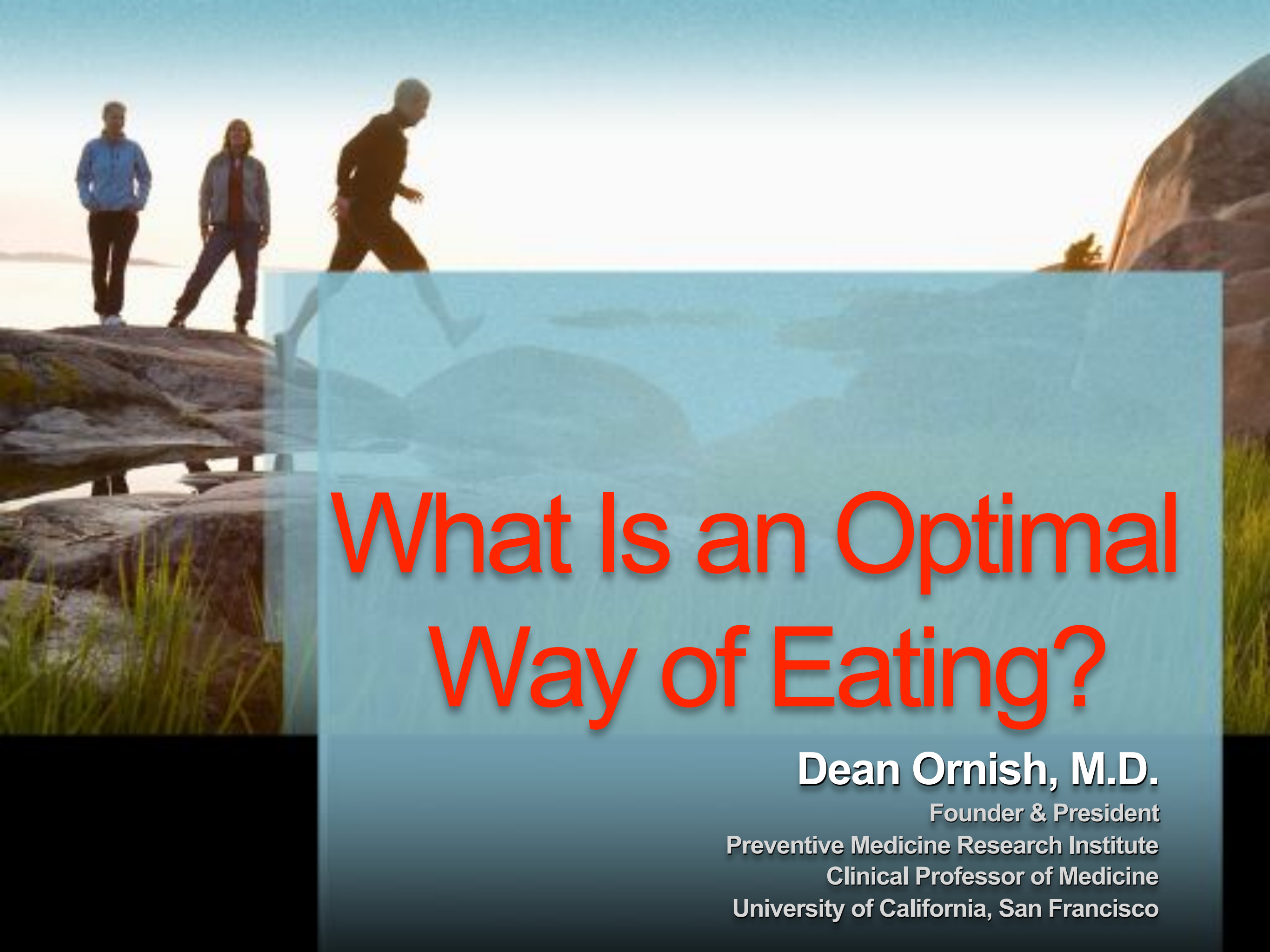


A photograph of three people on a rocky shore at sunset. Two people are standing on the left, and one is running on the right. The background shows a calm body of water and a large rock formation on the right. A semi-transparent blue rectangle is overlaid on the right side of the image, containing the title and speaker information.

What Is an Optimal Way of Eating?

Dean Ornish, M.D.

Founder & President
Preventive Medicine Research Institute
Clinical Professor of Medicine
University of California, San Francisco

When assessing different diets, it's important to examine clinical endpoints, not just biomarkers.

Optimal Lifestyle Program



- Plant-based diet
- Stress management
- Moderate exercise
- Psychosocial support



Optimal Lifestyle Program



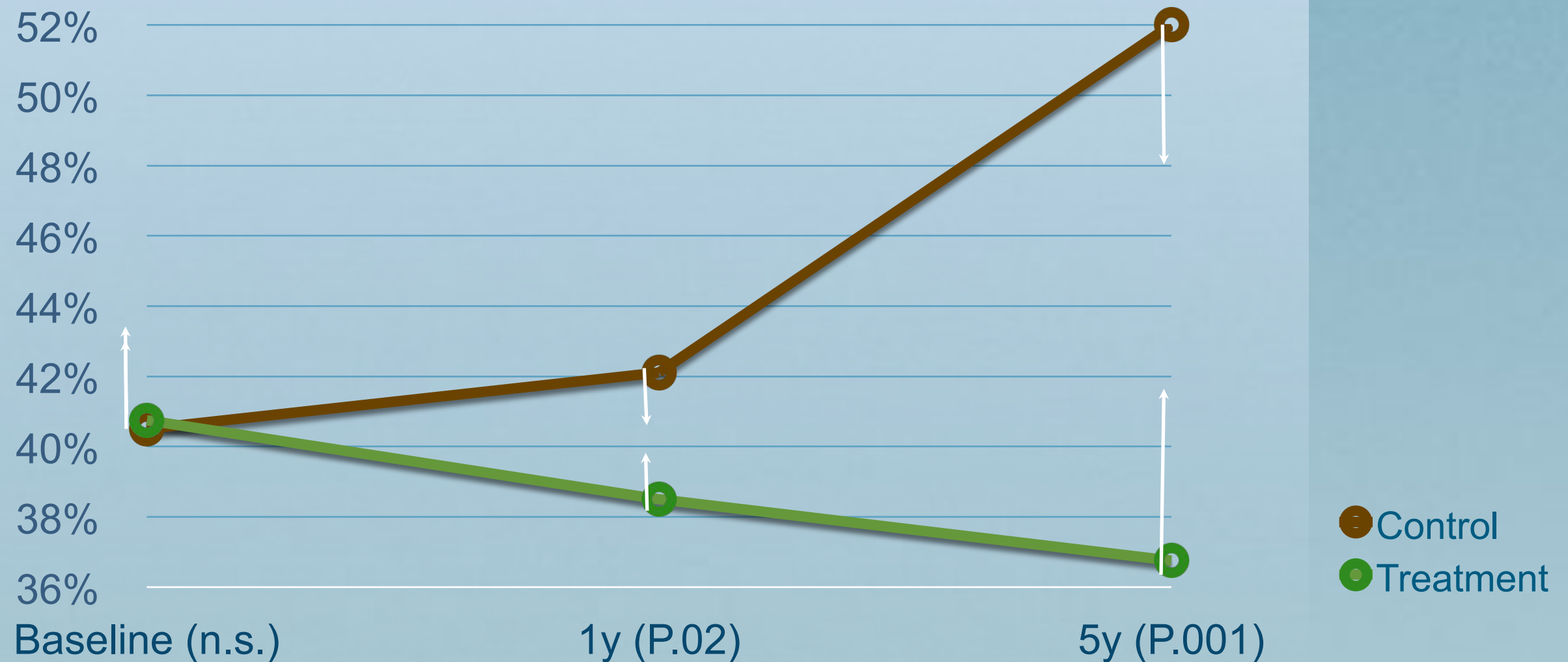
- Eat well
- Stress less
- Move more
- Love more



Reversing Heart Disease

Lifestyle Heart Trial

% Diameter Stenosis: Quantitative Coronary Arteriography



There was a 300%
improvement in coronary
blood measured by cardiac
PET scans after 5 years.

--Gould KL, Ornish D, et al. *JAMA*. 1995;274:894-901.

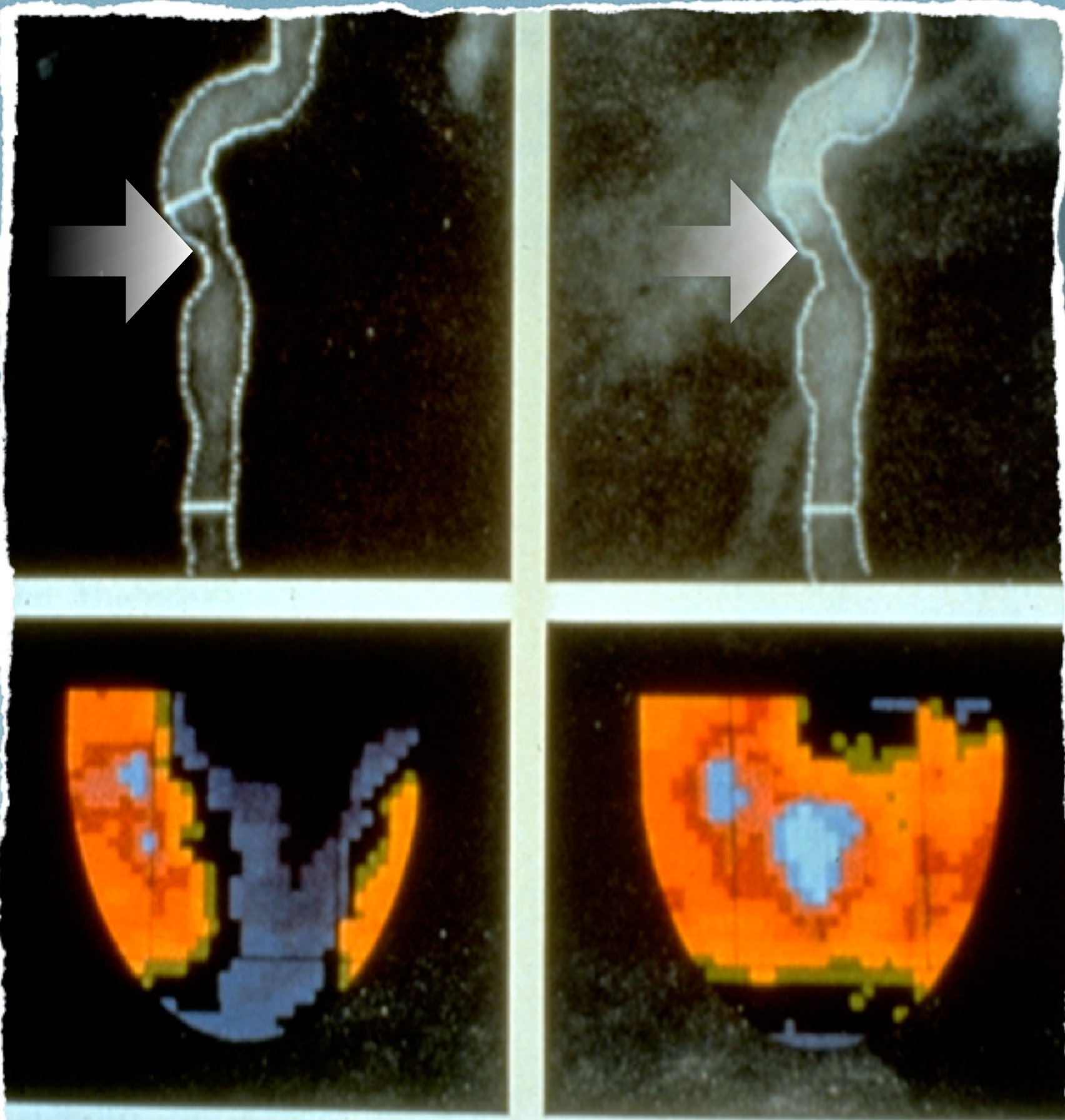


Figure 2. Quantitative coronary angiograms and cardiac PET scans obtained

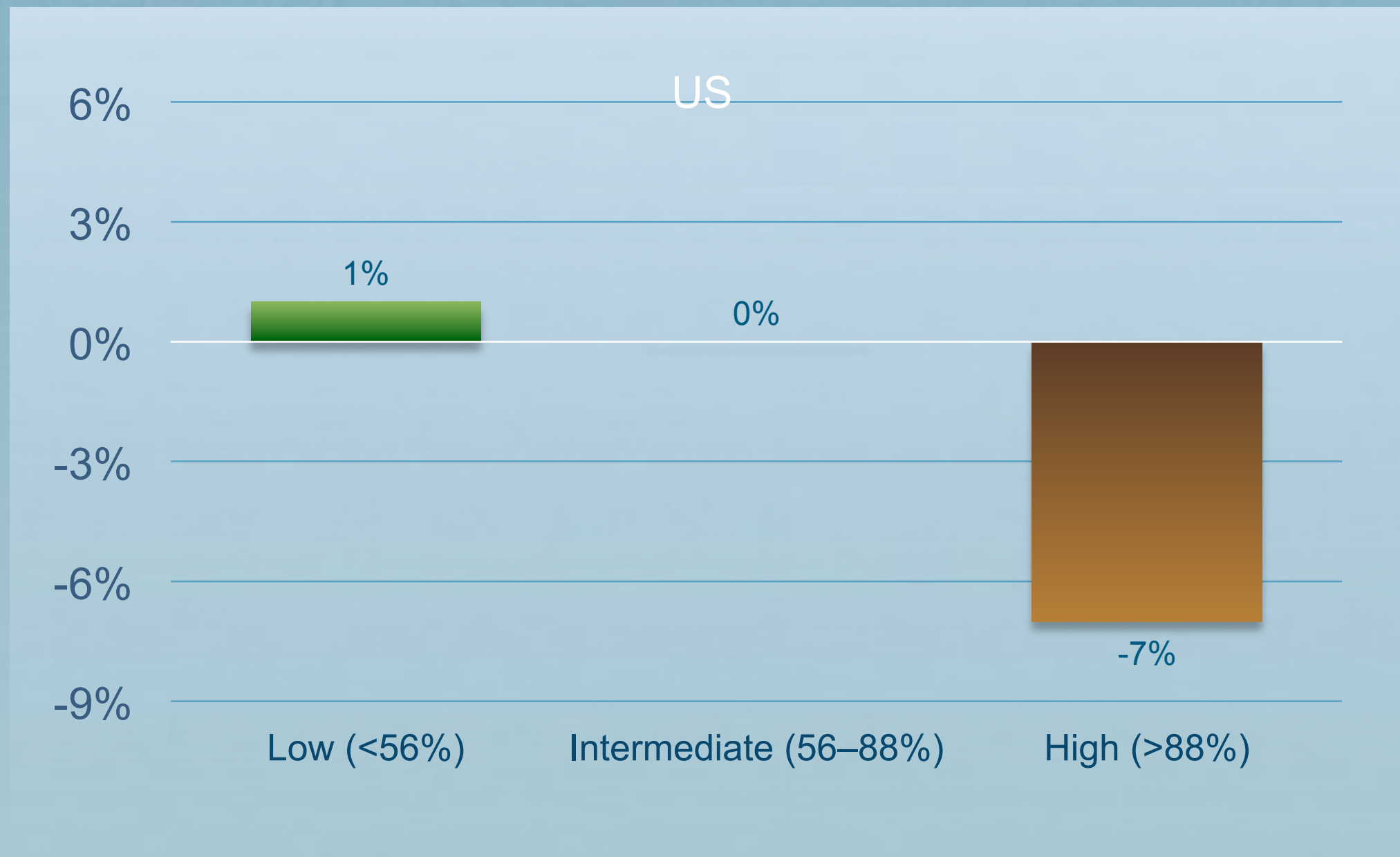
99% of patients stopped or reversed their heart disease as measured by cardiac PET scans after 5 years. In contrast, 45% of controls got worse, 50% showed no change, and only 5% improved ($p = 0.03$).

--Gould KL, Ornish D, et al. *JAMA*. 1995;274:894-901.

There was a 40% reduction
in LDL-cholesterol in the first
year without cholesterol-
lowering drugs.

--Ornish D et al. JAMA. 1998;280:2001.

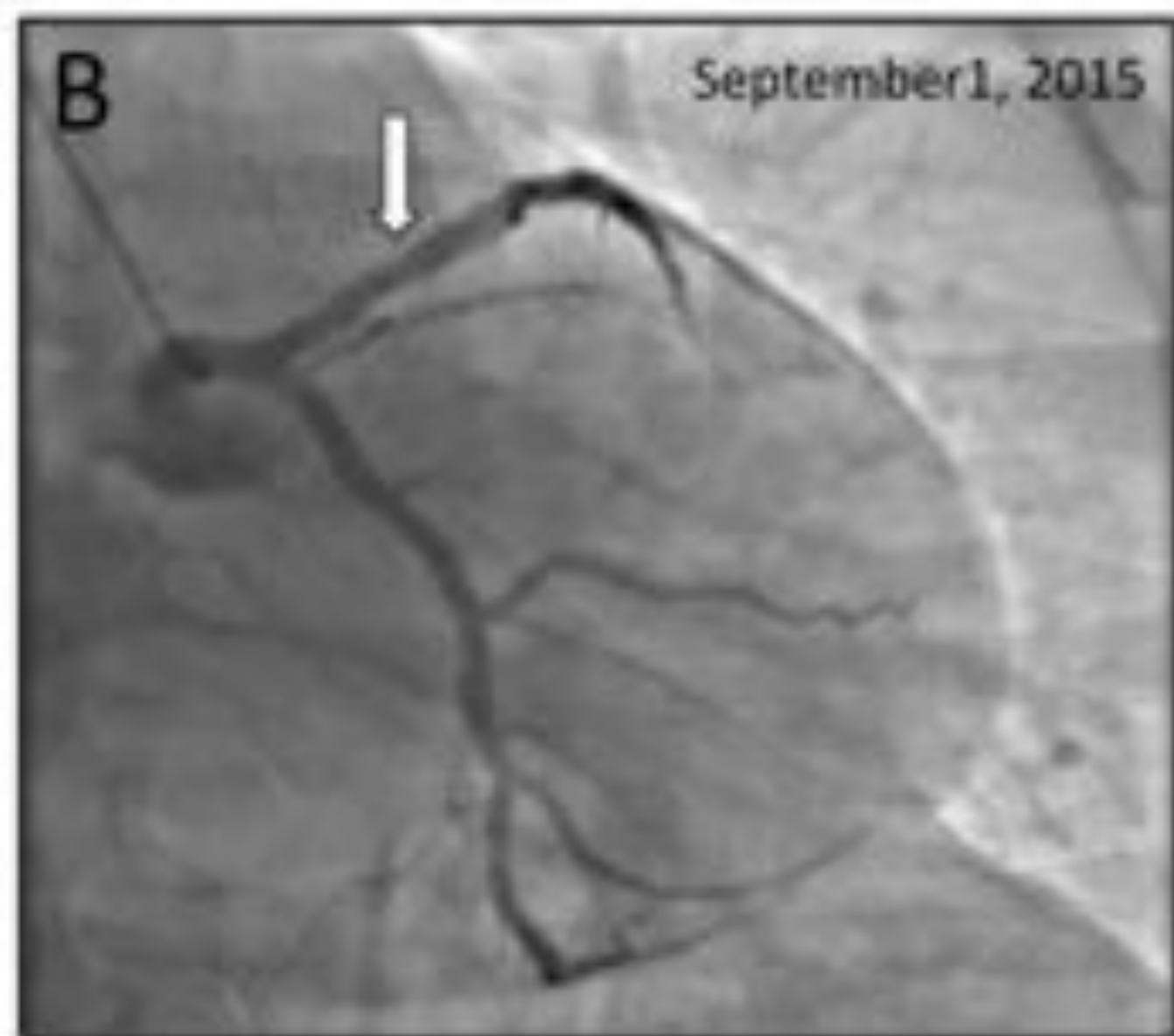
Adherence and Change in Coronary Atherosclerosis after Five Years



Ornish D et al. JAMA. 1998;280:2001

Lifestyle Heart Trial

- There were 2.5 times as many cardiac events in the randomized control group as in the lifestyle group after five years.

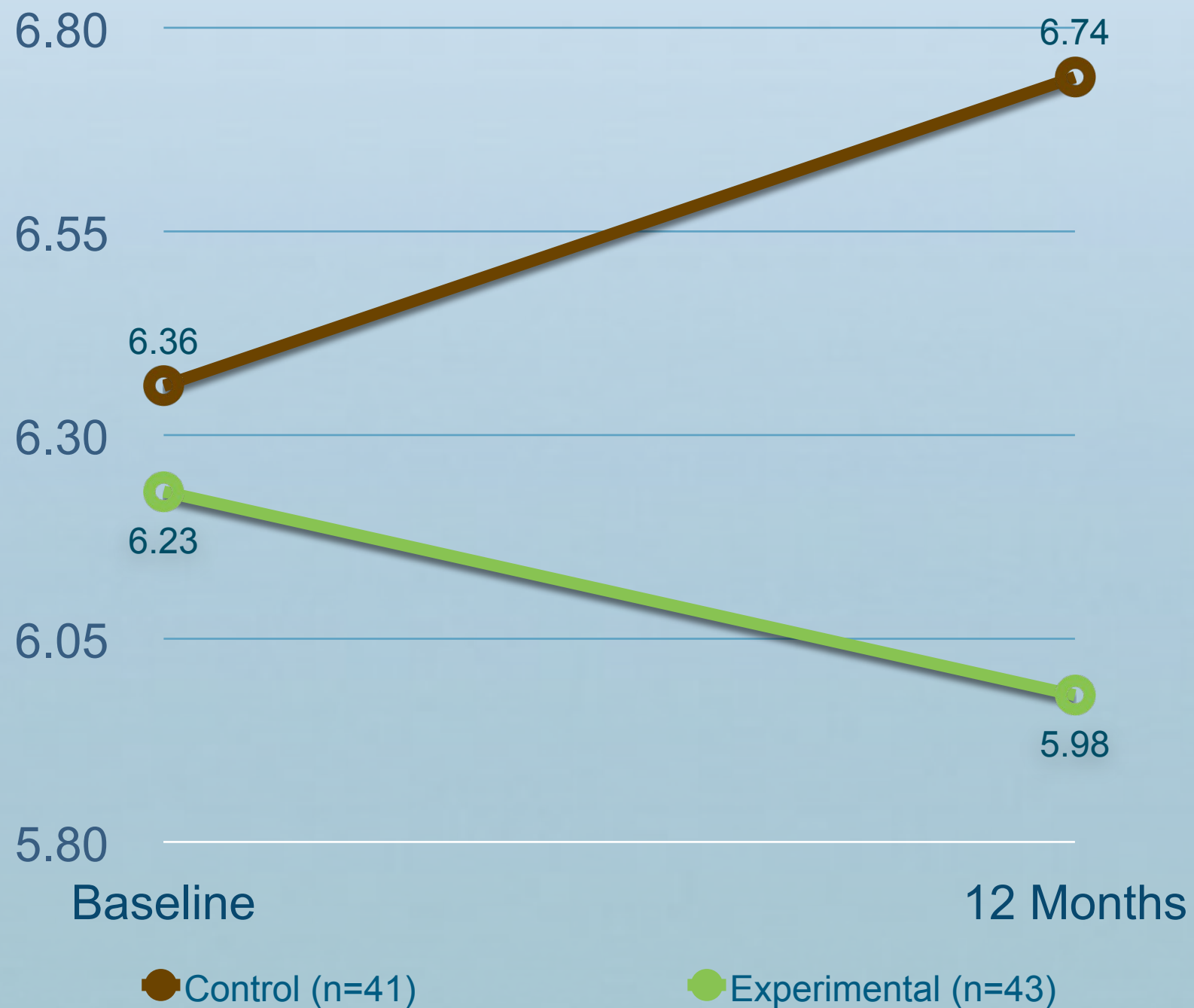


Reversing Prostate Cancer

Patient Selection Criteria

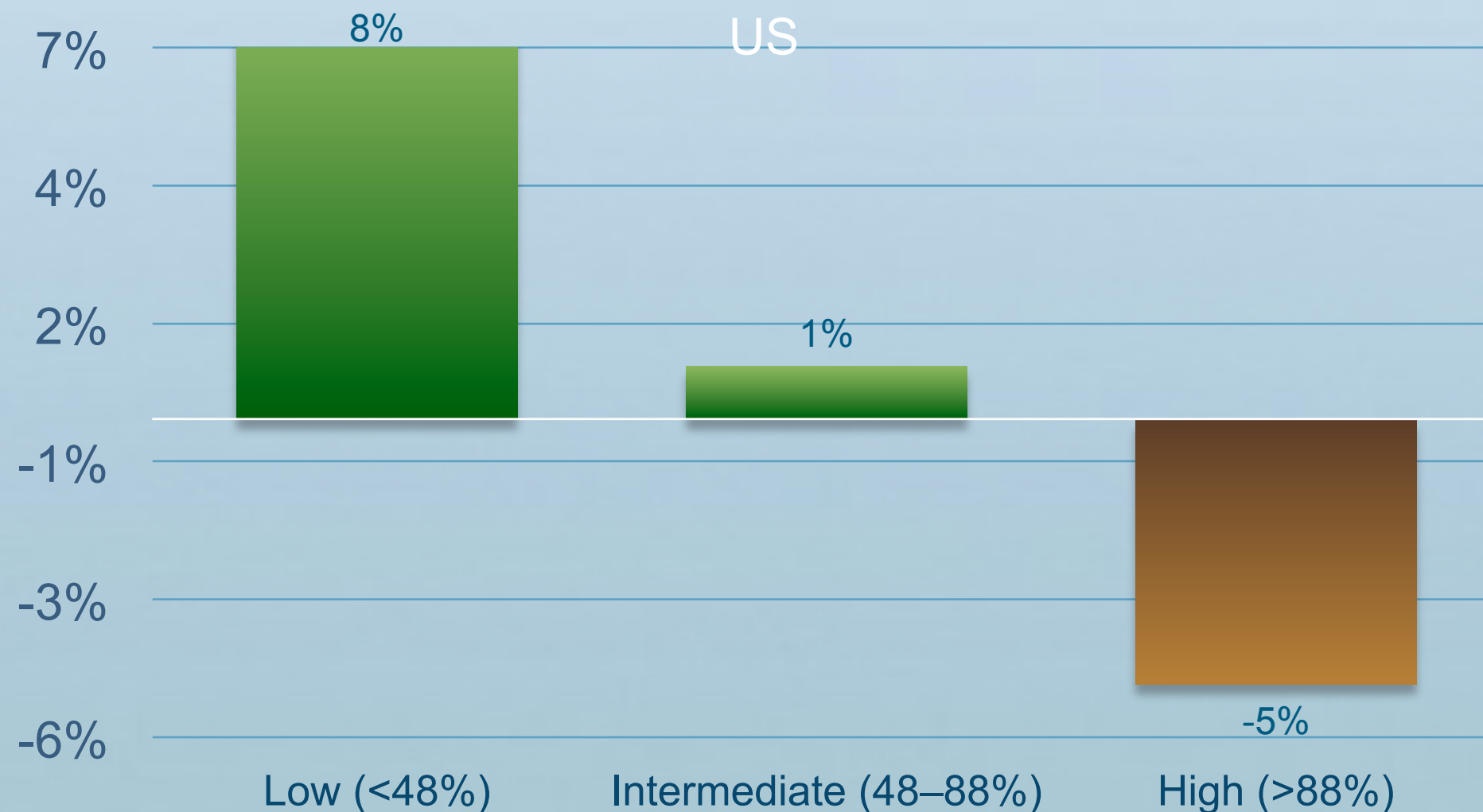
- 93 men with biopsy-proven prostate cancer, PSA 4–10, Gleason <7
- All patients chose to do watchful waiting for reasons unrelated to this study
- Randomly assigned to intensive cardiac rehabilitation or usual care

Changes in PSA



P=0.002

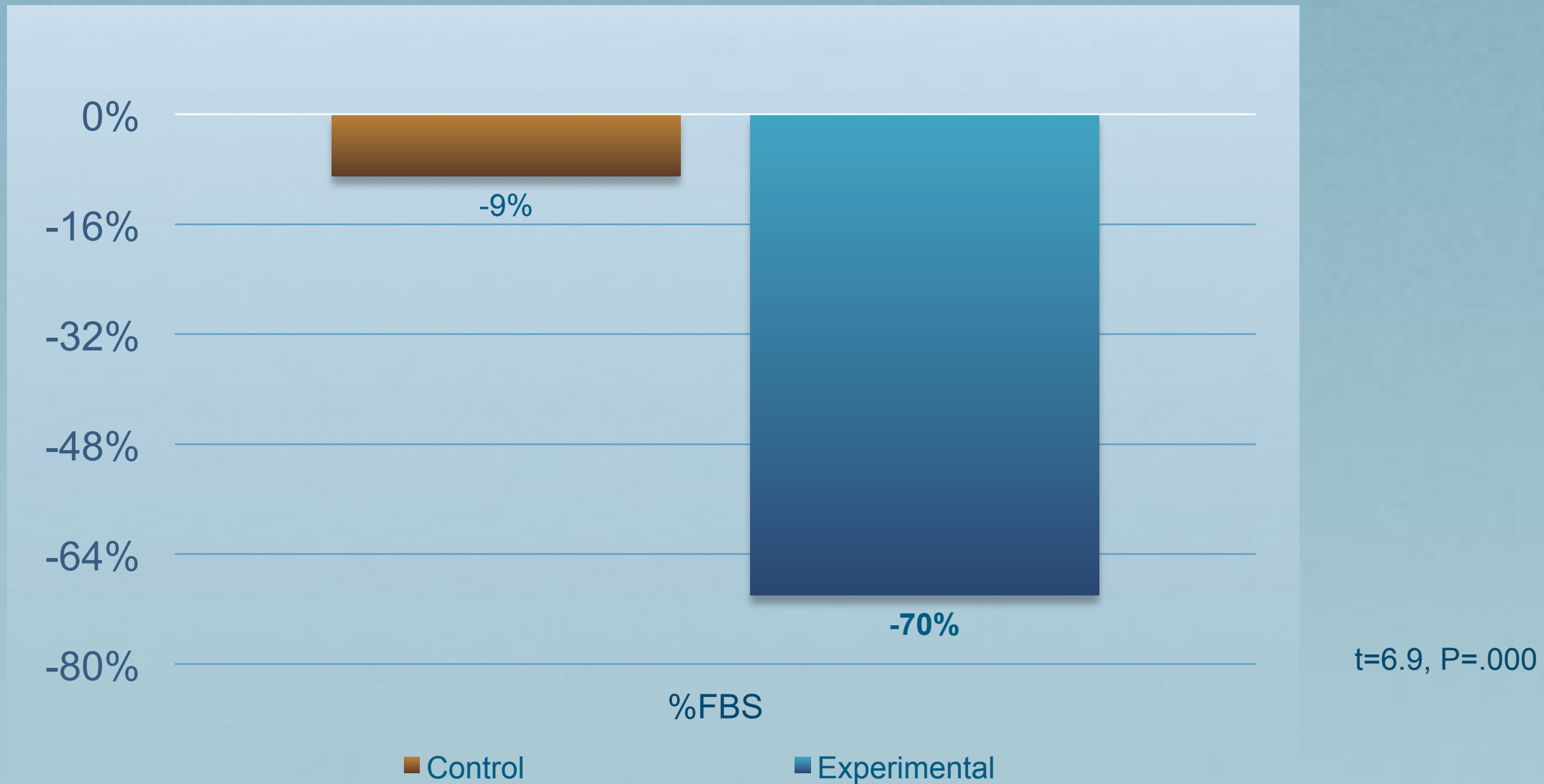
Degree of Lifestyle Change and Changes in PSA



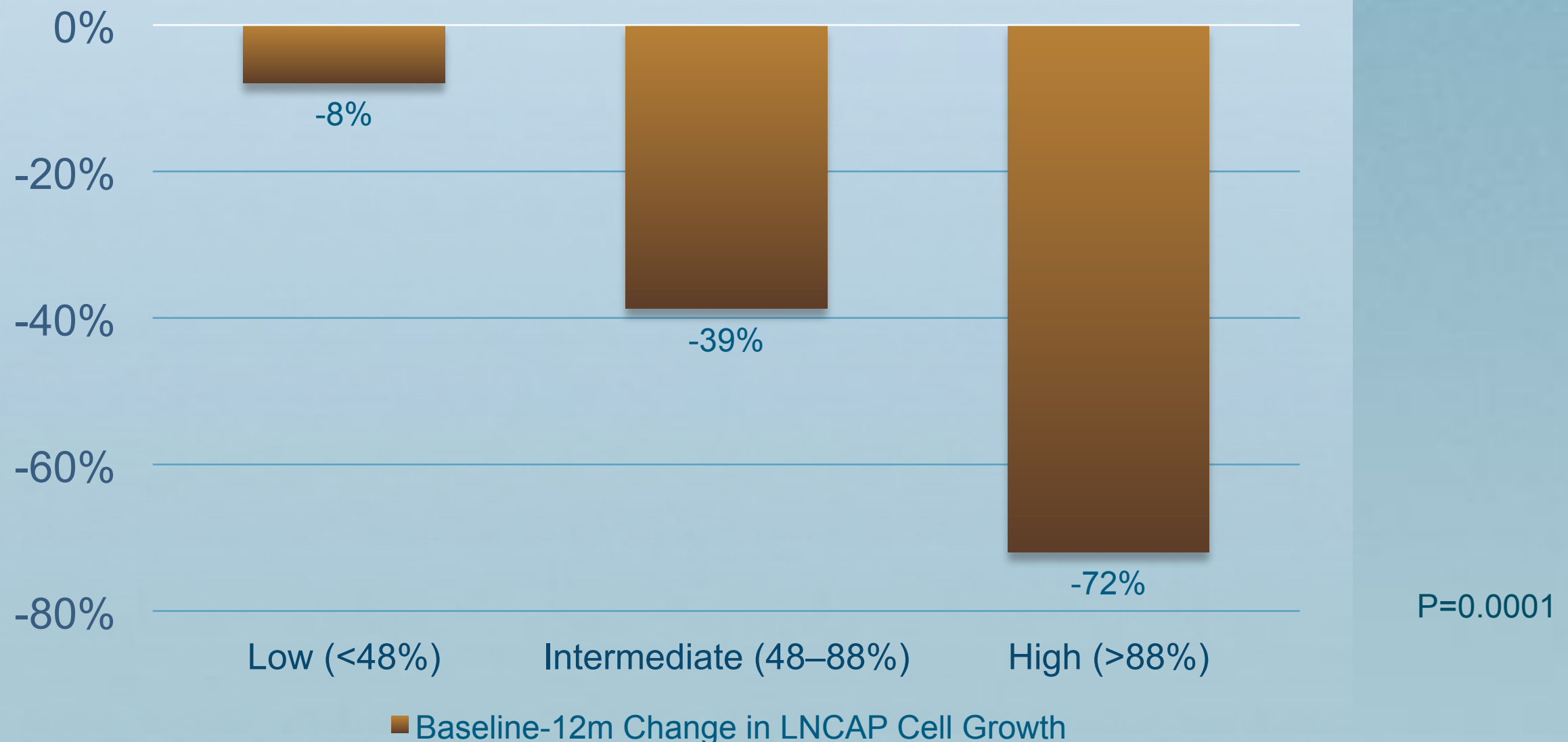
P=0.001

Ornish D et al. Journal of Urology. 2005;174:1065

Change in Prostate Tumor Growth (LNCaP)



Degree of Diet & Lifestyle Change and Inhibition of LNCaP Tumor Growth





Baseline
PSA—6.4 ng/ml



1 year later
PSA—4.5 ng/ml

None of the experimental group patients but six control group patients had conventional treatment during the first year.

Ornish D et al. Journal of Urology. 2005;174:1065

A man with dark, curly hair and a beard is sitting at a wooden table, smiling broadly while eating from a white bowl. He is holding a yellow-handled spoon. On the table, there is a white mug, a bag of flour, and a large white jug. In the background, there is a wooden shelf with various items and a framed calendar on the wall.

can lifestyle changes
beneficially affect
gene expression?

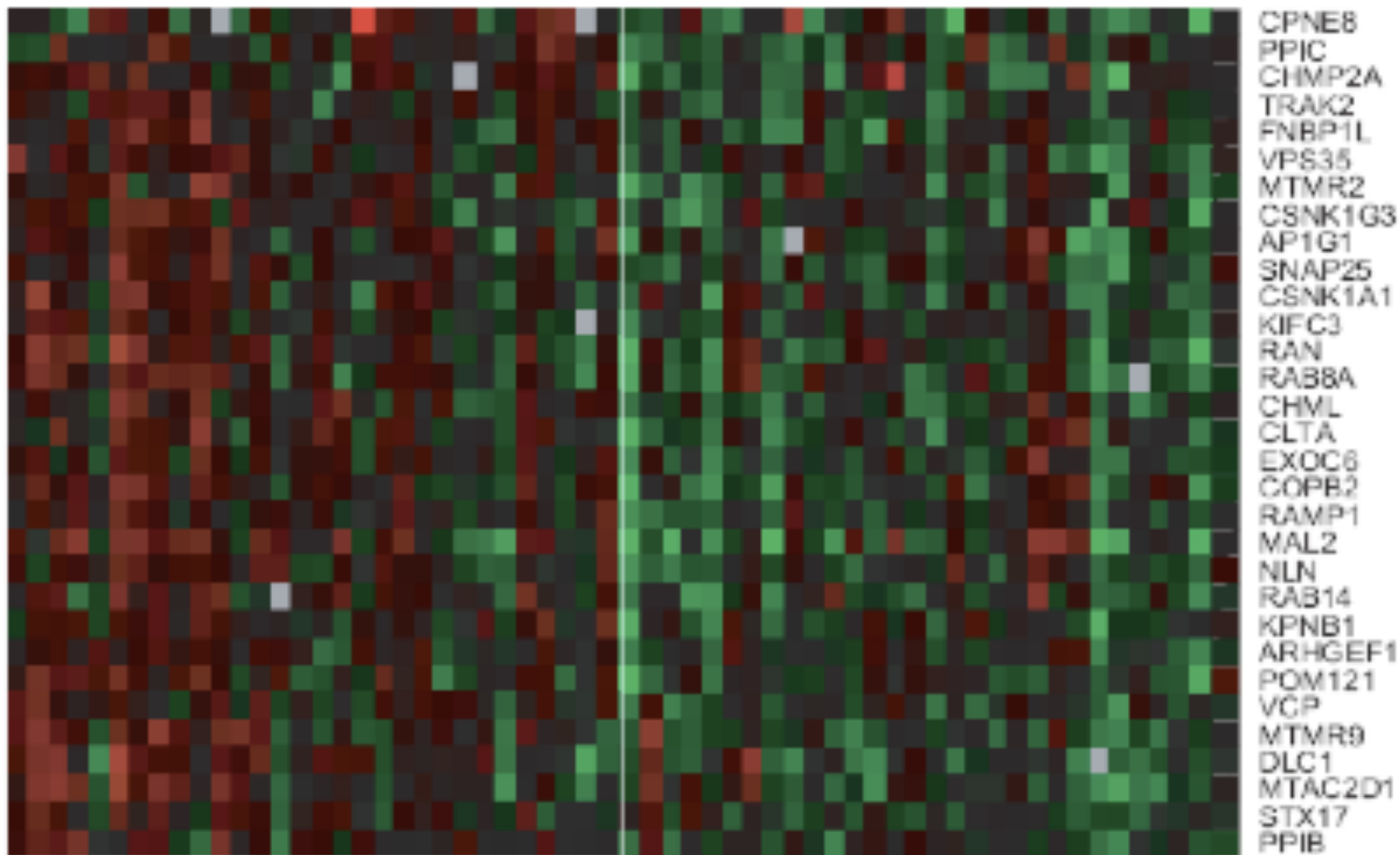
Gene expression in 501
genes was beneficially
affected in only 3 months

Ornish et al. Proc Nat Acad Sci USA 2008; 105: 8369.

RAS family oncogenes (RAN, RAB14, RAB8A) that promote prostate cancer and breast cancer were downregulated.

Pre-intervention

Post-intervention



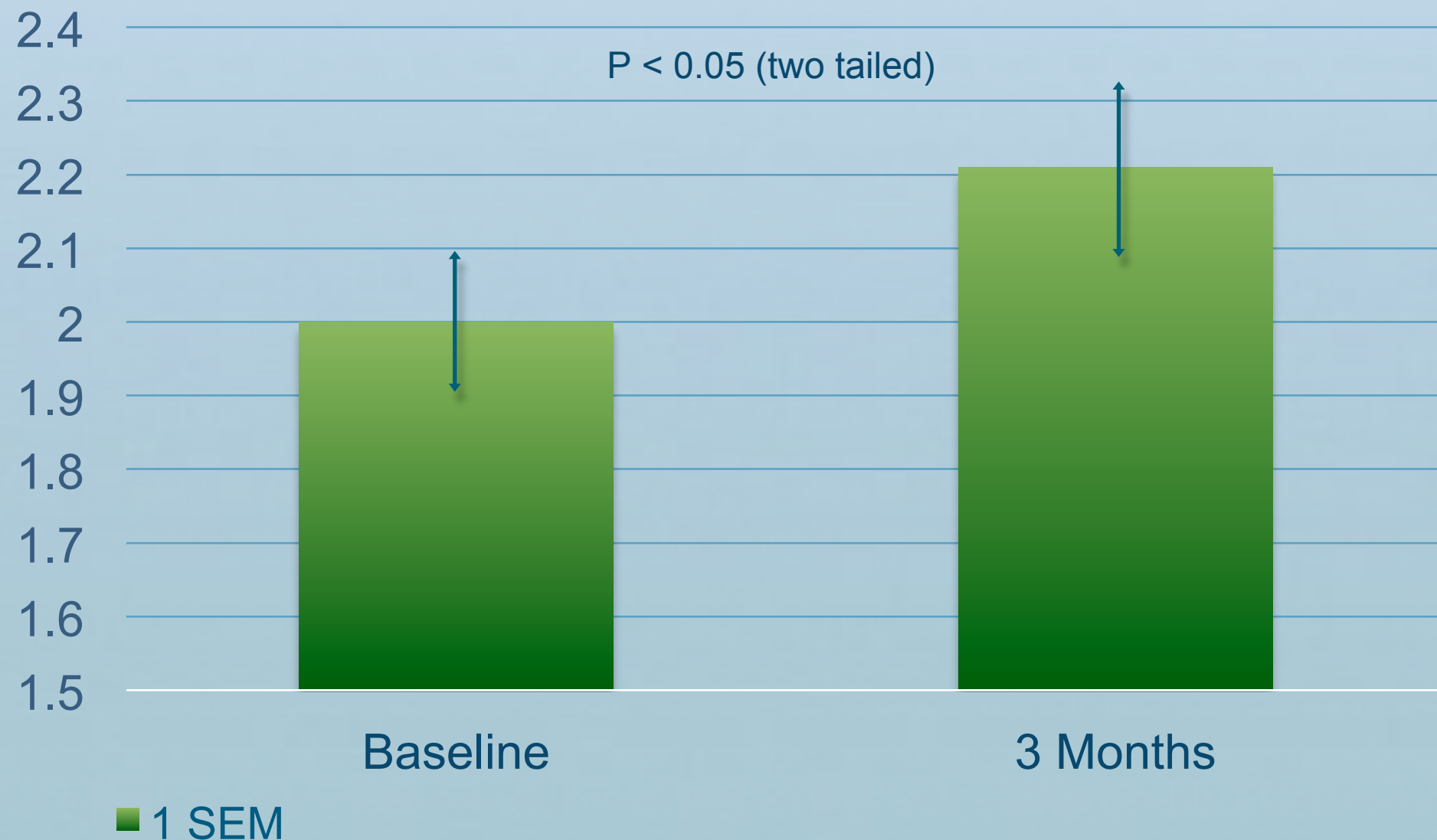
change in genes
linked with
breast cancer and
prostate cancer
(red = turned on
green = turned off)

Ornish et al. *Proc Nat Acad Sci USA* 2008; 105: 8369.

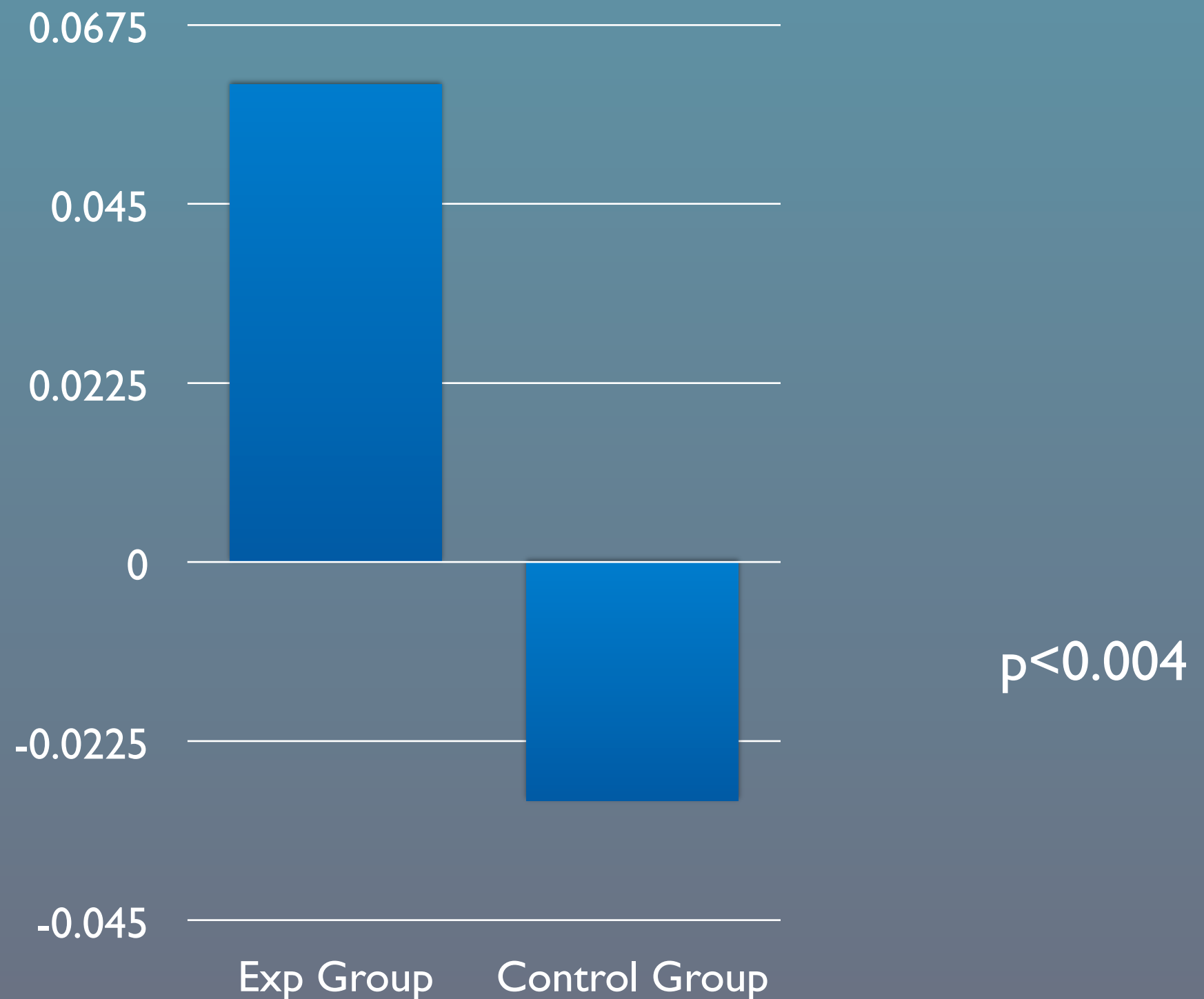
Reversing Aging at a Cellular Level

Telomerase increased 30% in only 3 months

Telomerase Activity (Ln)



Mean Changes in Telomere Length After 5 Years



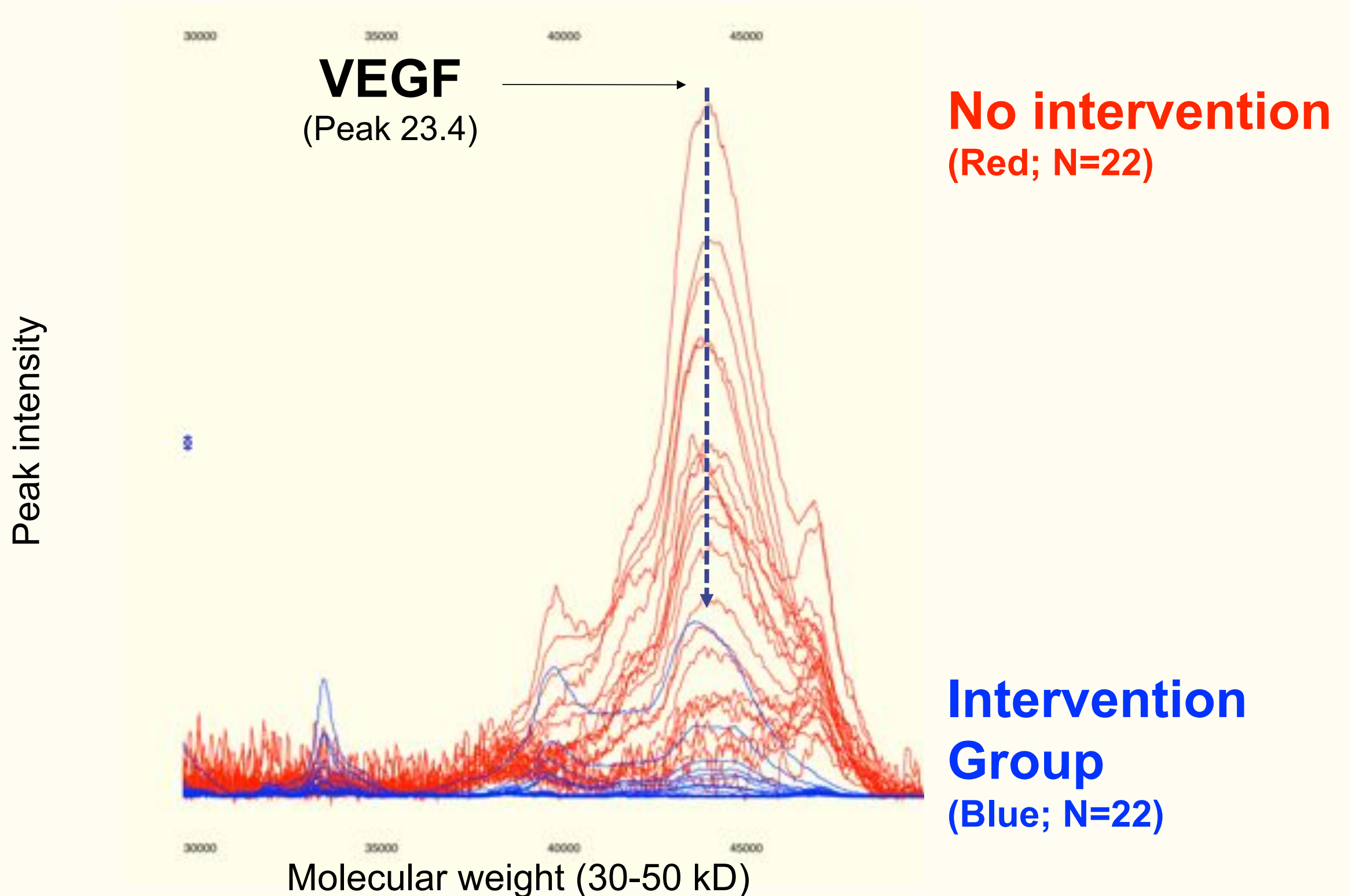
There was a significant correlation between adherence and telomere length ($p < 0.007$)

Ornish D et al. *Lancet Oncology* 2013.

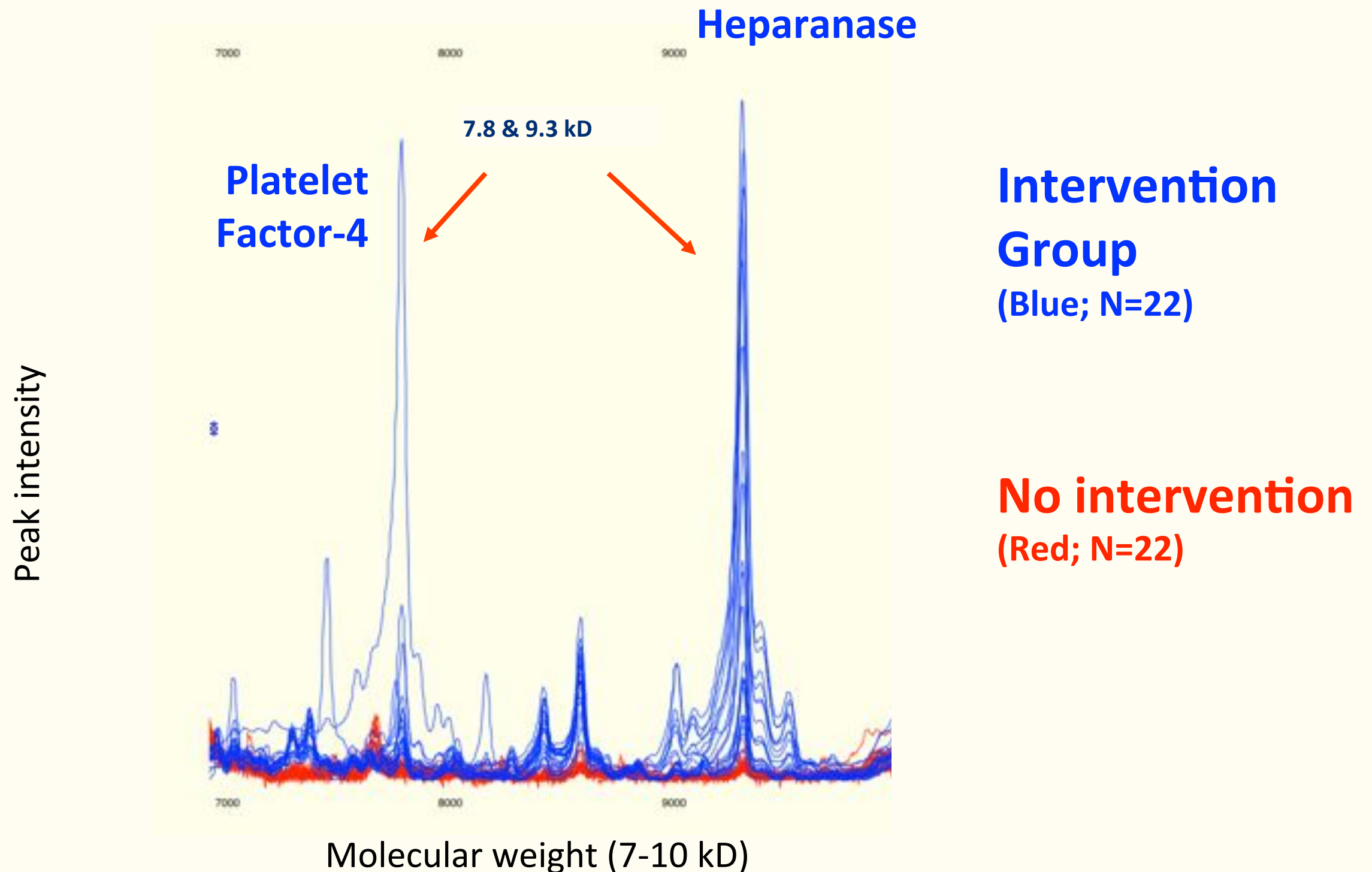
Our Genes Are
Not Our Fate

Inhibiting Angiogenesis

Tumor angiogenesis factor VEGF is markedly suppressed in the Intervention Group



Intervention group exhibits high levels of antiangiogenic Platelet Factor 4 (PF4) and heparanase, a protein that binds and inhibits many angiogenic growth factors



What is an optimal
way of eating?

Convergence of Nutrition Advice

- Consume mostly plants: fruits, vegetables, whole grains, legumes, & soy products in their natural forms
- What you *include* in your diet is as important as what you *exclude*
- Eat food as close as possible in its natural form

Convergence of Nutrition Advice

- Reduce intake of hydrogenated fats, trans fats, and most saturated fats
- Consume 4 grams/day of omega-3 fatty acids
- Organic is better (taste + health)
- Reduce intake of sugar, refined carbohydrates, & high glycemic foods

It's not low carb vs. low fat.
It's low in bad carbs and bad fats;
higher in good carbs and good fats.
Low in animal protein and
high in plant-based proteins.

In those age 65 or older, the risk of cognitive decline was 38% lower in those eating high vs low amounts of vegetables.

--Morris MC et al. *Neurology*. 2006;67(8):1370-6.

In those age 65 or older,
consuming saturated fat and trans
fats more than doubled the risk of
developing Alzheimer's disease.

--Morris MC et al. *Arch Neurol*. 2003;60(2):194-200.

TIME

Eat Butter.

Scientists labeled fat the enemy. Why they were wrong

BY BRYAN WALSH



myth: “Americans have been told to eat less fat, they’re consuming less fat but they’re fatter than ever, so fat is good for you.”

Reality: American Diet Since 1950

- 67% more added fats
- 39% more sweeteners
- 800 calories more per capita
- 57 pounds more meats

source: USDA Agriculture Fact Book 2001-2

TIME



THE
WAR
ON
DELICIOUS
By Jeffrey Leaner

Diets high in animal protein:

- 75% increase in total mortality
- 400% increase in cancer risk
- 500% increase in diabetes
- significantly higher IGF-1 levels

—Levine ME et al. Cell Metabolism 19, 407–417, March 4, 2014

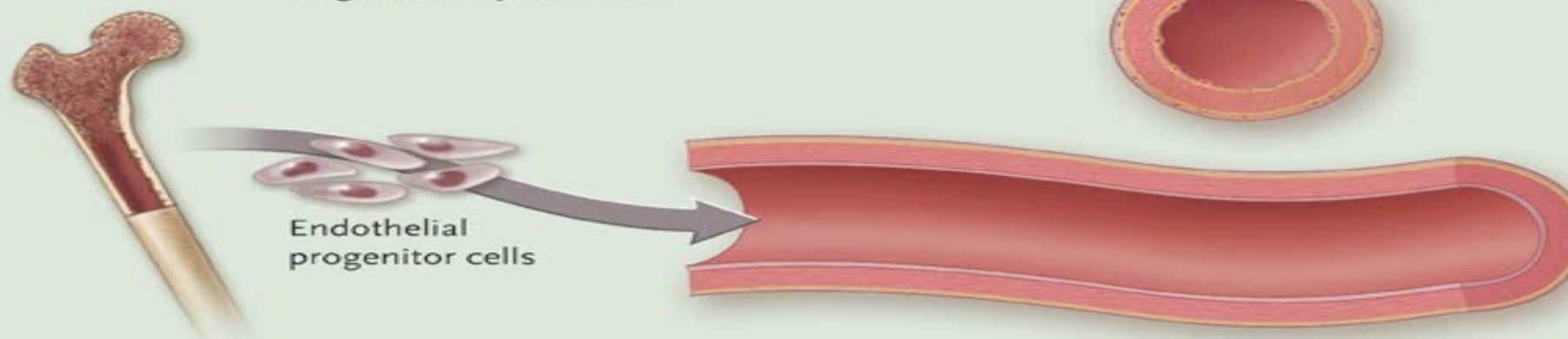
The only diet proven in RCTs to reverse CHD without lipid-lowering drugs is a whole foods plant-based diet very low in fat & refined carbohydrates.

- Ornish D et al. *JAMA*. 1983;249:54.
- Ornish D et al. *Lancet*. 1990;336:129.
- Gould KL, Ornish D, et al. *JAMA*. 1995;274:894.
- Ornish D et al. *JAMA*. 1998;280:2001.

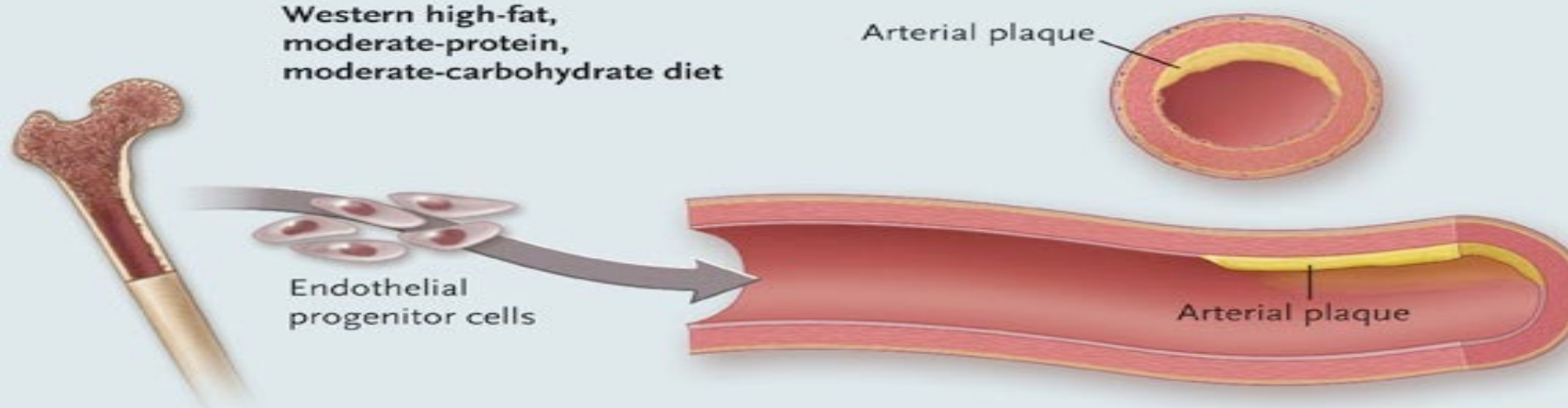
No study has ever proven that a high protein low carb diet can reverse or prevent heart disease.

A

Low-fat, moderate-protein,
high-carbohydrate diet

**B**

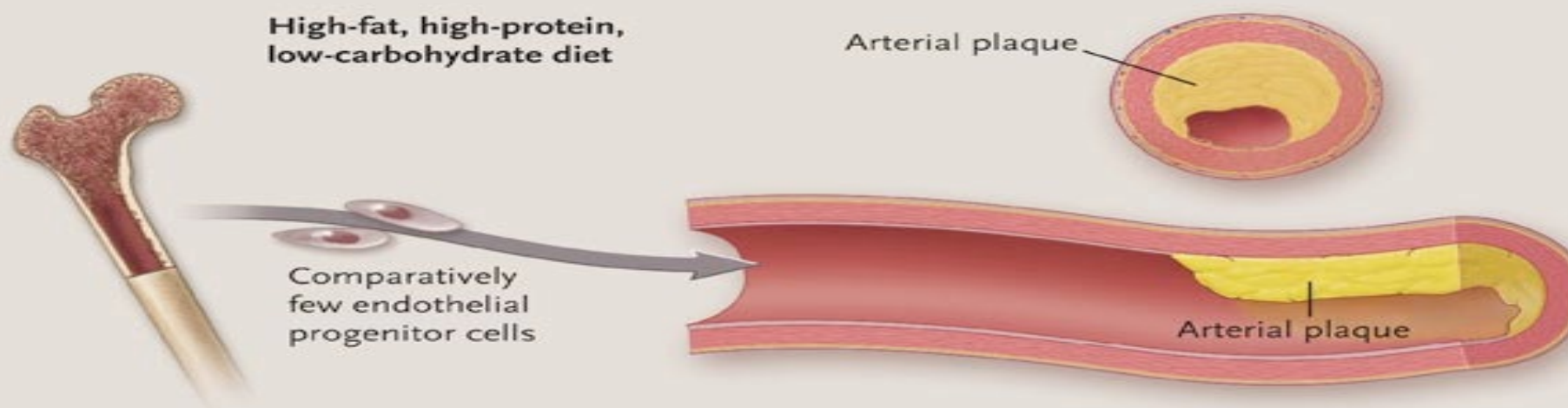
Western high-fat,
moderate-protein,
moderate-carbohydrate diet



Increased insulin
Increased total cholesterol
Increased triglycerides
Increased oxidized LDL

C

High-fat, high-protein,
low-carbohydrate diet



No change in insulin
Increased total cholesterol
Increased triglycerides
Increased oxidized LDL
Increased free fatty acids
Decreased endothelial progenitor cells

High Protein, Low Carb Diets:

- Low numbers of circulating endothelial progenitor cells (EPC's)
 - mononuclear cells that repair damaged vessels & improve endothelial function
- Double the level of non-esterified fatty acids
 - activate inflammatory pathways
 - increase atherosclerosis

After 4 weeks, flow-mediated vasodilation significantly increased on a plant-based diet compared to a HPLC diet.

Miller M et al. J Am Diet Assoc. 2009;109:713-717.

Red meat and egg yolks
increase TMAO levels,
causing atherosclerosis.

Hazen S et al. N Engl J Med. 2013 Apr 25;368(17):1575-84

In 37,698 men and 83,644 women,
red meat consumption was
associated with a significantly
increased risk of all-cause,
cardiovascular, and cancer mortality.

Pan A, Willett W. JAMA Internal Med. 2012;172:555.

In 47,896 men, consumption of choline (red meat, eggs, & milk) was associated with a 70% increased risk of lethal prostate cancer.

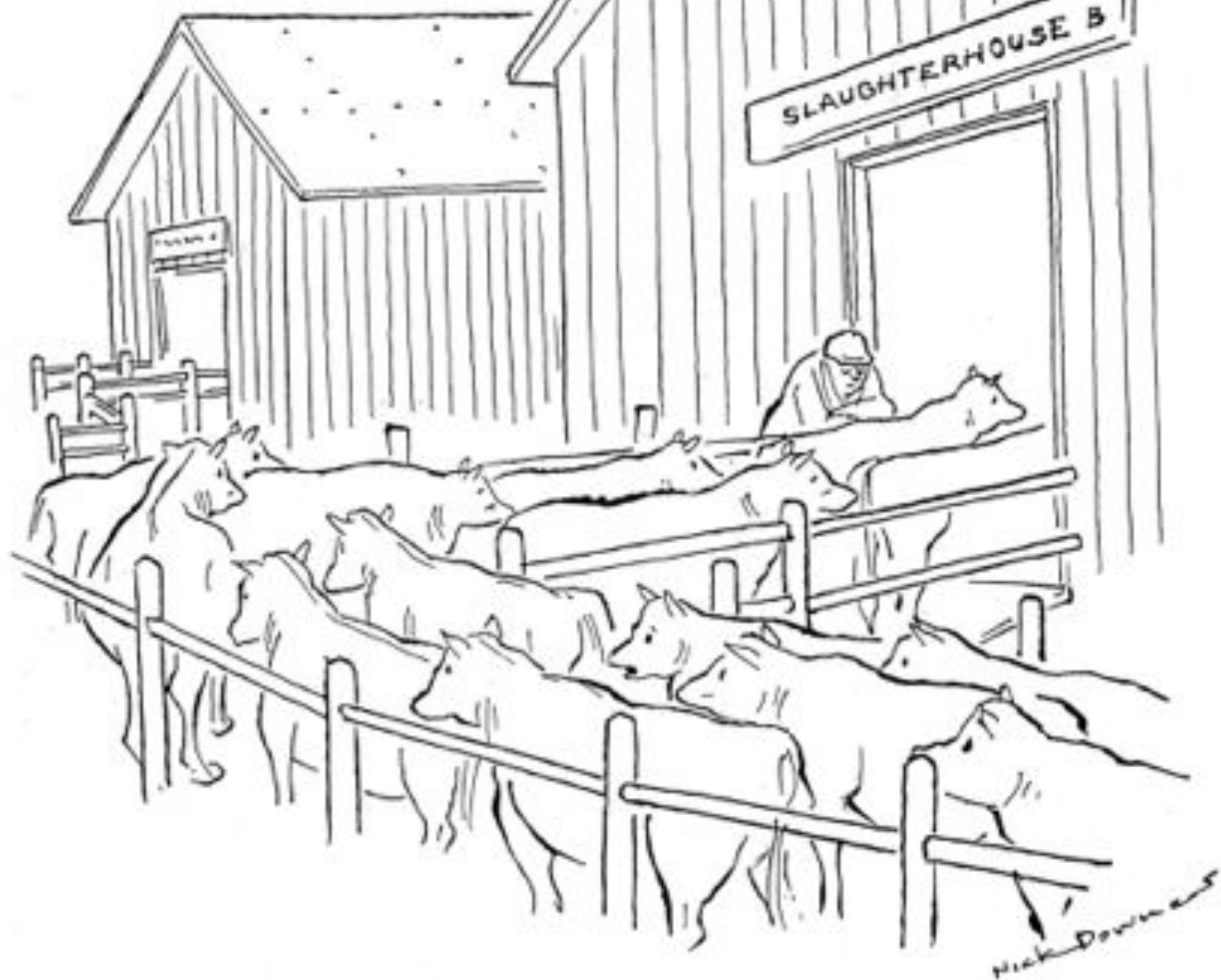
Richman EL et al. Am J Clin Nutr. 2012;96:855.

A plant-based diet down
regulates the mTOR gene,
prolonging life.

Solon-Biet SM et al, Cell Metab. 2014 Mar 4;19(3):418-30.

Red meat is high in Neu5Gc,
a tumor-forming sugar
causing chronic inflammation.

Samraj AN et al. PNAS. 2015 Jan 13;112(2):542-7.



"My only consolation is that by eating us they're
killing themselves."

In a metabolic ward study,
reducing fat led to a 67%
greater weight loss than
reducing carbohydrates.

Hall KD et al. Sept. 2015, Cell Metabolism 22, 1–10

Mediterranean Diet (PREDIMED)

- “low fat” reduced 39% to 37% fat
- increased consumption of sugar and refined carbohydrates
- no significant reduction in the rates of heart attack, death from CV causes, or death from any cause
- significant reduction only in stroke rates

Personally Sustainable =
Globally Sustainable

Good for You =
Good for our Planet

Our Food Choices Profoundly Affect Three Major Areas:

- Energy Crisis
- Global Warming Crisis
- Health Crisis

Energy Crisis

- 20% of the fossil fuel we burn in this country goes to produce processed foods
- It takes 10 times more energy to produce animal-based protein than plant-based protein

It takes 4,000-18,000
gallons of water for a
1/3 pound hamburger

U.S. Dept of the Interior, U.S. Geological Survey

Global Warming Crisis

- Livestock causes more global warming than all forms of transportation *combined*
- Responsible for 18% (and perhaps 50%) of the world's total greenhouse gas emissions
- In contrast, the entire global transportation system accounts for only 13% of greenhouse gas emissions

Health Crisis

- 86% of the \$3.0 trillion in health care costs are due to chronic diseases
- Many of these chronic diseases can often be prevented or even reversed by lifestyle changes including a whole foods plant-based diet.



Transformation