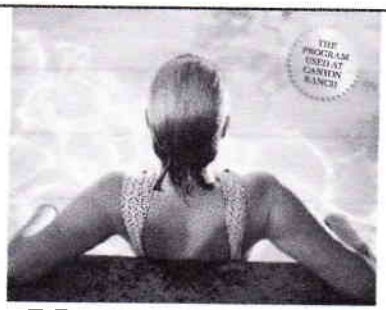

PRIME FOR LIFE

FUNCTIONAL FITNESS FOR AGELESS LIVING

RANDY RAUGH, MPT

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"If exercise could be put in a pill it would be the number one anti-aging medicine and the number one anti-depression medicine."

Robert N. Butler, MD. President of the International Longevity Center

2

EXERCISE

- Decreases/Prevents
  - + Immunity
    - × NK cells
    - × Influenza
  - + Heart disease
  - + Strokes
  - + Diabetes
  - + Erectile dysfunction
  - + High blood pressure
  - + Osteoporosis
  - + Depression/Anxiety
- Improves
  - + Osteoarthritis function
  - + Cognitive function
  - + Sleep
  - + Weight loss
  - + Self esteem
  - + Energy

3

DISEASES OF INSUFFICIENT STRESS

- Cardiovascular disease *
  - + Heart disease
  - + Peripheral vascular disease
  - + Strokes
- Diabetes Mellitus Type II *
- Osteoarthritis (too much or too little) *
- Osteoporosis

* Obesity is major risk

INADEQUATE MOVEMENT = WEIGHT GAIN

- BMI = Kg/M^2 or weight in Kg/height in meters squared
- Overweight defined as body mass index of >25
- Obesity defined as a body mass index of 30 or more
- http://www.cdc.gov/nccdphp/dnpa/bmi/
- 80% of those with diabetes are overweight
- Those overweight have altered insulin response

DIABETES MELLITUS TYPE II

- Initial stages: insensitivity to insulin
  - + Insulin "tells" cells to take in and use blood sugar
- More insulin made to compensate
- Blood sugar continues to rise
- Eventually pancreas may stop making insulin
  - + Person becomes insulin dependent
- **Muscle cells use blood sugar without insulin during exercise**

EXERCISE:

- Improves insulin and glucose levels within 7 days
- Immediate drop in glucose levels immediately in most people
- Increased sensitivity to insulin for up to 36 hours
- Age is a risk for diabetes, but...

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Chronic Vigorous Exercise Slows the Age-Related Deterioration in Glucose Tolerance

DR Seals et al., *J.Appl. Physiol.* 56: 1521 -1525, 1984

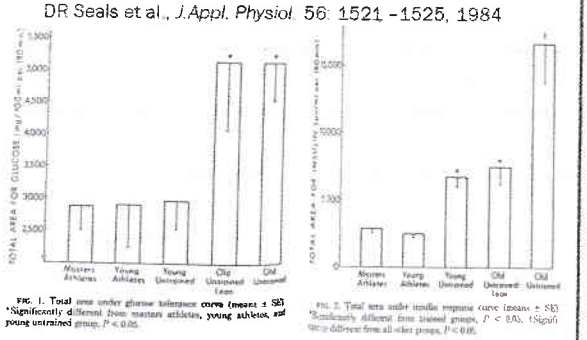

FIG. 1. Total area under glucose tolerance curves (means ± SE). *Significantly different from masters athletes, young athletes, and young untrained group, $P < 0.05$.

FIG. 2. Total area under insulin response curve (means ± SE). *Significantly different from trained groups, $P < 0.05$. †Significantly different from all other groups, $P < 0.05$.

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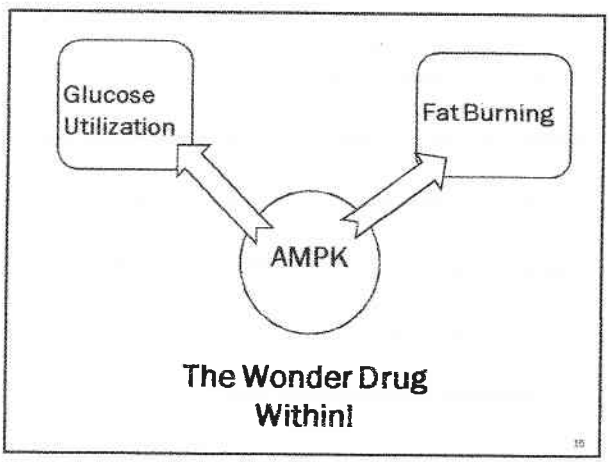

The Wonder Drug Within!

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BONE: PREVENTING OSTEOPOROSIS

- ½ women and ¼ men with serious risk of fracture in their lifetime
- Responds to impact, force and load
- Increased bone dev't in the directions along bone where most needed
  - Stronger per weight than bone improved with medications (which lay down bone throughout – not specifically to areas needed)
- Weight bearing activities may not be enough
  - Weighted vests may help
- Weight train with enough weight to elicit "near failure" between the 6th & 12th repetition
- Fewer sets & exercises with more resistance better than lots of sets and exercises and less weight.

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CARTILAGE (DAMAGE = OSTEOARTHRITIS)

- Joint interface
  - Dissipates energy from loading of joint (shock absorption)
- Inadequate stress: Spinal cord injured 25% < cartilage after 1 year
- Increased "optimal" stress (i.e. Exercise)
  - ↑ proteoglycan content (high affinity for water – absorbs shock) in 4 months of moderate intensity
  - ↑Cartilage thickness
- Excess stress: heaviest 20% in U.S. with 7-10 x risk of disabling Osteoarthritis in knee
- Imperfect correlation between radiological OA and Sx
- Alignment may be more important!

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TENDON & LIGAMENT

- **Tendon** (connecting muscle to bone)
  - Tension (pulling) increases tensile strength
  - Compressive force increases glycoproteins (it becomes like fibrocartilage in your ear)
- **Ligament** (linking bone to bone)
  - Strengthens, grows in diameter and tensile strength

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