THE CRITICAL NEED FOR LIFESTYLE INTERVENTION: HOW TO BEGIN?

John P. Foreyt, Ph.D.
Baylor College of Medicine
Houston, TX
Is it okay to be fat?

“I cannot stand fat people. Fat is like a pet peeve of mine. I know there are people who have glandular problems and can’t do anything about it, but a person who’s fat who could lose the weight if they weren’t so lazy, I just can’t stand.”

—Chris Nissen, 18, Kettering Ohio
TOO FAT? TOO THIN?
How media images of celebrities teach kids to hate their bodies

Wendy Lewis, 17, of New York City, compares her body to those of TV stars like (from left) Courteney Cox, Pamela Lee and Heather Locklear.
$25,000 REWARD

IF YOU SEE THIS MAN
EATING IN ANY RESTAURANT
ANYWHERE FOR A PERIOD OF ONE YEAR.
OR, UNTIL HE BRINGS HIS WEIGHT DOWN
to 200 LBS. OR LESS!

CALL PREVENTIVE PLUS —
DR. LIVA OR DR. ZITO

670-7616

“THIS REWARD WILL BE GIVEN TO YOUR FAVORITE CHARITY!”
DISCRIMINATION:
THE PAIN OF OBESITY

Former severely obese patients:
• 100% preferred to be deaf, dyslexic, diabetic or have heart disease or bad acne than to be obese again
• Leg amputation was preferred by 91.5% and blindness by 89.4%
• 100% preferred to be a normal weight person rather than a severely obese multimillionaire

# PREVALENCE (%) OF OVERWEIGHT (BMI\textgreater=25) AMONG U.S. ADULTS

<table>
<thead>
<tr>
<th>Year</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>1980</td>
<td>46.0</td>
</tr>
<tr>
<td>1990</td>
<td>56.0</td>
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<tr>
<td>2000</td>
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<td>2020</td>
<td>82.5</td>
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<tr>
<td>2030</td>
<td>91.5</td>
</tr>
<tr>
<td>2040</td>
<td>100.0</td>
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</tbody>
</table>

\(^1\)Flegal et al., *JAMA, 2002* \(^2\)Projected
PREVALENCE (%) OF OBESITY (BMI $\geq$ 30) AMONG U.S. ADULTS

<table>
<thead>
<tr>
<th>Year</th>
<th>%</th>
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<tbody>
<tr>
<td>1980$^1$</td>
<td>14.4</td>
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<td>2000$^1$</td>
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<td>2020$^2$</td>
<td>46.5</td>
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<tr>
<td>2040$^2$</td>
<td>62.5</td>
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<tr>
<td>2060$^2$</td>
<td>78.5</td>
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<tr>
<td>2080$^2$</td>
<td>94.5</td>
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<tr>
<td>2100$^2$</td>
<td>100.0</td>
</tr>
</tbody>
</table>

$^1$Flegal et al., *JAMA, 2002*  $^2$Projected
The Metabolic Syndrome

CVD

Atherosclerosis

Diabetes

β-cell defect

Biochemical Abnormalities

Insulin Resistance

 Courtesy N Abate, UT-Southwestern
METABOLIC SYNDROME

- Abdominal obesity (waist circumference)
  - Men > 40 in (102 cm)
  - Women > 35 in (88 cm)

- Triglycerides ≥ 150 mg/dl

- High density lipoprotein
  - Men < 40 mg/dl
  - Women < 50 mg/dl

- Blood Pressure ≥ 130/>85 mm Hg

- Fasting Glucose ≥ 110 mg/dl

NCEP ATP III, 2001
CLINICAL MANAGEMENT OF METABOLIC SYNDROME: ADA RECOMMENDATIONS

• Lifestyle interventions first, followed by pharmacologic interventions if necessary

• Target levels of risk factors:
  • Blood pressure < 130/80
  • LDL-cholesterol < 100 mg/dl
  • Triglycerides < 150 mg/dl
  • HDL-cholesterol > 40 mg/dl (women > 50)
  • Glycosylated hemoglobin < 7%

Diabetes Care, 2003; 26: Suppl. 1: S33-S50
Management of underlying causes:

- Weight control enhances LDL lowering and reduces all risk factors

- Physical activity reduces VLDL and LDL and increases HDL

CLINICAL MANAGEMENT OF METABOLIC SYNDROME

Treat lipid and nonlipid risk factors:

• Hypertension
• Aspirin in CHD patients
• Elevated triglycerides
• Low HDL

Lifestyle = 7% weight loss, 150 min physical activity/week

Diabetes Prevention Program. NEJM, 2002; 346: 393-403
FINNISH DIABETES PREVENTION STUDY

• Design:
  • 522 middle-aged overweight (BMI 31)
  • 172 men and 350 women
  • Mean duration 3.2 years

• Intervention Group: Individualized counseling
  • Reducing weight, total intake of fat and saturated fat
  • Increasing uptake of fiber, physical activity

Tuomilehto J. et al., NEJM, 2001; 344: 1343-1350
FINNISH DIABETES PREVENTION STUDY

After 4 years – risk of diabetes reduced by 58%

Tuomilehto J. et al., NEJM, 2001; 344: 1343-1350
PARADOX OF INCREASING OBESITY PREVALENCE

• ↑ Focus on healthy eating and physical activity
• ↑ Awareness of dangers of obesity, but…
• Obesity prevalence continues to rise
  • Work & commuting demands
  • Little time to exercise
  • Little time to prepare food
  • Availability of high-fat/calorie foods
THE “TOXIC ENVIRONMENT”

• 7% of U.S. population eats at McDonald’s every day

• The average child sees 10,000 food commercials each year, mostly for candy, fast food, soft drinks, and sugared cereals

• Energy-saving devices reduce physical activity

Brownell & Battle, 2003
RATIONALE FOR PUBLIC POLICY INTERVENTIONS

• Increases in obesity prevalence due to genes?
  • Increased calories (e.g., 200 Kcal/day over 10 years)
  • Increased portion sizes (e.g., 22 oz. steaks and 44 oz. sodas)
  • Western diets in developing nations increase risk of obesity

Brownell & Battle, 2003
FOOD PRODUCTION
UNITED STATES

• Food industry produces 3800 kcal per person per day
• Average adult requires < 2000 kcal

USDA, 1997
PER CAPITA FOOD CONSUMPTION
(KCAL/CAPITA/DAY)

Industrial Countries

<table>
<thead>
<tr>
<th></th>
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<td>2947</td>
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<td>3206</td>
<td>3380</td>
<td>3440</td>
<td>3500</td>
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WHO, 2003
TRENDS IN DIETARY SUPPLY OF FAT (GRAMS/CAPITA/DAY)

North America

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<tr>
<td></td>
<td>117</td>
<td>125</td>
<td>138</td>
<td>143</td>
<td>+26</td>
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</tbody>
</table>

WHO, 2003
WHAT REALLY MAKES YOU FAT?

The latest science on how your body handles CARBS vs. FATS
Dr. Atkins' New Diet Revolution

Over 100 Weeks on The New York Times Bestseller List

REVISED AND UPDATED

ROBERT C. ATKINS, M.D.
THE SOUTH BEACH DIET

The Delicious, Doctor-Designed, Foolproof Plan for Fast and Healthy Weight Loss

Arthur Agatston, M.D.
<table>
<thead>
<tr>
<th>Diet</th>
<th>Carb%</th>
<th>Fat%</th>
<th>Protein %</th>
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<tr>
<td>Mediterranean Diet</td>
<td>45-55</td>
<td>25-35</td>
<td>20</td>
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<tr>
<td>NIH Dietary Ref. Intakes</td>
<td>45-65</td>
<td>25-35</td>
<td>15</td>
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<tr>
<td>Am. Heart Assoc.</td>
<td>40-60</td>
<td>&lt; 30</td>
<td>10-30</td>
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<td>NCEP-ATPIII</td>
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<td>25-35</td>
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<td>45-65</td>
<td>25-35</td>
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<td>Food Guide Pyramid</td>
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<td>15</td>
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<tr>
<td>NCI, NIA, NIDDK, NHLBI</td>
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<td>25</td>
<td>15</td>
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<tr>
<td>Atkins Diet</td>
<td>11</td>
<td>56</td>
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<td>South Beach</td>
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<td>43</td>
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<tr>
<td>Zone Diet</td>
<td>40</td>
<td>30</td>
<td>30</td>
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</table>
Trends in Dietary Treatment of Obesity
High Protein/Low Carbohydrate

- Banting Diet (Banting, 1864)
- Protein-sparing-modified fast (Blackburn et al., 1973)
- Very-low-calorie diet (Blackburn et al., 1975)
- Dr. Atkins diet (Brehm et al 2002; Foster et al., 2003; Samaha et al., 2003, Westman et al., 2003)
When you miss ESSENCE, you miss you. Subscribe today.
DON'T BE A DIET DISASTER LIKE OPRAH

The way Oprah is today — and (inset) as she was just over a year ago. She's more like the Grand Old Oprah.

She piled on the pounds again after losing 67 lbs. in 3 months.
OPRAH HITS DEADLY 205 LBS.
Doctors alarmed as she refuses to diet to save her life

Woody’s going bald! ‘Cheers’ star in frantic fight to save his hair
OPRAH’S VOW:
“"I’LL NEVER DIET AGAIN!"
Fed up with her 14-year fight for a model figure, OPRAH WINFREY is learning to love the robust shape she’s in.
As Di steps aside, here comes Camilla

JFK Jr. hosts the Democratic party

EXCLUSIVE
Book Excerpt

HOW OPRAH DID IT!

She tried all the food fads. Now Oprah shares the diet and fitness plan that finally worked for her
SUPER SIZE AMERICA

HOW OUR WAY OF LIFE IS KILLING US
Big Texan Steak Ranch
Amarillo, Texas

72-oz Steak FREE if eaten within 1 hour
Public Health Goal: Stop Weight Gain of Population

- Combination of reduction in energy intake and increase in physical activity of 100 kcal/day
- Eat 3 bites less of fast food hamburger (=100 kcal)
- Walk additional 20 min (= 100 kcal)

Hill et al., Science, 2003
READINESS TO CHANGE

“Habit is habit, and not to be flung out of the window, but coaxed downstairs a step at a time.”

Mark Twain
COMMUNICATION STRATEGIES: FACILITATING BEHAVIORAL CHANGE

• Self-Monitoring
• Stimulus Control
• Cognitive Restructuring
• Stress Management
• Social Support
## Behavioral Methods for Weight Loss: The Patient Diary

<table>
<thead>
<tr>
<th>LUNCH</th>
<th>TIME</th>
<th>FRAME OF MIND</th>
<th>ACTIVITY</th>
<th>CALORIES</th>
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<tbody>
<tr>
<td>Roast Beef Sandwich</td>
<td>12:30</td>
<td>Hurried</td>
<td>Office Work</td>
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<tr>
<td>Ritz Crackers, 6</td>
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<td></td>
<td></td>
<td>90</td>
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<tr>
<td>Hot Cocoa, 1 cup</td>
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<td></td>
<td>175</td>
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<tr>
<td><strong>TOTAL</strong></td>
<td></td>
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<table>
<thead>
<tr>
<th>DINNER</th>
<th>TIME</th>
<th>FRAME OF MIND</th>
<th>ACTIVITY</th>
<th>CALORIES</th>
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<tbody>
<tr>
<td>Chicken Pot Pie</td>
<td>17:00</td>
<td>Relaxed</td>
<td>Television</td>
<td>545</td>
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<tr>
<td>Carrot-Raisin Salad</td>
<td></td>
<td></td>
<td></td>
<td>310</td>
</tr>
<tr>
<td>Cauliflower, 1 cup</td>
<td></td>
<td></td>
<td></td>
<td>28</td>
</tr>
<tr>
<td>Skim Milk, 1 cup</td>
<td></td>
<td></td>
<td></td>
<td>88</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td></td>
<td></td>
<td></td>
<td>971</td>
</tr>
</tbody>
</table>

**PHYSICAL ACTIVITY**
- Walking
- **TIME**: 10 min.

HOW YOU STAND MAKES NO DIFFERENCE!
SELF-MONITORING

• Food Record
• Activity Record
• Weight Record
LUCKILY, RHODA WAS SAVED FROM OVER-EATING BY HER REFRIGERATOR'S AIRBAG.

POOF!
STIMULUS CONTROL

• Normalize eating pattern
• Lay out exercise clothes
• Find new ways to be active
AFFIRMATION

50¢
COGNITIVE RESTRUCTURING

- Realistic expectations
- Small changes
- Get a life
“If a problem is fixable, if a situation is such that you can do something about it, then there is no need to worry. If it’s not fixable, then there is no help in worrying. There is no benefit in worrying whatsoever.”

H.H. The Dalai Lama
That Old Man Rivers, He Keeps on Rolling Along

Mickey Rivers’ philosophy in the Texas Ranger media guide: “Ain’t no sense in worrying about things you got control over, ’cause if you got control over them, ain’t no sense worrying. And there ain’t no sense worrying about things you got no control over, ’cause if you got no control over them, ain’t no sense worrying.”

INSIDE SPORTS
STRESS MANAGEMENT

• Physical Activity
• Meditation
• Progressive Relaxation
SOCIAL SUPPORT

- Family
- Peer
- Community
TREATMENT PREDICTORS OF INCREASED WEIGHT LOSS

• Lifestyle modification
• Longer treatment
• Increased physical activity
• Pharmacotherapy
HOW MUCH EXERCISE IS ENOUGH FOR WEIGHT LOSS?

• 2800 kcal/wk (including 800 kcal/wk of high intensity exercise [$> 6$ METS] e.g. running, aerobic dance)
  
  **NWCR, 1999**

• 2550 kcal/wk (including 800 kcal/wk of high intensity exercise)
  
  **Jeffrey, JCCP, 1998**
WHY DON’T PATIENTS MAINTAIN THEIR LOSSES?

• Physiological: Reduced metabolic rate
• Environmental: Constant exposures to energy dense foods and low levels of physical activity
• Psychological: Small weight losses (8-10%) are disappointing

Perri & Foreyt, 2004
FACTORS ASSOCIATED WITH WEIGHT MANAGEMENT SUCCESS: CORRELATIONAL

- Attendance at intervention sessions
- Early adherence to behavioral strategies
- Absence of depression or binge eating
- Large initial weight losses
- Low-fat, low-calorie diet
- Diet and weight self-monitoring
- High levels of physical activity

Perri & Foreyt, 2004
FACTORS ASSOCIATED WITH WEIGHT MANAGEMENT SUCCESS: CLINICAL TRIALS

• Continuing care through professional contacts
• High frequency of moderate-intensity, home-based aerobic exercise
• Providing exercise equipment and prescribing short bouts of exercise
• Portion controlled meals plus continuing care
• Combining behavior therapy, portion control, and pharmacotherapy

Perri & Foreyt, 2004
LONG-TERM WEIGHT MAINTENANCE: NATIONAL WEIGHT CONTROL REGISTRY

• > 3200 members
• Maintained average weight loss of 30 kg for 5.5 yrs
• > 15% have maintained their weight loss > 10 yrs
• Members have lost an average of 10 BMI units from 35 to 25 kg/m²

Hill & Wing, 2003
LONG-TERM WEIGHT MAINTENANCE: NATIONAL WEIGHT CONTROL REGISTRY

WEIGHT LOSS STRATEGIES

- 89% used both diet and exercise
- 9% used diet only
- 1% used exercise only
- No common dietary strategy
- 50% lost weight on their own
- 50% used a formal program
- Triggering event: medical (32%); emotional (32%); lifestyle (26%)
LONG-TERM WEIGHT MAINTENANCE: NATIONAL WEIGHT CONTROL REGISTRY

• Diet: 24% fat, 56% carbohydrate, 20% protein
• Physical Activity: 60-90 min/day moderate intensity (400 kcal/day), mostly walking
• Frequent self-monitoring: daily or weekly weighing, daily food records, counting calories or fat grams
• Eating breakfast: 78% ate breakfast every day

Hill & Wing, 2003
HOW MUCH EXERCISE IS ENOUGH FOR WEIGHT MAINTENANCE?

- 80 min/day of moderate activity (4 METS) (e.g. brisk walking, pleasure cycling)
- 35 min/day of intense activity (6 METS) (e.g. running, aerobic dance)

Schoeller, AJCN, 1997
STRENGTH TRAINING VS. AEROBIC TRAINING

• Diet and exercise calories the same
• Strength: 2 set/6 reps + 1 set to max (8)
• Aerobic: 30 @ 70% HR
• Both groups lost 9 kg (9.2%) in 8 wks
• Strength group lost sig. less LBM

Geliebter, AJCN, 1997
MULTIPLE SHORT BOUTS VS. ONE CONTINUOUS BOUT OF EXERCISE

- Exercise 5 d/wk, progressed from 20-40 min, 20 wks
- MSB increased adherence (87 d vs. 69 d)
- MSB greater duration (233 vs. 188 min/wk)
- MSB lost 9 kg; CB lost 6 kg
- CV benefits similar

Jakicic, IJO, 1999
TRENDS IN THE LONG-TERM MANAGEMENT OF OBESITY

• Meal Replacements
• Internet Behavioral Counseling
• Pharmacotherapy + Behavioral Counseling
Four Year Body Weight Loss

- Conventional Diet
- Slim-Fast 2x a day
- Slim-Fast, 1x a day

Experimental Period, months
INTERNET: BEHAVIORAL COUNSELING (1 YEAR)

Tate, Jackvony, & Wing, JAMA, 2003
# OBESITY PHARMACOTHERAPY

## Systemically Acting

<table>
<thead>
<tr>
<th>System</th>
<th>Mechanism</th>
<th>Examples</th>
</tr>
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<tbody>
<tr>
<td>CNS</td>
<td>Noradrenergic</td>
<td>Phentermine</td>
</tr>
<tr>
<td></td>
<td>Stimulate norepinephrine and dopamine release</td>
<td></td>
</tr>
<tr>
<td>CNS</td>
<td>Noradrenergic &amp; serotonergic</td>
<td>Sibutramine</td>
</tr>
<tr>
<td></td>
<td>Block norepinephrine, serotonin and dopamine reuptake</td>
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</tr>
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</table>

## Nonsystemically Acting

<table>
<thead>
<tr>
<th>System</th>
<th>Mechanism</th>
<th>Examples</th>
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</thead>
<tbody>
<tr>
<td>Digestive</td>
<td>Inhibition of lipase</td>
<td>Orlistat</td>
</tr>
</tbody>
</table>
SIBUTRAMINE: MODE OF ACTION

- Inhibition of Serotonin and Noradrenaline Reuptake
- Enhancement of Satiety
- Increased Energy Expenditure
STORM Study Results

ORLISTAT (XENICAL) MECHANISM OF ACTION
XENDOS RESULTS: EFFECT OF XENICAL ON BODY WEIGHT

Sjostrom et al., 9th ICO, Sao Paulo 2002. Poster Presentation
XENDOS RESULTS:
CUMMULATIVE INCIDENCE OF TYPE 2 DIABETES

- Placebo + lifestyle
- Xenical + lifestyle

Incidence of T2D (%) vs Week

- Placebo + lifestyle: 9.0%
- Xenical + lifestyle: 6.2%

Relative Reduction (RR) vs Placebo: 37%

*p=0.0032

Sjostrom et al., 9th ICO, Sao Paulo 2002, Poster Presentation
The maximal placebo-subtracted weight loss never exceed 4.0 kg for any single drug comparison.

Haddock, Poston, Foreyt, & Ericsson, 2002
BRIEF COUNSELING STUDY

• 15 minute counseling/month
• Drug only
• Behavioral counseling only
• Drug + behavioral counseling

Foreyt et al., 2004
BRIEF COUNSELING STUDY

• Review food/physical activity records
• Review goals from last visit
• Review problems & solutions
• Set realistic goals
• Give positive feedback
• Sign contract

Foreyt et al., 2004
Percent Weight Loss in Completers

Percent Weight Loss (%)

Drug only
Brief Counseling only
Drug+Brief Counseling

Months
Proportion Meeting ≥ 5% Weight Loss Criterion Among Completers

![Bar chart showing the proportion of completers meeting the weight loss criterion over 6 and 12 months for different treatment groups: Drug only, Brief Counseling only, and Drug+Brief Counseling.](image-url)
<table>
<thead>
<tr>
<th>Biochemical Interest</th>
<th>Believed Mechanism</th>
<th>Potential Drug</th>
</tr>
</thead>
<tbody>
<tr>
<td>Leptin Receptor</td>
<td>When mutated, resists leptin binding</td>
<td>Repairs receptor; tailored leptin-like molecule</td>
</tr>
<tr>
<td>Neuropeptide Y</td>
<td>Stimulates carbohydrate craving</td>
<td>NPY antagonist</td>
</tr>
<tr>
<td>Biochemical Interest</td>
<td>Believed Mechanism</td>
<td>Potential Drug</td>
</tr>
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<td>----------------------</td>
<td>--------------------</td>
<td>---------------</td>
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<tr>
<td>Peptide YY\textsubscript{3-36}</td>
<td>Reduces appetite and food intake</td>
<td>PYY agonist</td>
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<tr>
<td>Ghrelin</td>
<td>Increases appetite</td>
<td>Ghrelin antagonist</td>
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# BIOCHEMISTRY OF FAT METABOLISM

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<th>Believed Mechanism</th>
<th>Potential Drug</th>
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<tbody>
<tr>
<td>Galanin</td>
<td>Stimulates fat intake and lowers insulin levels</td>
<td>Galanin antagonist</td>
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<tr>
<td>Cholecystokinin</td>
<td>Signals brain to stop eating</td>
<td>CCK agonist</td>
</tr>
<tr>
<td>Dopamine</td>
<td>Signals brain to stop eating</td>
<td>Dopamine/fatty acid combination drug</td>
</tr>
</tbody>
</table>
Gastric Surgery

Vertical Banded Gastroplasty

Roux-en-Y Gastric Bypass

Consensus Development Conference Panel
Ann Int Med 1991; 115:956
Bottom Line

• Obesity is an environmental problem
• Despite progress in genetic research, public health advances only will occur when we take the environment seriously
• Acknowledging the role of the environment in the etiology of obesity will help us stop focusing on the individual, which is encouraged by genetic and biological explanations, and begin focusing on changing the toxic environment
• Until we do this, we will not make substantial progress in addressing the epidemic of obesity

Poston & Foreyt, Atherosclerosis, 1999
REALISTIC MANAGEMENT GOALS

• 5-10% weight loss
• Health, energy and fitness
• Well-being and self-esteem
• Mood and appearance
• Functional and recreational activity
KEY ELEMENTS

- Focus on health and energy
- Food and physical activity diaries
- Gradual increase in physical activity
- Gradual reduction in dietary fat
- No feelings of food deprivation
- Social support groups
SUMMARY: FACILITATING BEHAVIORAL CHANGE

• Have patient keep ongoing records (food and physical activity diaries)
• Have patient set realistic goals
• Help patient identify when, where, and how behaviors will be carried out
• Follow up patient’s progress
• Congratulate patient’s successes: do not criticize
BENEFITS OF MODEST WEIGHT LOSS

“Several studies demonstrate that small losses... help reduce obesity-related comorbidities and that improvements in these risk factors persist with maintenance of these modest weight losses.”

-Institute of Medicine, 1995

- ↓ Glucose levels
- ↓ Insulin levels
- ↓ Glycated hemoglobin
- ↓ Triglyceride levels
- ↑ HDL cholesterol levels
- ↓ LDL cholesterol levels
- ↓ Blood pressure
- ↑ Quality of life levels
“The Current Epidemics of Chronic Diseases are a Result of Discordance Between Our Ancient Genes and Modern Lifestyle.”

WEIGHT MAINTENANCE

“Accuse not nature. She has done her part. Do Thou but Thine.”

John Milton (1687), *Paradise Lost*
Couch Potatoes, Arise!
Fat for Life?

Six Million Kids Are Seriously Overweight. What Families Can Do.

By Geoffrey Cowley & Sharon Begley