Short Cuts to A Long Life: Diet, Exercise, Supplements Stress reduction/Sleep

Terry Grossman M.D.
www.grossmanwellness.com

Short Cuts to Diet

Obesity: We need to go to great lengths to avoid great widths
Reasons are quite simple

- We are consuming more calories
- We are eating more sugar

Blame it on our genes

Our genetic code makes us crave sugar and eat it whenever possible
We want to go the other direction: Calorie Restriction

- The only proven method of increasing life span in animal experiments
- Also associated with increased health & youthfulness

SHORTCUTS TO CR

“CALORIC RESTRICTION WITHOUT THE RESTRICTION”

Carbohydrate Concentration (CC) or Time Limited Carbohydrate (TLC) Diet and Rx Metformin

The Carbohydrate Concentration (CC) Diet

A/K/A THE TLC (TIME LIMITED CARBOHYDRATE) DIET
It’s mostly about insulin

- The body can burn either carbs or fat (prefers fat)
- When you eat starchy carbohydrates (carbs), your insulin level rises
- When insulin rises → carbs are burned, fat is stored
- When insulin is low, fat is burned instead

Benefits of Calorie Restriction (CR)

- Study of 48 healthy men and women who did 25% CR for 2½ years
- Changes seen in 2 biomarkers of longevity - fasting insulin level and body temperature
- CC Diet lowers fasting insulin
  - Heilbronn LK et al. Effect of 6-Month Calorie Restriction on Biomarkers of Longevity, Metabolic Adapation, and Oxidative Stress in Overweight Individuals JAMA. 2006;295(13):1539-1548

The Carbohydrate Concentration Diet

- The Carbohydrate Concentration Diet is very simple to follow and has only a few simple rules:
  - Eat 3 meals a day.
  - Don’t snack.
  - Fast 12 hours each night.
  - Eat virtually all of your carbohydrates for each day in the course of one meal
- The CC Diet will lead to low insulin levels for 20 hours each day
Advantages of the CC Diet

• You won’t have to give up any type of food that you enjoy eating
• You can eat normal amounts of food, yet still be able to experience many of the benefits of full-blown caloric restriction by having low insulin levels over 80% of the time
• Low insulin levels will moderate your appetite & lead to lower calorie consumption

CALORIC RESTRICTION WITHOUT THE RESTRICTION

Metformin
Metformin derived from French Lilac

Folk medicine treatment for diabetes

In the 1920s guanidine compounds were isolated as the active ingredients

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Metformin

- Most commonly prescribed drug to treat Type 2 diabetes
- Unlike other agents, rarely causes low blood sugar
- Metformin (like CR) lowers insulin

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Metformin has 4 chief mechanisms of action

1. Decreases glucose absorption from GI tract
2. Inhibits glucose formation in the liver
3. Increases sensitivity & number of insulin receptors, increasing peripheral glucose uptake
4. Increases fatty acid oxidation
Decreased glucose absorption

Decreased glucose production

Increased peripheral glucose uptake & fatty acid oxidation

Type II Diabetes

- Worldwide, 382 million (2013) vs. 30 million (1985) – 8.4% of adult population
- 29.1 million Americans in 2012
- > 20 yrs old = 11.3%
- > 65 yrs old = 27%
- 1.9 million people diagnosed with T2 DM in 2010 = One person every 16 seconds
- Prediabetics – 86 million
  - CDC, Jan 26, 2011.  
    cdc.gov/media/releases/2011/p0126_diabetes.html

Costs of Diabetes

- 2012-2014, 1.5 - 4.9 million deaths/yr
- Diabetes 2-3 x risk of death
- Global cost $612 billion in 2014
- $245 billion in the US

- American Diabetes, Association (Apr 2013).  
Estimated prevalence of diagnosed and undiagnosed diabetes in people aged 20 years or older, by age group, United States, 2007


Estimated lifetime risk of developing diabetes for individuals born in the United States in 2000


Diabetes & Prediabetes Definitions

<table>
<thead>
<tr>
<th></th>
<th>Diabetes</th>
<th>Prediabetes</th>
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<tbody>
<tr>
<td></td>
<td>Fasting glucose &gt; 125</td>
<td>Fasting glucose = 100-124</td>
</tr>
<tr>
<td></td>
<td>2 hr PP glucose &gt; 200</td>
<td>2 hr PP glucose = 140-199</td>
</tr>
<tr>
<td></td>
<td>Hb A1c &gt; 6.5</td>
<td>Hb A1c = 5.7 – 6.4</td>
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<tr>
<td></td>
<td>29 million in US</td>
<td>86 million in US</td>
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20-39 40-59 60+

Percent

Age Group

2.6 10.8 23.1
Fasting blood sugar > 85 increases CV risk

- If FBS > 85, RR of cardiovascular death increased 40% (95% CI)

85 percent of people have suboptimal blood glucose

- In 1976, 75% had FBS < 85
- In a recent study in Japan of 11,369 non-diabetics only 15% had FBS < 85 at baseline
- 85% had “high normal” FBS >85

New Definition – “High Normal” Blood Sugar (most common)

- FBS > 125 Diabetes 11%
- FBS 100 – 124 Prediabetes 35%
- FBS 86 – 99 High normal 39%
- FBS 70 – 85 Optimal 13%
- FBS < 69 Hypoglycemia 2%
Executive Health Patients
Grossman Wellness Center

<table>
<thead>
<tr>
<th>FBS</th>
<th>Description</th>
<th>Exec Prog</th>
<th>Ave</th>
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</thead>
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<tr>
<td>&gt;125</td>
<td>T2 DM (+300% risk MI)</td>
<td>3%</td>
<td>11%</td>
</tr>
<tr>
<td>100-124</td>
<td>Prediabetes</td>
<td>12%</td>
<td>35%</td>
</tr>
<tr>
<td>85-99</td>
<td>High normal (+40% risk MI)</td>
<td>60%</td>
<td>39%</td>
</tr>
<tr>
<td>70-84</td>
<td>Optimal</td>
<td>24%</td>
<td>13%</td>
</tr>
<tr>
<td>&lt;69</td>
<td>Hypoglycemia</td>
<td>2%</td>
<td>2%</td>
</tr>
</tbody>
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Antiaging Potential of Metformin

- In the early 1970s, Dr. Vladimir Dilman hypothesized that biguanides may have use as “geroprotectors” and anticancer effects (“metabolic rehabilitation”)
- In the early 1990s, Dilman & Ward Dean hypothesized that metformin be considered as an “antiaging” therapy

CR reduces levels of sugar & insulin

- High levels of sugar & insulin are major risk factors associated with aging
- High levels of sugar & insulin promote cancer growth & heart disease
- Sugar & insulin levels tend to increase with age
- The aging process itself can be thought of a form of “pseudo-diabetes”
Metformin twice as effective as other possible CR-mimetics

- Using gene chips, metformin was found to be twice as effective as a CR-mimetic as other compounds.
- Metformin affected 63 genes involved in energy production, protein synthesis & degradation, cell growth, and detoxification.

Metformin extends lifespan of mice

- Mice who received metformin in their drinking water had increase in mean life span +37.8%.
- Mean life span of last 10% survivors +20.8%.
- Maximum life span +2.8 months.

Affordable Therapy

- Generic metformin: 7 cents/500 mg
  - $4.20/ month @ 500 mg twice a day
- Side effects are less with time-release formulation.
Metformin: Who should take it?

- Type II diabetes  11%  YES
- Prediabetes     35%  YES
- High normal sugar 39%  YES
- Optimal         13%  YES
- Hypoglycemia    2%   NO

- Not everyone should take metformin, just 98 percent of us

Short Cuts to Exercise

Our bodies require exercise for optimal function but our genetic code tells us not to
Longevity Benefits of Exercise

- Average 65 year olds can expect 12.7 additional years of life to 77.7, while highly active 65 year olds can expect 18.4 years of life to 83.4 (6.7 years = 53% increase)
- 50 year old men – moderate exercise added 1.1 years, high exercise 3.7 years
- 50 year old women – moderate exercise added 1.5 years, high exercise 3.5 years


Benefits of exercise proven 60 years ago

Physical Activity at Work and Coronary Artery Disease, 31,000 London Transport Workers

- Drivers vs. Conductors
- Coronary Occlusion Rate
- Early Mortality

Harris JN et al. Lancet 1983
New ideas regarding optimal aerobic exercise

Exercise then

Exercise now

Get in great shape in 20 minutes

**Warm up**
- 2:00 min exertion / 1:00 min rest
- 2:00 min exertion / 1:00 min rest
- 1:30 min exertion / 1:30 min rest
- 1:30 min exertion / 1:30 min rest
- 1:00 min exertion / 2:00 min rest
- 1:00 min exertion / 2:00 min rest

**Cool down**

Greater Exertion

Progress to Maximum Interval Training

- Alternate 30 seconds of maximum exercise with 30 seconds of rest
- Perform 6 – 9 cycles
Strength Training

Strength Training reverses hormone decline of aging

UPPER BODY EXERCISES
Pushups (women)

Windmills

Dips
Pull Ups

Chin Ups

Arm Curls
Chest Press

CORE BODY EXERCISES

Crunches
LOWER BODY EXERCISES

Squats

Lunges
Toe Raises

Stretch Afterwards

Exercise 80-120 minutes a week

2-3 x 20 minute aerobics
2-3 x 20 minute strength training
SHORT CUTS TO SUPPLEMENTS

AN ASPIRIN A DAY
Can help prevent heart attacks, strokes and cancer

Aspirin reduces cancer risk

- Cancer: 69,224 participants; 34 trials
  - Aspirin reduced cancer deaths 15% (562 vs 664 deaths; OR 0.85, p=0.008; 34 trials,)


Further Research - Cancer

- 8 trials (25,570 patients), aspirin reduced death due to cancer 21%
- Benefit seen only after 5 years for esophageal, pancreatic, brain, and lung cancer (all cancers, hazard ratio [HR] 0.66, 0.50-0.87; gastrointestinal cancers, 0.46, 0.27-0.77; both p=0.003).
- More than 5 years for benefit in stomach, colorectal, and prostate cancer
- Aspirin dose unimportant (at least 75/day)
Aspirin reduces heart attack but increases bleeding risk

- 9 trials (102,000 patients) aspirin, 10% less heart attack
- 50mg and 325mg per day – no difference
- Increase in “nontrivial” bleeding in 1:73


US Preventive Services Task Force Recommendations

- Men 45 - 79 years
- Women age 55 - 79 years
- Must weigh potential benefit of reduction in heart attacks/strokes vs. potential harm of gastrointestinal hemorrhage
- Not recommended <45 men, <55 women or anyone >80

Conclusions

- Men over 45, women over 55 up to 79 years of age with personal risk factors or family history of heart disease or cancer
- 81 mg (baby) aspirin: 1 a day
- Needs to be done every day (every other day not shown to be effective)
- Needs to be done long term – at least 3 – 5 years
Short Cuts to Stress Reduction/Improving Sleep

It’s a matter of brain waves

More alpha waves = more relaxation, less stress
Shortcut – Cranial Electrical Stimulator (CES)

CES reduces symptoms in Soldiers/Veterans

- 1514 service members and veterans (N=1,514) with a CES device provided by the Department of Defense or VA Medical Center from 2006-2011 sent questionnaires
- Of 152 who replied, clinical improvement of 25% or more from using CES for anxiety (66.7%), PTSD (62.5%), insomnia (65.3%) and depression (53.9%)
- More than 50% reported clinical improvement of 50% or more

Anxiety & Depression

- 115 people with a primary diagnosis of an anxiety disorder took The Hamilton Rating Scale for Anxiety and the Hamilton Depression Rating Scale17
- Measurements at baseline and weeks 1, 3 & 5
- Response to treatment was defined as a reduction of ≥50% or more
- A significant difference between the active CES group and the sham CES group on anxiety and depression was seen
Anxiety

• 12 people with generalized anxiety disorder received CES for 6 weeks
• Hamilton Rating Scale for Anxiety (HAM-A) and the Clinical Global Impressions-Improvement (CGI-I) scale
• 6 patients (50% of the intent-to-treat sample and 67% of completers) had a 50% decrease in HAM-A score and a CGI-I score of 1 or 2

Attention

• 21 people received placebo treatment
• 31 people received 20 minutes of CES
• On the Continuous Performance Test, 4 measures showed significant gains in attention
• 31% of CES people improved vs. 4% of the control group

Everyone can afford the “Short Cuts to a Long Life” program

• CC Diet - FREE
• Metformin - $0.14/day
• Exercise - FREE
• Aspirin 81 mg - $0.03
• CES device - $349*
  (* Or meditate - FREE)