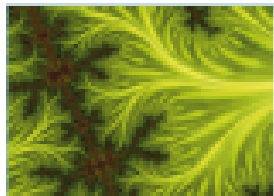
JEAN MAYER  
USDA  
HUMAN  
NUTRITION  
RESEARCH  
CENTER ON  
AGING

HNRC A



Jose M Ordovas  
***Prediccion and  
Prevencion de la  
Obesidad: Un reto  
para las “omicas”***

Madrid, 7 de Nov. 2016



instituto  
**imdea**  
alimentación

**cnic**  
Fundación  
Centro Nacional de  
Investigaciones  
Cardiovasculares  
Carlos III

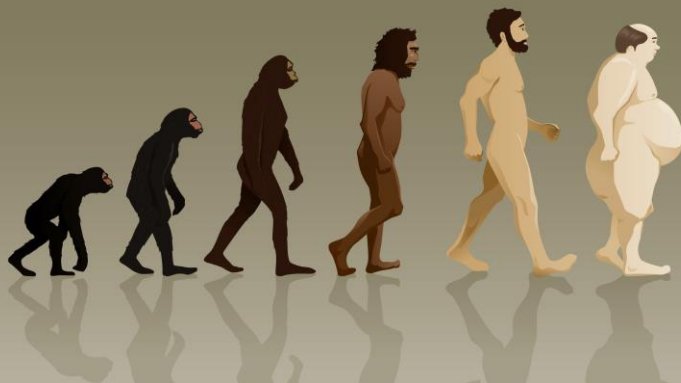
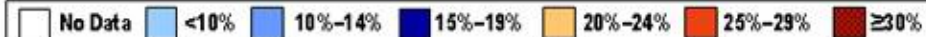
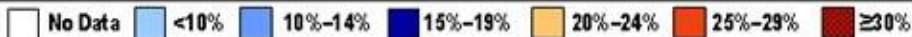
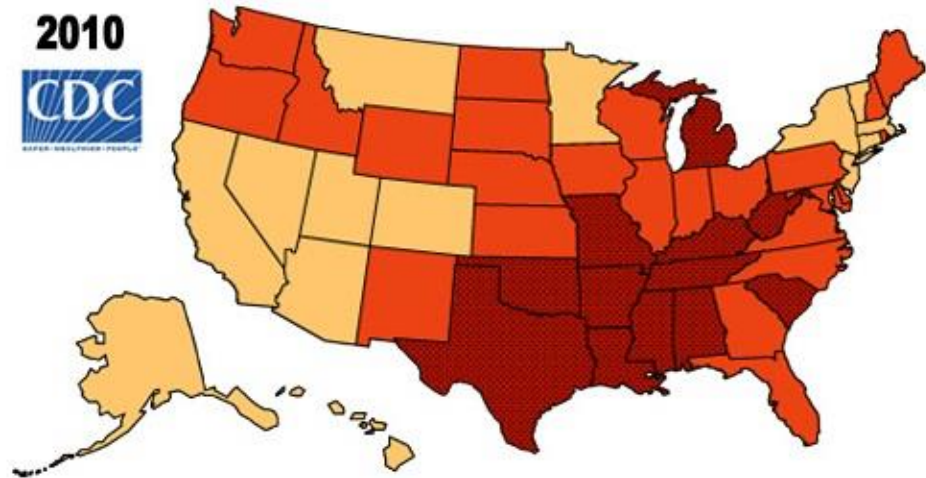
**Tufts**  
UNIVERSITY

# The Growing Obesity Epidemic

1985



2010



**OBESITY IS A GROWING EPIDEMIC**  
THAT IS THREATENING THE HEALTH AND THE FUTURE OF THE WORLD.

MORE THAN  
**1.4**  
BILLION  
ADULTS WORLDWIDE ARE  
OVERWEIGHT OR OBESE

Source: World Health Organization

MORE THAN  
**HALF**  
OF UK ADULTS  
ARE EITHER  
OVERWEIGHT  
OR OBESE.

Source: BBC Health

AT LEAST  
**2.8**  
MILLION  
PEOPLE DIE  
EACH YEAR AS A RESULT OF BEING  
OVERWEIGHT  
OR OBESE.

Source:  
World Health Organization



# It May be Growing, but it is not New



Benjamin Marshall  
 Daniel Lambert XIX c.



Rubens, Peter Paul  
 Venus at the Mirror XVII c



Juan Carreño de Miranda  
 La monstrea desnuda XVII c



Nero



Galba



Otho



Vitellius



Vespasian



Willendorf  
 20K-22K BCE



Gagarino  
 20K BCE



Berekhat Ram  
 250K-280K BCE



# Obesity: Identity Crisis

## A History of Obesity, or How What Was Good Became Ugly and Then Bad

Garabed Eknoyan

Chronic food shortage and malnutrition have been the scourge of humankind from the dawn of history. The current worldwide epidemic of obesity, now recognized as a public health crisis, is barely a few decades old. Only after the technological advances of the eighteenth century did a gradual increase in food supply become available. The initial effect of these advances in improved public health and amount, quality, and variety of food was increased longevity and body size. These early favorable outcomes of technological advances notwithstanding, their incremental effect since the Second World War has been an overabundance of easily accessible food, coupled with reduced physical activity, that accounts for the recent increased prevalence of obesity. Obesity as a chronic disease with well-defined pathologic consequences is less than a century old. The scarcity of food throughout most of history had led to connotations that being fat was good, and that corpulence and increased "flesh" were desirable as reflected in the arts, literature, and medical opinion of the times. Only in the latter half of the nineteenth century did being fat begin to be stigmatized for aesthetic reasons, and in the twentieth century, its association with increased mortality was recognized. Whereas early reports listed obesity as a risk factor for mortality from "chronic nephritis," the subsequent recognition of the more common association of obesity with diabetes, hypertension, and heart disease altered the listings and questioned its being a risk factor for kidney disease. An enlarging body of evidence, accrued over the past decade, now indicates a direct association of obesity with chronic kidney disease and its outcomes.

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Index Words: Obesity; chronic kidney disease; food history; Pima Indians; famine; malnutrition

Obesity is a worldwide public-health problem, with increasing incidence and prevalence, high costs, and poor outcomes. As a disease, with defined pathologic and pathophysiologic complications, it is just about a century old.<sup>1-3</sup> In fact, the term "obesity" does not appear in the English language until the seventeenth century, and then only as a descriptive literary term for excessive fatness or corpulence.<sup>4</sup> The impact of obesity on quality of life began to be appreciated and recorded in the eighteenth century, but only in the middle of the nineteenth century it was recognized as a cause of ill health, and then only in the first decades of the twentieth century were its morbid complications and increased mortality documented.<sup>1-3,5</sup> What has made this gradual medicalization of obesity alarming is the exponential increase in its incidence over the past 60 years, which led the World Health Organization to declare it a global epidemic and worldwide public-health crisis.<sup>6,7</sup>

Much like other killer diseases (cardiac, vascular, and respiratory) that have emerged as the scourge of humankind over the same period of time, obesity is a chronic disease. As a chronic disease, the indolent onset of its complications (diabetes, hypertension, and atherosclerosis) account for its morbidity and mortality.<sup>3</sup> Unlike

the other chronic diseases, however, it is not a silent killer, but one whose external manifestations are evident to afflicted individuals from its outset as weight gain and increased girth. As a public-health problem, therefore, this externally manifest disease is one that is easy to detect, which allows for potentially considerable time to prevent its complications. Prevention is not an easy task at best, and complications remain "a bomb awaiting to be defused."<sup>8</sup>

### Historical Roots

The accrued evidence for a multifactorial etiology of obesity notwithstanding, the available information from thermodynamics of food metabolism has clearly established what had long been intuitively assumed—that in the final analysis, the cause of excess subcutaneous and visceral fat deposition in an individual is the cumulative effect of an imbalance between the

From the Renal Section, Department of Medicine, Baylor College of Medicine, Houston, TX.

Address correspondence to G. Eknoyan, MD, Department of Medicine (523-D), Baylor College of Medicine, One Baylor Plaza, Houston, TX 77030. E-mail: geknoyan@bcm.tmc.edu

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1548-5595/06/1304-0012\$32.00/0

doi:10.1053/j.ackd.2006.07.002

Good

Ugly

Bad



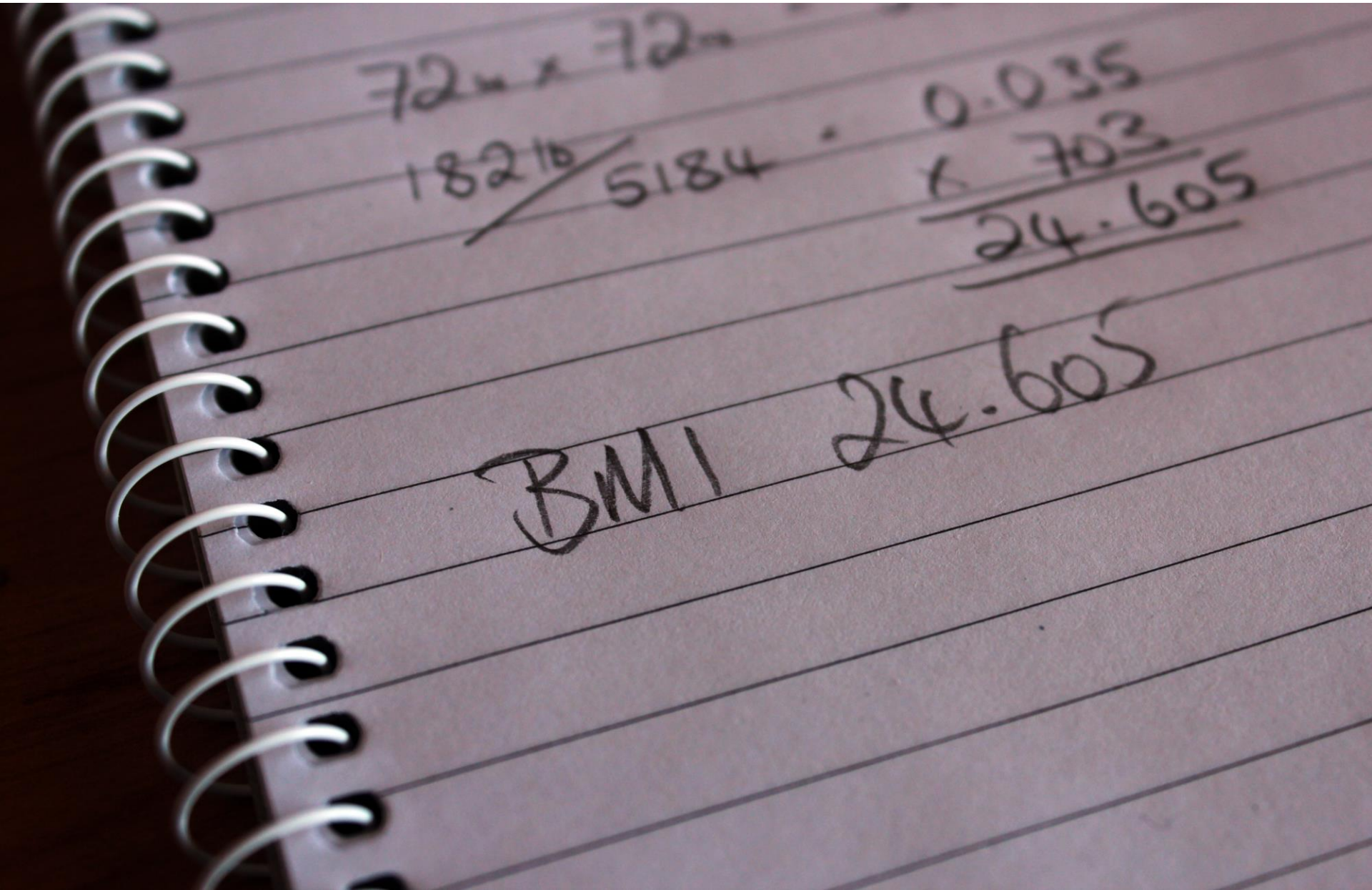
### The Negative Effects of Obesity on Your Health and Your life

- cancer
- joint problems
- low self-esteem
- heart attacks
- depression
- breathing problems
- high blood pressure
- type 2 diabetes
- Increased sweating
- limited mobility
- high cholesterol
- arthritis
- social discrimination
- bone problems
- hernia
- deep vein thrombosis
- fewer employment opportunities
- lower life expectancy

NZ New Image Int - Alpha Lipid Network  
<http://www.alphalipid2012.weebly.com/>  
<http://www.facebook.com/alphalipid2012>  
 Email: nialpha12@gmail.com



# How to Classify Obesity?



# RECHERCHES

SUR

# LE POIDS DE L'HOMME

AUX DIFFÉRENS AGES,

PRÉSENTÉES

A LA SÉANCE DU 5 MAI ET LUES DANS LA SÉANCE DU 2 JUIN 1832,

PAR A. QUETELET,

DIRECTEUR DE L'OBSERVATOIRE DE BRUXELLES; DES ACADÉMIES ROYALES DE BRUXELLES, DE BERLIN ET DE TURIN;  
DE L'INSTITUT DES PAYS-BAS, ASSOCIÉ LIBRE ÉTRANGER DE LA SOCIÉTÉ STATISTIQUE DE PARIS; DE LA SOCIÉTÉ  
PHILOMATIQUE DE LA MÊME VILLE; DE LA SOCIÉTÉ ROYALE ASTRONOMIQUE DE LONDRES;  
DE LA SOCIÉTÉ DE PHYSIQUE ET D'HISTOIRE NATURELLE DE GENÈVE; DES SOCIÉTÉS DES  
SCIENCES NATURELLES ET MÉDICALES DE HEIDELBERG ET DE WURZBOURG, ETC.



BRUXELLES,

M. HAYEZ, IMPRIMEUR DE L'ACADÉMIE ROYALE.

1833.

Stamp issued by Belgium to commemorate the centenary of the death of Adolphe Quetelet (1796–1874), who in 1832 developed the 'Quetelet Index' now known as the Body Mass Index (BMI).





## OBESITY AND ITS RELATION TO HEALTH AND DISEASE

Donald B. Armstrong, M.D., Louis I. Dublin, Ph.D., George M. Wheatley, M.D.  
and  
Herbert H. Marks, A.B., New York

One of the subtler and more serious health hazards of our time is obesity. It develops so gradually and under such pleasurable circumstances that treatment is often difficult. The victim, feeling hopelessly trapped in his own fat, tends to rationalize his condition. Not only can obesity become a physical impediment in itself, but it may predispose its victims to heart disease, diabetes, liver disease, and other complications.

There are many indications that overweight is becoming increasingly important in medical practice. More men and women are living to the ages in which adipose tissue is easy to acquire and difficult to lose. The high level of national income has permitted many persons to indulge their desire for food and drink, and too often this means high calory foods. Recently, the high cost of first-class protein foods has favored increased carbohydrate intake. On the other hand, a growing segment of the public is showing real interest in weight control. This appears to stem from a desire to learn and adopt changes in diet and mode of living that promise better health and longer life and improved physical appearance.

Obesity, lying in the twilight zone between health and disease, is a logical point of assault on the medical problems of older persons. Weight control is a positive approach to the maintenance of health and prevention of some of the major diseases of middle and later life. The problem is not an easy one for the physician. The solution involves the education of the patient and winning his cooperation. This in turn requires understanding from the physician of human motivation and behavior as well as nutrition in health and disease. The time has come for a more vigorous and rounded approach to the problem. It is our purpose in this paper to show the influence of obesity on morbidity, mortality, and prognosis, to point out some of the present limitations of our knowledge about weight reduction, and to indicate ways in which the practicing physician can utilize weight control as a tangible approach to preventive medicine in the adult population.

### FREQUENCY AND CAUSES OF OVERWEIGHT

How many adults in this country are overweight? We cannot answer the question exactly because no sharp line divides the overweight from the normal-weight person. Under the circumstances, the most suitable basis for the answer is to take an arbitrary percentage departure from average weight for height. For men and women over 25 a fixed set of standards based on the average weight at the ages of 25 to 30 is recommended, with due allowance in the individual case for those factors in body structure which influence weight. The ideal weight tables now in popular use, which were prepared several years ago by the Metropolitan Life Insurance Company, take these factors into account.<sup>1</sup>

As a practical measure, we may define overweight as any deviation of 10% or more above the ideal weight for

the person. On this basis at least one-fifth of the population over age 30, or about 15 million, are overweight, and a considerable number of younger people weigh more than is good for them. We would consider that a weight 20% or more above the ideal constitutes pathological overweight, or obesity which definitely requires correction. On this basis the number of obese adults is 5 million or more.

As for the cause of overweight, most critical students of the subject now agree that simple unadulterated overeating is the basic cause in the majority of cases.<sup>2</sup> Endocrine factors in the etiology of obesity cannot be disregarded, but obesity explainable solely on the basis of endocrine dysfunction is rare. No doubt a higher proportion of the exceptional cases come to the attention of physicians than of the common garden variety of overweight. Making allowance for this, we are probably safe in saying that overeating accounts for the overweight in at least 95% of the cases.

### OVERWEIGHT AND IMPAIRMENTS

The association of overweight with many serious physical impairments is evident from numerous studies. Information is most abundant on circulatory disorders, and we shall refer only to the more recent and important contributions. Thomson<sup>3</sup> has studied the association between overweight and hypertension among Metropolitan Life Insurance Company employees reaching 40 between 1930 and 1943 for whom blood pressure records usually extended back many years. The frequency of diastolic levels of 90 mm. of mercury or over was analyzed in relation to the ponderal index (weight in pounds divided by height in inches). At 35 to 44 years, 26% of those classified as of heavy build had diastolic pressures of 90 mm. of mercury or over, as compared with 15% for persons of medium build and 9% for persons of light build. At 45 to 54 years, the figures among all groups were higher, but the differences according to body type persisted.

The recent report of Master, Dublin, and Marks,<sup>4</sup> based on a sample among 74,000 industrial workers, showed at every age and in both sexes a steady progres-

From the Statistical Bureau and the Health and Welfare Division of the Metropolitan Life Insurance Company.

Read before the General Scientific Meetings at the One Hundredth Annual Session of the American Medical Association, Atlantic City, June 12, 1951.

1. Ideal Weights for Women, Metropolitan Life Insurance Company, Statistical Bulletin, 23:6 (Oct.) 1942; Ideal Weights for Men, Metropolitan Life Insurance Company, Statistical Bulletin, 24:6 (June) 1943.

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4. Master, A. M.; Dublin, L. I., and Marks, H. H.: The Normal Blood Pressure Range and Its Clinical Implications, J. A. M. A. 143:1464 (Aug. 26) 1950.

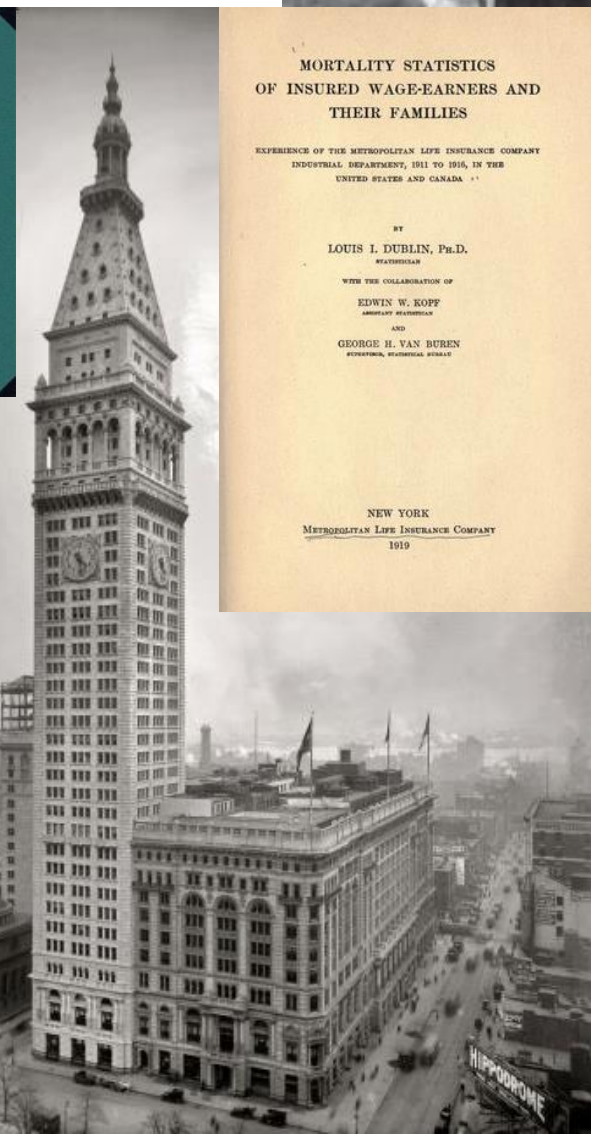
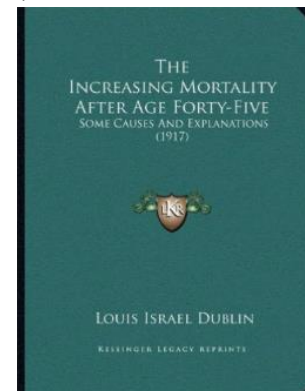
Louis Israel Dublin (1882 -1969)

Vice president and statistician of the Metropolitan Life Insurance Company

ARMSTRONG DB, DUBLIN LI, WHEATLEY GM, MARKS HH. Obesity and its relation to health and disease. J Am Med Assoc. 1951 Nov 10;147(11):1007-14.

ARMSTRONG DB, DUBLIN LI, BONNETT EC, MARKS HH. Influence of overweight on health and disease. Postgrad Med. 1951 Nov;10(5):407-21.

DUBLIN LI, MARKS HH. Mortality among insured overweights in recent years. Trans Assoc Life Insur Med Dir Am. 1951;35:235-66.



### MORTALITY STATISTICS OF INSURED WAGE-EARNERS AND THEIR FAMILIES

EXPERIENCE OF THE METROPOLITAN LIFE INSURANCE COMPANY INDUSTRIAL DEPARTMENT, 1911 TO 1916, IN THE UNITED STATES AND CANADA

BY  
LOUIS I. DUBLIN, Ph.D.  
STATISTICIAN  
WITH THE COLLABORATION OF  
EDWIN W. KOPF  
ASSISTANT STATISTICIAN  
AND  
GEORGE H. VAN BUREN  
SUPERVISOR, STATISTICAL BUREAU

NEW YORK  
METROPOLITAN LIFE INSURANCE COMPANY  
1919



## Reprints and Reflections

### Indices of relative weight and obesity\*

Ancel Keys<sup>1</sup>, Flaminio Fidanza<sup>2</sup>, Martti J Karvonen<sup>3</sup>, Noburu Kimura<sup>4</sup>  
and Henry L Taylor<sup>5</sup>

<sup>1</sup>Director, Laboratory of Physiological Hygiene, University of Minnesota School of Public Health, <sup>2</sup>Professor, Institute of Food and Nutrition Science, University of Perugia, Italy, <sup>3</sup>Director, Institute of Occupational Health, Helsinki, Finland, <sup>4</sup>Director, Institute of Cardiovascular Research, University of Kurume, Japan and <sup>5</sup>Professor, Laboratory of Physiological Hygiene, University of Minnesota School of Public Health

#### Introduction

THE NEED for an index of relative body weight was recognized from the beginning of anthropometry, that is to say as soon as serious attention was given to the dimensions of the body and their biological and medical implications. Body weight in proportion to height or to some function of height is interesting because it should indicate something about 'build' or shape and about obesity or fatness.

Various indices of relative weight have been espoused and applied for many years but as yet there is no agreement on any particular index. In part this reflects confusion-or at least lack of agreement-about what a relative weight index should represent and mean; in part the reason is a lack of "calibrating" data and of systematic examination of wide-ranging samples of data analyzed in parallel. The purpose of this paper is to provide a comparison of various indices of relative weight as applied to data on weight, height and body fatness of men in several countries in Europe, in Japan, men in South Africa, as well as of white men in the United States.

In the present paper guidance in the analysis was provided by two assumptions. First, it is assumed that a major reason for the use of a relative weight index is to remove the dependency of weight on height. Second, it is assumed that in the selection of an index attention should be given

to the degree to which the index may indicate relative obesity or body fatness.

#### Relative body weight-life insurance averages

Superficially, it might seem simplest and most informative to express the weight of the individual as a percentage of the average weight of persons of the same height, age and sex in the population to which he belongs. That was the reasoning that led to publication of "standard height-weight" tables by the life insurance industry, beginning with the Medico-Actuarial Mortality Investigations of 1912.<sup>1</sup>

As originally published, the life insurance industry tables simply provided, for the two sexes, average weights, in pounds, at specified ages and heights, in inches. Those measures were recorded, 'as customarily dressed in indoor clothing', in connection with application for life insurance. Roughly, at least for men, it seems that the extra height added by the shoes may be compensated for by the extra weight added by the shoes and the rest of the 'indoor clothing', so that similar relationships should hold for barefoot height and nude weight or in light underclothing.

We have published a metric system version of those 1912 tables based on smoothed plots of the discrete values in the original tables.<sup>2</sup> In the present paper, 'relative body weight' means the body weight expressed as a percentage

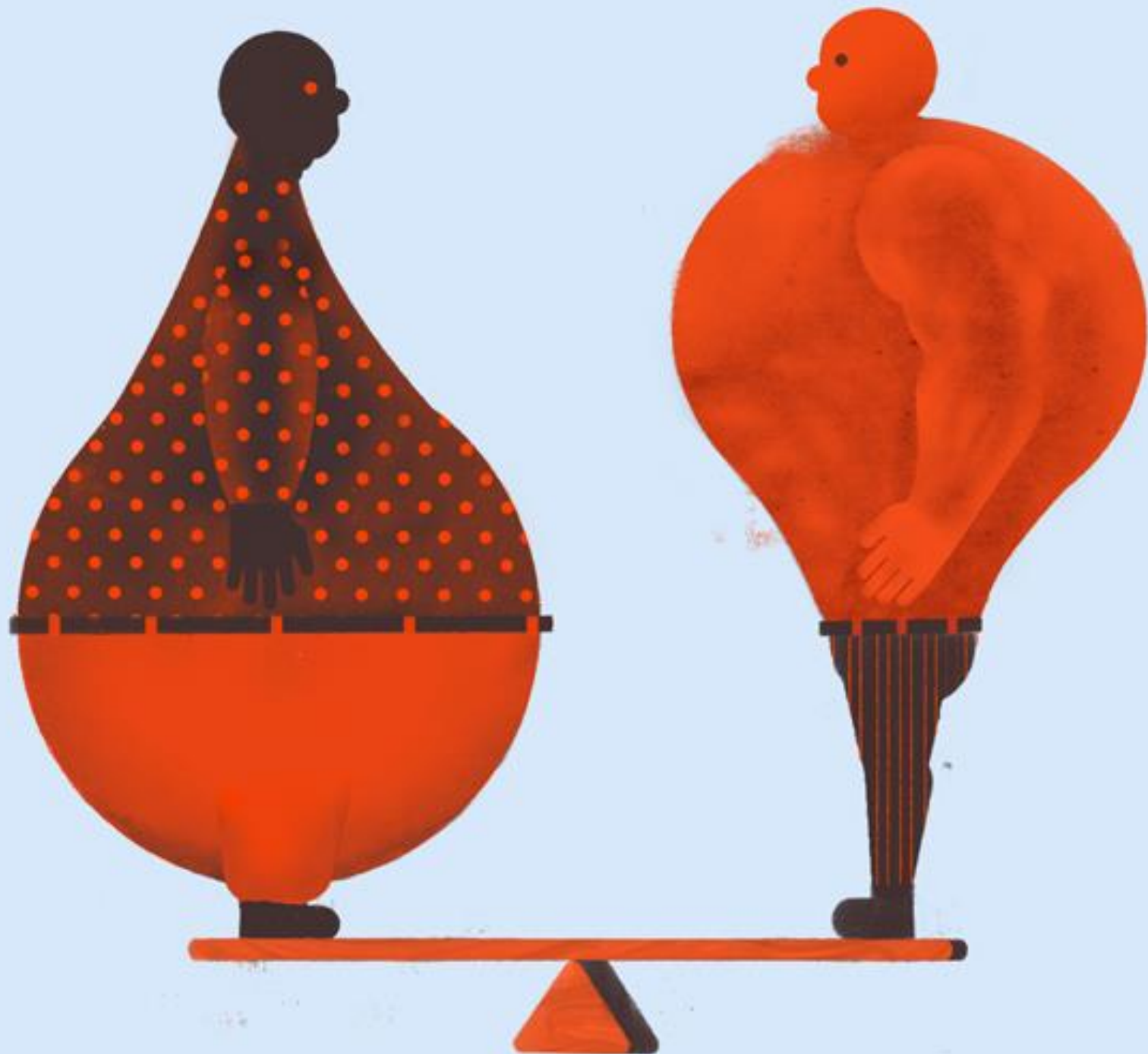


Ancel Benjamin Keys (1904 – 2004)



\*Keys A, Fidanza F, Karvonen MJ, Kimuru N, Taylor HL. Indices of relative weight and obesity. *J Chron Dis* 1972. Vol. 25. pp. 329–343. Reprinted with permission.

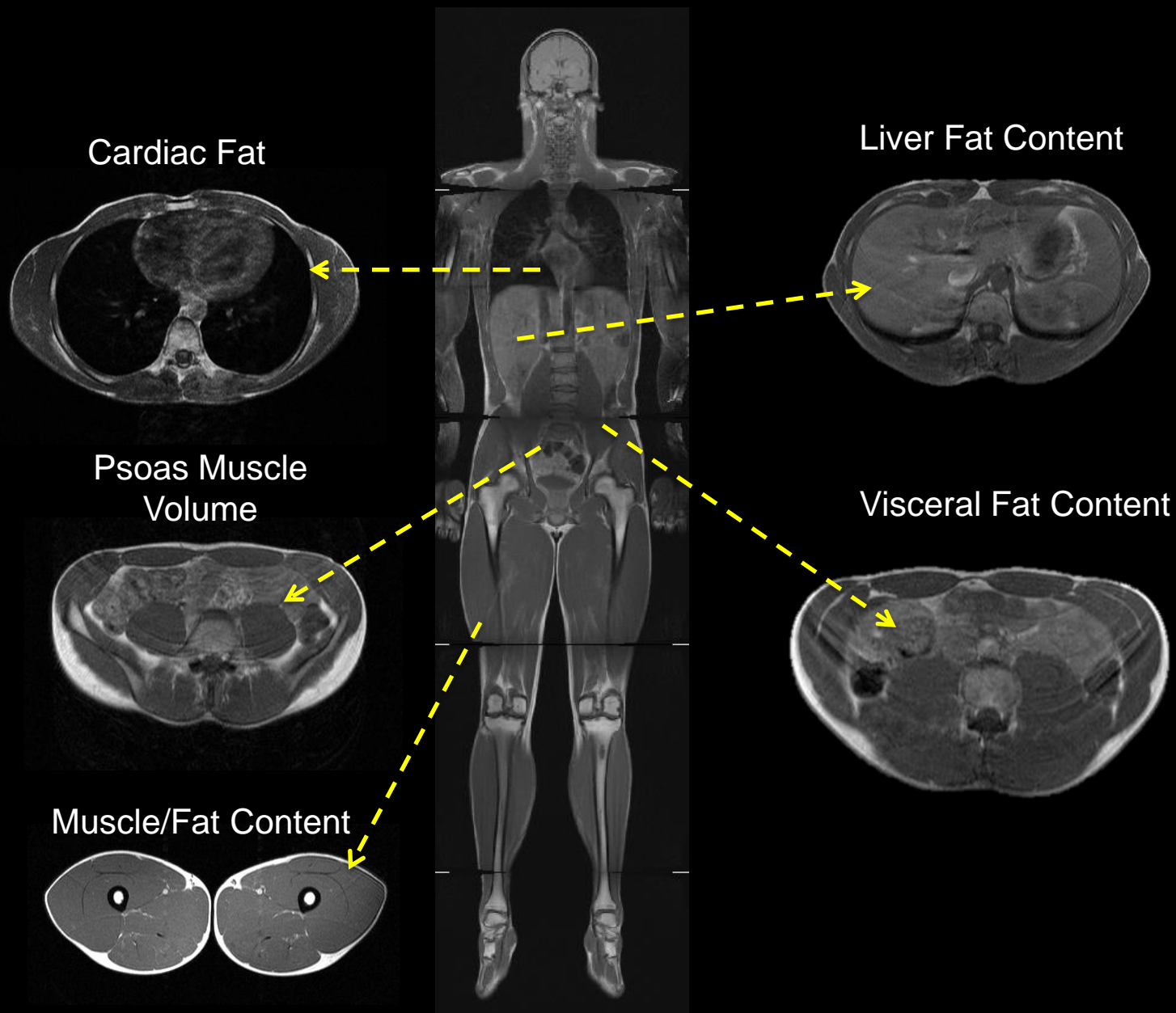


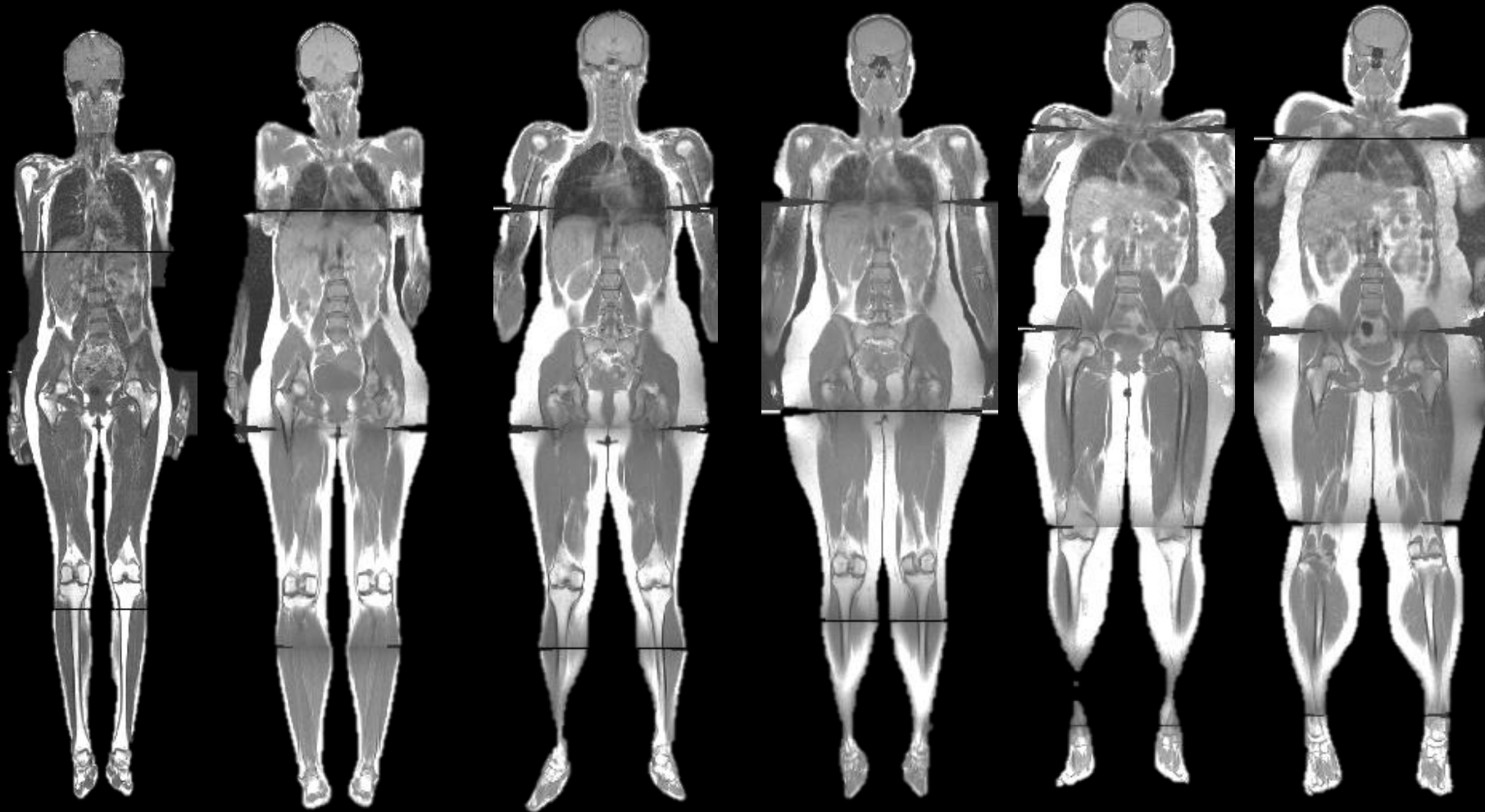




## A Deeper Look to Obesity







BMI 18 kg/m<sup>2</sup>

BMI 22 kg/m<sup>2</sup>

BMI 25 kg/m<sup>2</sup>

BMI 30 kg/m<sup>2</sup>

BMI 35 kg/m<sup>2</sup>

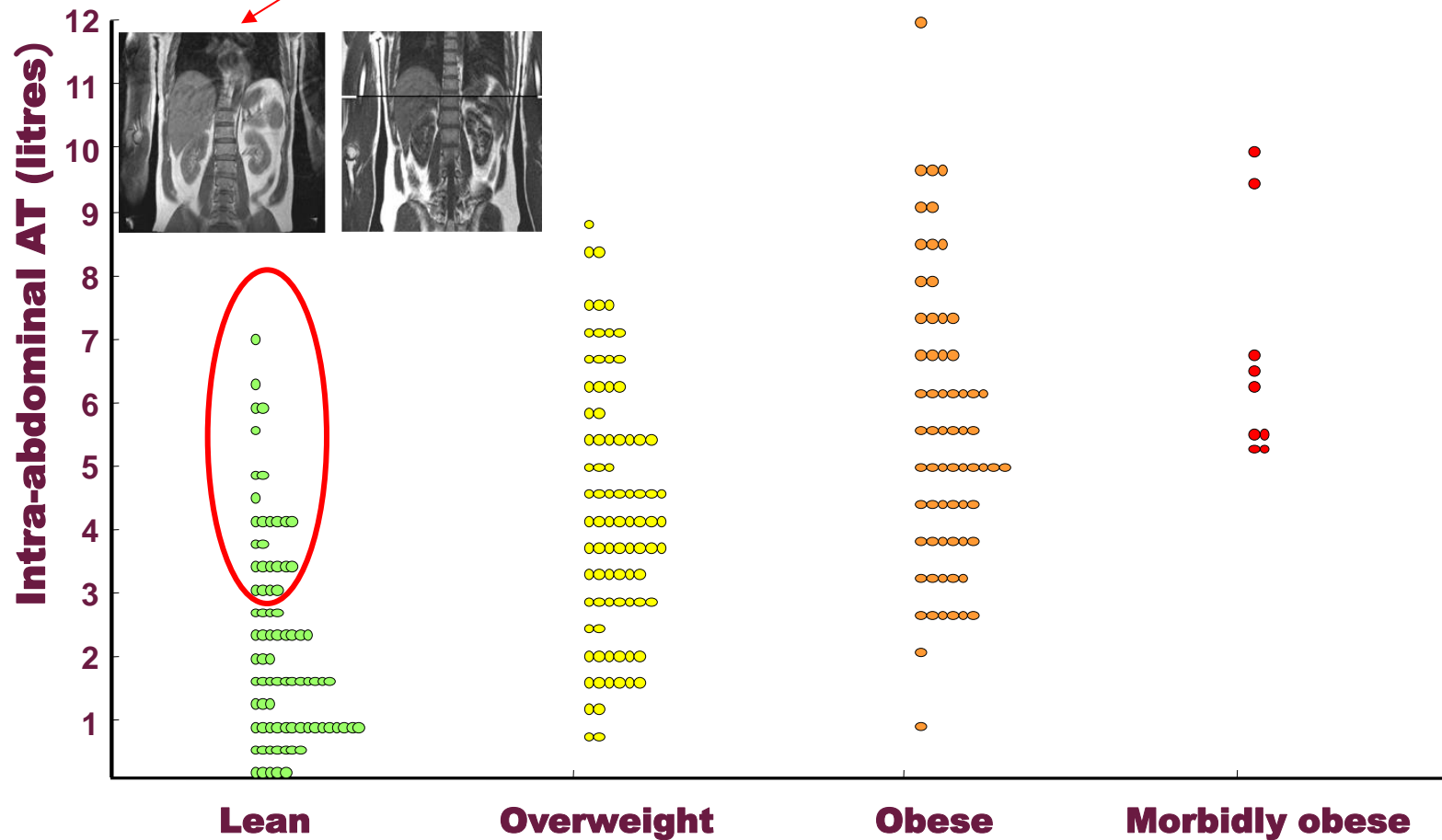
BMI 40 kg/m<sup>2</sup>

Thomas et al 2015



# Body Fat Distribution

**TOFI: “thin on the outside, fat on the inside”**

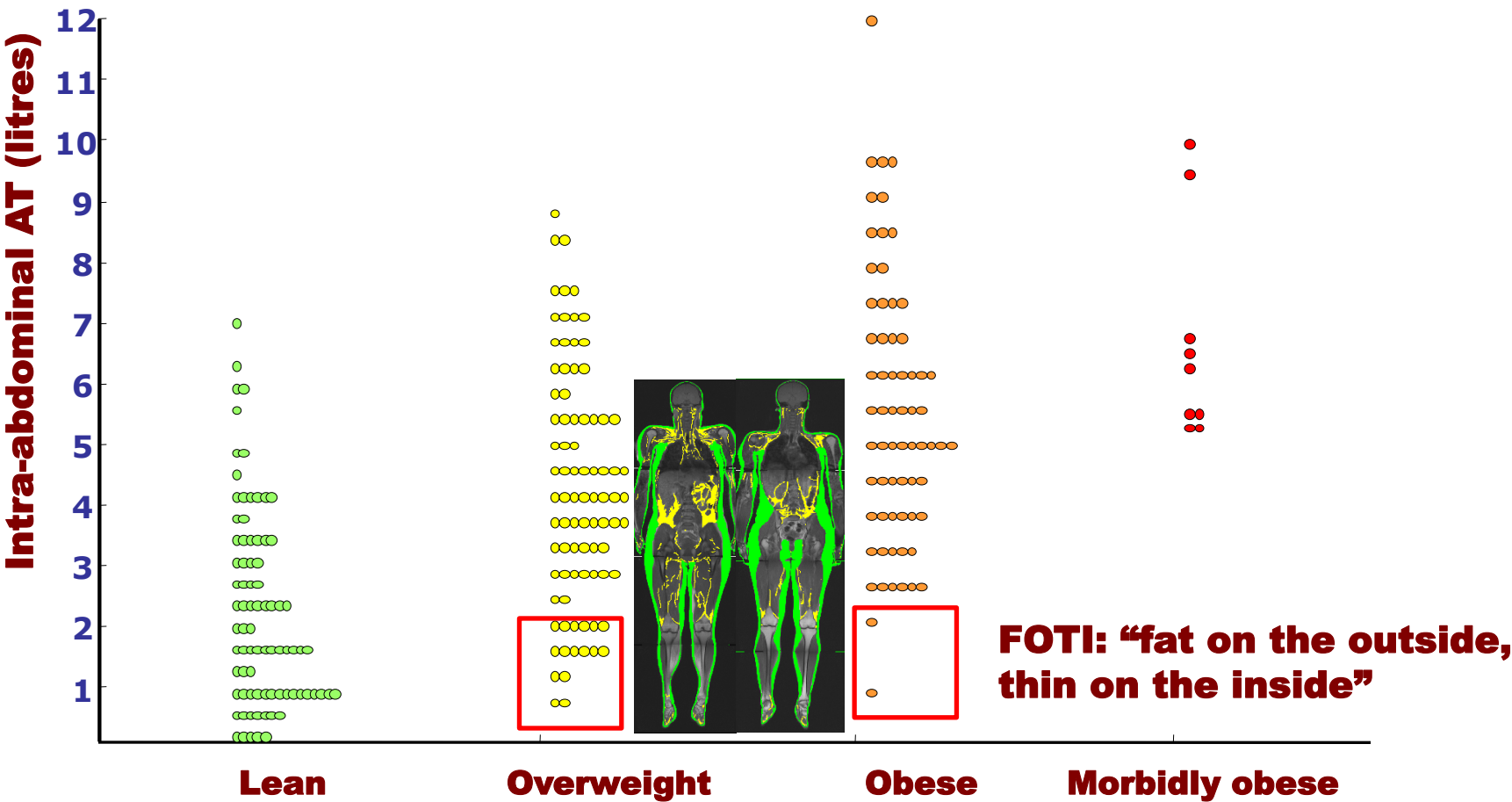


- TOFI:**
- **15.9 % of lean males**
  - **11.5% of lean females**

	Controls (n=38)	TOFI (n=37)	P-value
Insulin Sensitivity (mg.min <sup>-1</sup> .kg <sup>-1</sup> .pmol <sup>-1</sup> )	7.7e <sup>-2</sup> (1.3e <sup>-2</sup> )	5.0e <sup>-2</sup> (1.2e <sup>-2</sup> )	<0.05

# Body Fat Distribution

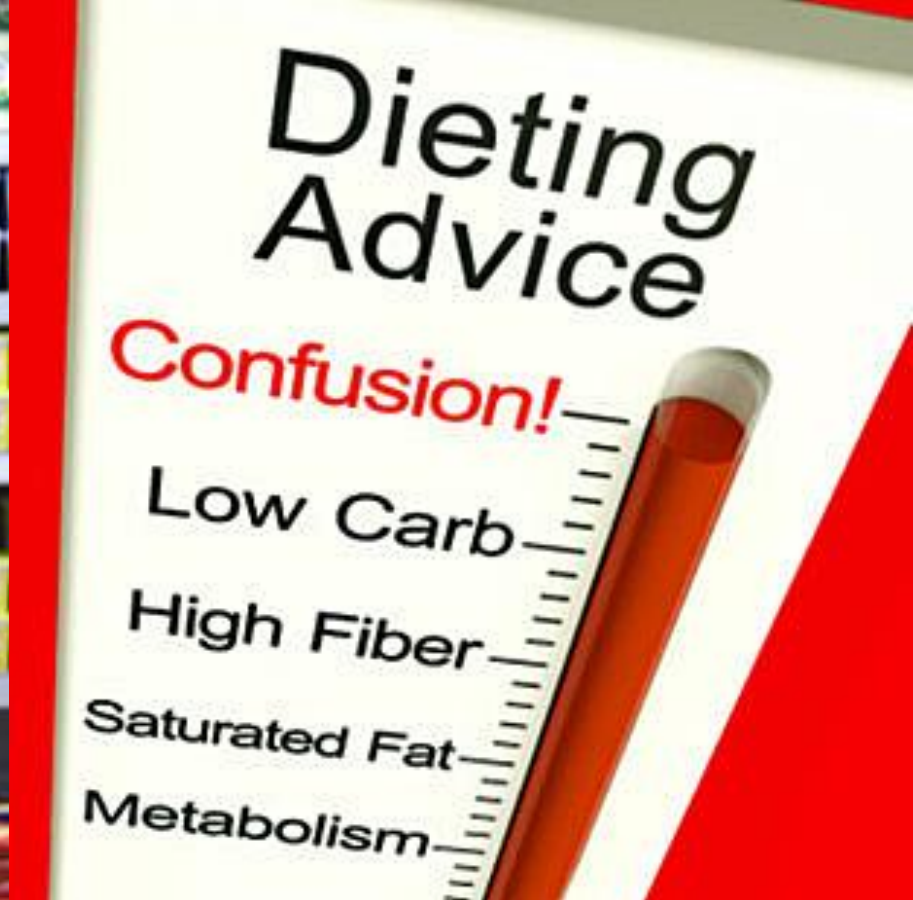
MHO\*/FOTI



\*Metabolically healthy obese









# What's in the Scientific Report for the 2015 Dietary Guidelines?

***FOCUS ON**  
a healthy  
dietary pattern*



*rich in vegetables, fruit,  
whole grains, seafood, legumes, & nuts*

***LIMIT**  
these foods . . .*



*Added sugars*

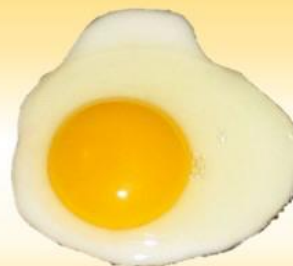


*Refined  
grains*



*Red/processed  
meats, saturated fats*

***These foods**  
are o.k.!*



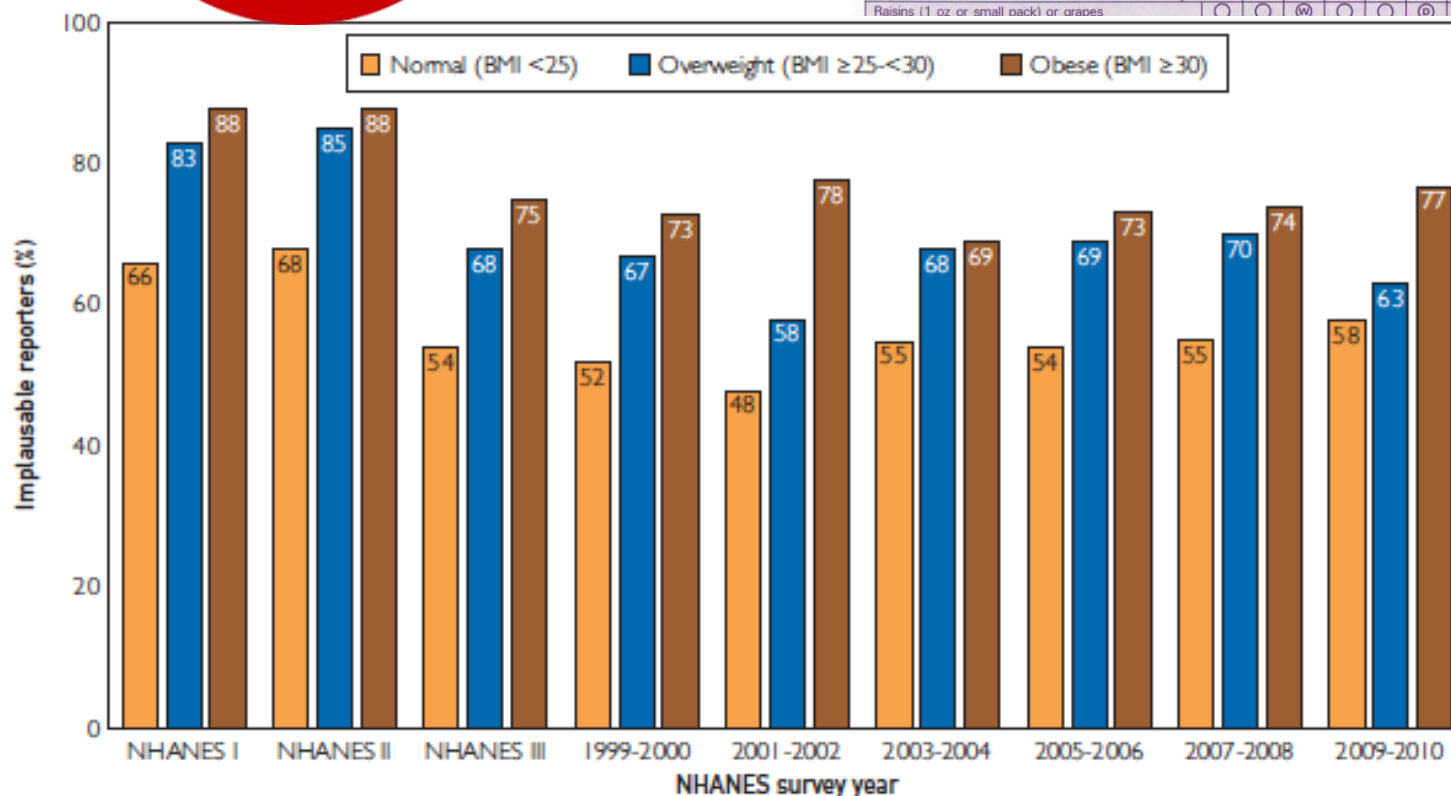
*Eggs*



*Coffee is good!*



the past year.	never, or less than once per month	1-3 per mo	1 per week	2-4 per week	5-6 per week	1 per day	2-3 per day	4-5 per day	6+ per day
<b>DAIRY FOODS</b>									
Skim or low-fat milk (8 oz glass)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Whole milk (8 oz glass)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Cream, e.g. in coffee, or whipped cream (1 Tbs)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Sour cream (1 Tbs)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Non-dairy coffee whitener (1 tsp)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Sherbet or ice milk (½ cup)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ice cream (½ cup)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Cottage or ricotta cheese (½ cup)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Cream cheese (1 oz)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Other cheese, e.g. American, cheddar, etc. plain or as part of a dish (1 slice or 1 oz serving)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Margarine, added to food or bread (1 pat); exclude use in cooking	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Butter, added to food or bread (1 pat); exclude use in cooking	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Yogurt (1 cup)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<b>FRUITS</b>									
Raisins (1 oz or small pack) or grapes	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

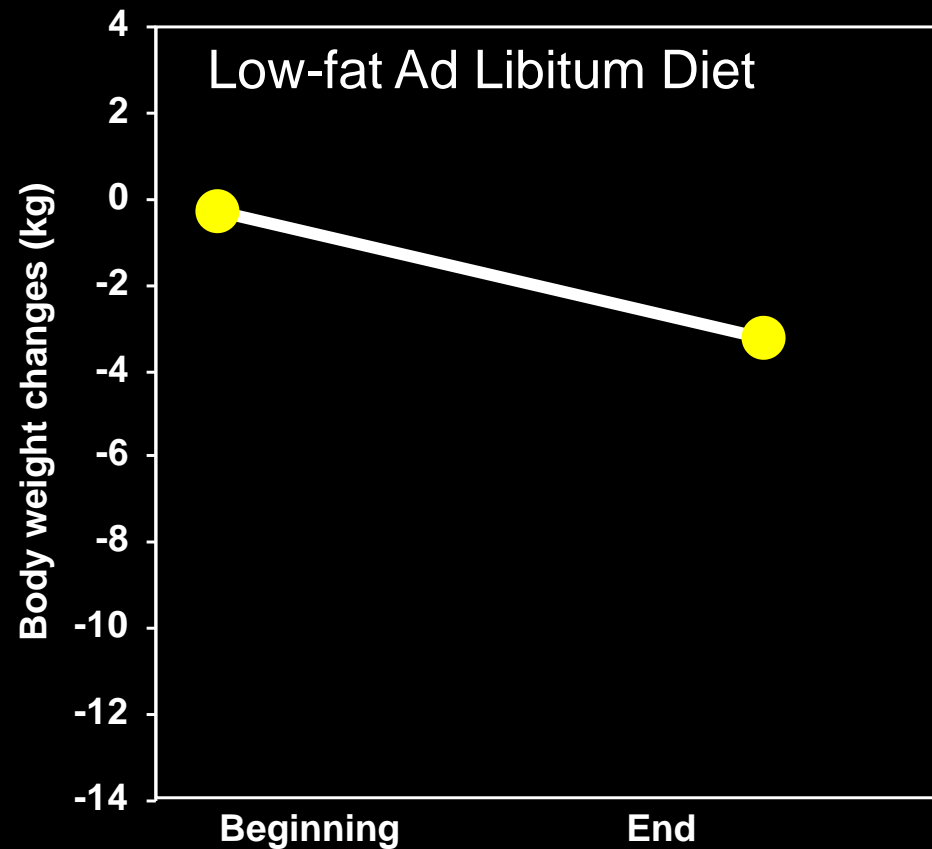
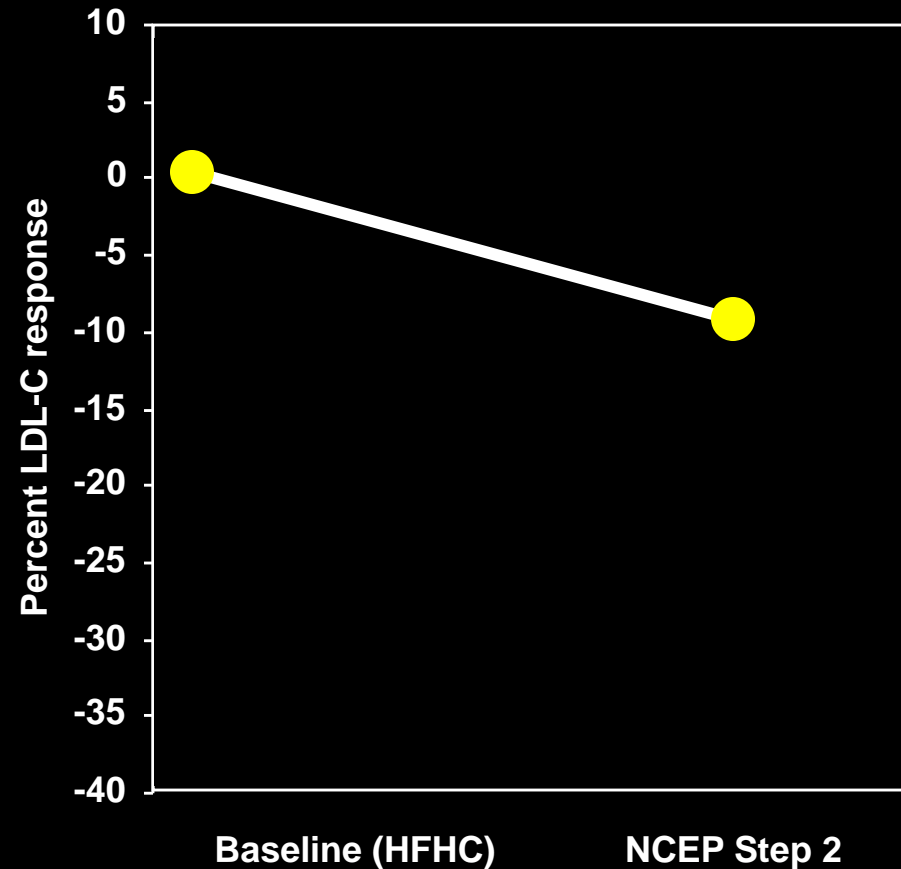


Percentage of implausible reporters by BMI for US women aged 20 to 74 years in the National Health and Nutrition Examination Survey (NHANES) (1971-2010). Physiologically implausible values were determined via the following equation: (reported energy intake/basal metabolic rate) <1.35. Implausible values may be considered “incompatible with life.”





# Response to Diet Intervention:

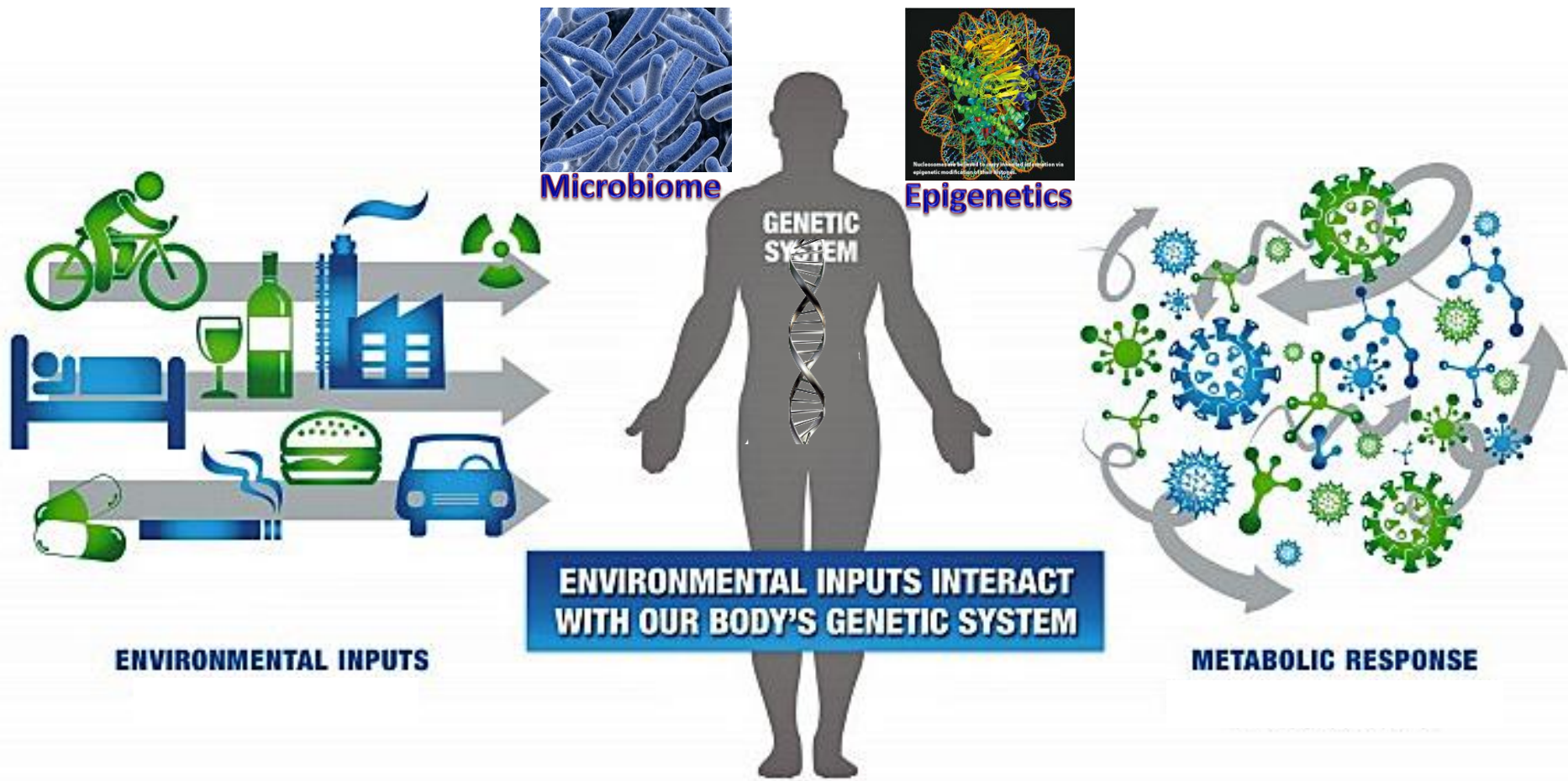


Schaefer EJ, Lichtenstein AH, Lamon-Fava S, McNamara JR, Schaefer MM, Rasmussen H, Ordovas JM. Body weight and low-density lipoprotein cholesterol changes after consumption of a low-fat ad libitum diet. *JAMA*. 1995;274:1450-5.

Schaefer EJ, Lichtenstein AH, Lamon-Fava S, Contois JH, Li Z, Rasmussen H, McNamara JR, Ordovas JM. Efficacy of a National Cholesterol Education Program Step 2 diet in normolipidemic and hypercholesterolemic middle-aged and elderly men and women. *Arterioscler Thromb Vasc Biol*. 1995 Aug;15(8):1079-85.



# Personalized Health/Disease Prevention: Interaction Genome-Environment



**The Unique combination of genetics,  
epigenetics, microbiome and environment  
makes us also UNIQUE.**

**But we do not need (and cannot afford) unique solutions**



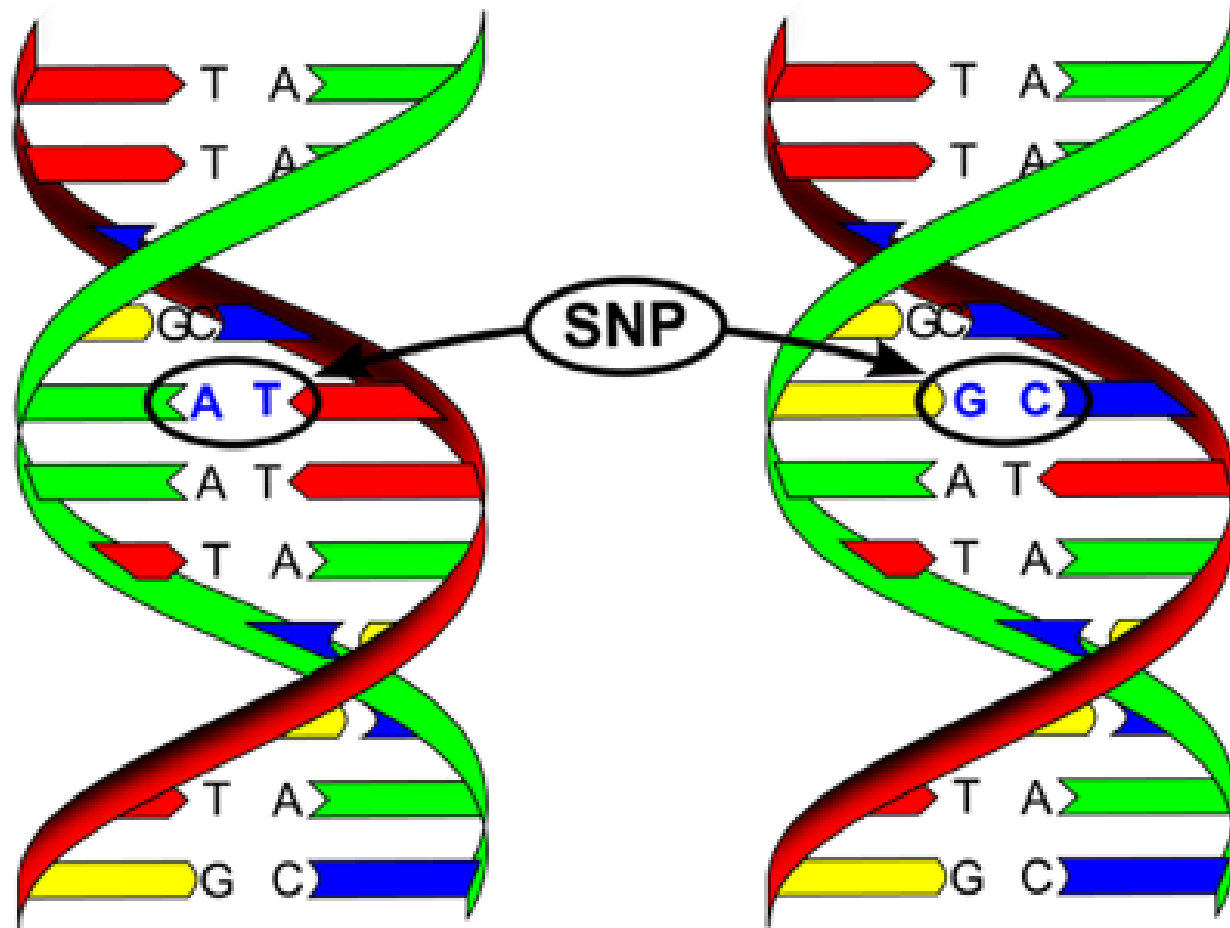




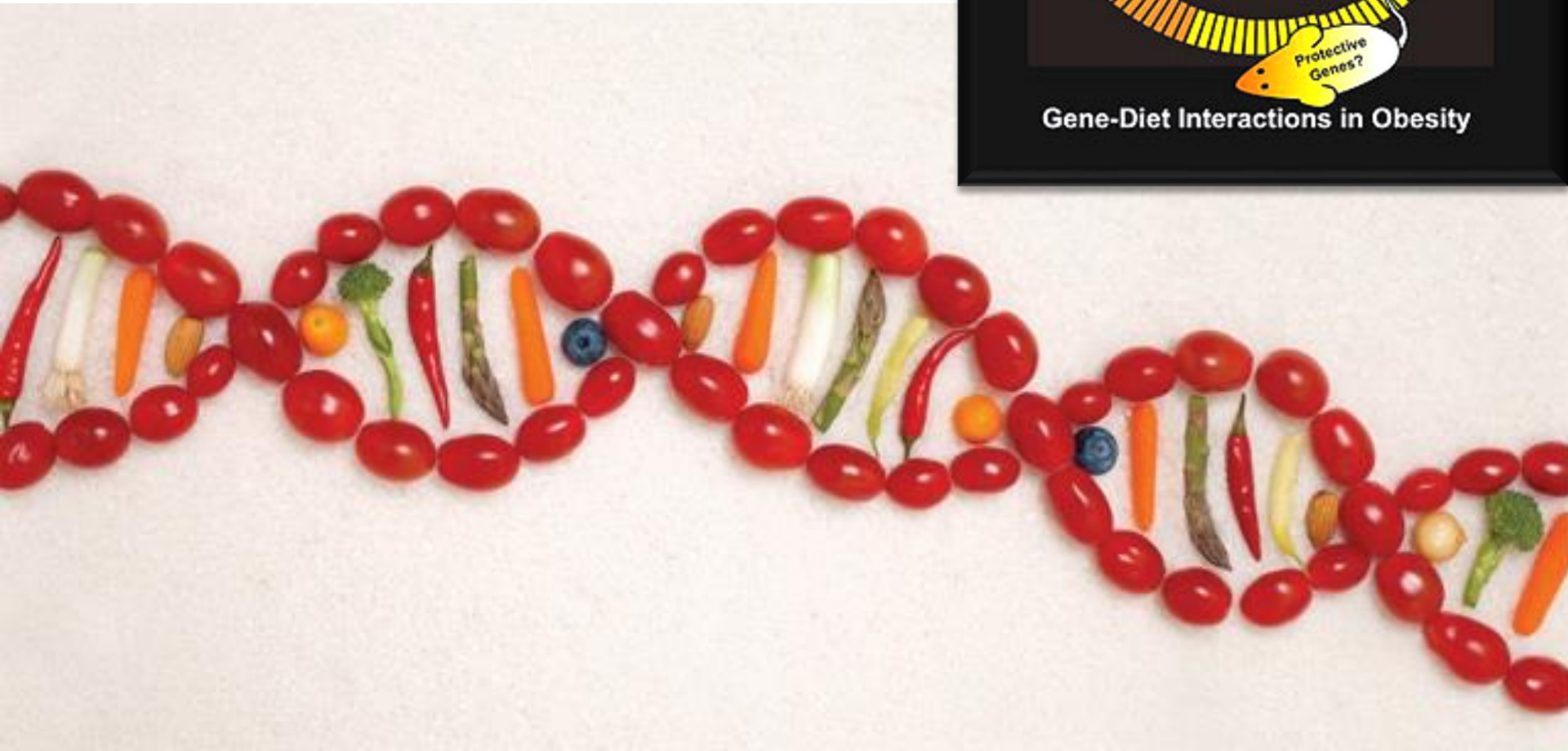
“The journey of a thousand miles  
***begins with one step***”

Lao Tzu

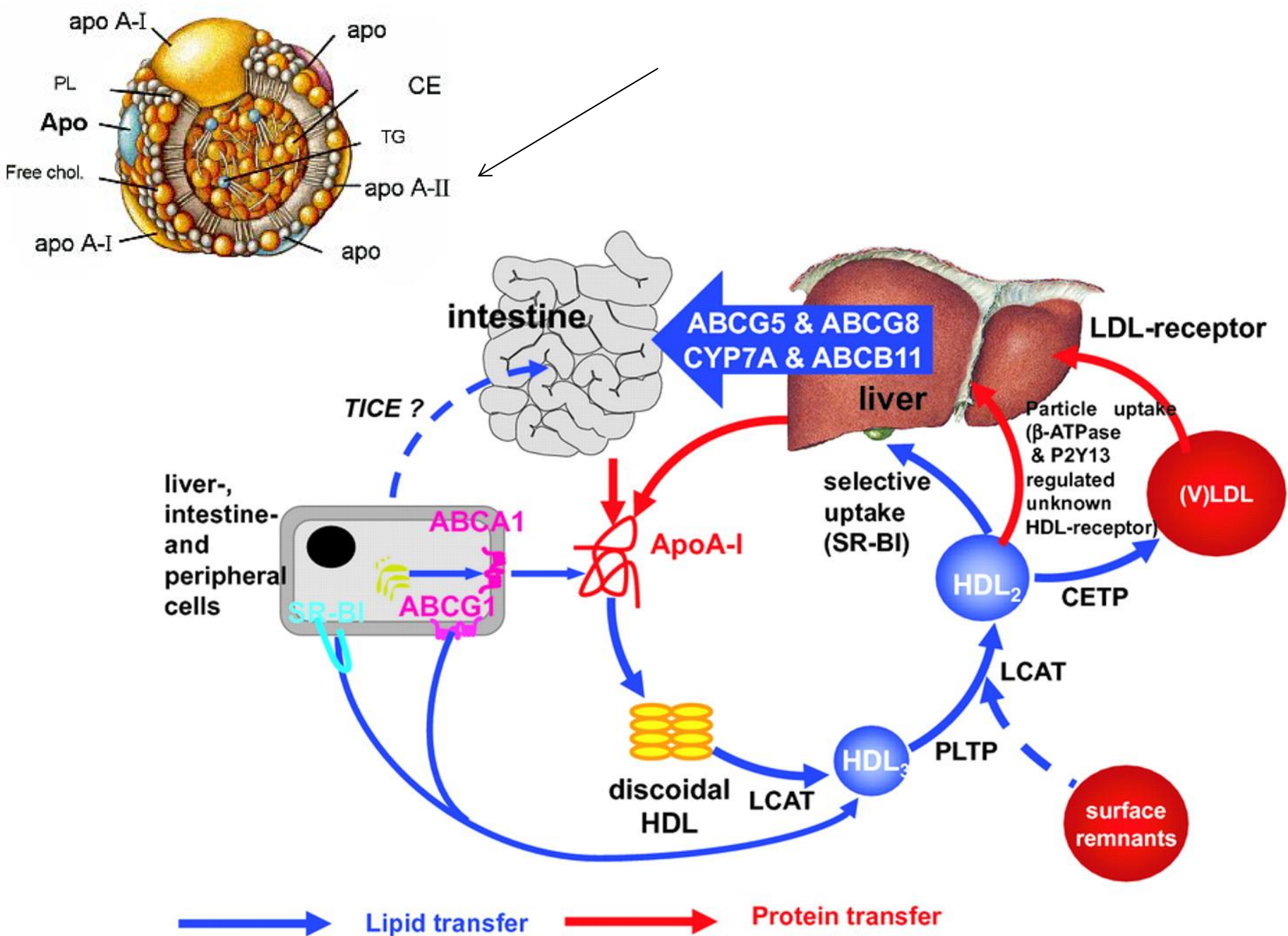
# Single Nucleotide Polymorphism (SNP)



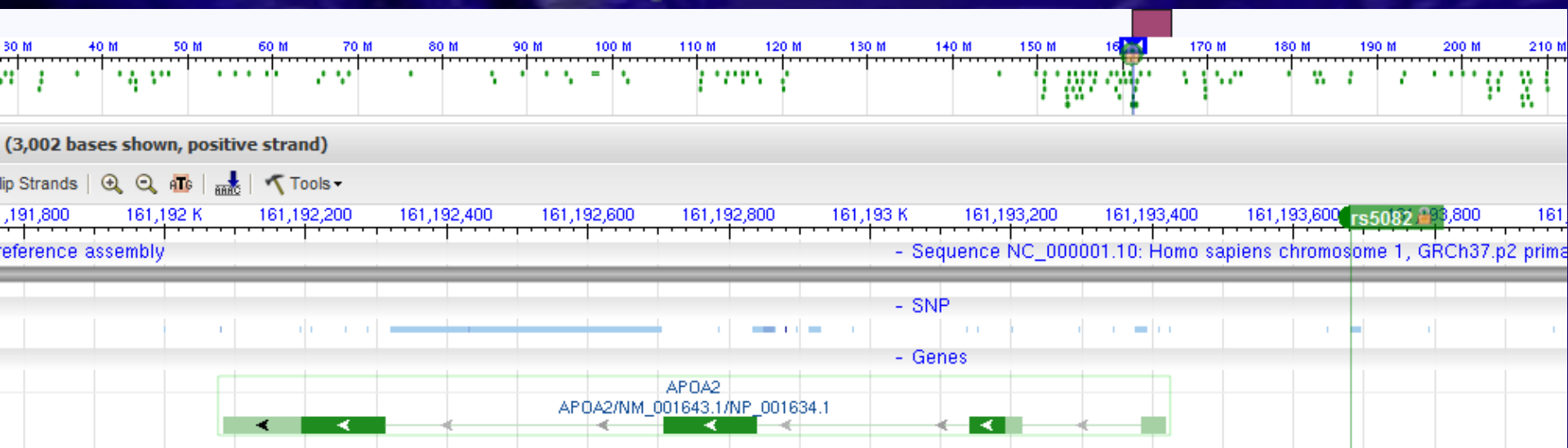
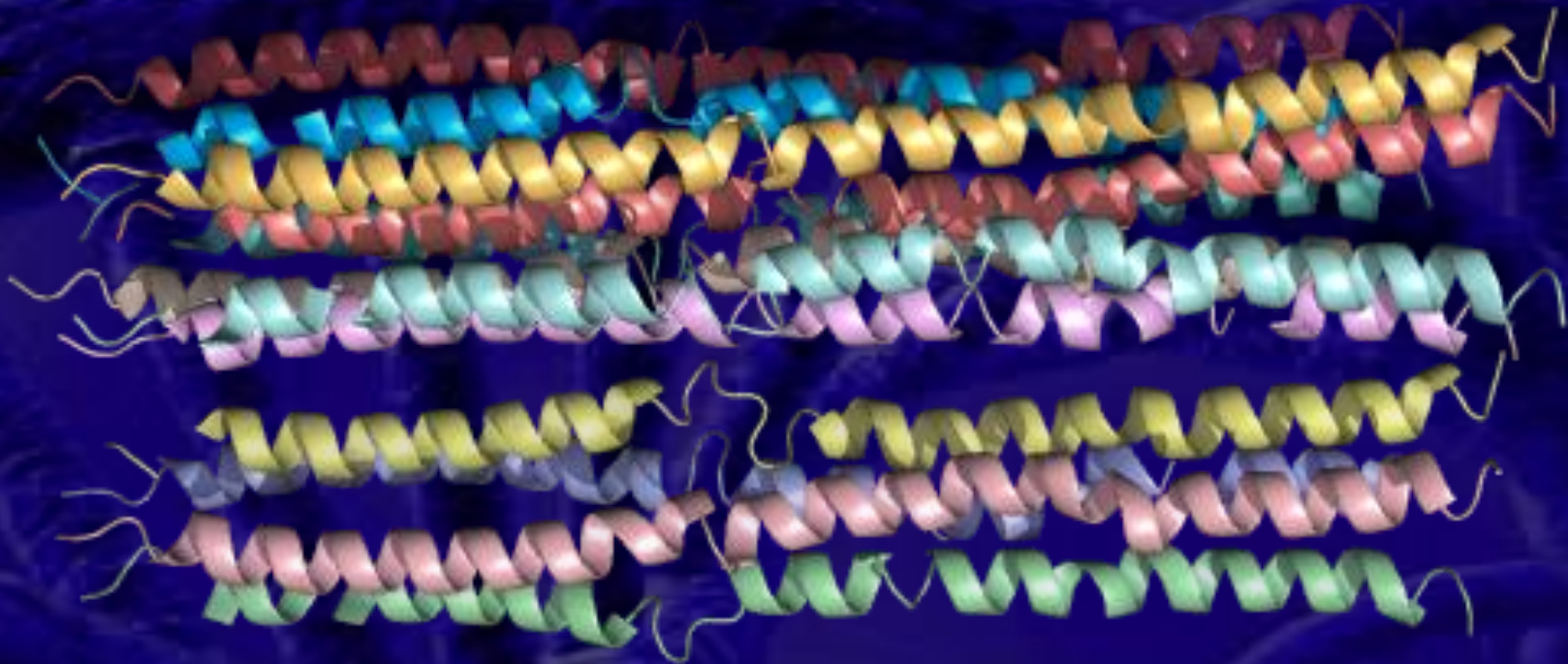
# Nutrition and Genetics Unite







# APOA2 and Obesity

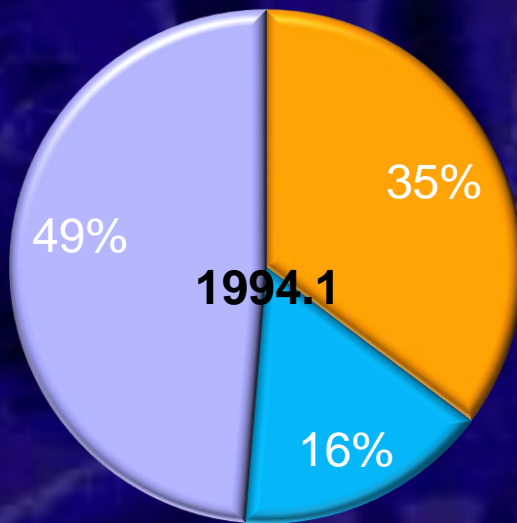


# Association between the APOA2 -265T>C polymorphism and dietary intake

**TT+TC (n=913)**

**Intake (kcal/day)**

■ Fat ■ Protein ■ Carbohydrates

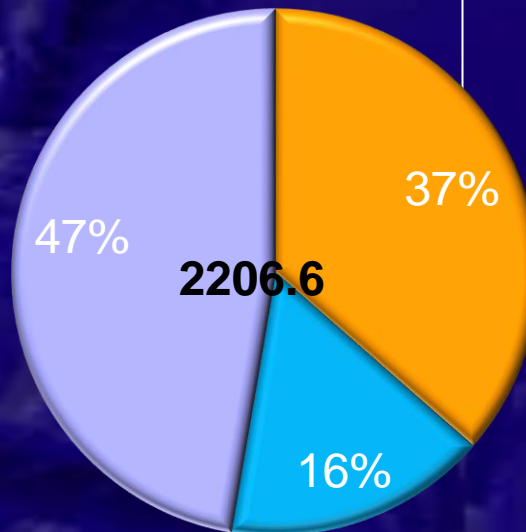


**87.9 kg**

**CC (n=165)**

**Intake (kcal/day)**

■ Fat  
■ Protein  
■ Carbohydrates



**92.2 kg**



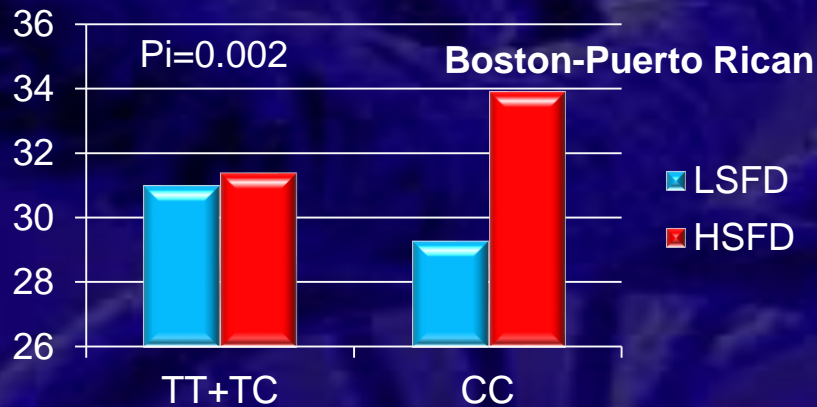
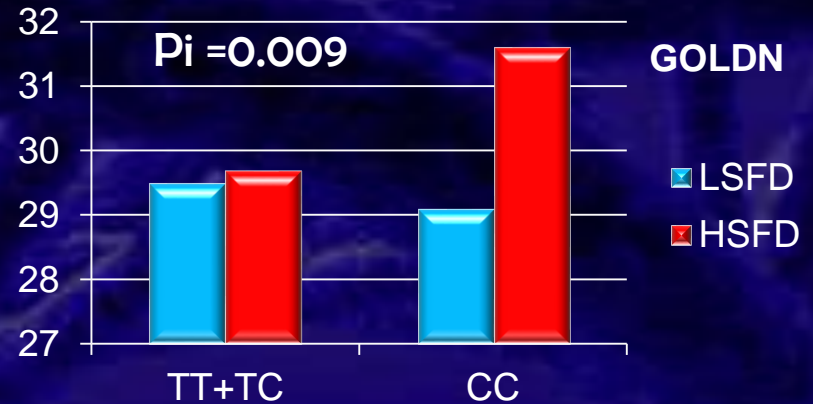
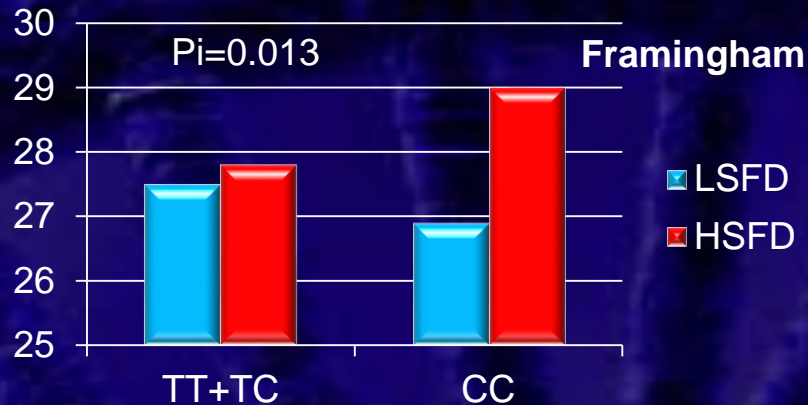


# APOA2 -265T>C in US Populations

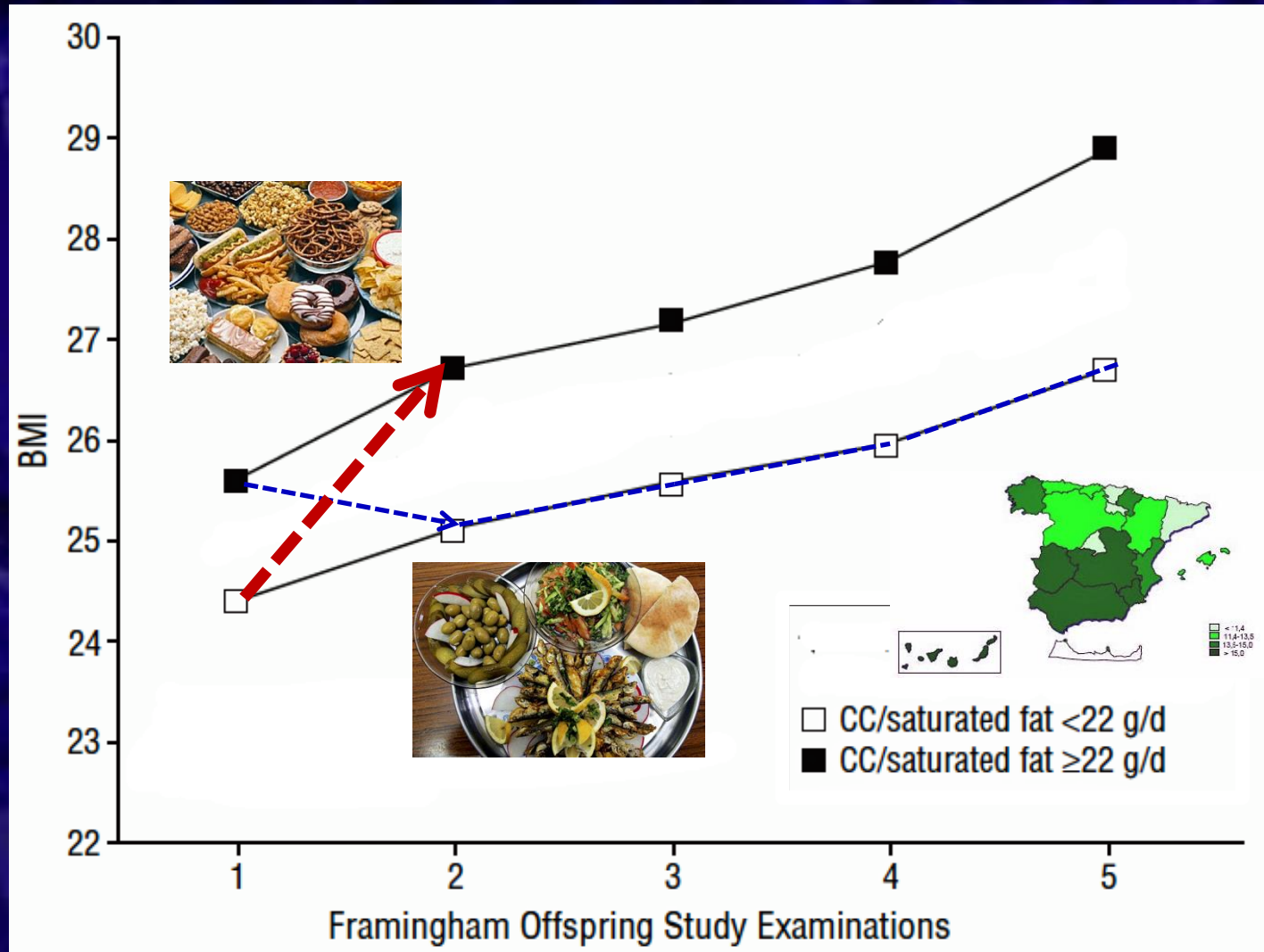




# APOA2 m265T>C, Saturated FAT and BMI



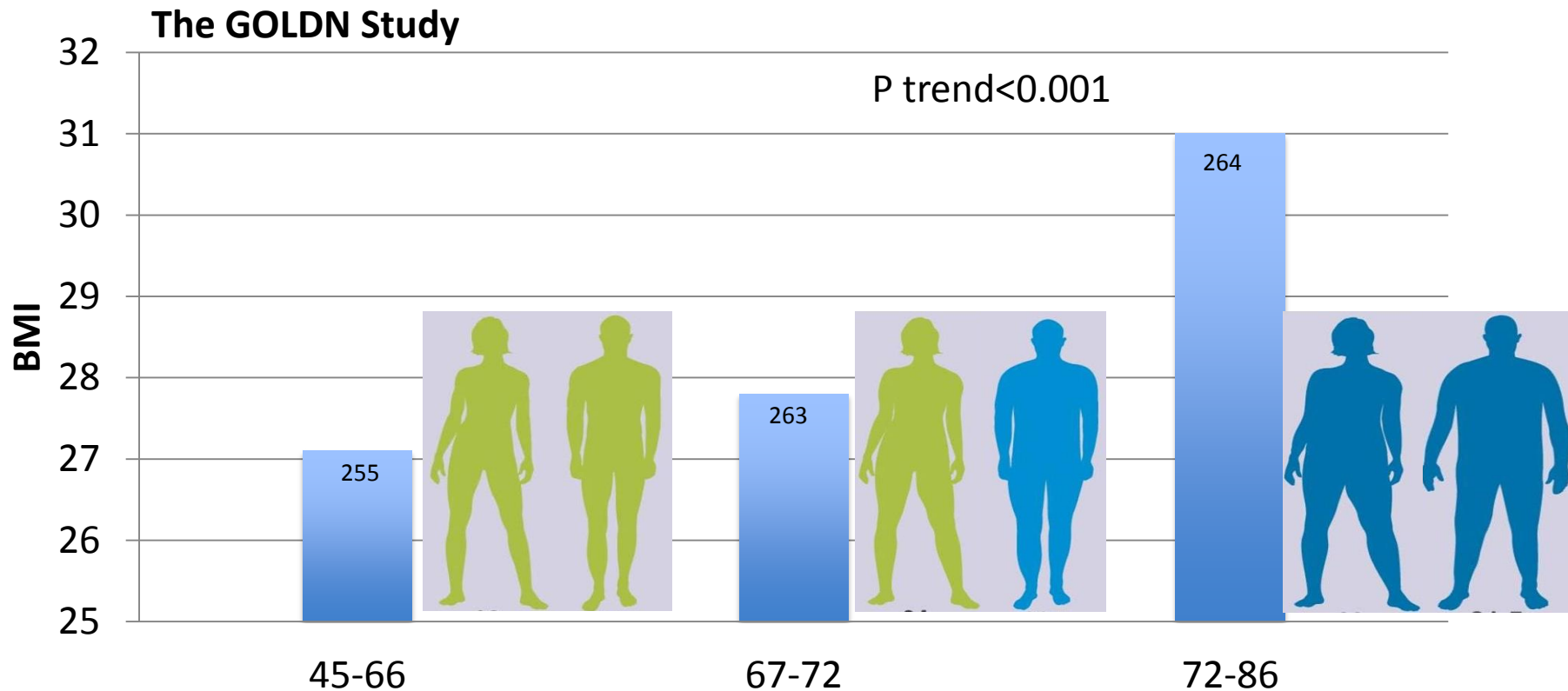
# BMI Values Dependent on Saturated Fat Intake on APOA2 -265 CC subjects across 20 years in the Framingham Offspring Study



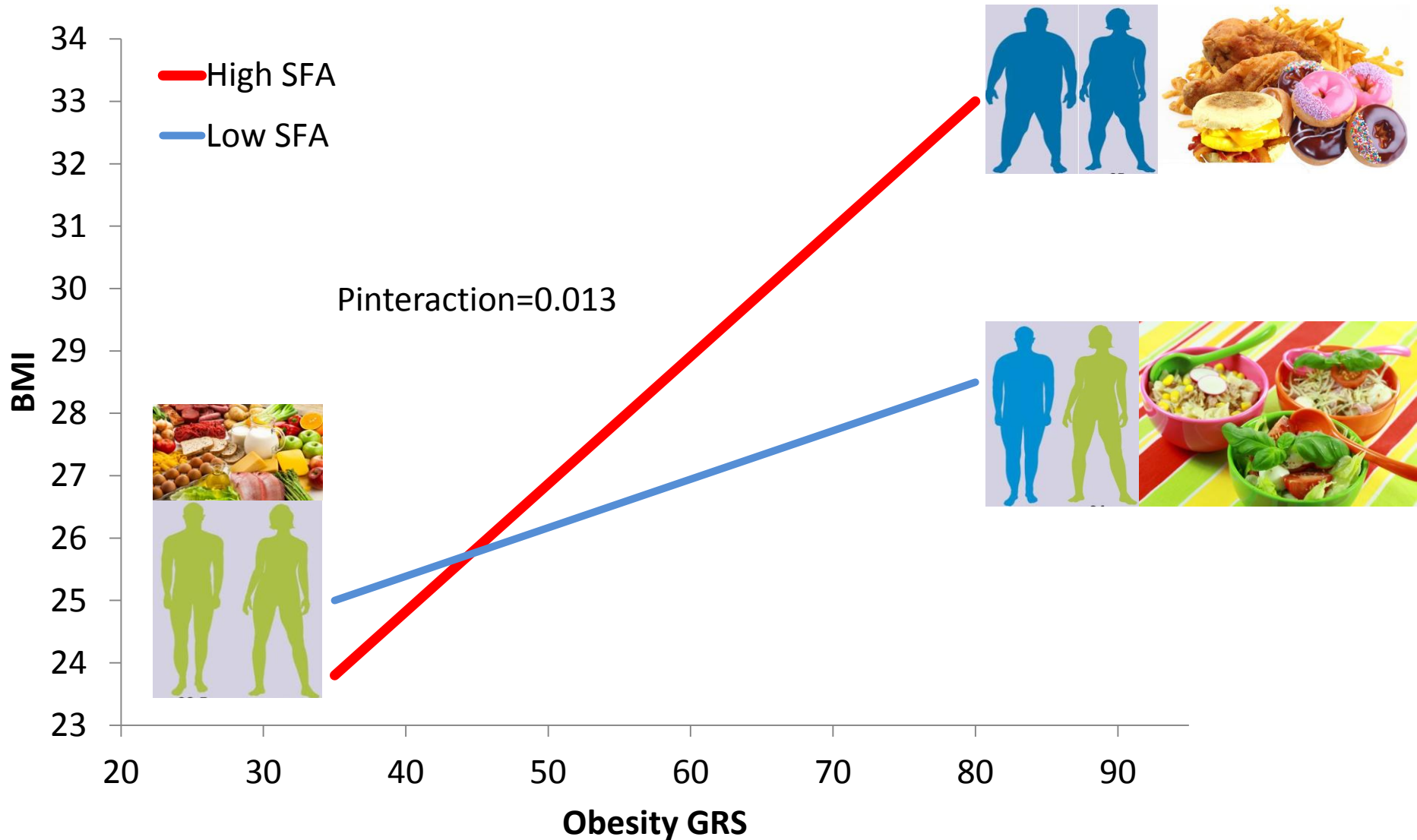


# Weighted Genetic Risk Score (GRS) calculated on the basis of 63 obesity-associated variants

For each variant one individual can be homozygote normal (0), heterozygote (1) or homozygote abnormal (2). Therefore, with 63 variants the score could go from 0 (minimum obesity risk) to 126 (maximum obesity risk)



# Diet Modulates Genetics









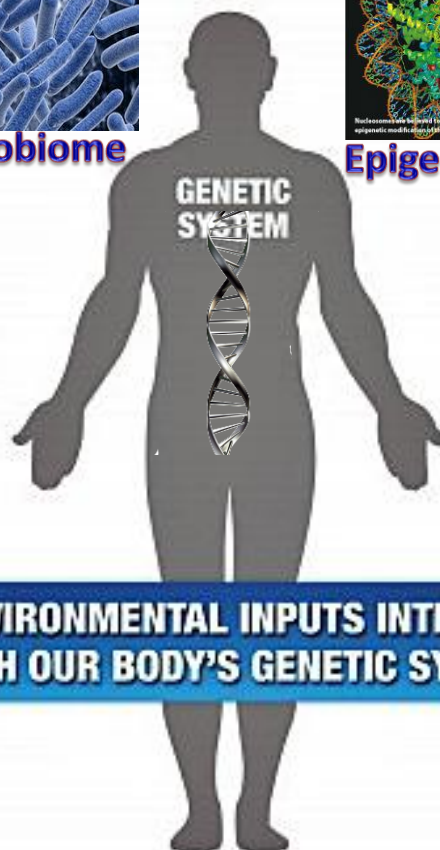
**Microbiome**



**Epigenetics**



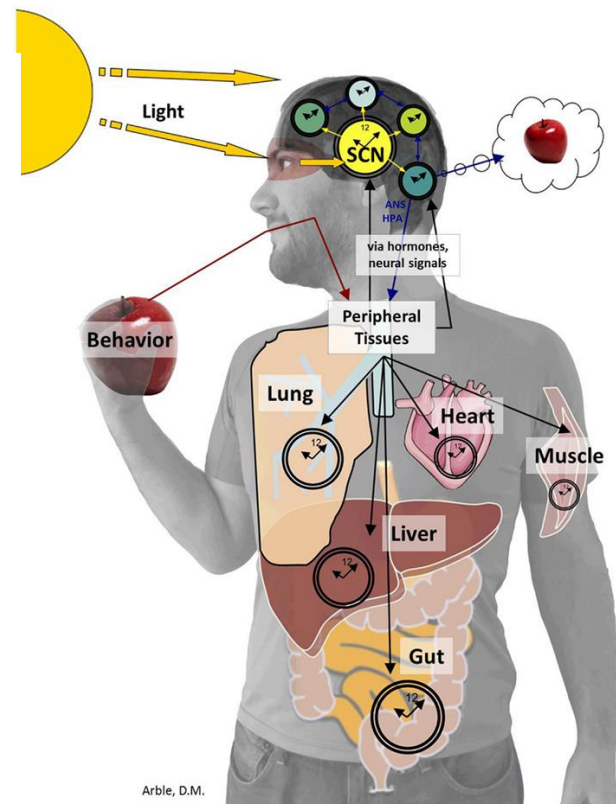
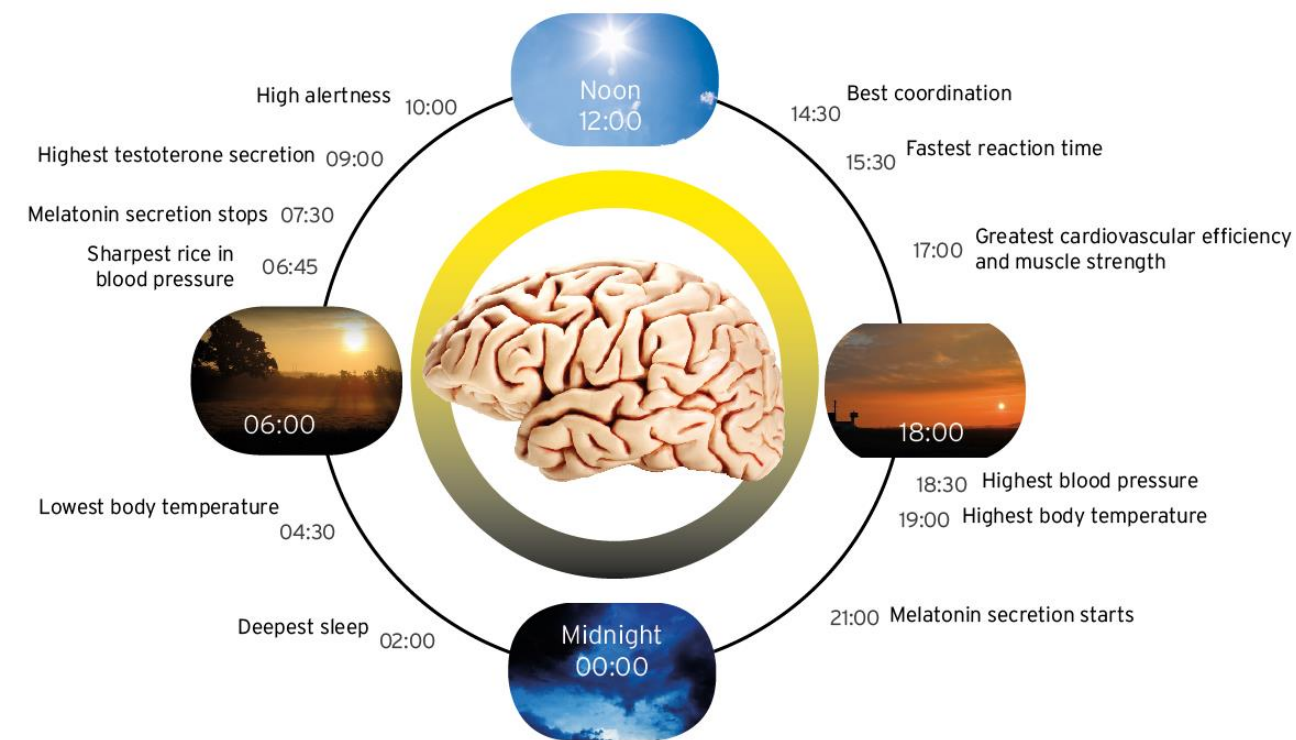
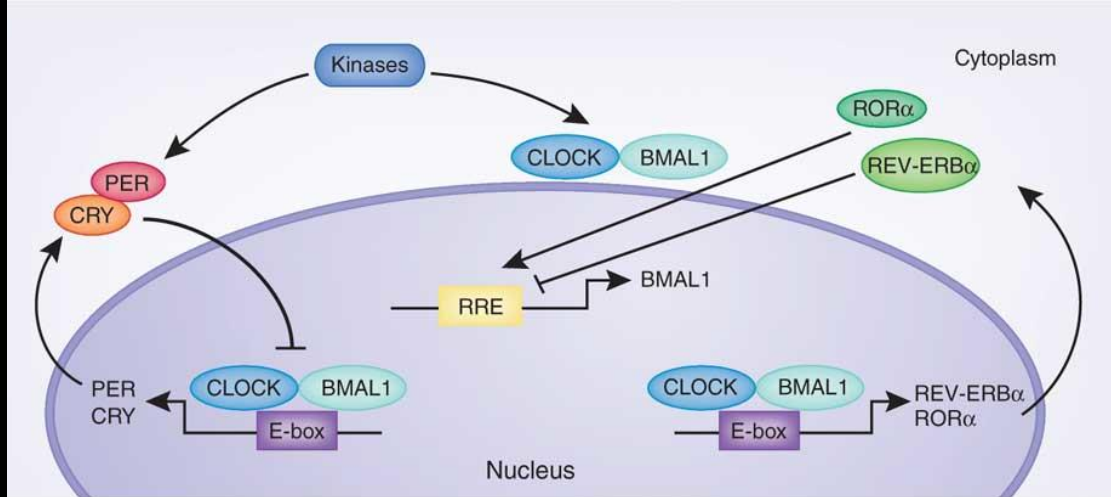
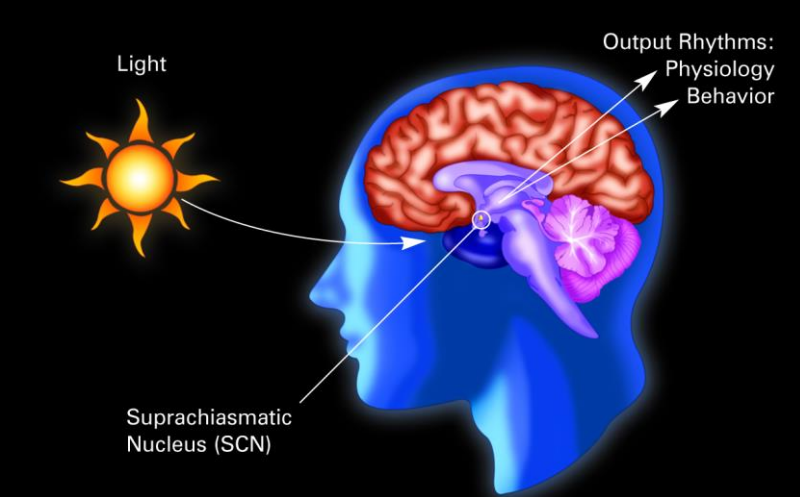
**ENVIRONMENTAL INPUTS**



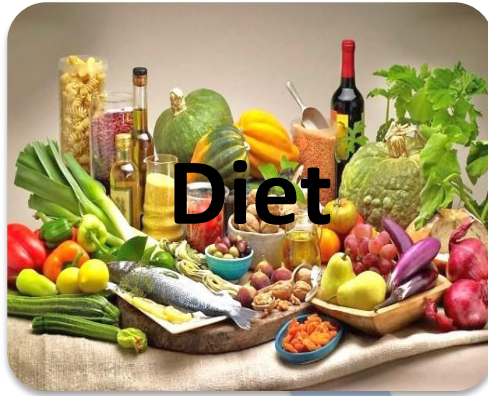
**ENVIRONMENTAL INPUTS INTERACT  
WITH OUR BODY'S GENETIC SYSTEM**



**METABOLIC RESPONSE**





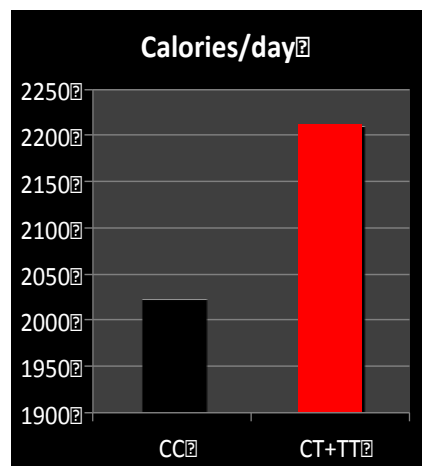






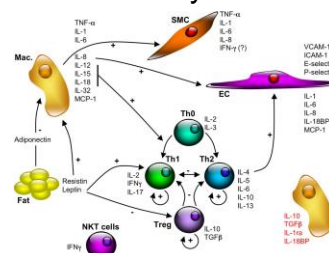
## Associations between the CLOCK rs3749474 SNP, diet and obesity

Elevated calorie intake

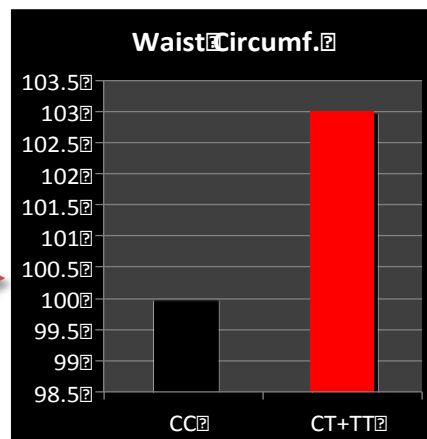


Impaired sleep

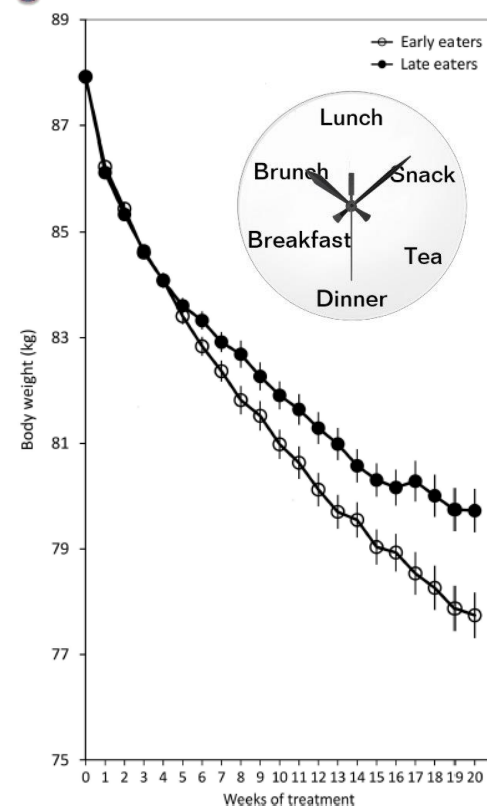
Elevated cytokines

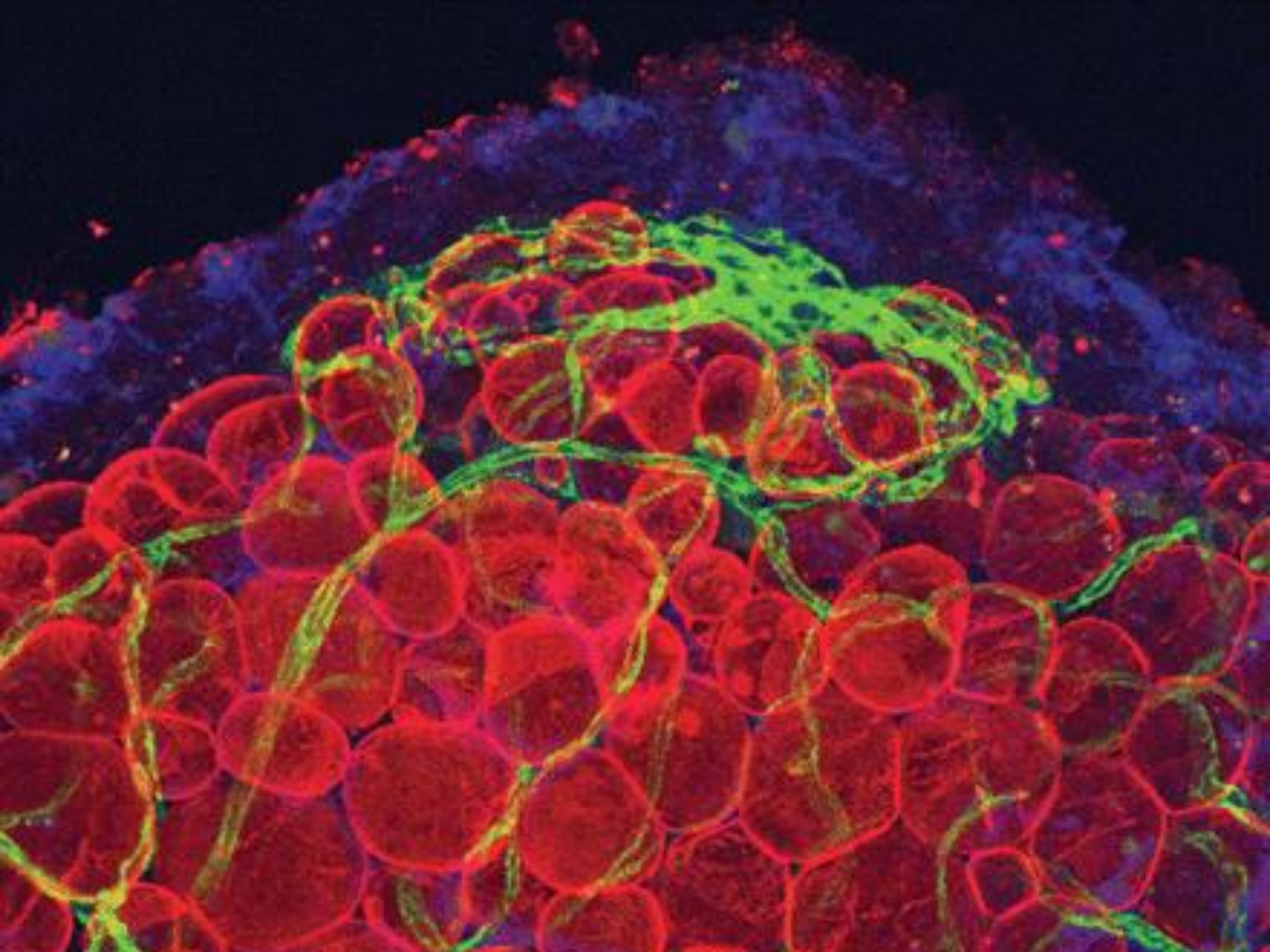


Increased obesity



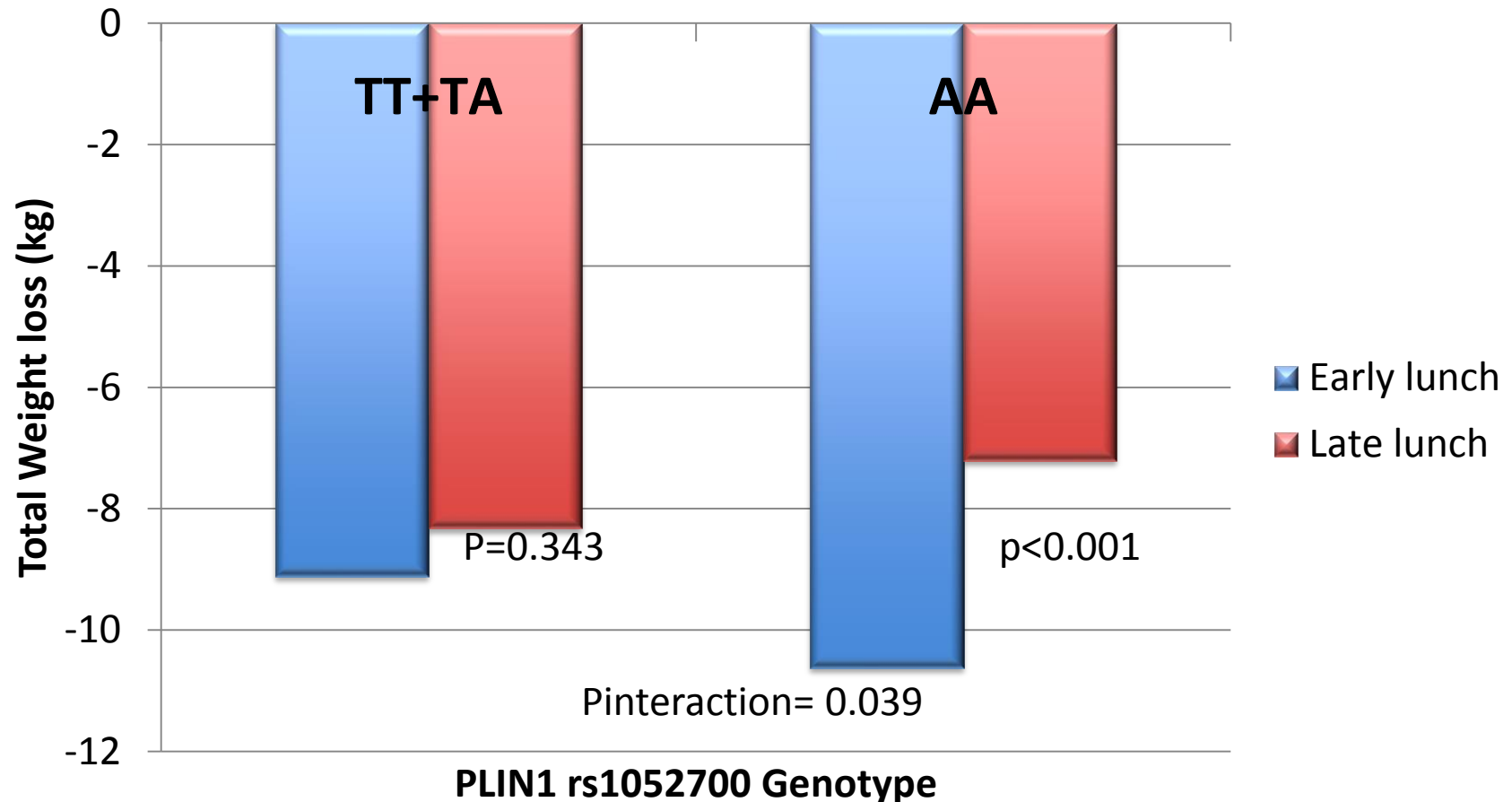
## Timing of food intake predicts weight loss effectiveness

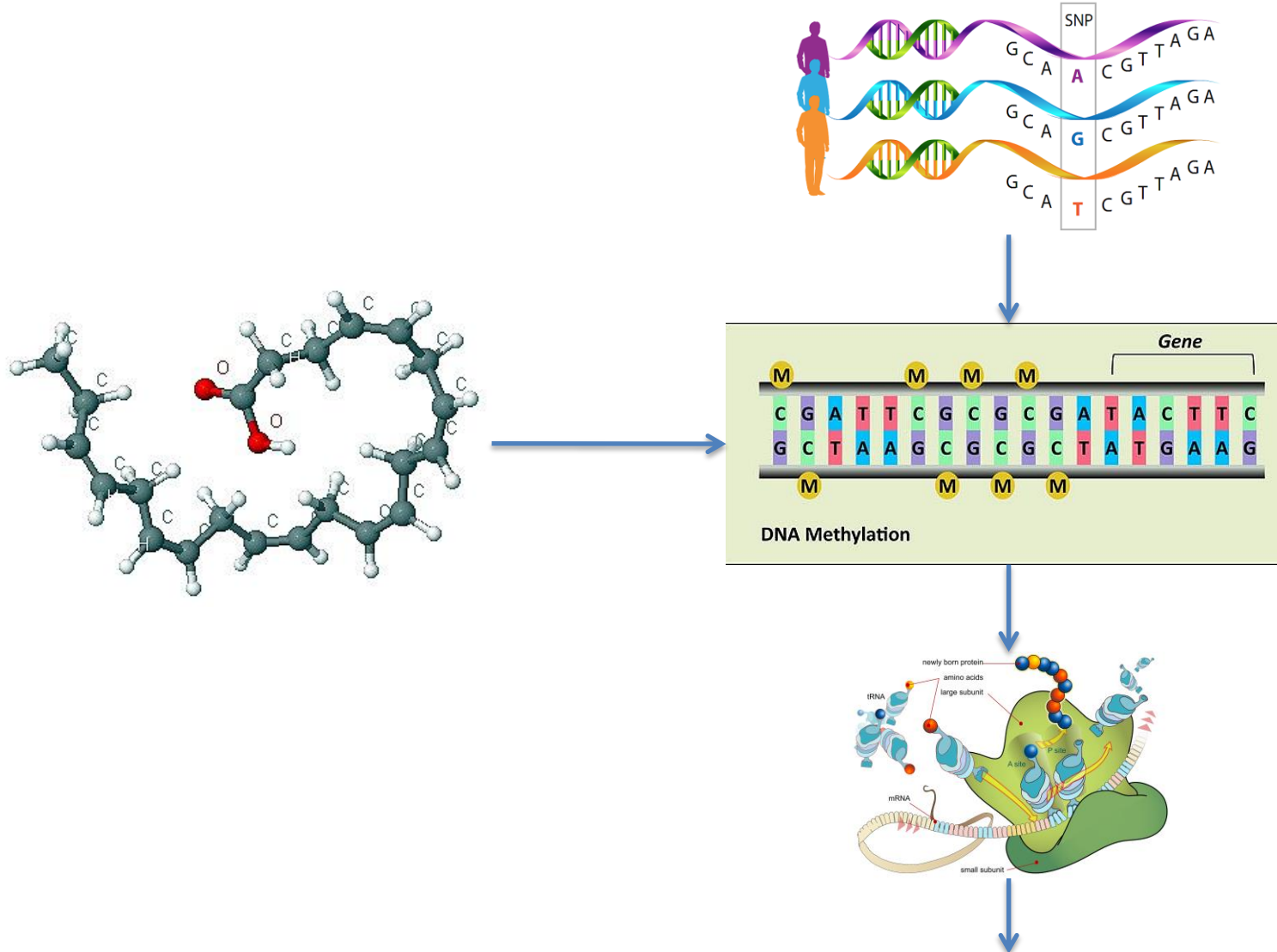






# Mean total weight loss by PLIN1 14995A>T (rs1052700) SNP according to lunch timing (eating early or late with the cutoff at 15:00)





LIPID PROFILE			
	DESIRABLE	BORDERLINE	HIGH RISK
Cholesterol	<200 mg/dl	200-239 mg/dl	240 mg/dl
Triglycerides	<150 mg/dl	150-199 mg/dl	200-499 mg/dl
HDL cholesterol	60 mg/dl	35-45 mg/dl	<35 mg/dl
LDL cholesterol	60-130 mg/dl	130-159 mg/dl	160-189 mg/dl
Cholesterol/HDL ratio	4.0	5.0	6.0

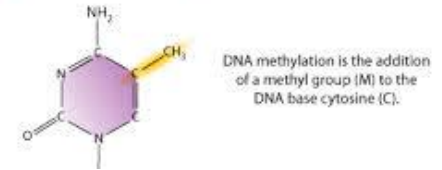


# Epigenome-Wide Study Identifies Novel Methylation Loci Associated with Body Mass Index and Waist Circumference

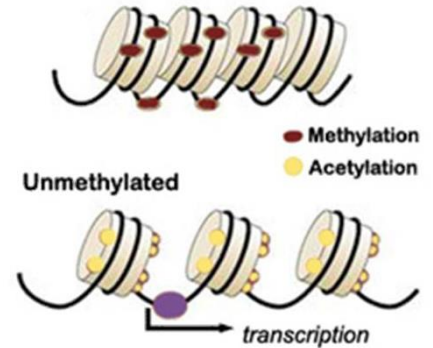
**TABLE 1** Demographic and anthropometric characteristics of the study populations

	GOLDN (n = 991)	ARIC (n = 2,097)	FHS case-control (n = 1,935)	FHS random sample (n = 442)
Age, years <sup>a</sup>	49 ± 16	56 ± 6	65 ± 9	71 ± 8
Sex, % female	52	64	61	30
Race, %				
European American, %	100	-	100	100
African American, %	-	100	-	-
Current smokers, %	7	24	9	6
Body mass index, kg/m <sup>2</sup>	28 ± 6	30 ± 6	28 ± 6	29 ± 5
Waist circumference, cm	97 ± 16	101 ± 15	-	-

<sup>a</sup>Values are shown as mean ± SD or %.



**Methylated DNA**

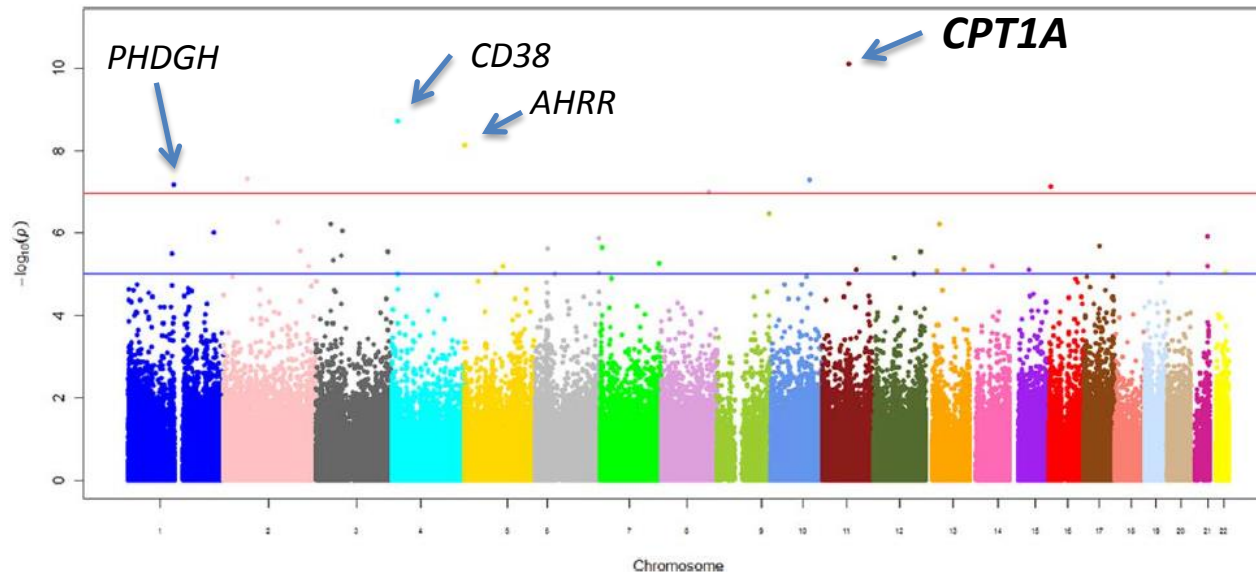


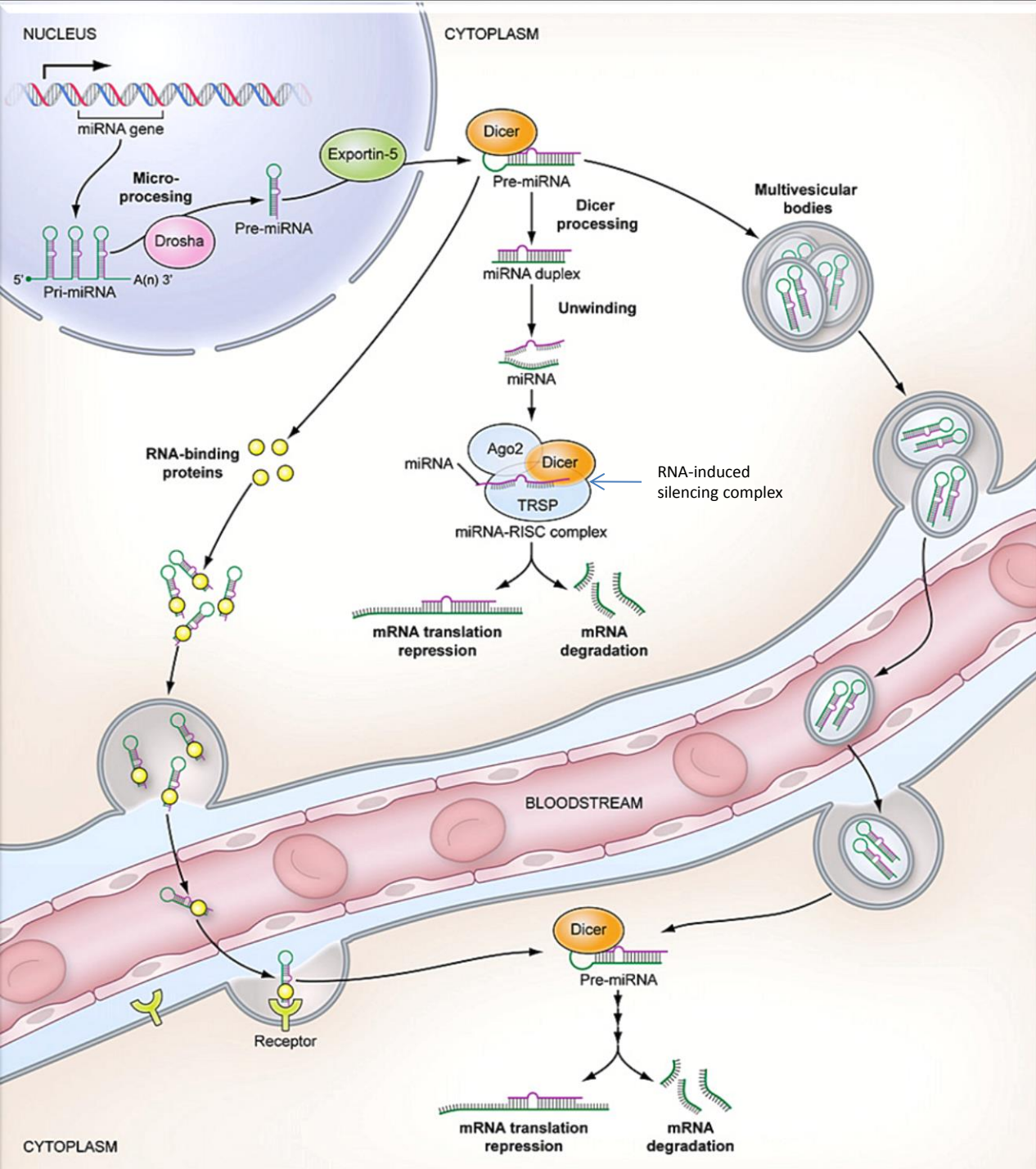
## Carnitine palmitoyltransferase 1A (CPT1A):

- This enzyme is essential for fatty acid oxidation, a multistep process that breaks down (metabolizes) fats and converts them into energy.
- higher methylation status of CPT1A results in decreased expression of the gene, which in turn is negatively correlated with BMI and WC.
- Dietary factors such as intake of long-chain monounsaturated fatty acids have also been shown to regulate CPT1A expression as well as DNA methylation patterns.

Aslibekyan S et al. Obesity.2015

Jul;23(7):1493-501.





186



233



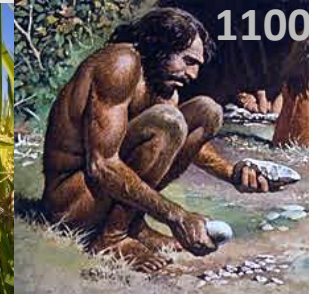
717



387



2540



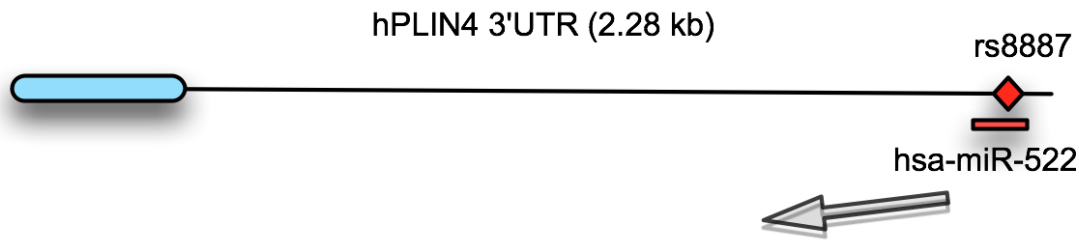
1100

There are currently over 10,000 miRNAs that have been identified in a range of species including metazoa, mycetozoa, viridiplantae, and viruses.

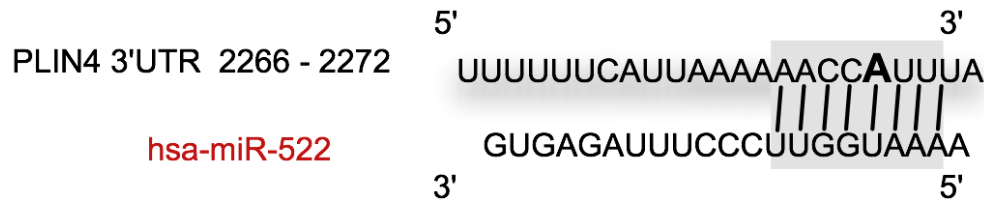
It is estimated that more than 60% of human protein-coding genes harbor miRNA target sites in their 3' untranslated region and, thus, are potentially regulated by these molecules in health and disease.



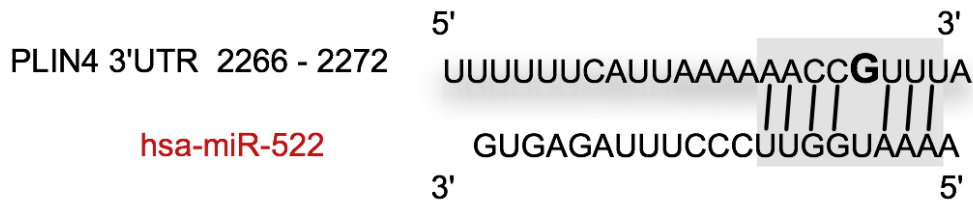
# PERILIPIN4 (PLIN4) rs8887 SNP creates a seed site for miR-522 and it is associated with BMI



rs8887 A allele (**Least Common**)

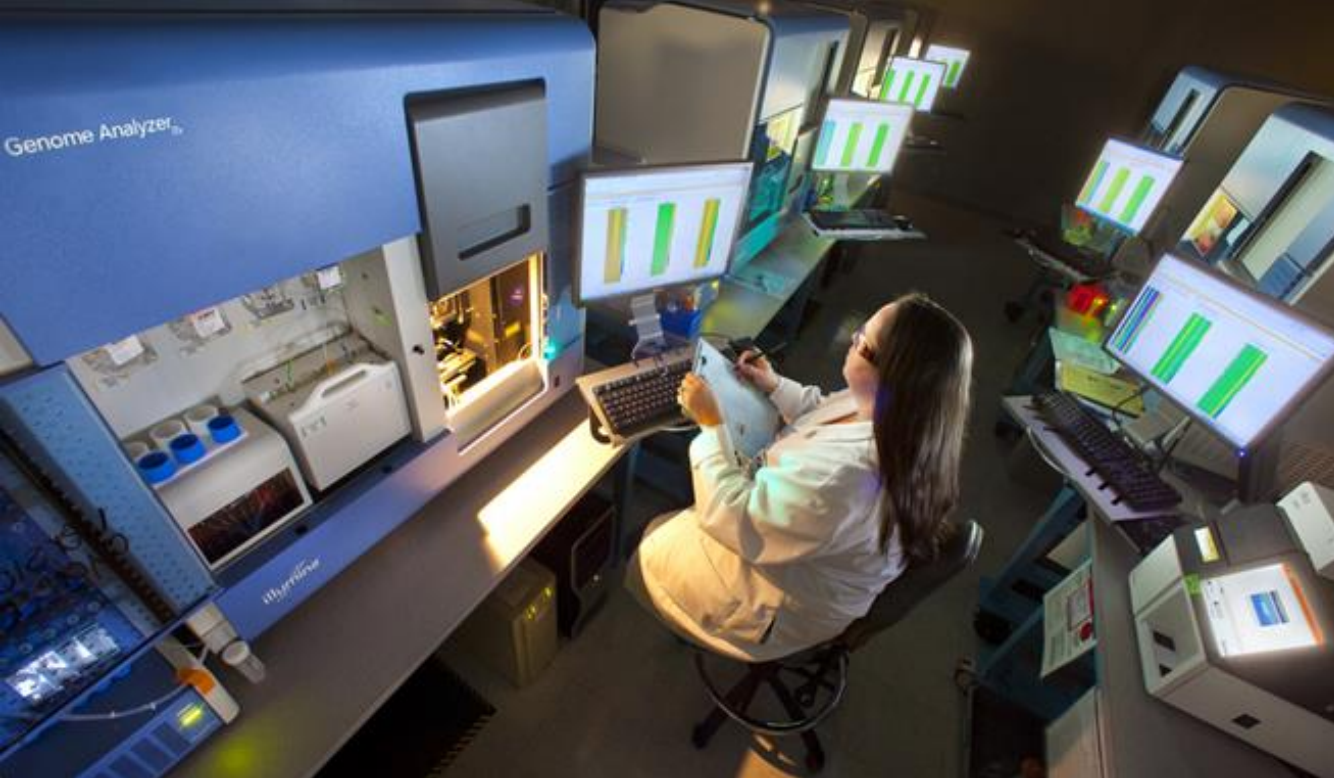


rs8887 G allele (**Most Common**)



An "A" may look like a "G"





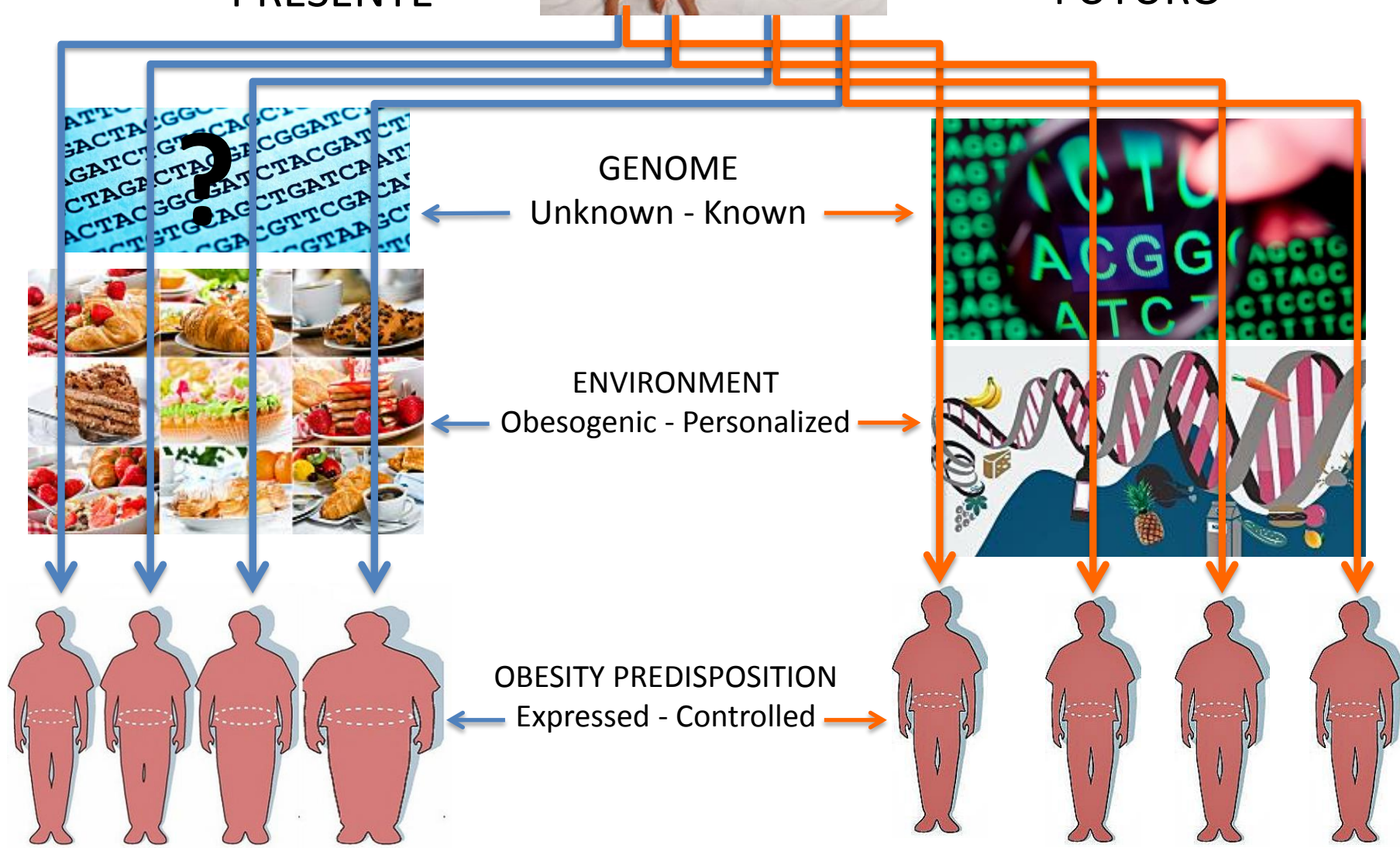


# Global versus Genome-Based Personalized Dietary Recommendations



PRESENTE

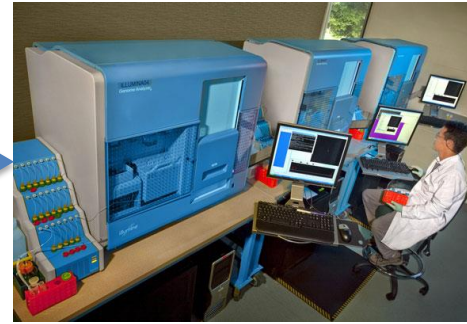
FUTURO



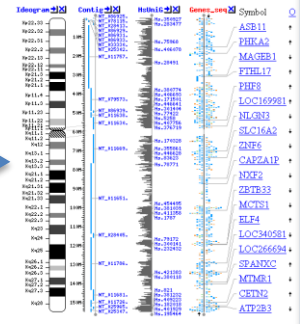
# This is how it is (will be) done.....



Saliva collection for  
DNA extraction



Genomic Analysis



Interpretation

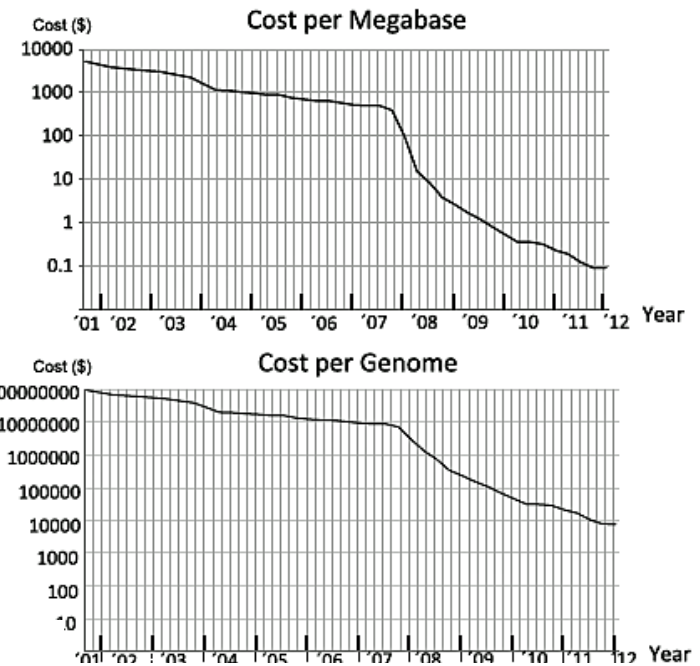
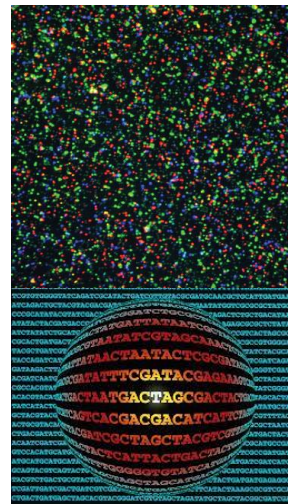
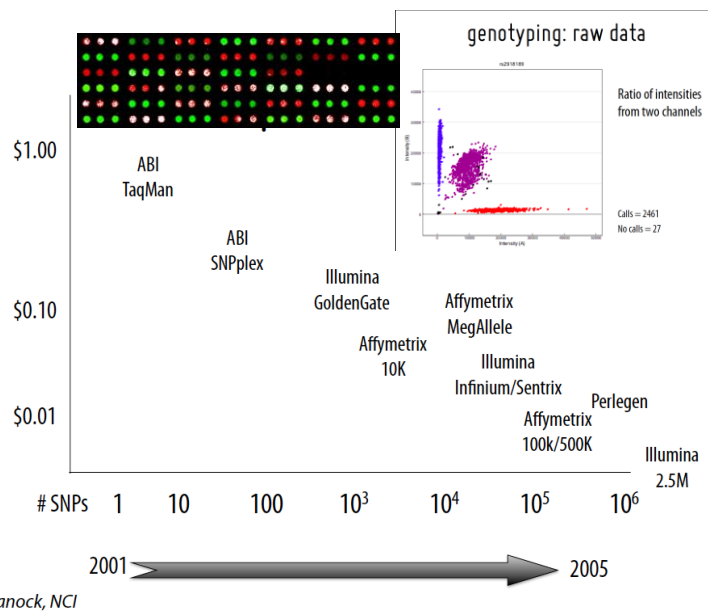


Healthy Aging



Personalized Advice





## Personal Genome Service™

Get to know your DNA. All it takes is a little bit of spit.

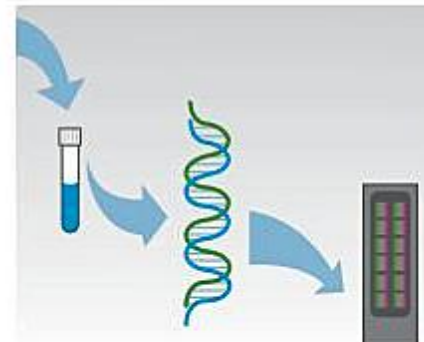
Here's what you do:



1. Order a kit from our [online store](#).



2. Register your [kit](#), spit into the tube, and send it to the lab.



3. Our CLIA-certified lab analyzes your DNA in 6-8 weeks.



4. Log in and start exploring your genome.

## Behavioral Genetics (46 Genes)

### Character

Optimism  
Risk-taking  
Persistence  
Shyness  
Composure  
Spill Personality  
Hyperactivity  
Depression  
Impulsive  
Attention  
Adaptability

### IQ

Intelligence  
Comprehension  
Analytical/Thinking  
Memory  
Creativity  
Reading Ability  
Imagination

### Artistic

Performing  
Musical  
Drawing  
Dancing  
Literature  
Linguistic

### EQ

Affectionate  
Faithfulness  
Passion  
Immature love  
Sentimentality  
Sociability  
Autism  
Self Reflection  
Self Control

### Sports

Endurance  
Sprint  
Technique  
Training Sensitivity  
Tendency of Sport Injuries  
Sport Psychology

### Physical Fitness

Height  
General Wellness  
Health  
Obesity  
Myopia  
Addiction  
Alcoholism  
Smoking  
General Addiction

## Testimonials

"My child's test result shows that his IQ is excellent but he is weak in sports. The report suggested that he will perform well as a doctor or scientist due to his high scores in comprehension, analytical and intelligence genes. He is always No.1 in class but he can't perform well in sports despite his fondness in it. It's very useful for my child's future choice of education. Oftentimes, interest doesn't mean strength. I would develop my child according to his strength but concurrently, I would not put undue pressure on him in areas where he is weak. I believe this test will complement Child Development Programs." - Mdm Ho, Housewife

"If done early, parents can give their children a head-start, no more guessing games, no more trial and errors, just focus on their talents that they have discovered and zoom in and develop it, maximise it to their fullest potential. I believe it's an effective way to bring out the winner in a child." - Irene Tan, Psychologist

"Many parents let their children join music, arts, and drama & speech classes, etc. They spent so much but in the end those may not be the right programs for them. These days, classes are not cheap so I would rather do a one-time test to provide me with a scientific direction and then plan my finances well because I would know what to do for them." - Mr Lau, Engineer

Innate Talents & Traits Genetic Test is the incubator for the practice of knowledge (Genes) and application (Environment) in the real world.

Contact:

The Art of Intervention

Innate Talents & Traits Genetic Test

my gene profile  
Inborn Talent Genetic Test  
Buccal Sampling Test Kit

## Benefits of the Inborn Talent Genetic Test:

- Understand your child's natural talents and personality and shape his/her future development on this knowledge.
- Better utilise and invest your efforts, resources and time to develop the gifted areas to maximise the return on your investments.
- Tailor-make the development process around your child's personality
- Plan for your child's future more effectively and efficiently
- Choose the right course to major during college years
- Provide a guideline for career choices
- Genetic testing for the most accurate results
- Simple, painless procedure performed in minutes—no needles, invasive procedures or blood involved!
- Samples tested in multi-million-dollar, state-of-the-art overseas laboratory employing the latest American technology
- Total confidentiality assured



### What is a Gene?

A gene is a biological unit that determines an organism's **inherited** characteristics. It consists of a segment of the DNA that encodes a specific protein that contributes to (or protect against) disease or determine personality, talents & physical characteristics such as eye color.

### What does Talents & Traits Genetic Test (TTGT) Do?

This test reveals what talents and character traits a child may have inherited from his/her parents.



"When you know that your child has a genetic propensity for shyness, alcoholism or depression, you could intervene early" - Robert Plomin MRC Research Professor in Behavioral Genetics at the Institute of Psychiatry, King's College London Director of Social, Genetic & Development Psychiatry Center.



Children love winning. After identifying their gifted strengths and combined with the right programs, it will empower them to excel with ease. **TTGT** eventually saves time and money. If truly compliments whatever enrichment programs institutions may for our children. Moreover, it reduces heartaches from failures and emotional upheavals between parents and children. Genetic Testing will transform the landscape of our Educational Institutions.

### How is the Innate Talents & Traits Genetic Test Done?

There are only a few simple steps



**Step 1:** Hold Buccal Sampling Stick & DNA Auto-Processing Box.



**Step 2:** Insert the foam tip of the applicator deep into the side of the left cheek. Apply with fair amount of pressure and scrape the inside of subject's cheek. Repeat action 15 times.



**Step 3:** Data like foam tip of the applicator onto the duct of the DNA Auto-Processing Box. Repeat action 3 times. The DNA sample will be delivered to our Genetic Labs overseas for analysis. For privacy concerns, real names will not be used. 30 working days waiting time for results.







## ARE YOU A CALORIE HYPER-ASSIMILATOR?

- ✓ Gain weight eating even when low calorie dieting
- ✓ Have a sluggish elimination
- ✓ Suffer from gas or bloating
- ✓ Feel tired after meals

REGAIN CONTROL OF YOUR METABOLISM  
WITH OUR NEW HYPER-ASSIMILATOR PACK  
NOW AT SPECIAL ONE-TIME SAVINGS  
[CLICK HERE FOR MORE INFORMATION](#)



## Nutrition by blood type

Right For Your Type™ formulas by Dr. Peter D'Adamo

Finally, there exists a highly advanced system of supplementation that is ideally in-sync with your very individualized blood type needs. Each unique formula has been tailored to your blood type, and designed to deliver the highest quality ingredients at reasonable prices. Learn more about the only supplements manufactured that are right for you:

Type O • Type A • Type B • Type AB

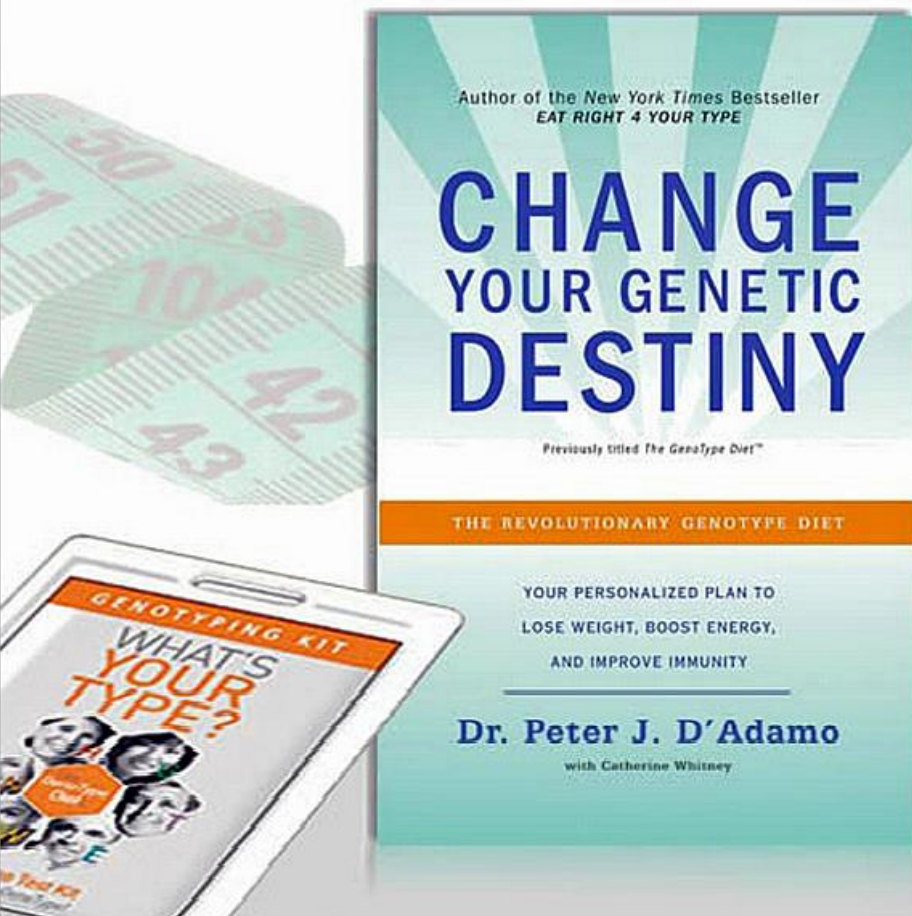


## Feed Your Genes

GenoType Diet™ formulas by Dr. Peter D'Adamo

With Eat Right 4 Your Type Dr. Peter J. D'Adamo started an international health revolution and proved that when it comes to dieting, one plan does not fit all. In 'Change Your Genetic Destiny', he takes his groundbreaking research to the next level. What's your GenoType?

Hunter ♦ Gatherer ♦ Teacher ♦ Explorer ♦ Warrior ♦ Nomad



## Fruity with a hint of double helix: A startup claims to tailor wine to your DNA

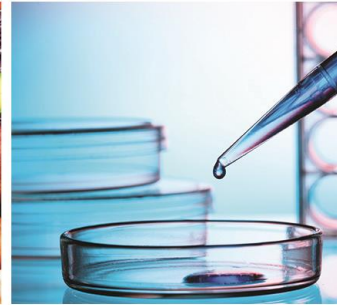


A new wine delivery service called Vinome is promising to deliver “the ultimate personalized wine experience” — customized to your DNA.



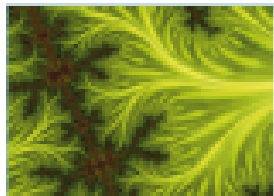
JEAN MAYER  
USDA  
HUMAN  
NUTRITION  
RESEARCH  
CENTER ON  
AGING

HNRCA



**Jose M Ordovas**

***Prediccion and  
Prevencion de la  
Obesidad: Un gran  
reto para las “omicas”***



instituto  
**imdea**  
alimentación

**cnic**  
Fundación  
Centro Nacional de  
Investigaciones  
Cardiovasculares  
Carlos III

**Thank you**

**Tufts**  
UNIVERSITY