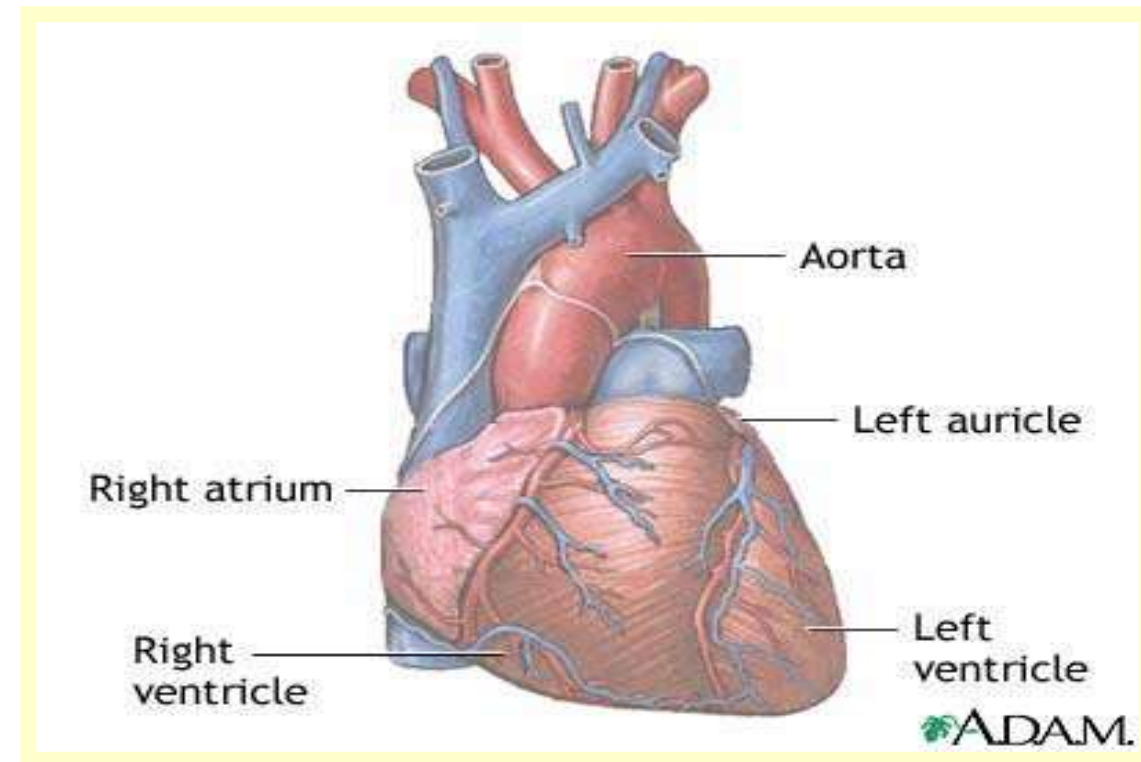


High Vibrational Living

The Segue to Optimum Health Vermont, 2018 Part 1



Stephen Sinatra, MD, FACC, FACN



Presentation Objectives

- Learn how optimal nutrition provides the basic foundation for the prevention and treatment of cardiovascular disease.
- Discuss some of the most popular nutritional trials demonstrating significant efficacy in coronary heart disease prevention.
- Discover why olive oil is the secret sauce of the Mediterranean Diet.
- Learn the beneficial effects of grounding on the human body.

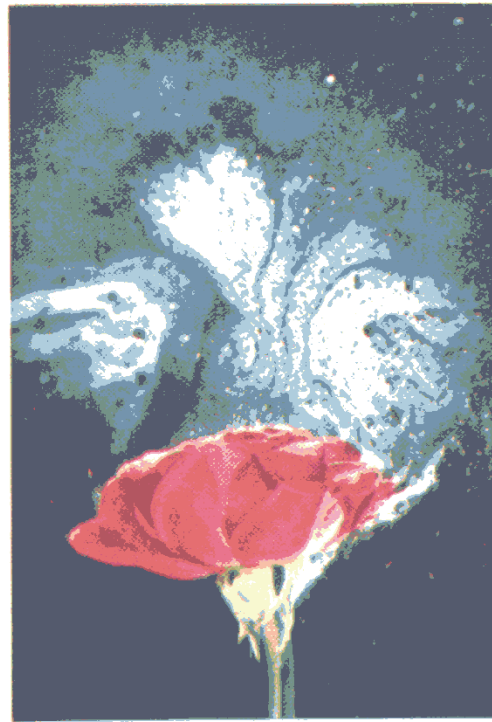
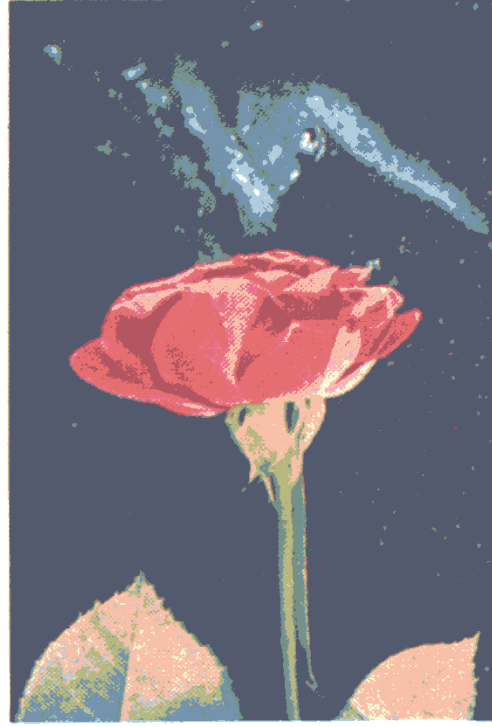
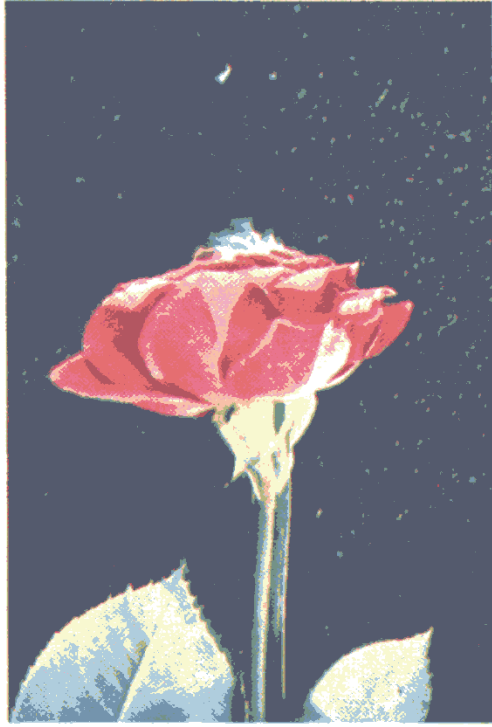


We live in an electrical universe
where everything is
interconnected! Pathology or
disease is frequently an electrical
malfunction (example –
ventricular PVCs and meridians)
and vibrational medicine is often
the solution!

Vibration

Everything from mineral-enriched soils and rocks - to trees and plants - to animals and humans - have a vibration in their structure and being.

*Sitting in a movie theater, cocktail party, dinner, or any event





Vibration

The goal is to enhance the vibration of cellular activity to support aliveness, creativity and health while diminishing stagnation and pathology at the same time. In the anti-aging movement, a higher vibration translates to 70 becoming the new 50.

Micro-voltage of cells is the key (pulsation) – cancer↓, health ↑, love ↑ ↑.





Cardiac Disease

Energetic Considerations

- 4th Chakra is in heart & lung area
- *Heartbreak and Heart Disease*
- Loss of love – unconditional love – cardiac risk
- The healing power of love
- Pets

The Paradigm of Vibrational Medicine

- All humans are conglomerations of electromagnetic energy
- Every cell transmits and receives energy
- Harmonious vs non-harmonious frequencies support or threaten healing
- Heart, brain and reproductive organs are most vulnerable to toxic frequencies
- Future of the healing arts is the application of positive vibrational energy → vital force

Vibration – The Precursor to Vital Force

- Vital force is our vital energy. It is call Chi by the Chinese; Ki by the Japanese; Prana by the Hindus, and Breath of God by Hebrews and Christians
- Scientific types refer to vital force when they focus on the mitochondria that produce it
- Mitochondrial dysfunction is at the heart of most diseases of the 21st Century. Heart disease and cancer, Alzheimer's and even aging itself

Vital Force and Mitochondria

Every living thing is permeated with a special vital force at conception. It can be life force, general vitality or simply vibration. A person's vital force or vibration increases or decreases based on mental, physical, emotional, and spiritual choices. Thus, it makes perfect sense – the better the choices, the higher the vibration or your vital force energy and the stronger and healthier you become. Thus, vital force, mitochondrial energy, and vibrations are all connected.

What Will Decrease Vibrational Energy

- Toxic energy fields – WiFi, smart meters, cellular and cordless phones, etc.
- Drugs/Alcohol/Sugar
- Chronic illness
- Negative emotions – Hostility, fear, anger, shame, resentment, depression...
- Over-vaccination in the newborn and infants
- Living in the energy of entitlement
- Living in a false self – My life is a lie
- Any misrepresentation of...The Truth!

What Will Increase Vibrational Energy

- Sleep/rest
- Organically grown foods
- Non-inflammatory diet
- High zeta potential water
- Mind/body interactions – meditation, prayer, yoga, Reiki, etc.
- Exercise
- Nutritional supplements
- Detoxification
- Taking in or giving unconditional love
- Self love
- Grounding

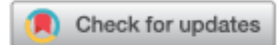
Healing Foods

Wisdom of the Ancients

Long before the age of microwaves, convenience and mass produced food, the ancient Greeks were buzzing about the idea of energy and its direct effect on all living things, especially humans. The ancient Greeks were rooted in the philosophy that the energy you take in affects the energy you put out and believed that high energy foods connected them most closely with spirit.

The Greeks believed that eating foods considered to be “high energy” or what we call foods of “higher vibration”, or “high vibrational foods” intersects with science. For example, Greek athletes believed that bee pollen was a superfood as it contained unpolluted and natural nutrients from the bee and the sun that supported performance and endurance.

REVIEW



Recent Science and Clinical Application of Nutrition to Coronary Heart Disease

Mark Houston, MD, MS, MSc, FACP, FAHA, FASH, FACN^a, Deanna Minich, PhD, FACN, CNS^b,
Stephen T. Sinatra, MD, FACC^c, Joel K. Kahn, MD, FACC^d, and Mimi Guarneri, MD, FACC, ABOIM^e

^aAssociate Clinical Professor of Medicine, Vanderbilt University Medical School, Director, Hypertension Institute and Vascular Biology, Medical Director of Division of Human Nutrition, Saint Thomas Medical Group, Saint Thomas Hospital, Nashville, Tennessee, USA; ^bUniversity of Western States, Institute for Functional Medicine, Seattle, Washington, USA; ^cAssistant Clinical Professor of Medicine, University of Connecticut Medical School, Farmington, Connecticut, USA; ^dClinical Professor of Medicine, Wayne State University School of Medicine, Kahn Center for Cardiac Longevity, Bloomfield Township, Michigan, USA; ^eDirector, Guarneri Integrative Health, Inc., La Jolla, California at Pacific Pearl, La Jolla, California, USA

ABSTRACT

One of the greatest threats to mortality in industrialized societies continues to be coronary heart disease (CHD). Moreover, the ability to decrease the incidence of CHD has reached a limit utilizing traditional diagnostic evaluations and prevention and treatment strategies for the top five cardiovascular risk factors (hypertension, diabetes mellitus, dyslipidemia, obesity, and smoking). It is well known that about 80% of CHD can be prevented with optimal nutrition, coupled with exercise, weight management, mild alcohol intake, and smoking cessation. Among all of these factors, optimal nutrition provides the basic foundation for prevention and treatment of CHD. Numerous prospective nutrition clinical trials have shown dramatic reductions in the incidence of CHD. As nutritional science and nutrigenomics research continues, our ability to adjust the best nutrition with an individualized approach is emerging. This article reviews the role of nutrition in the prevention and treatment of CHD and myocardial infarction (MI).

ARTICLE HISTORY

Received 29 June 2017

Accepted 14 September 2017

KEYWORDS

Nutrition; coronary heart disease; myocardial infarction; macronutrients; micronutrients

80% of CAD Prevention

- Exercise
- Weight management
- Smoking cessation
- Mild ETOH
- Optimal nutrition**

Okinawa/Mediterranean Diet

Although the Okinawa diet has been touted as an anti-inflammatory and anti-aging diet, as the average Okinawan lives longer than the average American, the Mediterranean diet has the most scientific literature demonstrating its remarkable anti-inflammatory and anti-aging benefits.

Mediterranean Diet and PREDIMED Study

- 4.8 year primary prevention
- Total CV deaths reduced 28% with nuts and 30% with 4 tablespoons daily of extra virgin olive oil (EVOO)
- Reduction in CVA was 33% from EVOO and 46% from nuts
- Reduction in MI – 20% with EVOO and 26% reduction from nuts
- New onset type 2 diabetes decreased 40% with EVOO and 18% nuts

Mediterranean Diet Mechanisms

- Olive oil is secret sauce
- 4 Tbsp of olive oil alters pro-inflammatory genetic expression including genes for atherosclerosis, inflammation, oxidative stress, vascular immune dysfunction, type 2 diabetes and hypertension

Mediterranean Diet Effects

- Lowers BP
- Improves serum lipids - Lowers total cholesterol, LDL, triglycerides, oxidized LDL, and LP(a) and increases HDL while decreasing the total LDL particle number
- Improves type 2 diabetes
- Reduces inflammation, lowers hsCRP, interleukin-6 (IL6), lowers vascular adhesion molecules
- Decreases brain natriuretic peptide (BNP)
- Reduces MI, CHD, and CVA
- Reduces homocysteine

Vegetarian Diets and Plant Based Nutrition

- Study of 44,500 participants followed for 11.6 years in GB. BMI, lipids and blood pressure all reduced in the vegetarian group. 32% lower incidence of CHD after adjustment for other CHD risk
- Study of 96,000 Seventh-Day Adventists from 2002 - 2007. 12% decrease in mortality from CVD
- Coronary artery calcium score reduced with dietary intake of fruit and veg

CAD and the Saturated Fat Controversy

- Data often conflicting
- A definite lesser evil than carbohydrates and sugars
- Replacement of SFA with PUFA reduces CHD risk
- Replacement of SFA with MUFA reduces CHD risk
- Replacement of SFA with omega 6 FA decreases CHD risk
- Replacement of SFA with refined CHO increases CHD risk

Trans-fatty Acids

- Inflammation and endothelial cell dysfunction consequences
- Study of 126,000 patients for every 2% higher intake of TFA, there was a 16% higher chance of premature death and a 25% increase of CHD death and non-fatal MI during the study
- Dyslipidemia – increases TG and VLDL, LDL-C
- Increases insulin resistance, hypertension, obesity

High Vibrational Dietary Lifestyle

- Low carb, higher fat, healthy protein – sugar and high fructose corn syrup accelerate aging – Three continent study
- Pesticide and insecticide free
- Organic bone broth
- High vibrational vegetable foods – kale, beets, broccoli, onions, garlic, avocado, artichoke, pomegranate, etc. – SYNERGY - sulforaphane and lycopene, resveratrol and turmeric
- Detox with psyllium fiber – detox drink – pure water without phthalates, psyllium fiber, electrolyte powder, chocolate shake
- Olive oil – secret sauce of the Mediterranean Diet – alters gene expression improving inflammation – PREDIMED Study
- Dark chocolate – polyphenols – blood pressure lowering
- Nuts – 7th Day Adventists
- Spices – Mediterranean Blend, garlic, rosemary, cayenne, curcumin, parsley, cilantro, black pepper, high vibrational salt
- Wild migratory salmon and shrimp – Nitric Oxide
- Tomato sauce

Appealing Futuristic Foods

- All organic
- GMO Free
- BPA Free
- Lower Sugar
- California Prop 65
- Gluten free
- Produced in Green Facility
- Nitric Oxide Supporting ingredients

Other High Vibrational Modalities

- The Schumann Concept/Grounding
- The French Paradox – Flavonoids vs ETOH
- Resveratrol/Turmeric
- Far Infrared Sauna – Increases vibrational cellular activity – Detoxification/Breast CA
- Mind/Body – Yoga, alternative nostril breathing – Supports HRV





7.83hz

Earth HeartBeat

Schumann Resonance

Grounding



Conductive Interfaces

Feet/Earth

- Grass
- Sand
- Dirt
- Concrete (unless painted or coated)
- Brick
- Terracotta
- Stone or Rock
- Grounded Footwear

Grounding/Earthing

- Earth maintains a negative electrical potential on its surface
- Direct contact with earth – Electrons are conducted to body – Help neutralize oxidative stress – free radicals have positive charge
- Favorable physiological and electro-physiological changes
- Improved cortisol dynamics, skin conductance, sleep, HRV, zeta potential, reduced inflammation, glucose, etc.
- Improvements in emotional stress - autonomic nervous system (ANS)

Autonomic Nervous System

- Modern living heightened sympathetic tone
- Sympathetic – vagal imbalance due to excessive sympathetic activity or reduced vagal tone – Stressed cardiovascular system
- Healthy ANS reflective of intact heart rate variability
- HRV imbalance reflecting ANS dysfunction – severity of CAD, increase in sudden death
- Improved HRV will reduce CV events

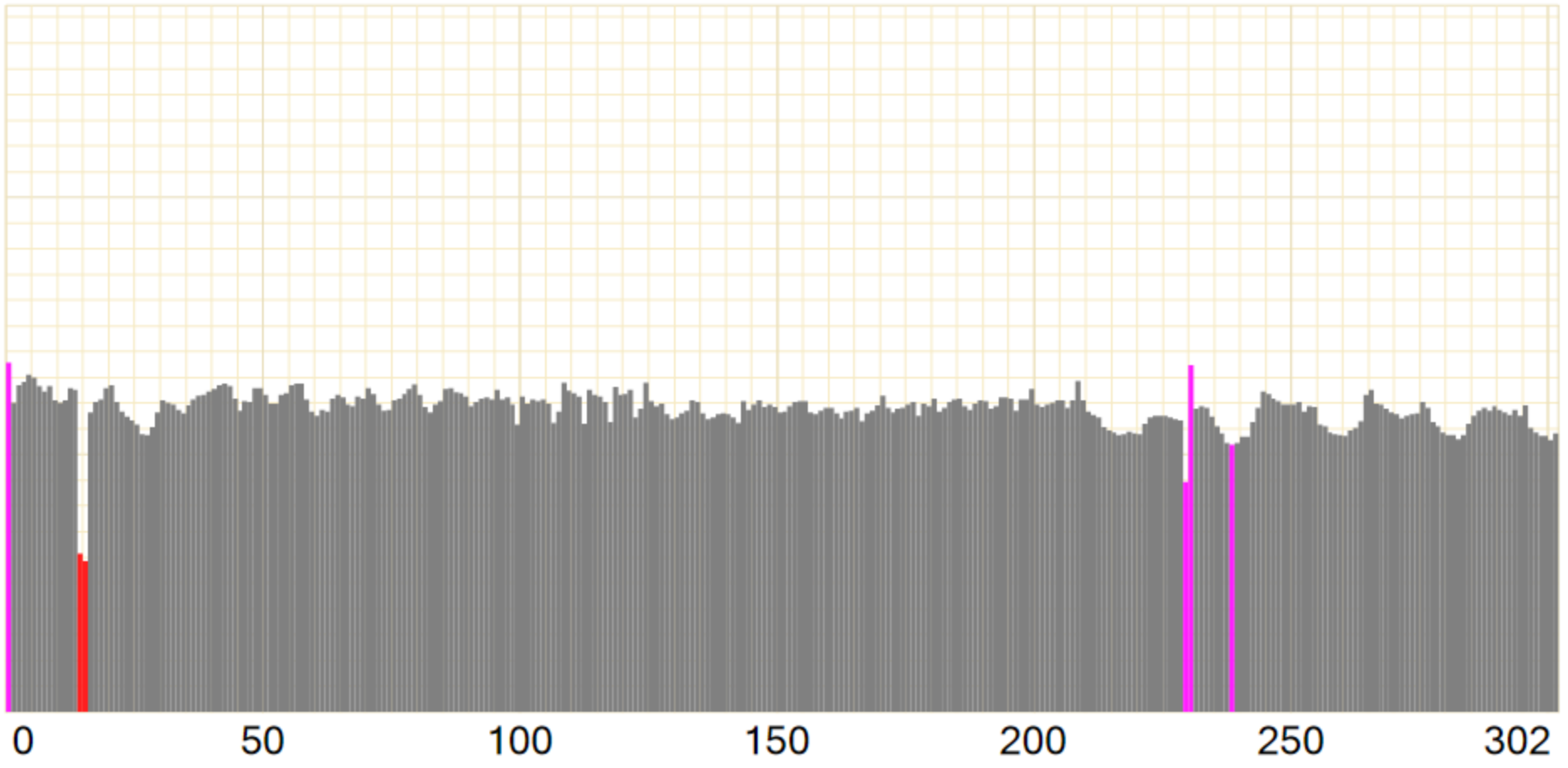
Emotional Stress, Heart Rate Variability, Grounding, and Improved Autonomic Tone: Clinical Applications

Gaétan Chevalier, PhD; Stephen T. Sinatra, MD, FACC, FACN, CNS

Abstract

Over the last few years, the utilization of integrative biophysics for medical application has been increasing in popularity. Grounding or earthing is the oldest and most basic form of natural bioelectric potential that supports physiological and electrophysiological changes in the body. Since previous investigations have shown that grounding profoundly affects skin conductance within seconds, we hypothesized that grounding may also improve heart rate variability (HRV).

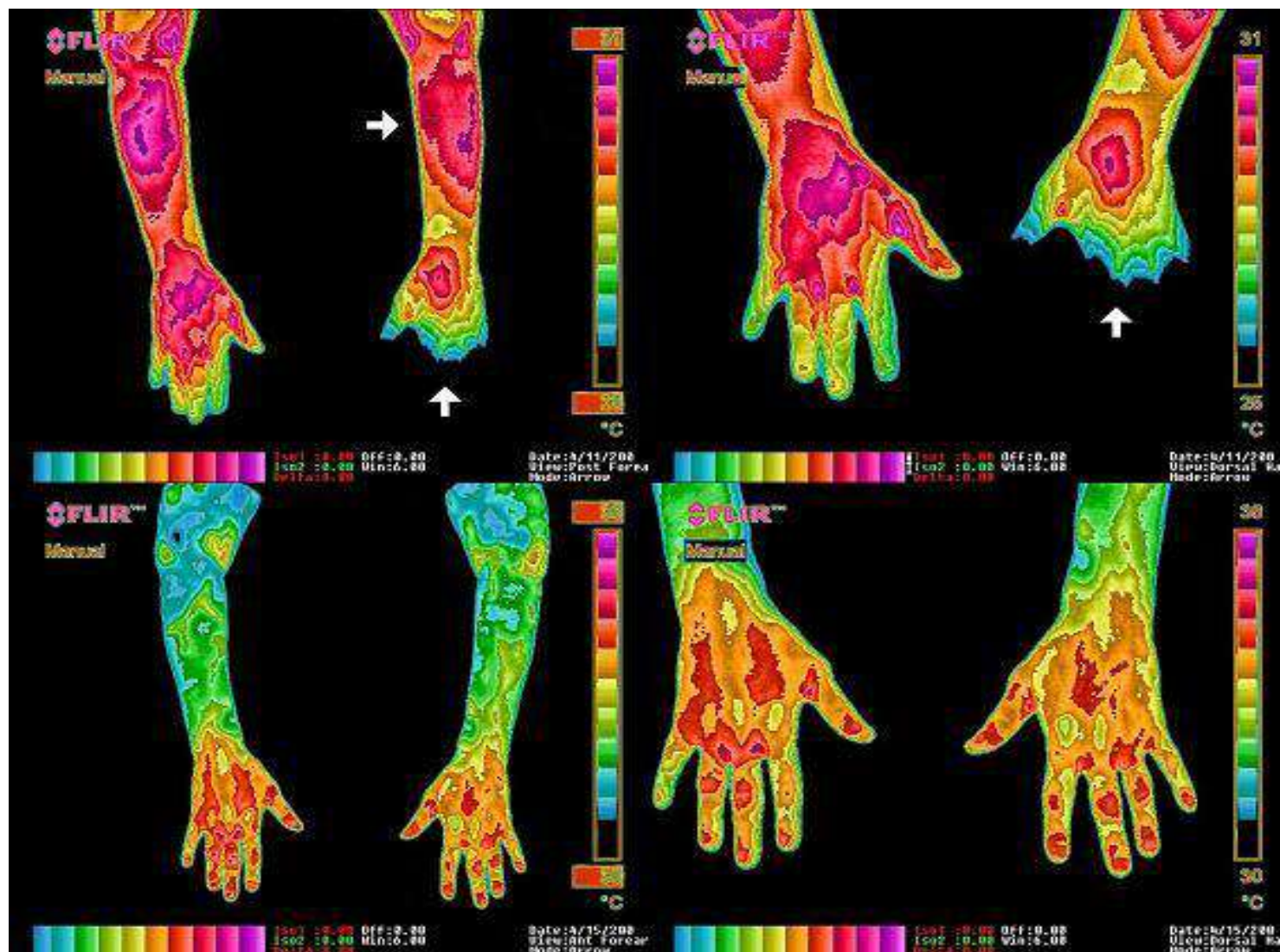
In this study of 27 final participants, grounded subjects had improvements in HRV that go beyond basic relaxation ($P < .01$). Since improved HRV has such a positive impact on cardiovascular status, it is suggested that simple grounding techniques be utilized as a basic integrative strategy in supporting the cardiovascular system, especially under situations of heightened autonomic tone (ie, when the sympathetic nervous system is more activated than the parasympathetic nervous system).



Total R-R intervals: 302
Base filter: 2
Filter Vitta: 4

Grounding and the Cardiovascular System

- Balance the ANS
- Improved HRV
- Electrons – neutralize free radicals, inc ATP production
- Circadian rhythms
- Increased zeta potential – thinner blood
- Decreased blood viscosity, reduced rbc aggregation

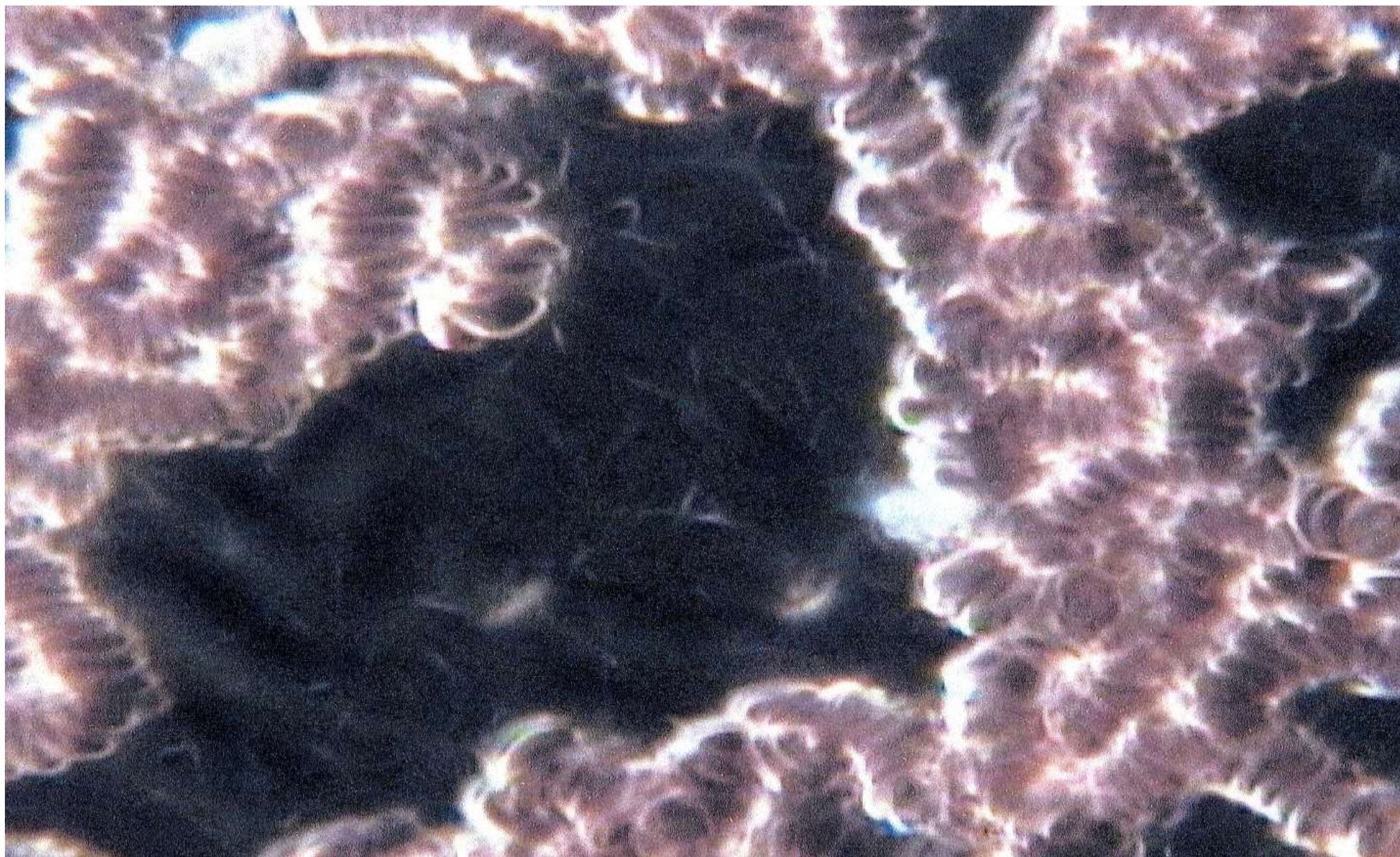


The top row images are of the upper extremities taken as a baseline on 4-11-05 (prior to ETT use). The arrows denote the areas of poor circulation. The temperature of the left hand is so low that the fingers are at the same temperature as the room and cannot be seen (thermal amputation). The bottom row images were taken on 4-15-05 after 4 nights of sleeping on the ETT system. Note the significant improvement in circulation with a return of normal thermal symmetry in both upper extremities.

Grounding in the Laboratory



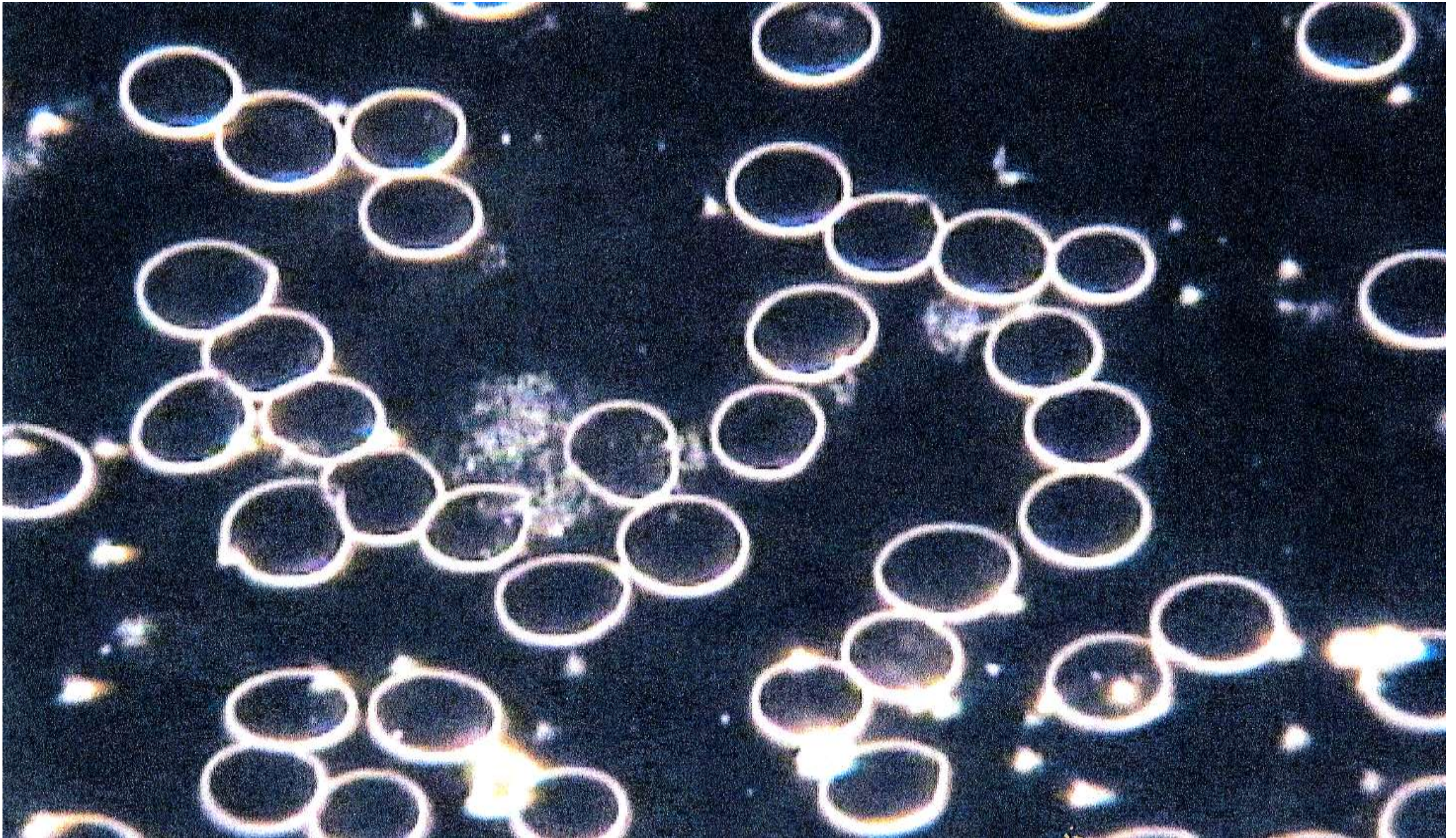
Before Grounding



Hypercoagulable Blood

- 21st Century Phenomenon
- Toxic EMF
- Blood viscosity – a forgotten variable
- Framingham risk factors
- Grounding – The Solution

After Grounding



Earthing (Grounding) the Human Body Reduces Blood Viscosity—a Major Factor in Cardiovascular Disease

Gaétan Chevalier, PhD,¹ Stephen T. Sinatra, MD, FACC, FACN,²
James L. Oschman, PhD,³ and Richard M. Delany, MD, FACC⁴

Abstract

Objectives: Emerging research is revealing that direct physical contact of the human body with the surface of the earth (grounding or earthing) has intriguing effects on human physiology and health, including beneficial effects on various cardiovascular risk factors. This study examined effects of 2 hours of grounding on the electrical charge (zeta potential) on red blood cells (RBCs) and the effects on the extent of RBC clumping.

Design/interventions: Subjects were grounded with conductive patches on the soles of their feet and palms of their hands. Wires connected the patches to a stainless-steel rod inserted in the earth outdoors. Small fingertip pinprick blood samples were placed on microscope slides and an electric field was applied to them. Electrophoretic mobility of the RBCs was determined by measuring terminal velocities of the cells in video recordings taken through a microscope. RBC aggregation was measured by counting the numbers of clustered cells in each sample.

Settings/location: Each subject sat in a comfortable reclining chair in a soundproof experiment room with the lights dimmed or off.

Subjects: Ten (10) healthy adult subjects were recruited by word-of-mouth.

Results: Earthing or grounding increased zeta potentials in all samples by an average of 2.70 and significantly reduced RBC aggregation.

Conclusions: Grounding increases the surface charge on RBCs and thereby reduces blood viscosity and clumping. Grounding appears to be one of the simplest and yet most profound interventions for helping reduce cardiovascular risk and cardiovascular events.

“Erythrocytes have a strong net negative charge called the zeta potential produced by the sialoglycoprotein coat such that approximately 18 nm is the shortest span between two cells.”

—Wintrobe’s *Clinical Hematology*¹

Grounding and the Cardiovascular System

- Balance the ANS
- Improved HRV
- Electrons – neutralize free radicals, inc ATP production
- Circadian rhythms
- **Increased zeta potential – thinner blood**
- **Decreased blood viscosity, reduced RBC aggregation**

Earthing and Detox

- Ocean environment perfect place
- Detox on outgoing tide – Sea air minerals – grounding
- Body 60-70% water
- Arm and heart connection – Zurich 1986
- Arm swing – detox thoracic duct
- Conductors, composers - longevity

Healing the Heart in the Age of Higher Consciousness

- The transition from the Information Age to the Age of Intuition
- As individual consciousness increases, it will allow us to move into a state of a higher vibration
- Need to unravel emotional toxicity/blocks so we can attain that higher vibration – forgiveness is key
- Tune into meditation/prayer, stillness and ask for guidance from ascended masters

The Age of Higher Consciousness (continued)

- The higher message will be revealed in your intuition
- Decrease reliance on technology and do not sacrifice safety for convenience
- Must protect unborn, newborn and young children from toxic frequencies
- Get back to nature (earth/ground) as much as possible
- Think only positive thoughts – give up negativity

Presentation Summary

- Truth, thoughts, feelings, emotions, grounding, specialized foods...all influence our vibration
- Trust your intuition! It is the truth
- Seeking and sustaining a higher vibration is the key to optimum health
- Walking/sleeping grounded – best strategies for taking in Mother Earth energy or the Schumann effect

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Metabolic Cardiology

*The new frontier in nutrition and
cardiovascular disease*

Part 2

Stephen T. Sinatra, M.D.,
F.A.C.C., F.A.C.N.

Vermont, 2018

Learning Objectives

- Define the complex role of energy and the heart
- Learn how targeted nutraceuticals can help people survive heart disease and “buy time” for intrinsic stem cell renewal
- Discover the new triad of bioenergetic energy in supporting diastolic dysfunction
 - Coenzyme Q10, D-ribose and L-carnitine

Metabolic Cardiology

A New Paradigm for the Prevention and Treatment of Heart Disease

Me-tab-o-lism (m_tab'_liz'm), n. The biochemical changes in the living cells by which energy is provided for vital processes and activities.

Metabolic Substances that Positively Impact the Heart

- Glucose – insulin – potassium – increase myocardial glycogen and ATP
- Magnesium – 300 enzymatic reactions improves energy in cells especially in recent infarcted myocardium
- Coenzyme Q10 – Lipid soluble antioxidant plays vital role in cellular ATP production.
- Carnitines – Support beta oxidation of fatty acids in mitochondria for energy production.
- D-ribose – Energy substrate to support oxidative phosphorylation in myocyte.

Conclusion – all improve cellular energy production and support myocardial function especially in the settings of ischemia and congestive heart failure.

Metabolic Cardiology

A New Emerging Field

- Congestive heart failure is an energy starved heart
- Role of ATP vs. oxygen in myocyte
- Pulsation of cell
- Decreased ATP concentration – serious defects in cellular metabolism

Reference: Bashore TM, Magorien DJ, Letterio J, Shaffer P, Unverferth DV. Histologic and biochemical correlates of left ventricular chamber dynamics in man. *J Am Coll Cardiol.* 1987;9:734-42.

New Clues in the Mystery of Heart Muscle Renewal

- Cardiomyocyte renewal (CR) & the Cold War
- Myocardium 40% regeneration after decades
- Can metabolic cardiology “Buy” time for CR?

Reference:

Bergmann O, Frisen J, et al. Evidence for cardiomyocyte renewal in humans. *Science* 2009;361(1):86-88.

Miracles in the Midst Anecdotal Cases or Vital Clues About a New Therapy for Heart Disease

Jim



Helen

Louise



George

Tommy

Catherine



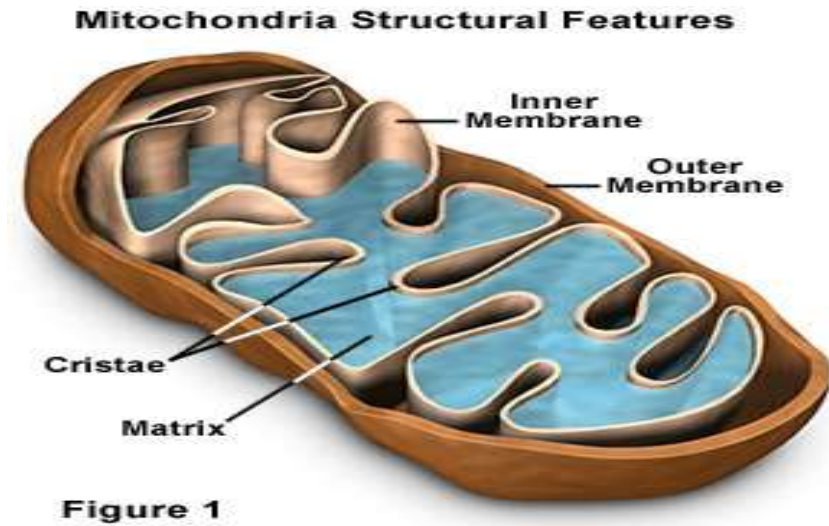
Dating the Heart: Exploring Cardiomyocyte Renewal in Humans

Evan Graham¹ and Olaf Bergmann^{1,2}

¹Department of Cell and Molecular Biology, Karolinska Institute, Stockholm, Sweden; and ²DFG Research Center for Regenerative Therapies, Technische Universität Dresden, Dresden, Germany
olaf.bergmann@ki.se

Regenerative mechanisms reported in the hearts of lower vertebrates have been recapitulated in the mammalian milieu, and recent studies have provided strong evidence for cardiomyocyte turnover in humans. These findings speak to an emerging consensus that adult mammalian cardiomyocytes do have the ability to divide, and it stands to reason that enrichment of this innate proliferative capacity should prove essential for complete cardiac regeneration.

Cellular Mitochondria



- Powerhouse of cells
- 3500 - 5000 mitochondria – myocyte 35% of entire cell
- ATP formed in mitochondria transferred to cytosol to supply energy to cell
- Mitochondrial respiration - not all oxygen is converted to CO₂ and water
- 3-5% of oxygen – toxic free radicals
- Mitochondrial DNA – unlike nuclear DNA, defensive mechanisms are just emerging in current medical literature

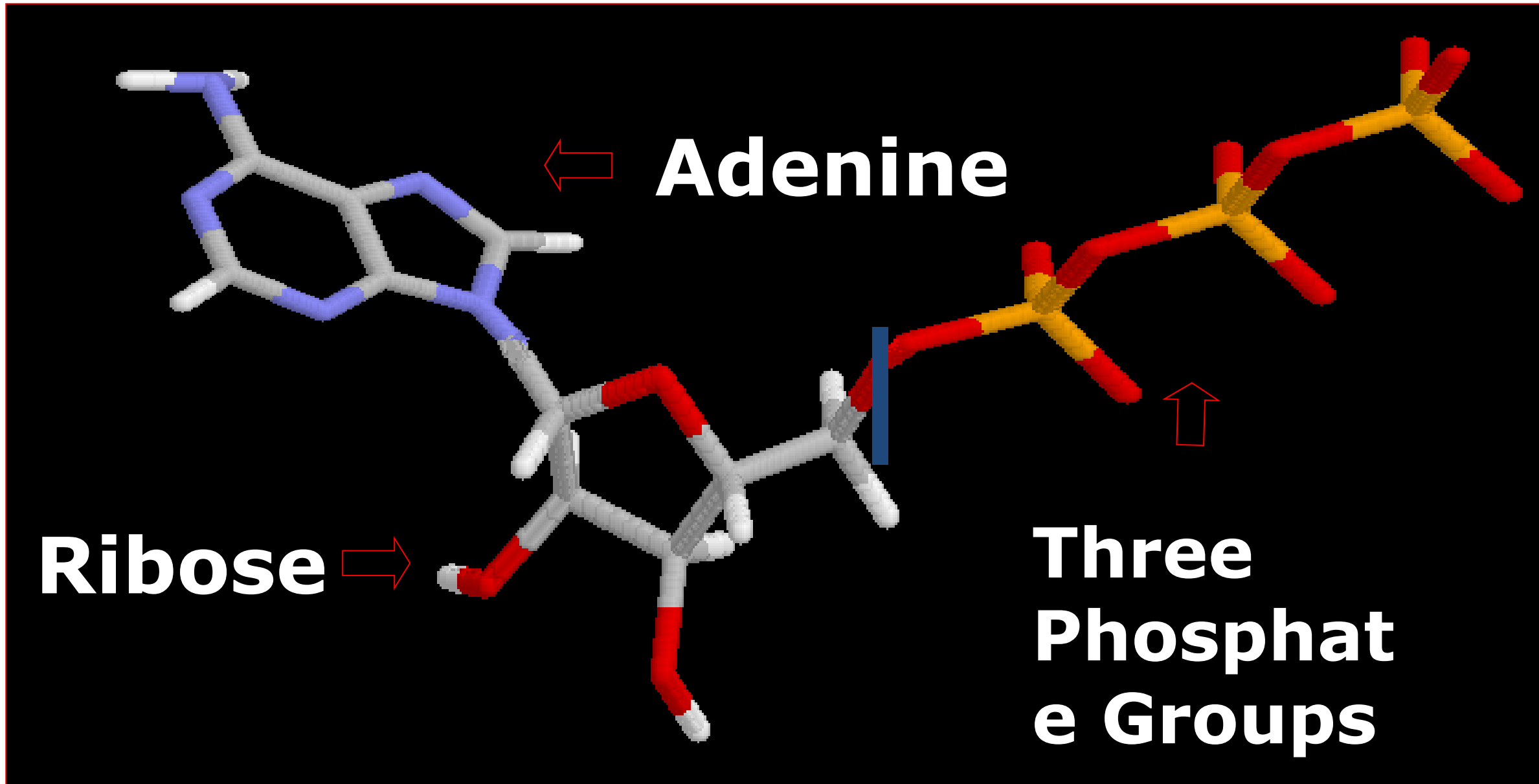
Heart Disease

- 100,000 cases of new onset CHF – Great Britain
- 39% Idiopathic
- Nutritional – Mitochondrial Failure
- Inflammation
- Is there a biochemical/metabolic connection to heart disease
- Is ATP nutraceutical support a solution

Bench to Bedside

- Failing myocardium – although viable and dysfunctional, is not irreversibly damaged
- Heart failure is an energy-starved heart running out of fuel
- Rx – support the cardiomyocyte
- Cellular biochemistry or bringing the conversation from the bench to the bedside is the challenge

Adenosine Triphosphate ATP



ATP and Myocardial Function

“A major clinical challenge today is to develop strategies to preserve or improve heart pump function while maintaining cell viability. To achieve this goal, an understanding of the metabolic machinery for ATP supply and demand is required... Every event in the cell, directly or indirectly, requires ATP. Myocytes (heart cells) need ATP to maintain normal heart rates, pump blood and support increased work, i.e., recruit its contractile reserve. The myocyte needs ATP to grow, to repair itself and to survive. The requirement for ATP is absolute.”

*Dr. Joanne Ingwall, Professor of Medicine (Physiology)
Harvard Medical School*

Reference: Ingwall JS. ATP and the heart. Boston, MA:Kluwer Academic Publishers, 2002.

Bioenergetics & the Heart

- Dysfunctional energy in diseased hearts, angina, CHF, PTCA, CABG
- Chronic CAD with ischemia and/or silent ischemia - severe energy deprivation occurs
- Any intervention that will slow rate of ATP degradation and speed-up recovery rate will minimize heart damage and enhance cardiac function

Bioenergetics & the Heart Part II

- CHF heart is energy starved, 30% of all energy lost
- Low intramyocardial ATP and reduced myocardial contraction
- Myocardial tissue may be restored significantly by oral supplements
- Coenzyme Q10, Carnitine, D-Ribose to restore ATP dynamics

Nutraceuticals Supporting Cardiac Metabolism

ATP Quantity

➤ D-Ribose

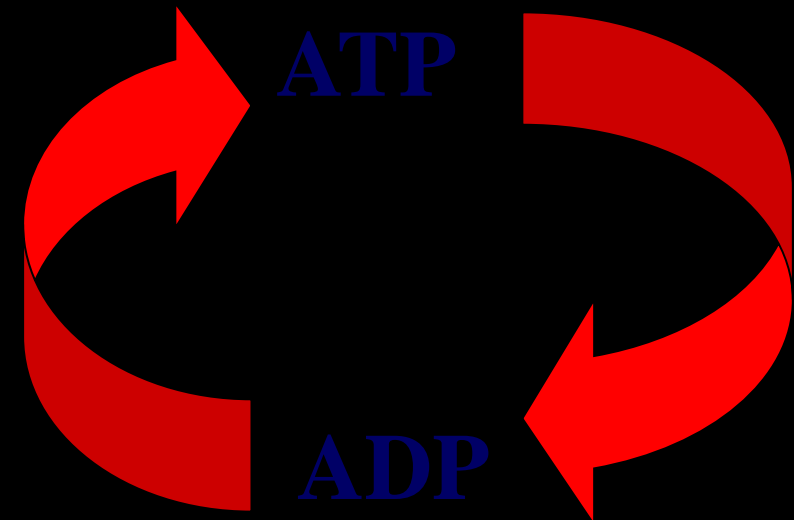
The rate-limiting compound in synthesis of new ATP

- *de novo* pathway
- Salvage pathways

ATP Turnover

➤ L-Carnitine

➤ CoQ 10



Role of ATP in Heart Function

ATP



```
graph LR; ATP[ATP] --> MF[Myocardial Function]; ATP --> IP[Ion pumps]; ATP --> B[Biosynthesis];
```

Myocardial Function

- **Systolic contraction**
- **Diastolic relaxation**

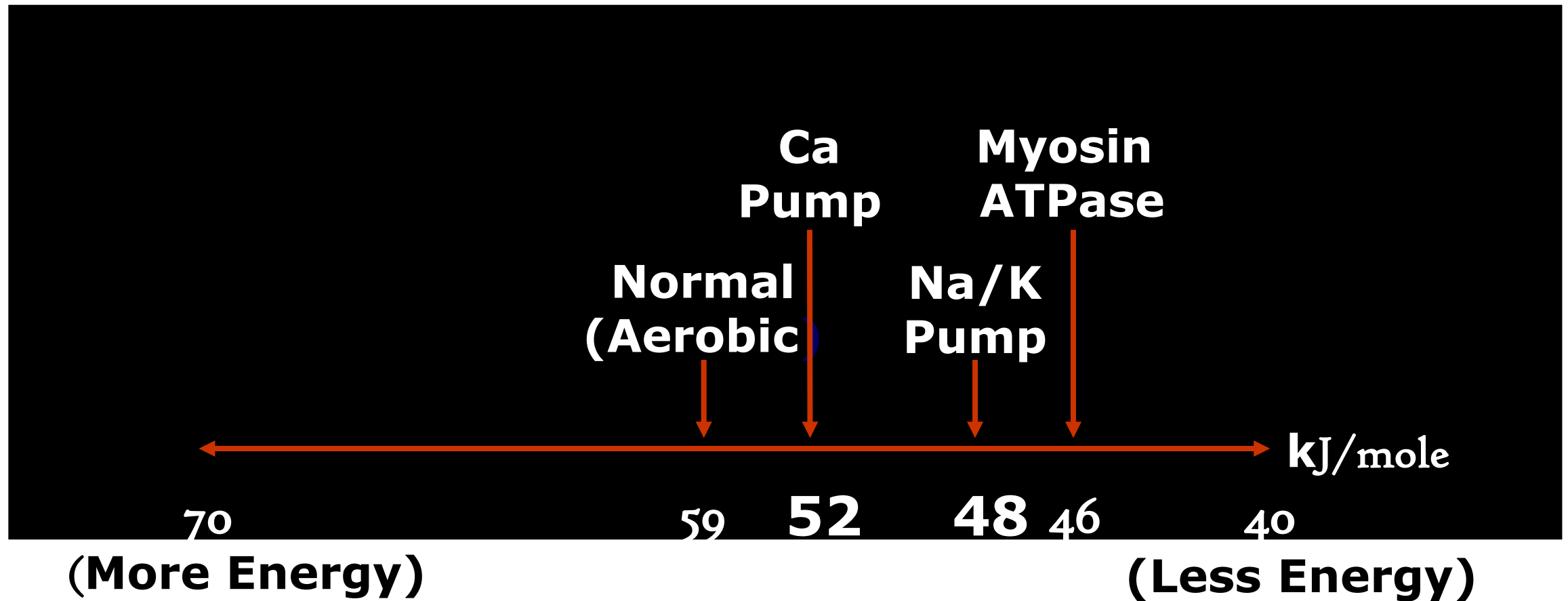
Ion pumps

- **Electrochemical gradients**
- **Ca⁺² pump**

Biosynthesis

- **Proteins & macromolecules**
- ***de novo* ATP synthesis**

A High [ATP] is the Driving Force Underlying all Cellular Functions



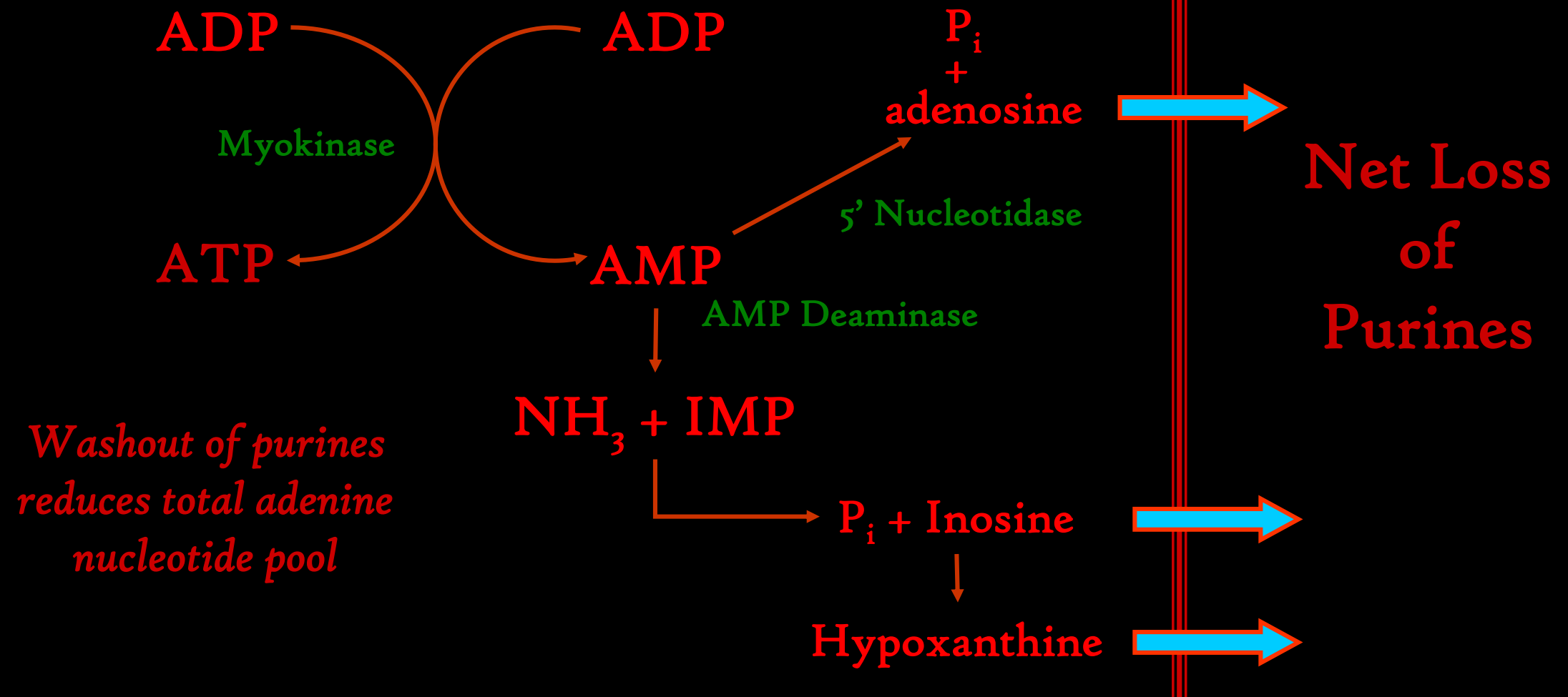
As [ATP] falls, one by one, cellular functional mechanisms become depressed.

Numbers in absolute values

Ischemic Stress Depletes ATP and the Total Adenine Pool

Heart or Skeletal Muscle

Plasma



The Solution

Restore the depleted energy substrates to the myocyte with nutraceutical support

- D-ribose
- Coenzyme Q10
- L-carnitine
- Magnesium

Heart Function

- 5M Americans CHF – 550,000 new cases/year
- 28% of men and women over age 45 have mild to moderate diastolic dysfunction with well preserved EF. (Redfield 2003)
- Women's Health Report, June 2011 – A consensus by leading experts on the top 10 questions in cardiovascular care for women.
- Women predominant, lack of specific therapy, high mortality and morbidity. What are the most effective treatments for diastolic heart failure?

Reference: www.womenheart.org

Diastolic Dysfunction

- More common in women with hypertension, IHSS, MVP, and infiltrative cardiomyopathy
- Diastolic dysfunction early sign of myocardial failure despite adequate systolic function
- Diastolic function requires more cellular energy than systolic contraction as higher concentrations of ATP required to activate calcium pumps necessary to facilitate cardiac relaxation and diastolic filling
- Statin – cardiomyopathy

Reference: Langsjoen PH et al. *Molecular Aspects of Medicine* 15, 1994 265-272.
Proceedings from the Third Conference of the International CoEnzyme Q10
Association, London, Nov. 2002.

Diastolic Dysfunction and Mortality

- 2/3 of out patients referred for echo had DD – no symptoms of CHF
- Echocardiogram from 1996 & 2005 > 36,000 persons had LVEF of 55% but a full 65.2% showed DD via mitral valve velocity
- Dr. W. Jaber, senior author “Clinicians don’t pay much attention to it because they don’t know what to do with it” and “moderate to severe should not be taken lightly”
- Authors offered no solutions – The only remedy is to restore energy substrates to myocardium – or – a metabolic cardiology program. (Sinatra)

Reference:

Halley, et al., Mortality rate in patients with diastolic dysfunction and normal systolic function. Arch Intern Med 2011;171:1082-1087.

Sinatra ST. Metabolic cardiology: the missing link in cardiovascular disease. Altern Ther Health Med. 2009 Mar-Apr;15(2):48-50. Review.

Diastolic Dysfunction

A Growing Epidemic?

- Risk of diastolic and systolic CHF >40 years is 20% -
- this is alarmingly high and in excess of many conditions associated in aging, JAMA 2003
- Progression of widespread DD and risk of heart disease failure occurring in advancing age and detected in healthy people, JAMA 2011
- Diastolic dysfunction and atrial fibrillation in patients undergoing cardiac surgery, AJC 2011
- ***Challenge to find precise physiological mechanism and a therapeutic solution – All studies inc Arch Int Med 2011

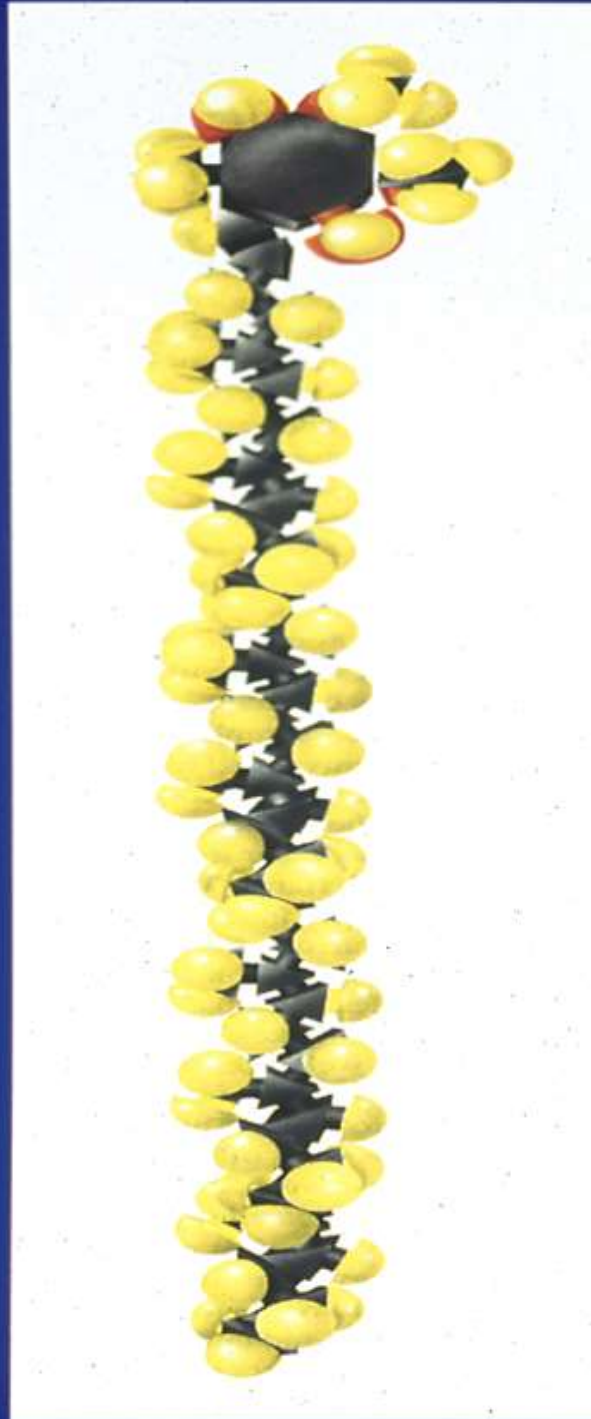
DD Physiological Mechanisms

- The energetic imbalance of diastolic heart failure is characterized by an increase in energy demand and a decrease in energy production, transfer and substrate utilization resulting in an ATP deficit
- Biopsies of heart tissue in heart failure patients reveal diminished quantities of ATP in the mitochondria, *AJC* 1987
- Similar energetic adaptations in atrium may contribute to atrial fib, *Am J Physiol* 2003

Diastolic Dysfunction – The Solution

- Randomized controlled trial, 300 mg of Coenzyme Q10 reduced plasma pyruvate/lactate ratios and improved endothelial function via reversal of mitochondrial dysfunction in patients with ischemic LV systolic dysfunction, Artherosclerosis 2011
- Improved diastolic function and compliance with CoQ10, AJC 2004
- Rx options that incorporate metabolic interventions targeted to preserve ATP energy substrates (D-ribose) or accelerate ATP turnover (L-carnitine and Coenzyme Q10) are indicated for at-risk populations and patients undergoing cardiovascular surgery
- Metabolic cardiology – providing essential raw materials that support cellular energy substrates needed by mitochondria to rebuild feeble ATP levels, Altern Ther Health Med 2009

CoEnzyme Q10



**2,3-dimethoxy-5-methyl-6-decaprenyl-
1,4-benzoquinone**

The History of CoQ10

- 1957 – CoQ10 first isolated from beef heart by Frederick Crane
- Mid-1960s – Professor Yamamura (Japan) is the first to use CoQ7 (related compound) in congestive heart failure
- 1972 – Dr. Littaru (Italy) and Dr. Folkers (United States) document a CoQ10 deficiency in human heart disease
- Mid-1970s – Japanese perfect industrial technology of fermentation to produce pure CoQ10 in significant quantities.
- 1977 – Peter Mitchell receives Nobel Prize for CoQ10 and energy transfer

- 1980s – Enthusiasm for CoQ10 leads to tremendous increase in number and size of clinical studies around the world
- 1985 – Dr. Per Langsjoen in Texas reports the profound impact CoQ10 has in cardiomyopathy in double blind studies
- 1990s – Explosion of use of CoQ10 in health food industry
- 1992 – CoQ10 placed on formulary at Manchester Memorial Hospital, Manchester, CT
- 1996 – 9th international conference on CoQ10 in Ancona, Italy. Scientists and physicians report on a variety of medical conditions improved by CoQ10 administration. Blood levels of at least 2.5 ug/ml and preferably higher required for most medical purposes

- 1996-1997 – Gel-Tec, a division of Tishcon Corp., under the leadership of Raj Chopra, develops the “Biosolv” process, allowing for greater bioavailability of supplemental CoQ10 in the body
- 1997 – CoQ10 hits textbooks of mainstream cardiology
- 1997-2004 – Continued research into role of CoQ10 in cardiovascular health and mitochondrial diseases
- 2004 – Canadian government places ubiquinone on statin labels as a precaution
- 2005 – Blood levels of CoQ10 much higher when taken twice daily compared to once-a-day dosing of the same amount
- 2006 – Introduction of Ubiquinol QH™ by Kaneka
- 2008 – Am Journal of Cardiology – Blood levels of CoQ10 in CHF an index of longevity
- 2011 – Q10 reduces oxidative damage in Down’s Syndrome
- 2013 – CoQ10 Rx for CHF Q-SYMBIO Study
- 2014 - Cochrane Collaboration meta-analysis – no convincing evidence of CHF ??

Lisbon, Portugal

Heart Failure Congress, 2013

- Dysfunctional bioenergetics and energy starvation of myocardium requires metabolic support
- Two year multi-center randomized double-blind study – 420 patients
- All cause mortality lower in CoQ10 group – 18 patients vs 36 patients placebo group and ↓ hospital admissions in Q group
- Fewer adverse events in Q group vs placebo
- Conclusion – CoQ10 should be considered part of maintenance Rx of CHF

Ref: S.A. Mortensen, et al. The Effect of Coenzyme Q10 on Morbidity and Mortality in Chronic Heart Failure. Results from the Q-SYMBIO Study. Abstract 440. Heart Failure Association of the European Society of cardiology.

Controlled Trials on Coenzyme Q10 1972-2018

*56- Some benefit
4 - No benefit*

Last two negative trials, Australian and Maryland, well-designed but inadequate blood levels for biosensitive result

L-carnitine

- Trimethylated amino acid-like cofactor for the transport of free long-chain fatty acids in the mitochondrial matrix where beta-oxidation occurs for cellular energy production
- Originally isolated from meat in 1905. Its crucial role in metabolism was discovered in 1955
- Carnitine deficiencies in humans – 1973

L-carnitine cont'd

- Like CoQ10, carnitine deficiency is usually not a factor in a healthy, well-nourished population consuming adequate animal protein
- Aging, genetic defects, cofactor deficiencies (B6, magnesium, folic acid, iron, vitamin C) liver or kidney disease, anticonvulsant drugs – dietary considerations can cause carnitine deficiencies
- The extreme of mild deficiency and tissue pathology are revealed in the population

L-carnitine and Diet

- Found in muscle
 - Sheep
 - Lamb
 - Cattle
 - Pig
- Very low in grains, cereals, fruits, and vegetables
- Like Coenzyme Q10, low in vegetarians

L-carnitine Physiology

- Beta oxidation of fatty acids – in mitochondria
- 60% of heart energy metabolism of fatty acids
- Removal of lactic acid and other toxic metabolites from blood
- Ammonia detoxification
- L-carnitine, Acetyl-L-carnitine, Propionyl-L-carnitine – Also function as antioxidants
- Next generation – Aminocarnitines

Mayo Clinic Review of 13 Clinical Studies on L-carnitine, April 2013

- 3629 patients with heart attack
- ↑ survival benefits of L-carnitine – limit infarct size, stabilize heart cell membranes and improve cellular energy metabolism
- Conclusion: ↓ in all cause death in large heart group 27%, ↓ anginal symptoms 40%, ↓ ventricular arrhythmias 65%

Ref: J.D. DiNicolantonio, et al. L-carnitine in the secondary prevention of cardiovascular disease: systematic review and meta-analysis. May Clinic Proceed. 88(6), 544-551(2013).

Carnitine and 100 year olds+

- 66 men & women 100 and older
- Six months – 1 group 2 grams of L-carnitine; 1 group placebo
- Carnitine laced Centenarians ↑ in energy, mental function, muscle mass; ↓ fat mass and ↓ fatigue
- Major improvement in sarcopenia (loss of muscle); ↑ 8 lbs muscle, ↓ 4 lbs fat

Ref: Malaguarnera M, et al. L-carnitine treatment reduces severity of physical and mental fatigue and increases cognitive functions in centenarians: a randomized and controlled clinical trial. *Am J Clin Nutr*, 2007;86(6):1738-44.

Summary of L-carnitine and Coenzyme Q10 in CV Disease

Unusual ability to enhance fatty acid oxidation in cells while removing excess harmful substances such as acyl groups and free radicals from basement membranes. CoQ10 acts like the spark plug to ignite the energy process in the mitochondria to form ATP or the energy of life. L-carnitine acts like a freight train shuttling in crucial fatty acids that are burned as fuel. Both these nutrients, while supporting cardiovascular function, preserve the inner mitochondrial membrane and delay the aging process at the same time.

D-Ribose: the New “Kid” on the Block

D-ribose is a naturally occurring pentose sugar that rebuilds the energy stores in the cell. These 3 compounds:

Ribose, CoQ10 and Carnitine, form the
“Triad of Metabolic Cardiology.”

Together they act like
“Rocket Fuel.”

D-ribose

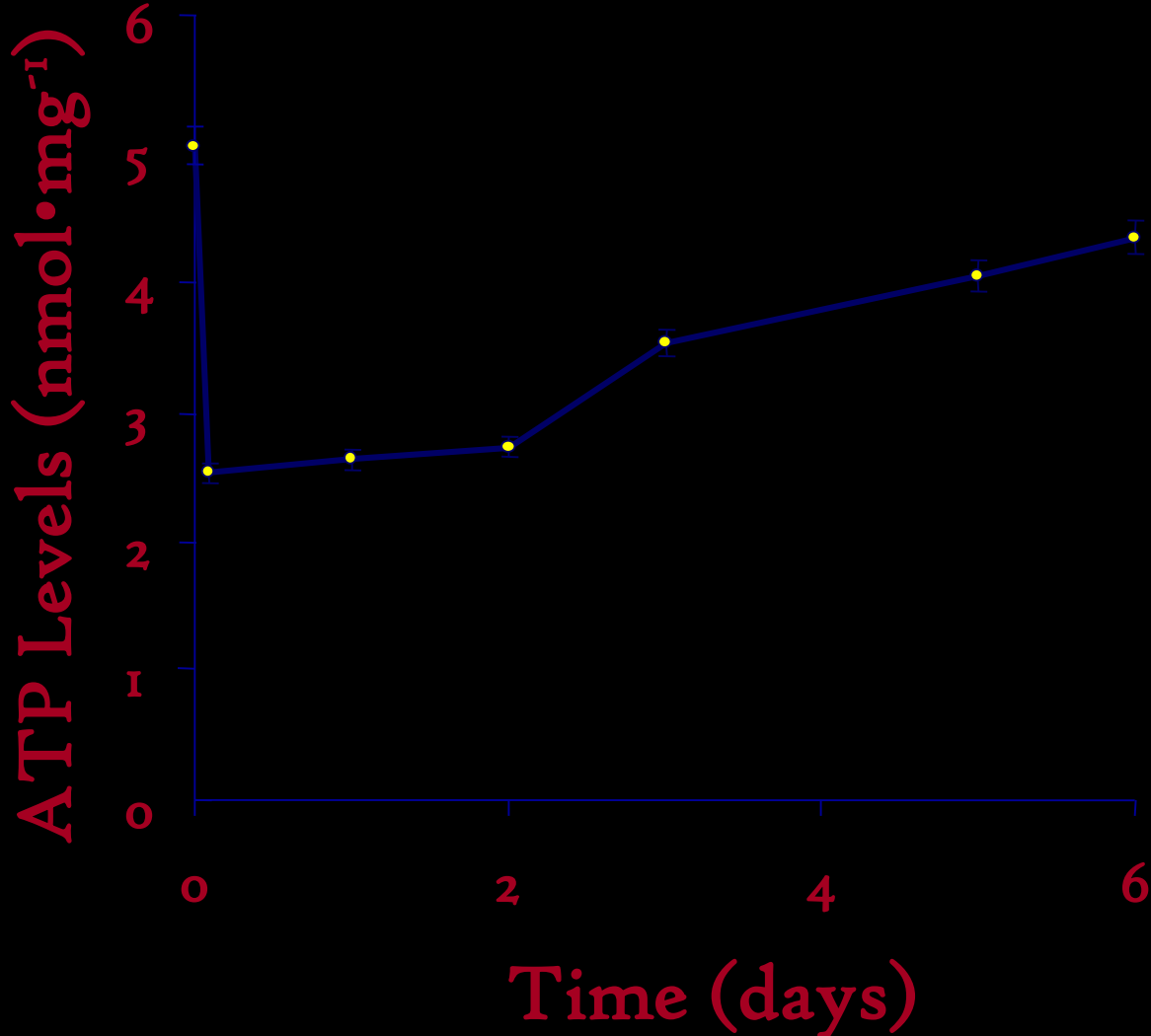
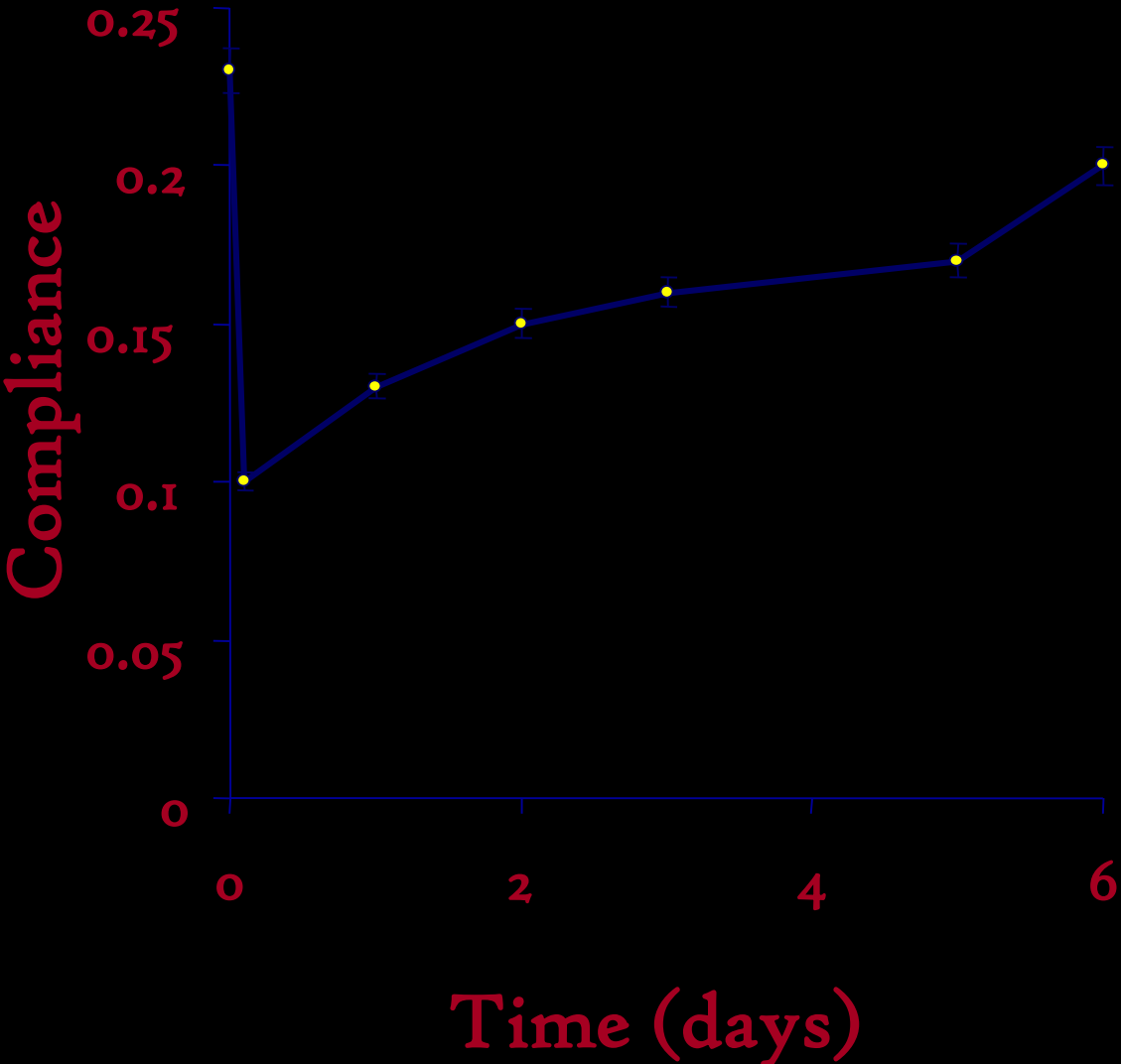
- Loss of purines in ischemic situation
- Slow process to replace adenine pool
- D-ribose used by cell to manage cellular energy restoration
- If D-ribose not available energy pool cannot be restored
- Human heart – it may take up to 100 days to restore ATP via *de novo* synthesis

Rate limiting step in salvage and synthesis of ATP is availability of D-ribose

LV Compliance

Myocardial ATP Levels

Following Global Ischemia



Correlation Between ATP Level and Diastolic Function

- Ischemia - dramatic drop in ATP concentration
- Decreased ATP corresponds to loss of diastolic function
- Administration of D-ribose – improvement in diastolic function

Documented Benefits of D-ribose

- Improves treadmill findings in patients with CAD
- Better diastolic function, QOL, and functional status in CHF
- Accelerates recovery of systolic function post CABG
- Speeds recovery of muscle ATP following anaerobic exercise
- Enhances strength and endurance gain with weight training
- Decreases free radical stress during anaerobic exercise
- Benefit in fibromyalgia

Metabolic Cardiology

- Complexity of cardiac energy metabolism is clear
- Failing/ischemic heart – loss of energy substrates
- ↓ATP -- ↓diastolic function
- Must restore energy reserve – ribose
- Enhance ATP turnover with carnitine & Q10
- All promote cardiac energy metabolism, restore ATP, ↑heart function

Metabolic Cardiology - Conclusion

- Mitochondrial restoration and energy pool support is the metabolic solution
- Metabolic therapy is often underutilized Rx for cardiac disease
- Targeted metabolic therapy will improve myocardial metabolism
- Metabolic cardiology provides great hope for future Rx for cardiovascular disease

Congenital Singlet Outlet Ventricle

- 9 years old Ryan in office – parents distraught
- Moderate to severe CHF
- No heart transplant available x 3
- Metabolic cardiology with Coenzyme Q10, L-carnitine, Magnesium
- D-ribose added in 2005
- Refused HT 3x – now 32 years old

Post-partum Cardiomyopathy

- Case study – Joan 34 year old female status post delivery
- Severe SOB, orthopnea, PND, pedal edema
- Bed to chair capacity – severe CHF
- Typed and crossed for cardiac transplant – MCV
- Started CoQ10 per day – mild improvement
- Doubled & tripled CoQ10 with marked improvement
- Cancelled HT after 6 months of Rx
- EF – 15% → 42% - Still on metabolic card program – 70+ years of age

Diastolic Dysfunction

- Multivitamin/mineral foundation program
- Coenzyme Q10: 100-200 mg
- L-carnitine: 250-500 mg
- D-ribose: 5 grams prior to any strenuous activity
- Magnesium: 400-800 mg
- Calamarine or Fish oil: 2 grams

Health Revelations from Heaven and Earth

**Sale & Book Signing
at registration desk after presentation**

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