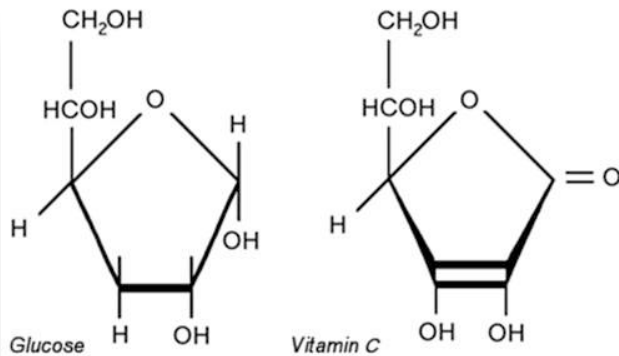


Thyroid Dysregulation and the Metabolic Roots of Cancer

Ron Hunninghake M.D.
Chief Medical Officer
Riordan Clinic



Riordan Clinic

www.riordanclinic.org

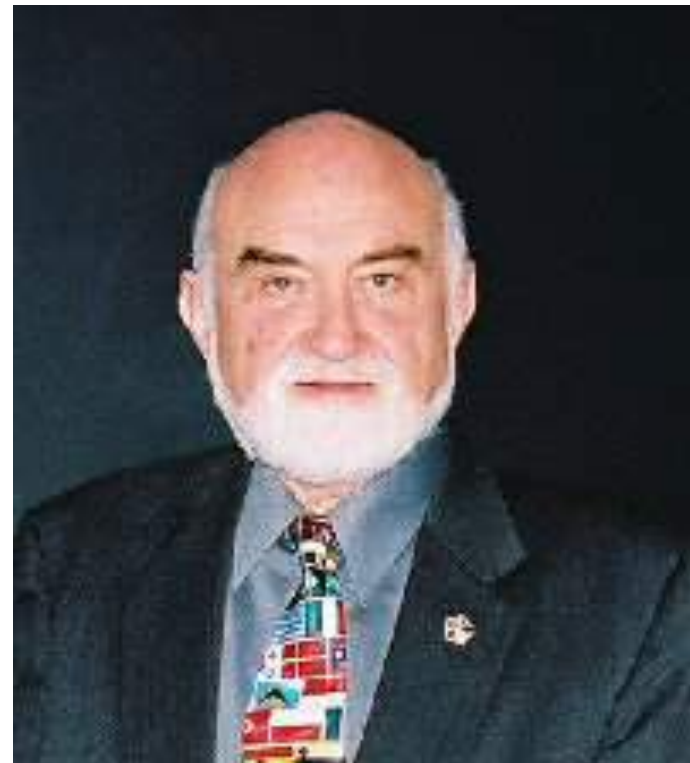
Riordan IVC Protocol



- Dr. Hugh D. Riordan
- Riordan Clinic Founder
- Died – January 7, 2005
- Developer:

**Riordan IVC Protocol
for
Adjunctive Cancer Care**

Dedication





Who We Are

Patient Care

Services

Online Store

Laboratory

Research

Education

$$\sqrt{2}R_0$$

$$R_1 = \sqrt{2}R_0$$

Search...

Search

$$R_0 = \sqrt{2}R_1$$

[Riordan Clinic](#) » [Research](#) » [Research Studies](#) » [Vitamin C Research – IVC](#) » [Vitamin C Research – IVC Protocol](#)

Vitamin C Research – IVC Protocol

The Riordan IVC Protocol for Adjunctive Cancer Care Intravenous Ascorbate as a Chemotherapeutic and Biological Response Modifying Agent

The Riordan IVC Protocol for Adjunctive Cancer Care

Intravenous Ascorbate as a Chemotherapeutic and
Biological Response Modifying Agent

[Download Protocol PDF](#)

INTRODUCTION

Vitamin C (ascorbic acid) is a major water soluble antioxidant that also increases extracellular matrix production and is important for proper immune cell functioning (Hoffman, 1985; Cameron, et al., 1979). It also plays key

New in Giving:
Gratitude Trail



Thank You



Research programs are funded in part through the support of the *Flossie West Memorial Trust* and the *Pure North S'Energy Foundation*.

**Free Download
of the PDF
IVC Protocol**

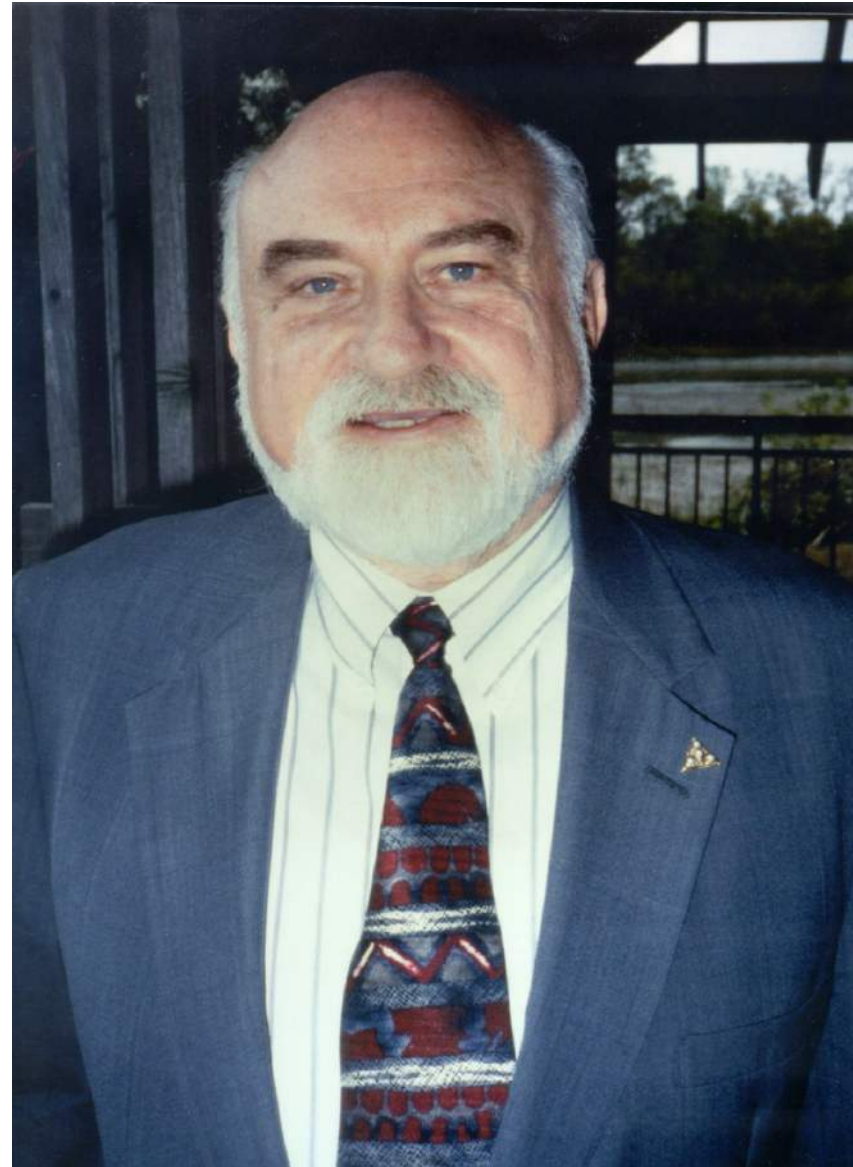
Riordan IVC Protocol Summary

- ✓ **Corrects scurvy** in cancer patients (less fatigue)
- ✓ Supports **detoxification systems** in the body
- ✓ **Relieves pain** and promotes well-being
- ✓ Boosts cellular **immunity** (to prevent secondary infections)
- ✓ Stimulates **collagen formation** (to wall off tumor)
- ✓ Inhibits **hyaluronidase** (to retard metastasis)
- ✓ Relieves **cellular hypoxia**/restores **aerobic metabolism**
- ✓ Restores **mitochondrial functioning**, improves **apoptosis**
- ✓ **Inhibits angiogenesis** and reduces tumor nutrient supply
- ✓ **Potentiates** chemotherapy and radiation
- ✓ **Reduces side effects** & toxicity of conventional therapy
- ✓ Plausible **oncologic adjunct** in cancer patient care

“We don’t treat
cancer here.

We treat
patients who
have cancer.”

-Dr. Hugh Riordan
1932-2005



Caring for Cancer Patients

Conventional	Riordan Clinic Care
Treat the Disease	Care for the Patient
Determine Grade and Stage of Tumor	Search for and Correct Underlying Root Causes
Kill Cancer Cells	Strengthen Healthy Cells
More Oxidative Stress	Lessen Oxidative Stress
Quantity of Survival	Quality of Life

Ascorbic Acid

Vitamin C Acting as an Anti-oxidant

Free Radicals
are harmful
oxidants

2FR

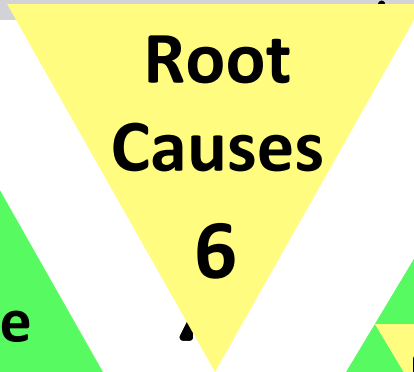
2FR

AA $2e^-$

DHA

Dehydroascorbate
(oxidized vitamin C)

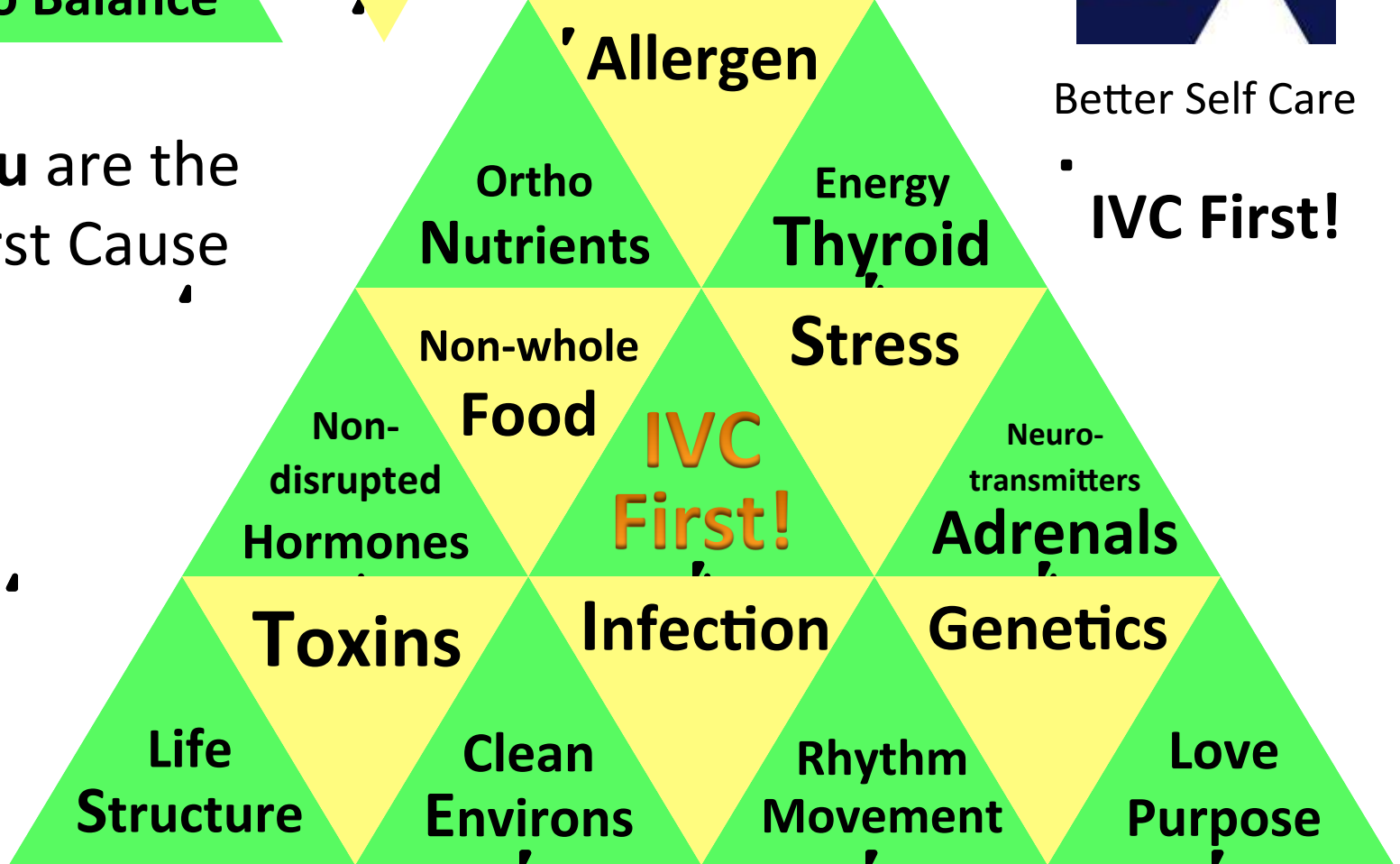




Better Self Care

You are the
First Cause

IVC First!



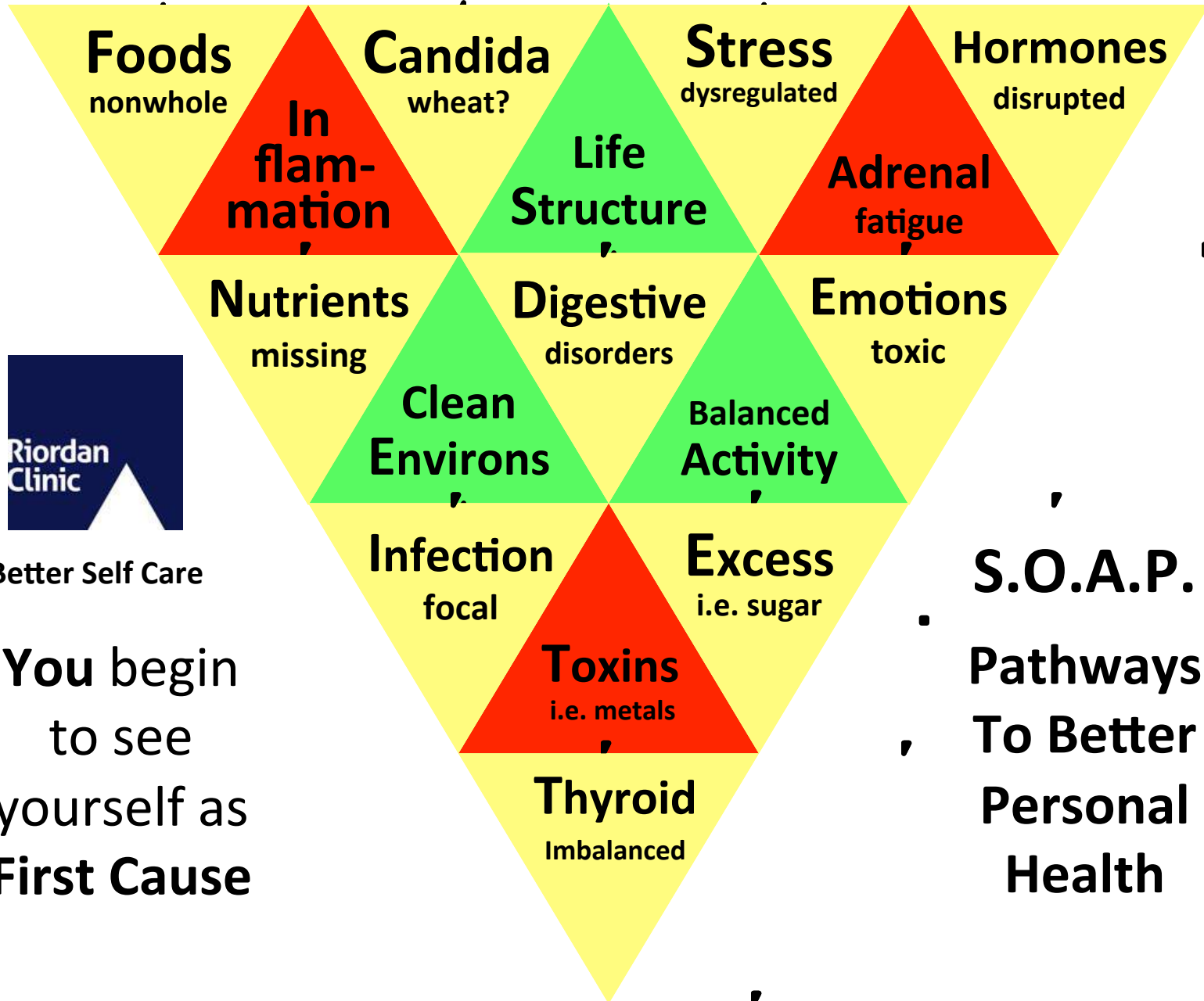
R.E.C.N.A.C.

- **Research Encompassing Novel Approaches to Cancer**
(The word “*cancer*” spelled backwards)
- Comprehensive biological research intent on discovering the underlying causes of cancer
- Goal of RECNAAC: to find nontoxic adjunctive treatment modalities for cancer patients

The Riordan Clinic Mission

- Our mission is to help you create real and lasting health by identifying and correcting **hidden root causes** of your chronic illness.

Root Causes: Detect & Correct



Better Self Care

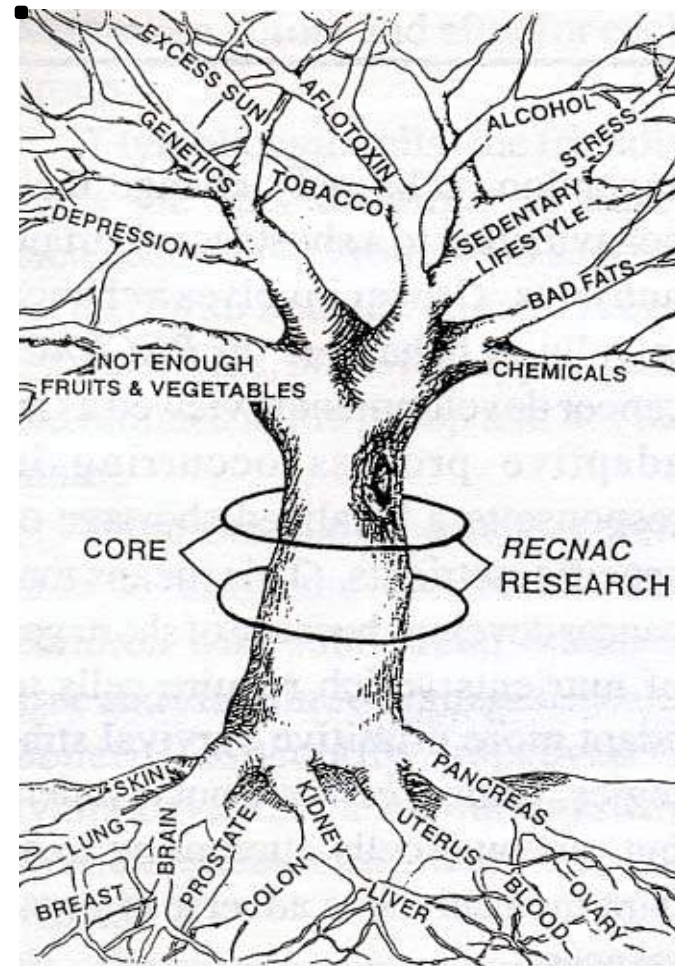
You begin to see yourself as **First Cause**

S.O.A.P.
Pathways
To Better
Personal
Health

4th Riordan IVC and Cancer Symposium

What are the Root Causes of **Cancer**?

(In the early years
of REC�AC,
roots and branches
got reversed.)



4th Riordan IVC and Cancer Symposium

Hunninghake	Addressing the Metabolic Roots of Cancer
Guilford	The Role of Glutathione in the Initiation of Cancer
Levy	Death by Calcium: The Oxidative Roots of Cancer
Berkson	Alpha Lipoic Acid in the Care of Certain Cancers
Bauerschmidt	Cancer and Nutrition
Crinnion	Environmental Toxicants and Complete Cancer Care
Seely	IVC and Cancer: A Systematic Review and Early Findings from a Prospective Cohort Study
Shallenberger	Oxygen, Mitochondria, ATP and the Origins of Cancer/Cases
Gonzalez/Miranda	Variables that Impact the Clinical Effectiveness of IVC in Cancer Care
Osborne/Kaumeyer	Practical Tips for Optimizing IVC Safety and Effectiveness
Levy	Vitamin C: Facts, Fiction, and the Law

Oxidative Factors Influencing Clinical Outcomes in Cancer Patients

- Age of patient
- Family history
- Nutritional status
- Smoking history
- Carcinogen exposure
- Exercise and fitness
- Sleep quality
- Radiation
- Comorbidity
- Financial stresses
- Family system disruption
- Belief structure
- Fear and depression
- Stage of Ca at diagnosis
- Stage of Ca at presentation
- Tumor burden
- Pain level
- Chemotherapy

Extracellular
Oxidative Stressors

Antioxidants and Cancer

- Contrary to the prevailing opinion of allopathic oncology, high-dose antioxidant therapies usually benefit rather than harm cancer patients
- The positive effects of antioxidant therapies have been borne out in numerous clinical trials and review articles¹⁻³

1. Simone CB 2nd, Simone NL, Simone V, et al. Antioxidants and other nutrients do not interfere with chemotherapy or radiation therapy and can increase kill and increase survival Part One *Alternative Therapies in Health and Medicine*, 2007;13:22-28.

2. Simone CB 2nd, Simone NL, Simone V, et al. Antioxidants and other nutrients do not interfere with chemotherapy or radiation therapy and can increase kill and increase survival *Alternative Therapies in Health and Medicine*, 2007;13: 40-47.

3. Block KI, Koch AC, Mead MN, et al. Impact of antioxidant supplementation on chemotherapeutic efficacy: a systematic review of the evidence from randomized controlled trials. *Cancer Treatment Reviews*, 2007;33:407-418

Charles B. Simone, M.D.

- ***The Truth About Breast Health, Breast Cancer***
- Antioxidants enhance treatment kill rate and reduce treatment side effects
 - Cellular studies: 145
 - Animal studies: 135
 - Human studies: 50
 - 8500 patients...5000 took antioxidants
 - 4700 of the 5000 showed increased survival

Published Benefits of Antioxidants

- correct nutritional deficiencies (common in cancer patients)
- interrupt the life cycle of cancer cells
- induce apoptosis, reduce side effects from chemotherapy
- control inflammation
- inhibit free radical production
- ease pain
- improve appetite and overall quality of life
- often extend life expectancy

Published Benefits of Antioxidants

- Rumelin A, Humbert T, Luhker O, et al. Metabolic clearance and the antioxidant ascorbic acid in surgical patients. *Journal of Surgical Research*, 2005;129:46-51.
- Ladas EJ, Kroll DJ, Oberlies NH, et al. A randomized, controlled, double-blind, pilot study of milk thistle for the treatment of hepatotoxicity in children with acute lymphoblastic leukemia (ALL). *Cancer*, 2010;116:506-513.
- Al-Tonbary Y, Al-Haggag M, El-Ashry R, et al. Vitamin E and N-acetylcysteine as antioxidant adjuvant therapy in children with acute lymphoblastic leukemia. *Advances in Hematology*, 2009; doi 10.1155/2009/689639.
- Pace A, Giannarelli D, Galie E, et al. Vitamin E neuroprotection for cisplatin neuropathy. *Neurology*, 2010;74:762–766.
- Goel A, Kunnumakkara AB, Aggarwal BB. Curcumin as “Curecumin”: from kitchen to clinic. *Biochemical Pharmacology*, 2007, doi: 10.1016/j.bcp.2007.08.016
- Yeom CH, Jung GC, Song KJ. Changes of terminal cancer patients’ health-related quality of life after high dose vitamin C administration. *Journal of Korean Medical Science*, 2007;22;7-11.
- Padayatty SJ, Riordan HD, Hewitt SM, et al. Intravenously administered vitamin C as cancer therapy: three cases. *CMAJ*, 2006;174:937-942.
- Drisko JA, Chapman J, Hunter VJ. The use of antioxidants with first-line chemotherapy in two cases of ovarian cancer. *J Am Coll Nutr*, 2003;22:118-123.

4th Riordan IVC and Cancer Symposium

Hunninghake	Addressing the Metabolic Roots of Cancer
Guilford	The Role of Glutathione in the Initiation of Cancer
Levy	Death by Calcium: The Oxidative Roots of Cancer
Berkson	Alpha Lipoic Acid in the Care of Certain Cancers
Bauerschmidt	Cancer and Nutrition
Crinnion	Environmental Toxicants and Complete Cancer Care
Seely	IVC and Cancer: A Systematic Review and Early Findings from a Prospective Cohort Study
Shallenberger	Oxygen, Mitochondria, ATP and the Origins of Cancer/Cases
Gonzalez/Miranda	Variables that Impact the Clinical Effectiveness of IVC in Cancer Care
Osborne/Kaumeyer	Practical Tips for Optimizing IVC Safety and Effectiveness
Levy	Vitamin C: Facts, Fiction, and the Law

1st Riordan IVC and Cancer Symposium

Optimization of Vitamin C
and Antioxidant Therapy

October 3, 2009

Dr. Tom Levy

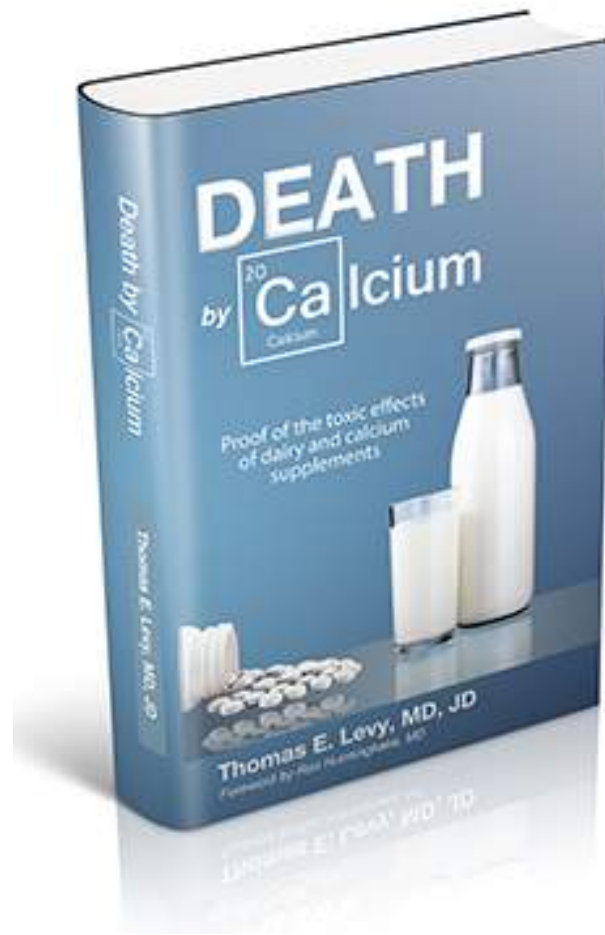
**A Theory of Life,
Disease and
Therapy:**

Electron Flow → Life

High Flow = Health

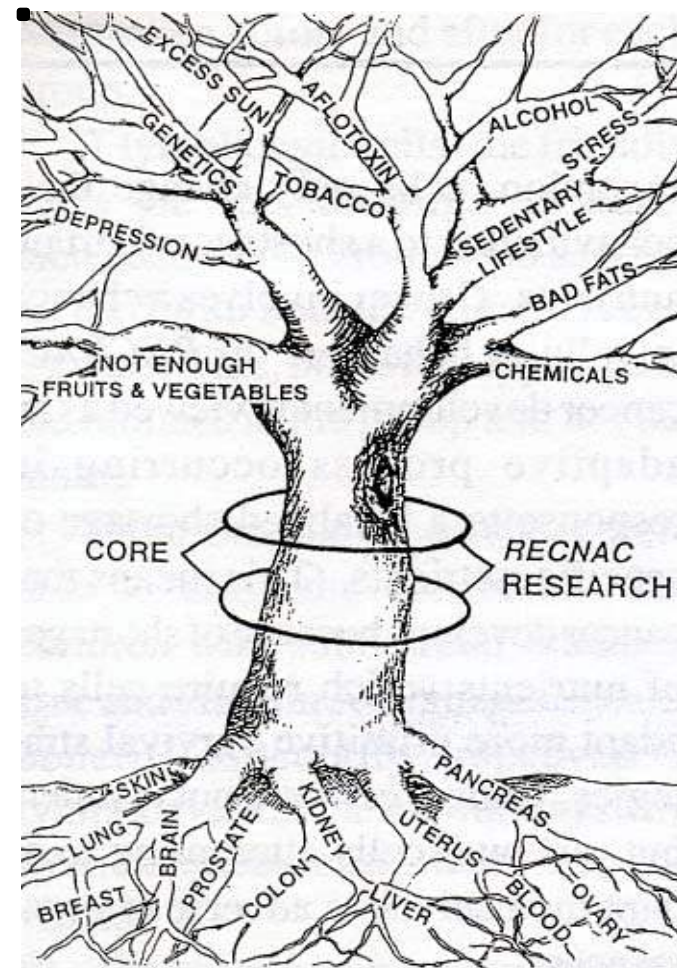
Low Flow = Disease

No Flow = Death

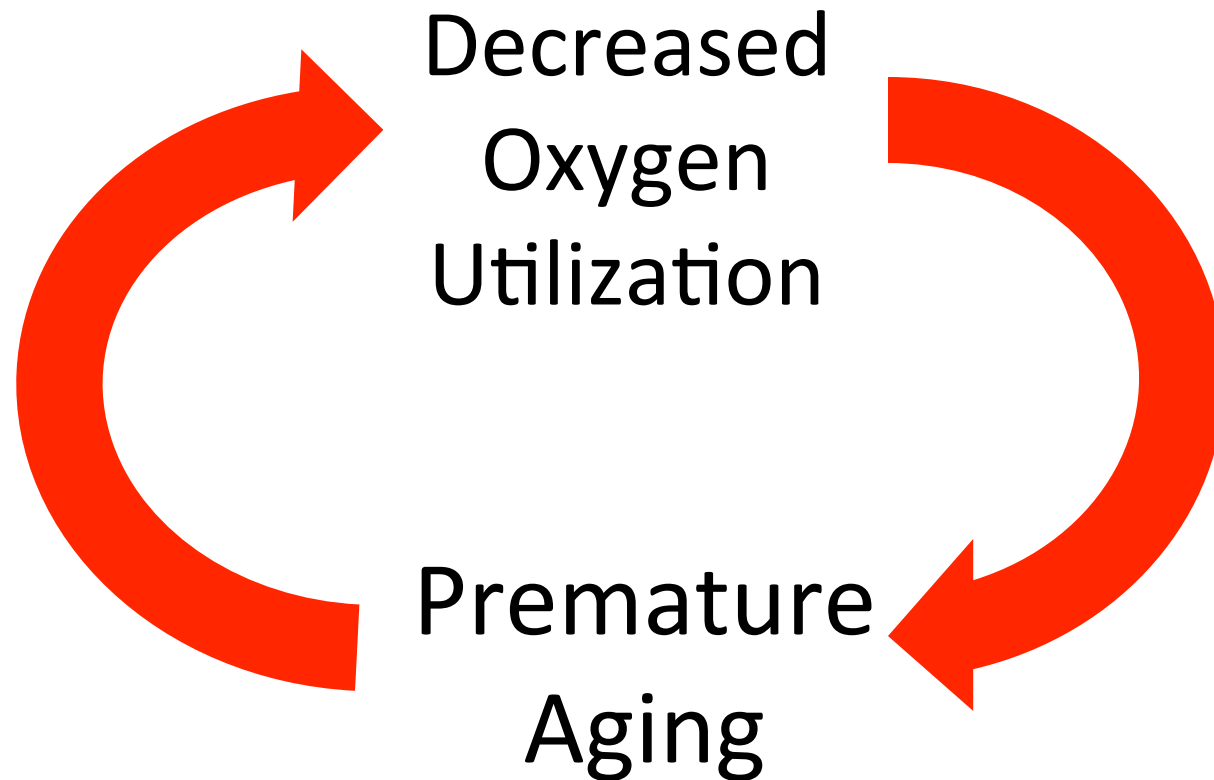


4th Riordan IVC and Cancer Symposium

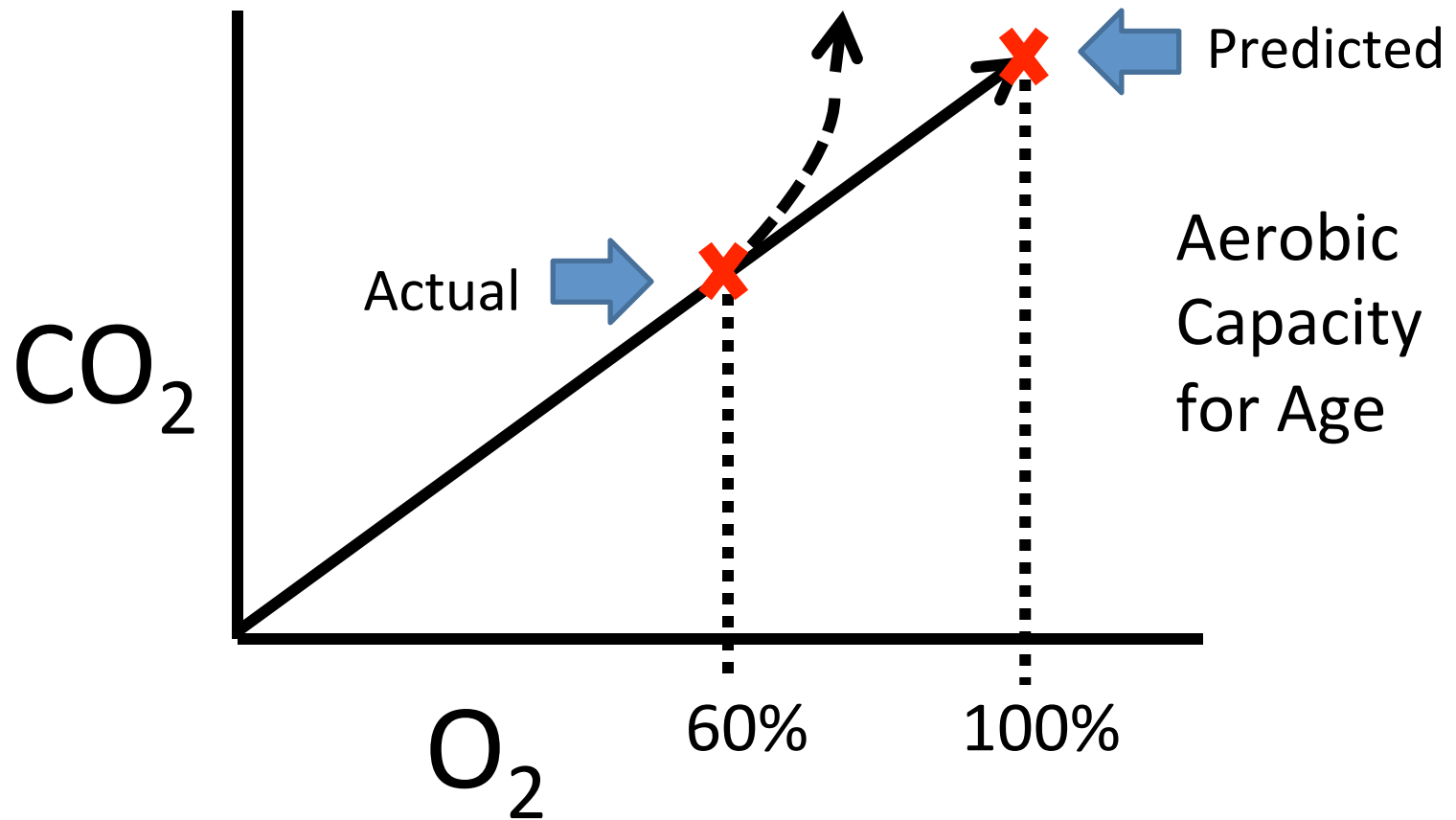
Poor Oxygen
Utilization:
Metabolic
Taproot
of Cancer?



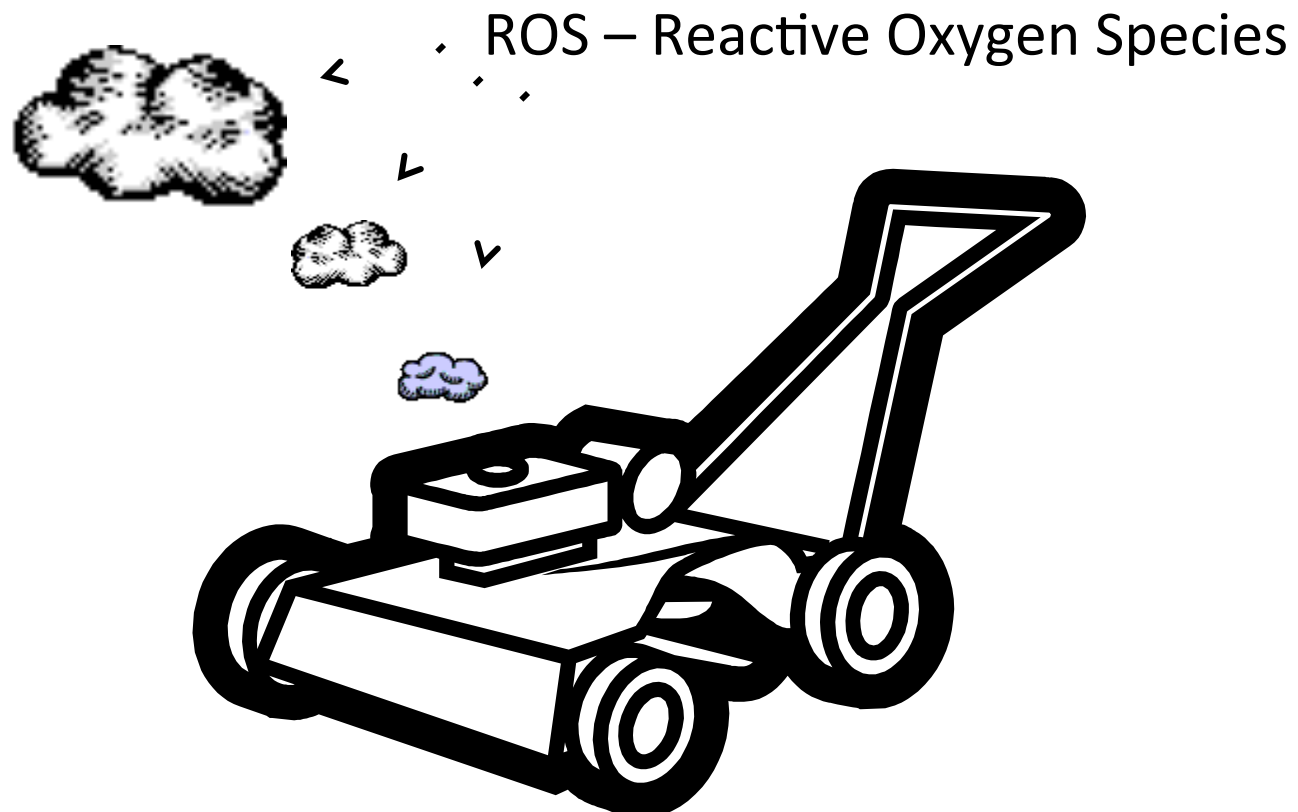
Which First? Chicken or Egg?



Decreased Oxygen Utilization = Mitochondrial Dysfunction



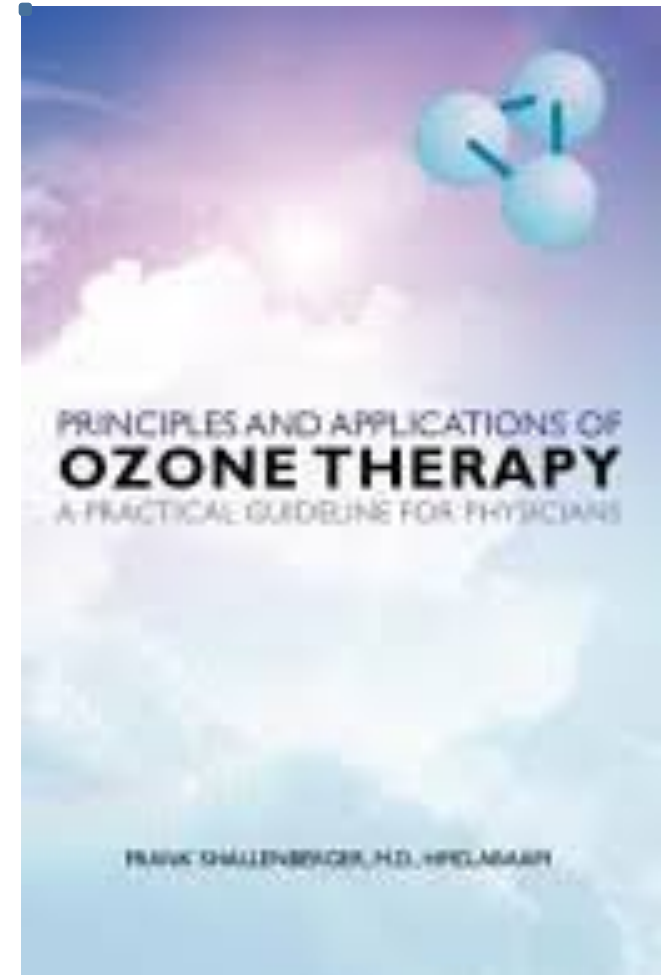
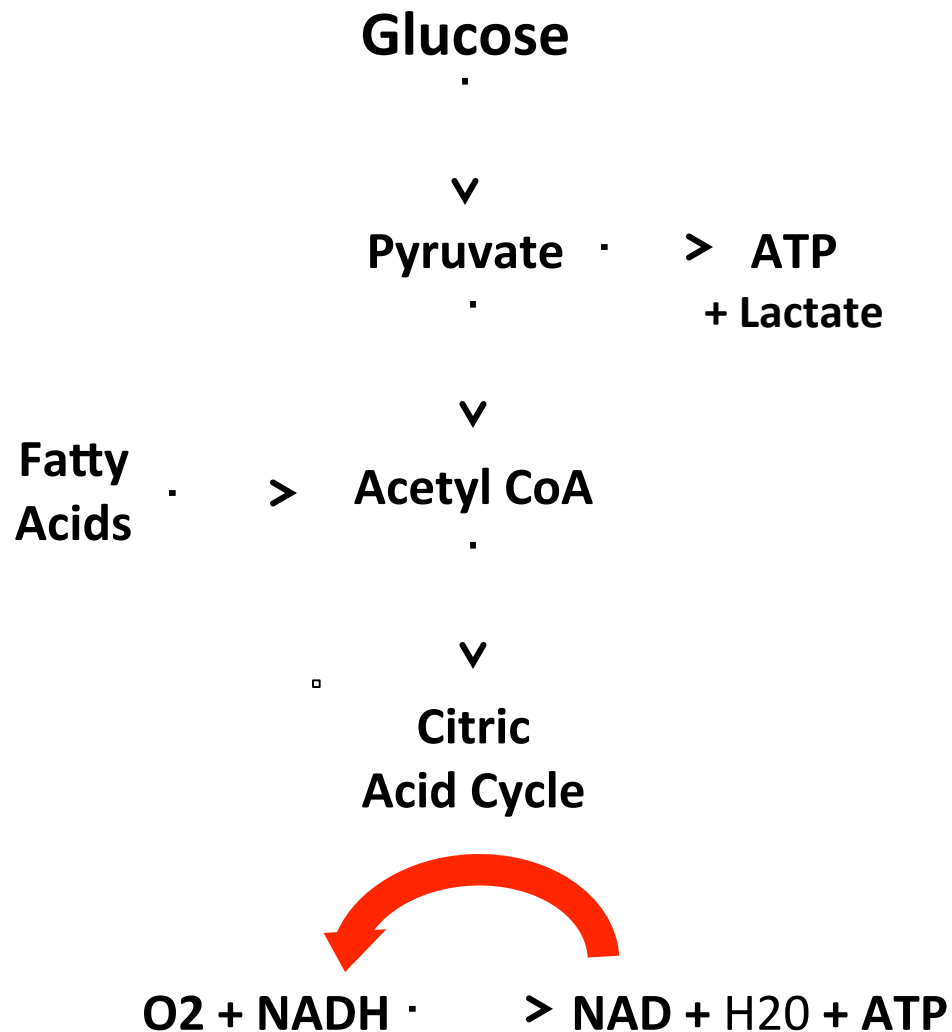
Slow Metabolic Idle



4th Riordan IVC and Cancer Symposium

Hunninghake	Addressing the Metabolic Roots of Cancer
Guilford	The Role of Glutathione in the Initiation of Cancer
Levy	Death by Calcium: The Oxidative Roots of Cancer
Berkson	Alpha Lipoic Acid in the Care of Certain Cancers
Bauerschmidt	Cancer and Nutrition
Crinnion	Environmental Toxicants and Complete Cancer Care
Seely	IVC and Cancer: A Systematic Review and Early Findings from a Prospective Cohort Study
Shallenberger	Oxygen, Mitochondria, ATP and the Origins of Cancer/Cases
Gonzalez/Miranda	Variables that Impact the Clinical Effectiveness of IVC in Cancer Care
Osborne/Kaumeyer	Practical Tips for Optimizing IVC Safety and Effectiveness
Levy	Vitamin C: Facts, Fiction, and the Law

4th Riordan IVC and Cancer Symposium



Root Causes

Dr. Frank Shallenberger

Early Onset Mitochondrial Dysfunction: E.M.O.D.

Poor O₂ Use

O₂ Decreased

E.O.M.D.

Factors That Decrease O₂ Utilization

Lipolysis decreased

Deficient Nutrients

Un-Coupled Thyroid

Sleep decreased

Stress increased

Deficient Hormones

Ozone First!

In-flamed

Toxins

Infection

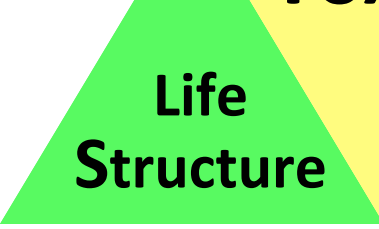
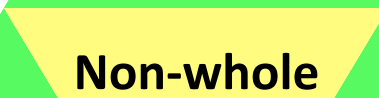
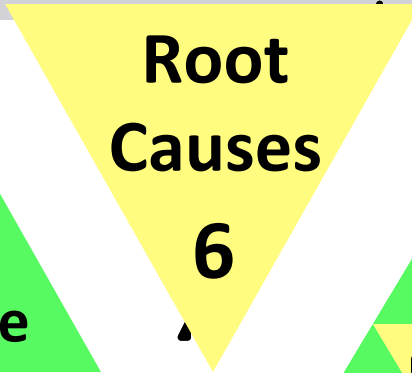
Ischemia

Low NAD/NADH

Poor Methylation

Not Enough Movement

Insulin Resistance



**You are the
First Cause**

IVC First!

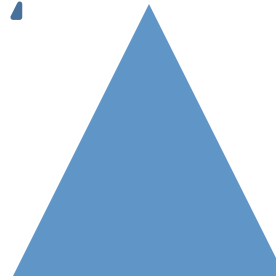
Is OXYGEN the bottom line?



“You can’t begin to learn
what you think you already know!”

6b. Intracellular Oxidative Stress

- Damaging free radicals are constantly being generated **within** the mitochondrial membranes housing the electron chain transfer system
- **Intracellular antioxidant enzymes** are the cell's key defense against mitochondrial oxidation
 - **Superoxide dismutases (SOD)**
 - **Catalase** is found in peroxisomes
 - **Glutathione peroxidase**



Reducing Intracellular Milieu

Oxygen (optimal utilization)

NAD/NADH ratio → ATP

Intracellular water quality

Nutritional microenvironment

Antioxidant enzymes

Healthy Lifestyle Choices

$3O_2 + NADH \cdot >$

NAD

+2 ATP

+

Oxidizing Intracellular Milieu

Stress and depletion

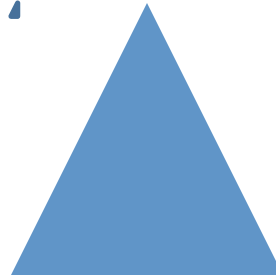
Accelerated aging

Poor oxygen utilization

Metals and toxins

Poor food/malnutrition

Unhealthy Lifestyle



▪ Reducing Intracellular Milieu

Oxygen (optimal utilization)

Water

Nutrients

Antioxidant enzymes

NAD and ATP (energy)

Healthy Lifestyle Choices

▪ Oxidizing Intracellular Milieu

Stress and depletion

Accelerated aging

Poor oxygen utilization

Metals and toxins

Poor food/malnutrition

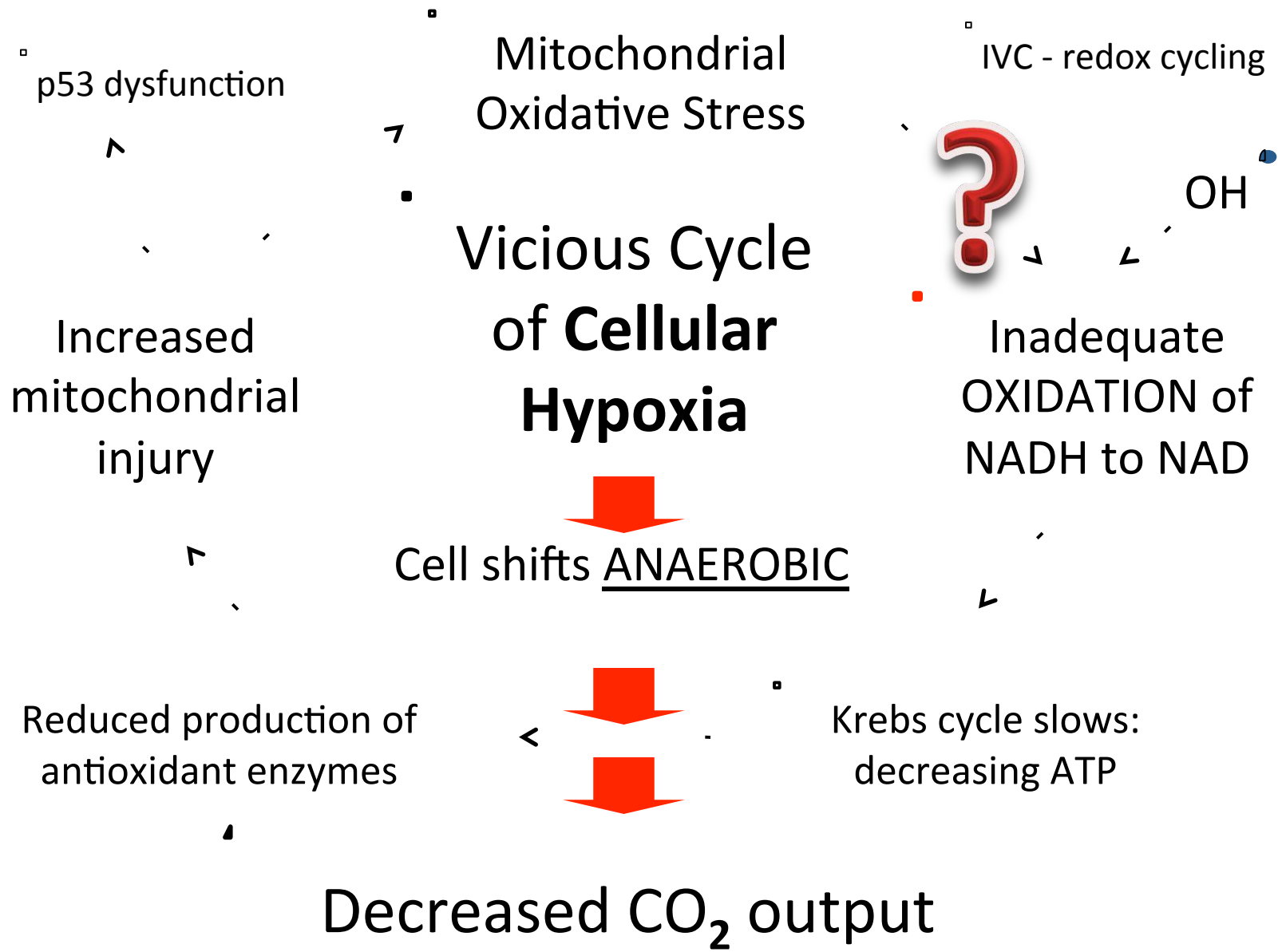
Unhealthy Lifestyle

Oxygen–induced Antioxidants

- Oxygen – it is so obvious, it is missed
- It's not what you take in...
it's what you utilize
- What is the difference between a 20 year old and a 70 year old?
(The #1 cancer risk factor)
- Decreased oxygen utilization!

Decreased Oxygen Utilization

- Oxidative stress is NOT ONLY caused by a deficiency of antioxidant nutrients!
- You can COVER UP THE CAUSE OF OXIDATIVE STRESS WITH ANTIOXIDANTS
...just like you can cover up a headache with an aspirin
- What is the predominant CAUSE of oxidative stress and free radical injury?
“Functional Hypoxia” – Levine & Kidd



Faulty Oxygen Transport

- Hemoglobin is the component in blood that serves as the primary transporter of oxygen from the lungs to cells.
- Cellular **anaerobic metabolism** does not produce sufficient amounts of carbon dioxide ...

CO₂ is required to displace oxygen from the hemoglobin molecule.

- With progressive mitochondrial oxidative stress, **cellular hypoxia** worsens, leading to progressive anaerobic metabolism (**insufficient O₂ transport**)

The Shift to Glycolytic Metabolism

- An anaerobic cell can derive **only 2 ATP's** while an aerobic cell can derive **36 more ATP's** from the metabolism of each glucose molecule.
- **Anaerobic cells become energy deficient.**
- With insufficient energy they can no longer operate all the **complex control mechanisms** that exist in normal multicellular cells.
- **These cells must shift to glycolytic metabolism** with lactic acid production.

Cancer Cells are Anaerobic

- In the 1920's a cancer researcher, Otto Warburg, discovered that the metabolism of cancer cells was **anaerobic**, and received a Nobel Prize for this work in metabolism.
- **Warburg believed that all cancer cells were anaerobic obligates.**

Wasting as a Sign of Anaerobic Metabolism

- **Cancer depletes nutrient reserves rapidly.**
- **Cachexia** (body wasting) is a strong indication of **anaerobic metabolism**, due to excessive and inefficient use of glucose (PET scanning.)
- Warburg performed one very interesting experiment where he put **non-cancerous human cells** in a Petri dish and **deprived them of oxygen.**
- **They survived...but turned cancerous.**

Extracellular and Intracellular oxidative stress perpetuates the *non-healing, low oxygen wound* resulting in *anaerobic cellular regression*

- Health – low oxygen wound
- Injury – persistent DNA damage
- Signal – unrelenting oxidation
- Repair – dysregulated inflammation
- Healing – anaerobic cellular regression



Low Oxygen Utilization

Water Wheel Analogy – Vitamin C Generating an Oxidant

AA

OH[•]

Redox
Cycling
requires
Ortho-dosing
of Vitamin C



DHA

Ascorbic Acid

Vitamin C Acting as an Anti-oxidant

Free Radicals
are harmful
oxidants

2FR

2FR

AA $2e^-$

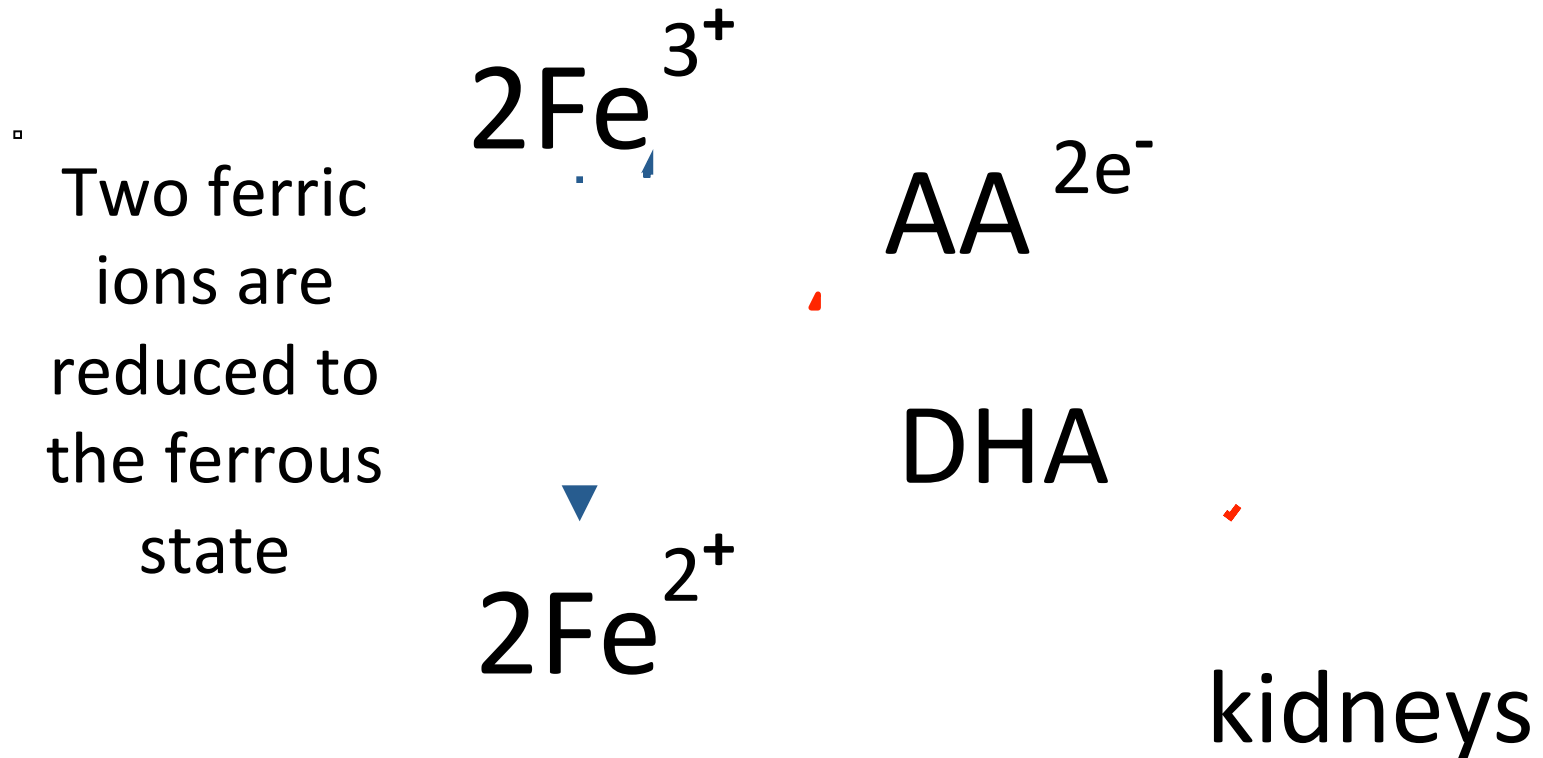
DHA

Dehydroascorbate
(oxidized vitamin C)

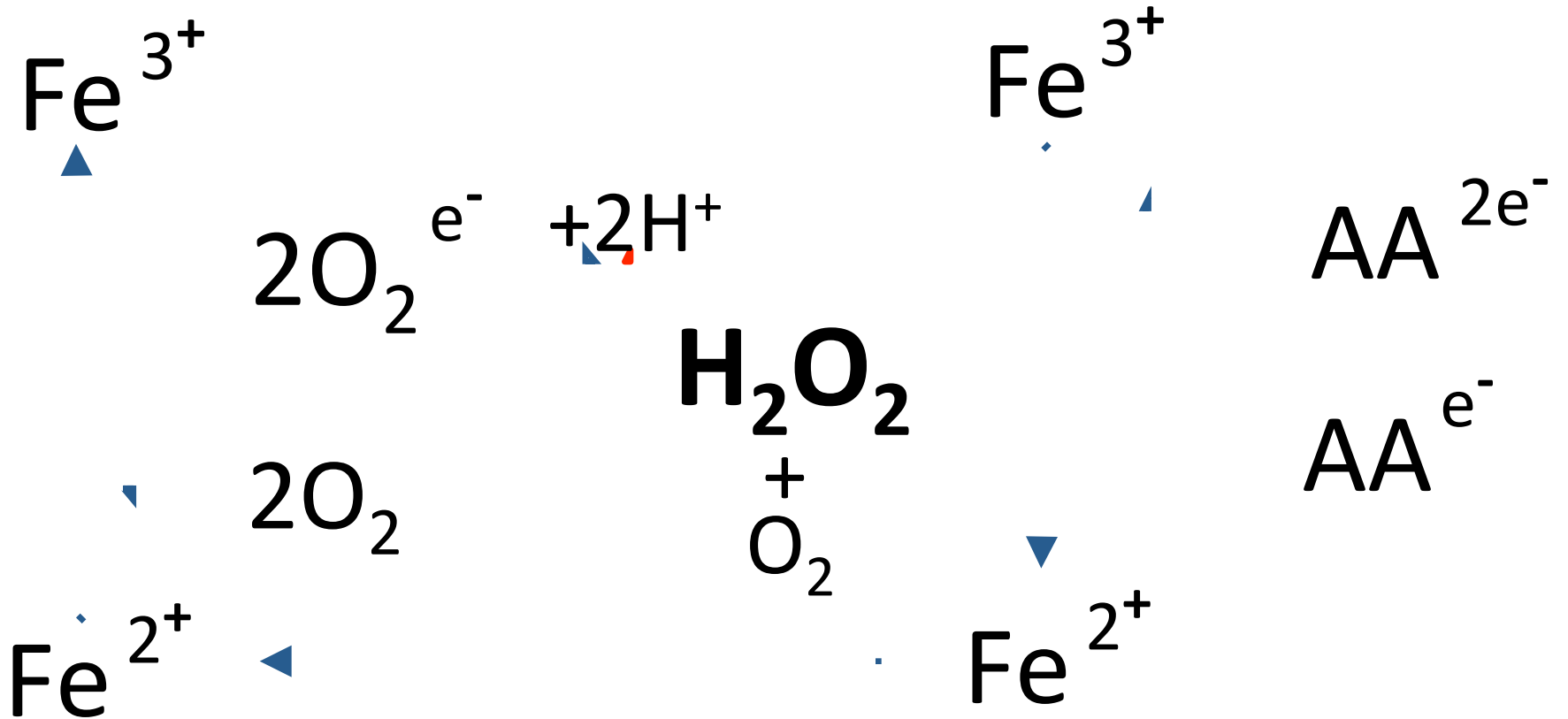


Dehydroascorbic Acid

Oxidized Vitamin C (DHA) Is Not Reabsorbed



Pro-oxidant Effect of Vitamin C in the Presence of Iron and Oxygen

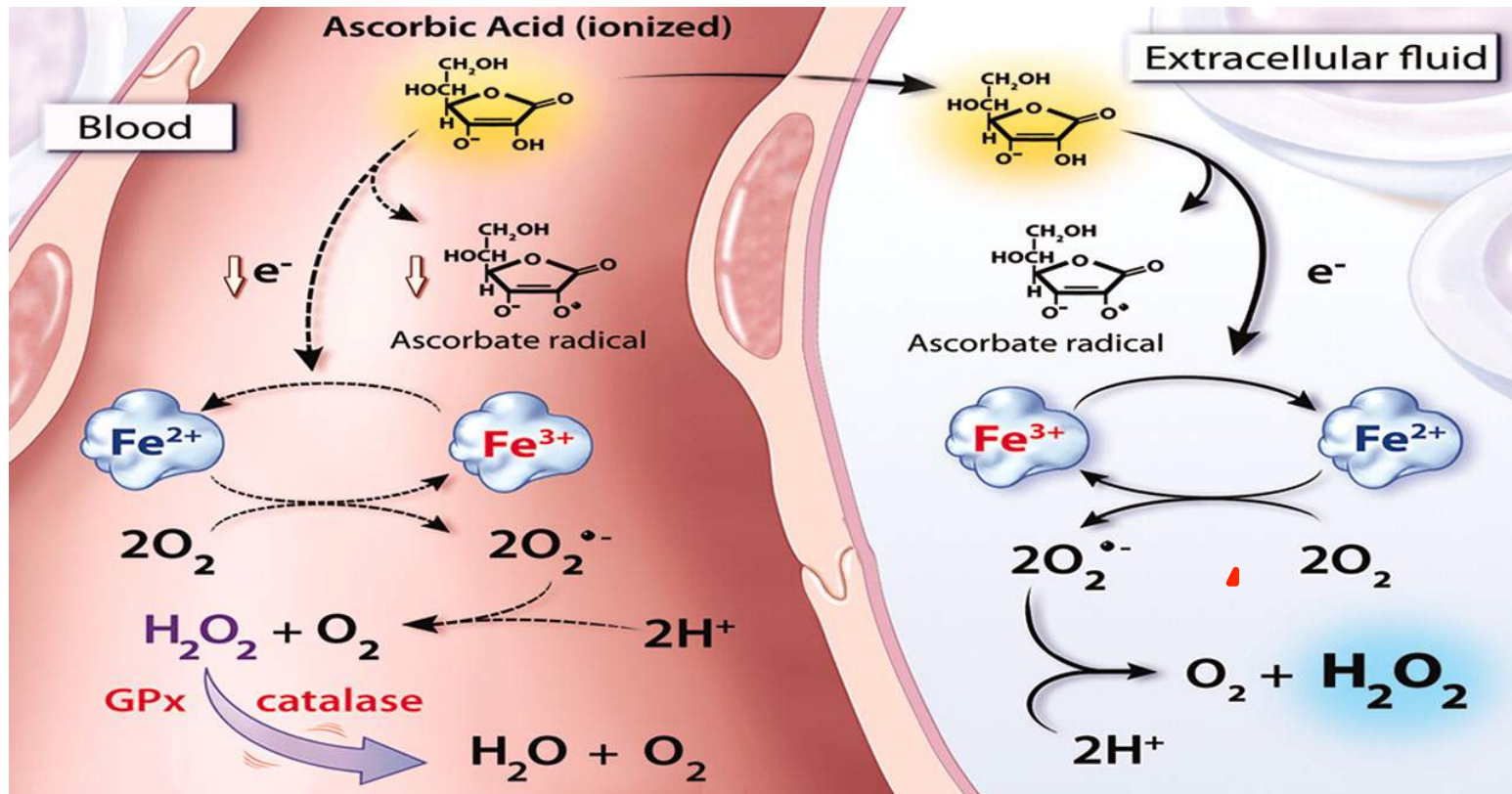


National Institutes of Health

May 14, 2007

“Ascorbate in pharmacologic concentrations selectively generates ascorbate radical and hydrogen peroxide in extracellular fluid in vivo”

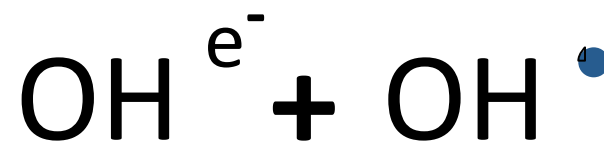
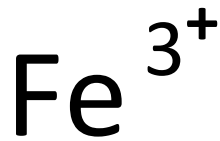
- **Proceedings of National Academy of Science**
- Chen, Espey, Krishna, Mitchell, Corpe, Buettner, Shacter, **Levine**
 - *May 14, 2007* | vol. 104 | no. 21 | **8749-8754**



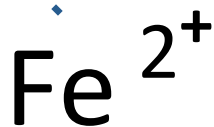
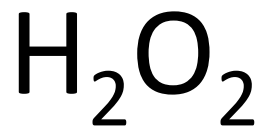
PNAS | May 14, 2007 | vol. 104 | no. 21 | 8749-8754

Fenton's Reaction

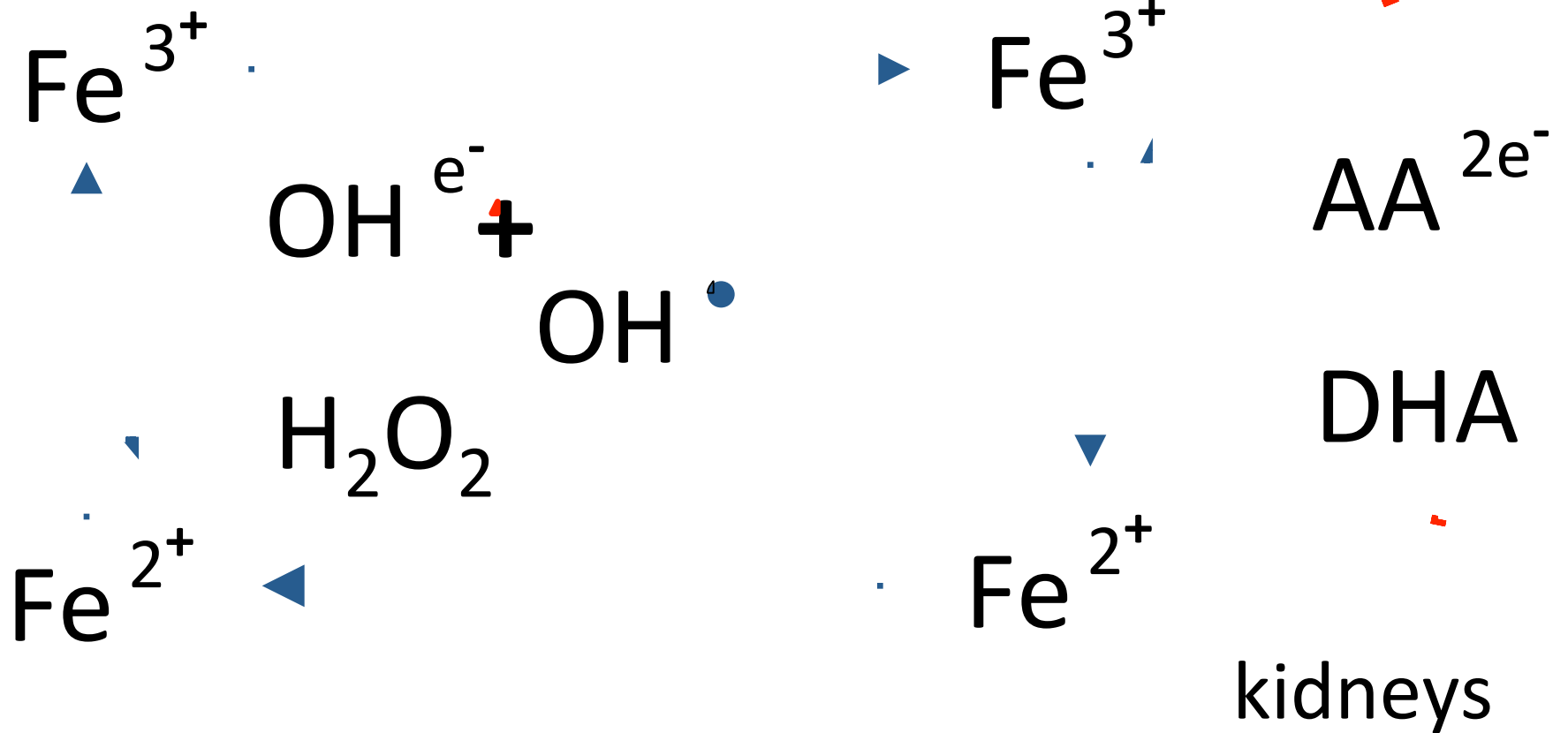
Ferrous Iron is Oxidized Back to Ferric State



Hydroxyl
Radical



Redox Cycling with IVC



Water Wheel Analogy – *Vitamin C Generating an Oxidant*

AA

OH[•]

Redox
Cycling
requires
Ortho-dosing
of Vitamin C



DHA

Ideal Redox Therapy is Bi-oxidant

- Conventional cancer treatments kill cancer cells by **increasing oxidation** and inducing apoptosis
- Damaged apoptosis control mechanisms, such as the p53 gene, allow **therapy-resistant cells** to emerge and multiply

The ideal redox therapy would do BOTH

...an **anti-oxidant** that repairs apoptosis controls

...a **pro-oxidant** that:

signals DNA initiation of apoptosis in damaged cancer cells

oxidizes NADH to NAD...thus helping to restore aerobic function

ATP generation allows for better intracellular production of

antioxidant enzymes that RESTORE MITOCHONDRIAL
FUNCTION

Root Causes

Dr. Frank Shallenberger

Early Onset Mitochondrial Dysfunction: E.M.O.D.

Poor O₂ Use

O₂ Decreased

E.O.M.D.

Factors That Decrease O₂ Utilization

Lipolysis decreased

Deficient Nutrients

Un-Coupled Thyroid

Sleep decreased

Stress increased

Deficient Hormones

Ozone First!

In-flamed

Toxins

Infection

Ischemia

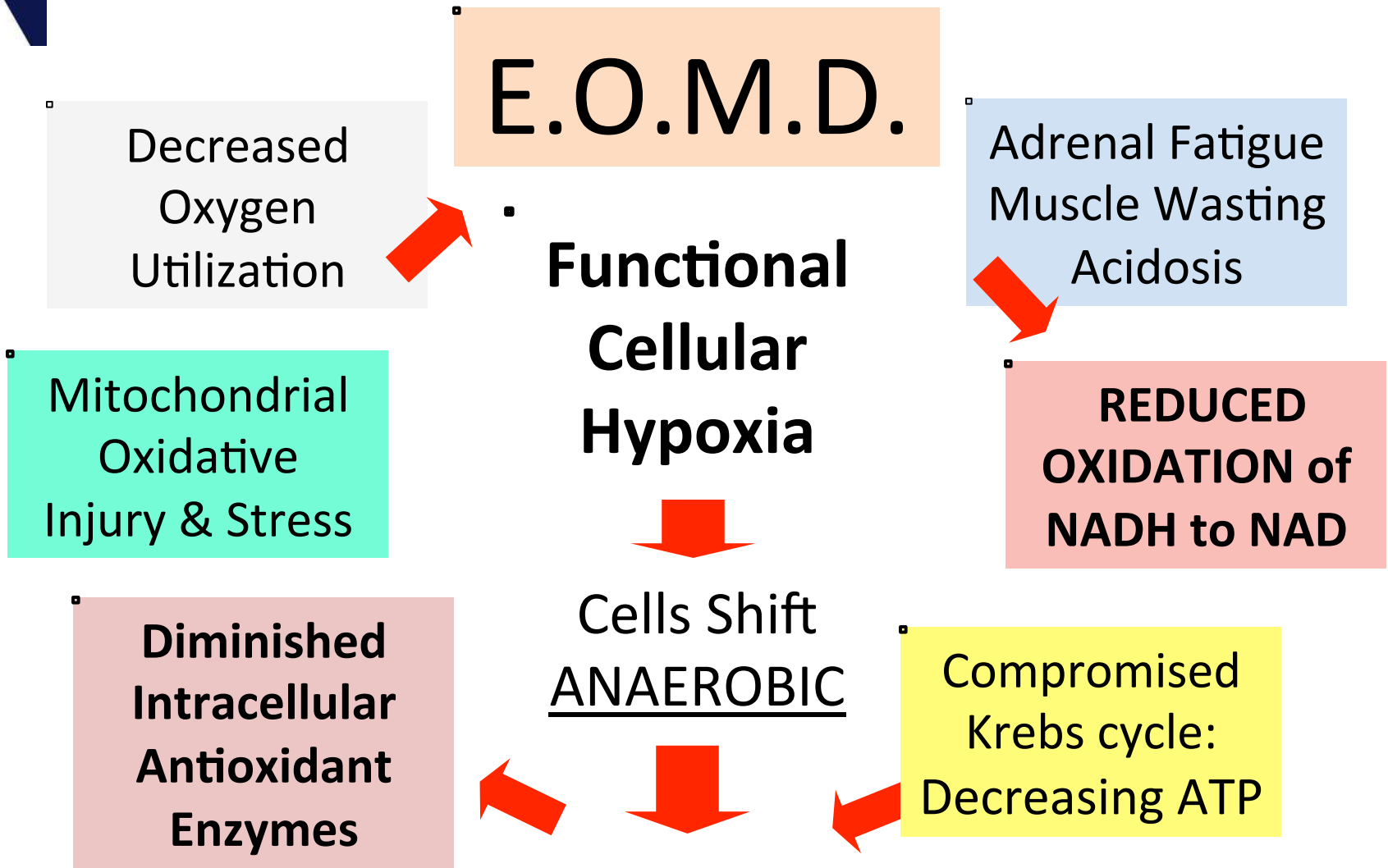
Low NAD/NADH

Poor Methylation

Not Enough Movement

Insulin Resistance

The Energy Deficit Theory of Aging and Degenerative Disease

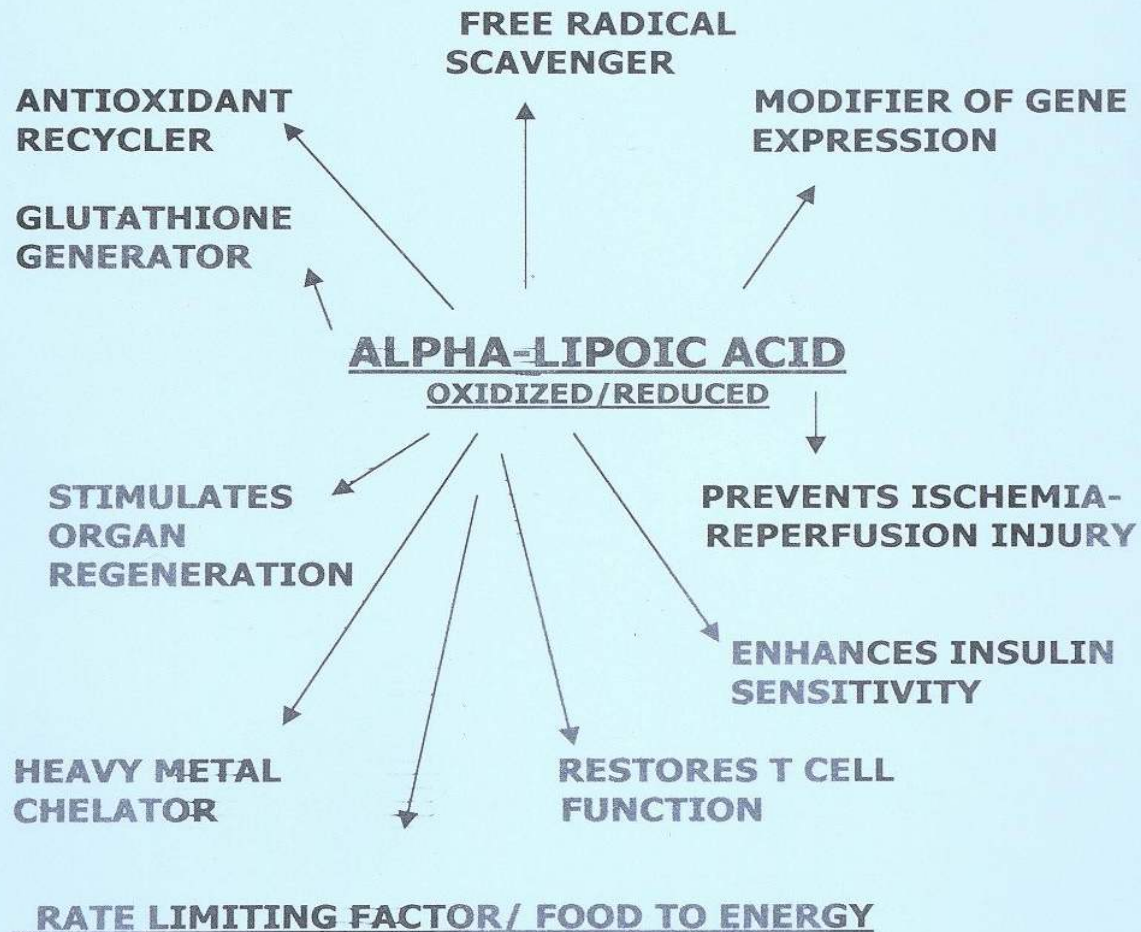


Decreasing CO₂ output – Diminishing oxygen exchange

4th Riordan IVC and Cancer Symposium

Hunninghake	Addressing the Metabolic Roots of Cancer
Guilford	The Role of Glutathione in the Initiation of Cancer
Levy	Death by Calcium: The Oxidative Roots of Cancer
Berkson	Alpha Lipoic Acid in the Care of Certain Cancers
Bauerschmidt	Cancer and Nutrition
Crinnion	Environmental Toxicants and Complete Cancer Care
Seely	IVC and Cancer: A Systematic Review and Early Findings from a Prospective Cohort Study
Shallenberger	Oxygen, Mitochondria, ATP and the Origins of Cancer/Cases
Gonzalez/Miranda	Variables that Impact the Clinical Effectiveness of IVC in Cancer Care
Osborne/Kaumeyer	Practical Tips for Optimizing IVC Safety and Effectiveness
Levy	Vitamin C: Facts, Fiction, and the Law

ACTIONS OF ALA



The Primary Intracellular Antioxidant System

Dehydro-
Ascorbate

Dehydro-
Lipoic
Acid

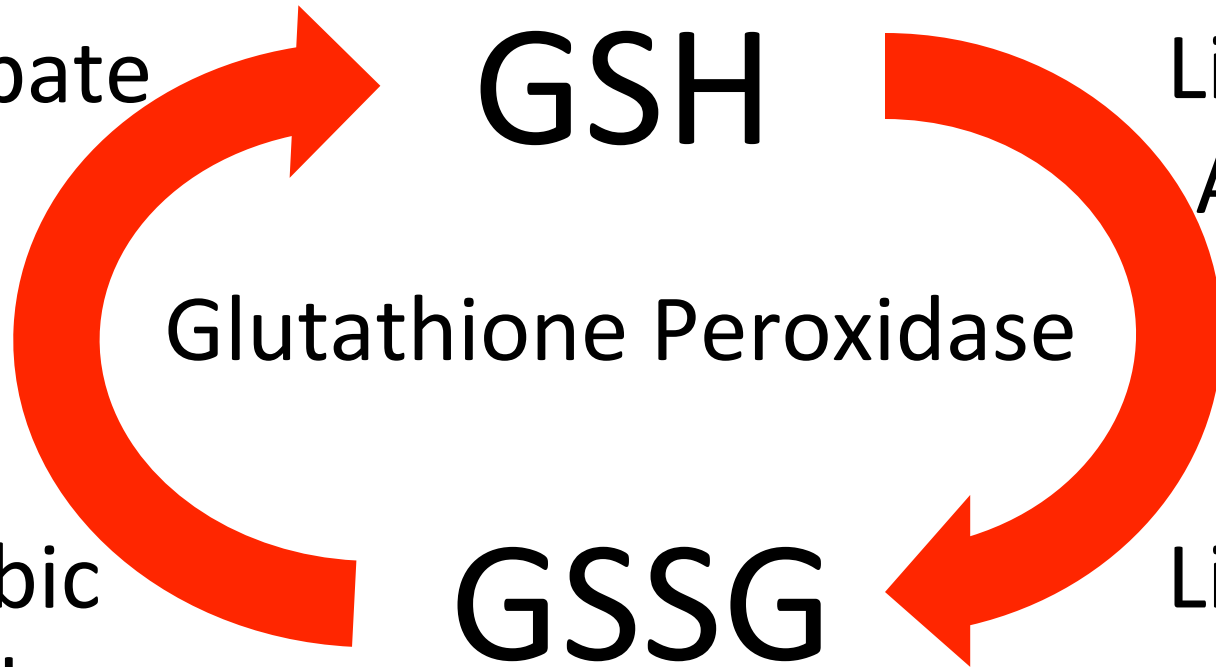
GSH

Glutathione Peroxidase

Ascorbic
Acid

Lipoic
Acid

GSSG



The Key Role of Glutathione Peroxidase

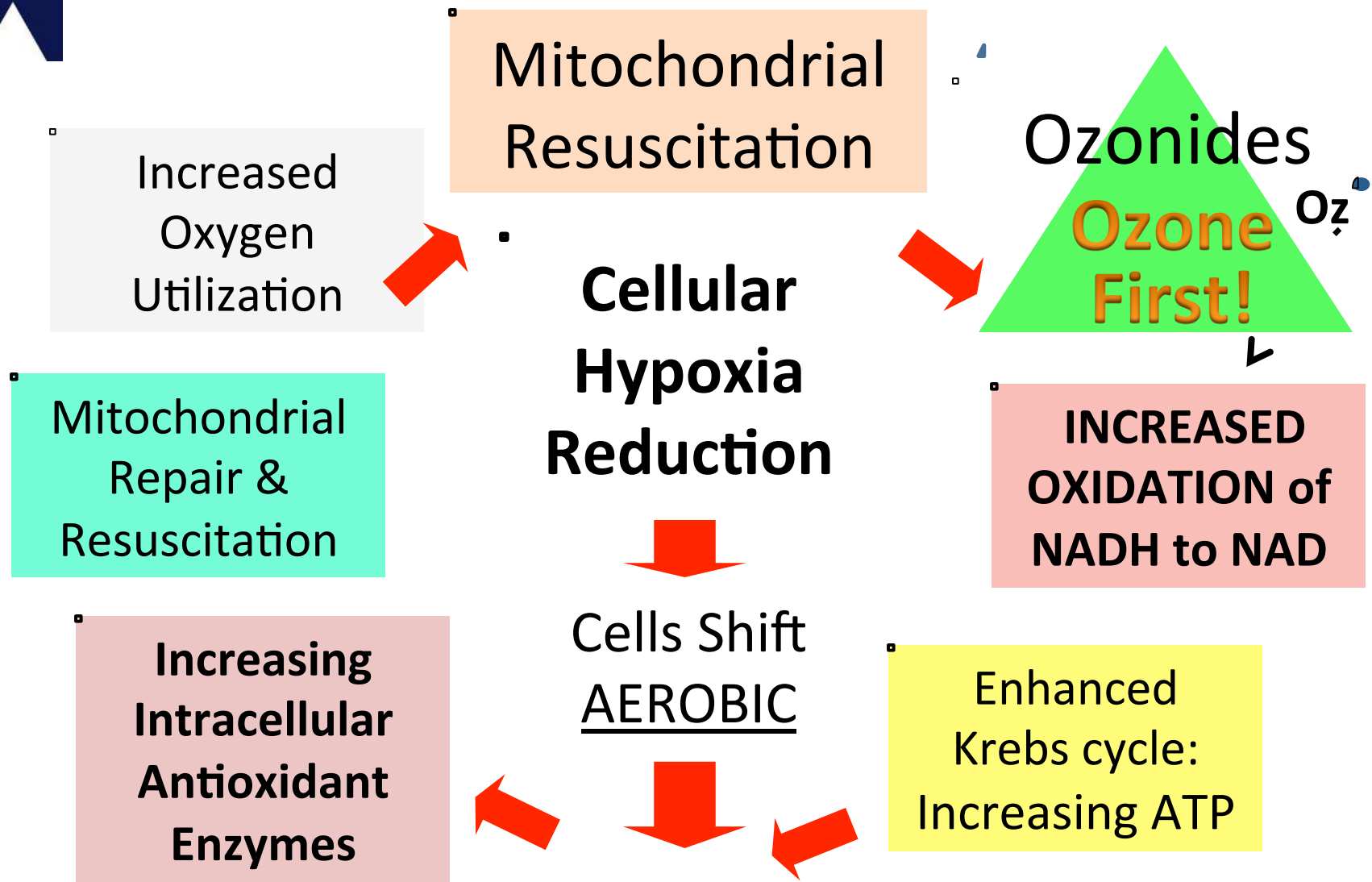
- Glutathione peroxidase activity as an intracellular enzyme is necessary for the regeneration of Ascorbic Acid from DHA
- Statement: “Extra antioxidant vitamins will not solve the problem of free radical excess unless the cells also have an optimal amount of glutathione peroxidase.” *

* Principles and Applications of Ozone Therapy
Shallenberger 2011 Pg 68

Intracellular Oxidant Stress

- **More than excessive ROS production?**
- Due to deficient antioxidant enzyme activity... especially glutathione peroxidase
- High dose IVC reduces ROS load...but does it increase intracellular antioxidant enzymes?
 - Note: see “IVC and the Bi-oxidant Paradox”
- **OZONE INDUCTION of the Intracellular Antioxidant Buffering Systems (IABS)**
 - Glut. Peroxidase; Superoxide Dismutase, Catalase

The Energy Deficit Theory of Aging and Degenerative Disease



Increased Oxygen Utilization

Mitochondrial Resuscitation

Ozonides
Ozone First! O_3

Cellular Hypoxia Reduction

Mitochondrial Repair & Resuscitation

INCREASED OXIDATION of NADH to NAD

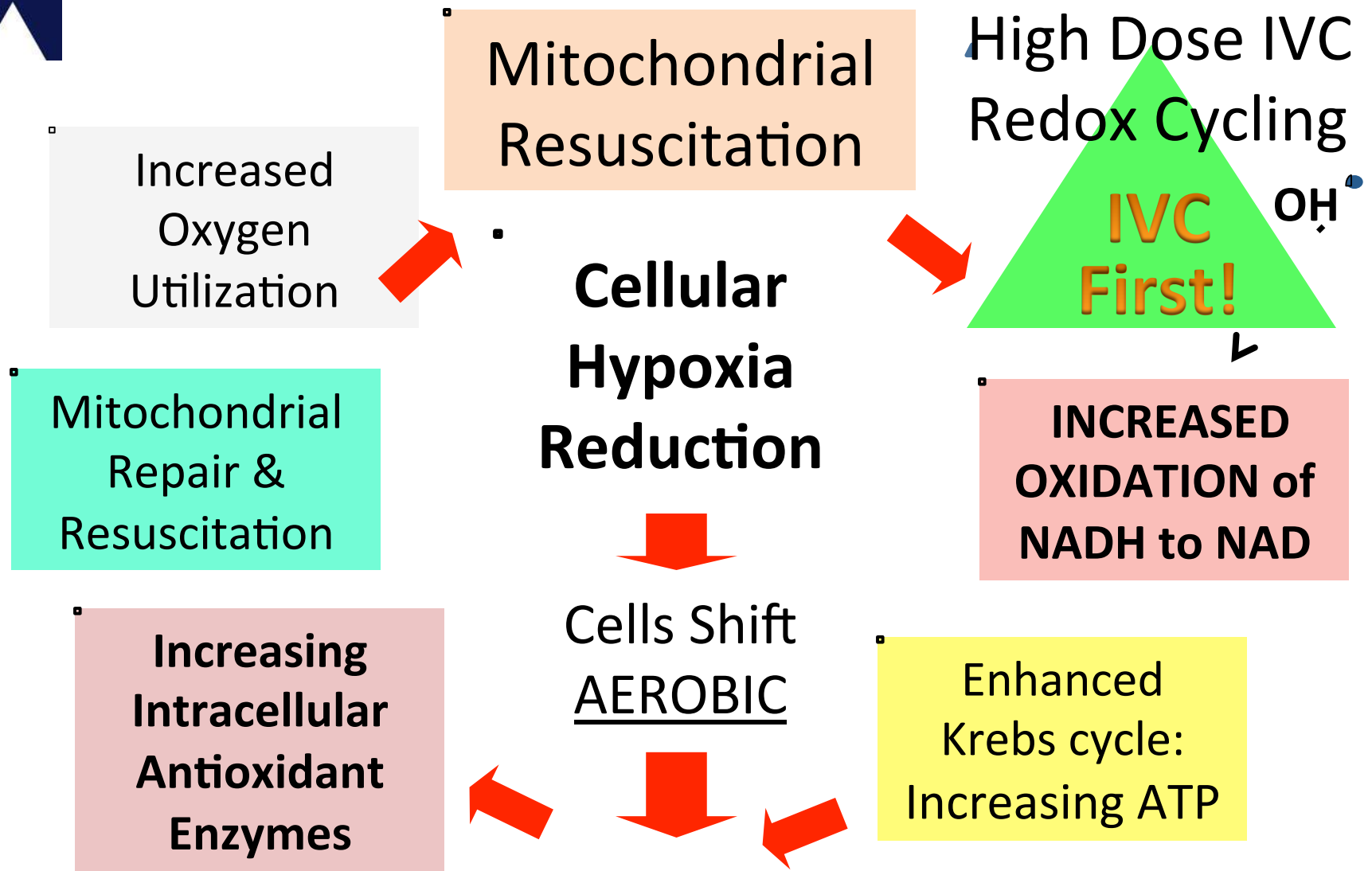
Increasing Intracellular Antioxidant Enzymes

Cells Shift AEROBIC

Enhanced Krebs cycle: Increasing ATP

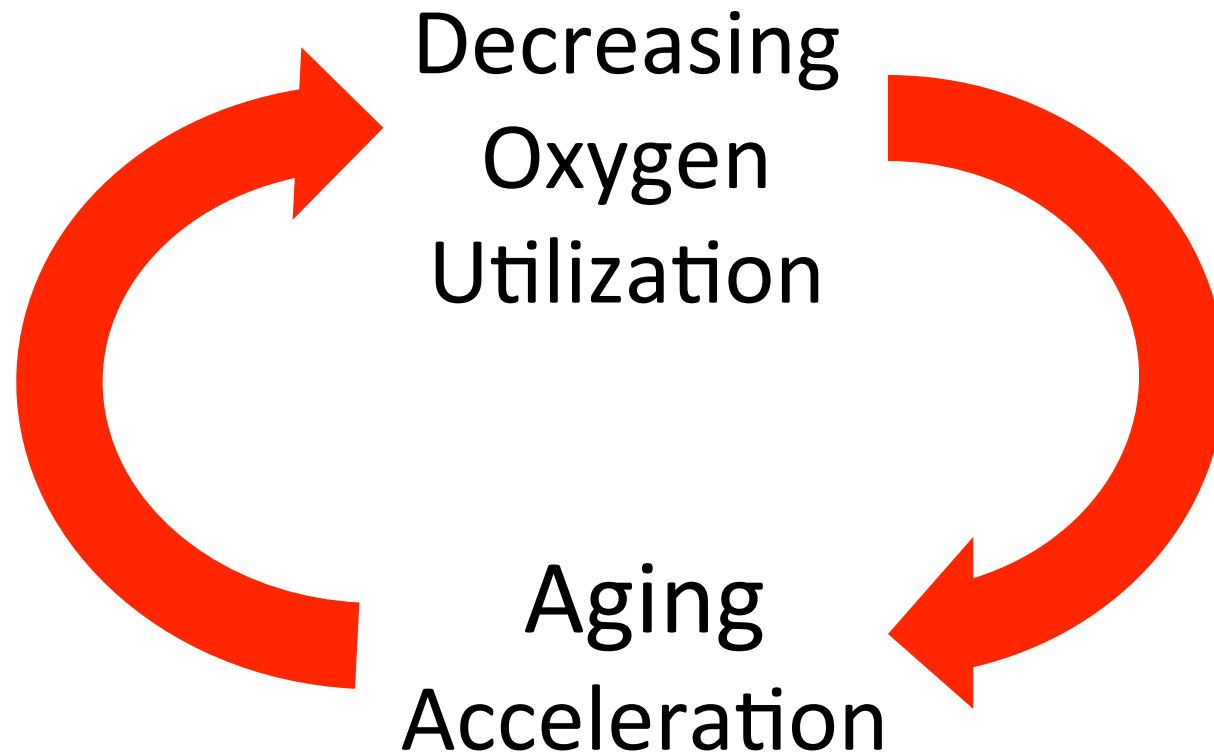
Increasing CO₂ output – Better oxygen exchange

The Energy Deficit Theory of Aging and Degenerative Disease

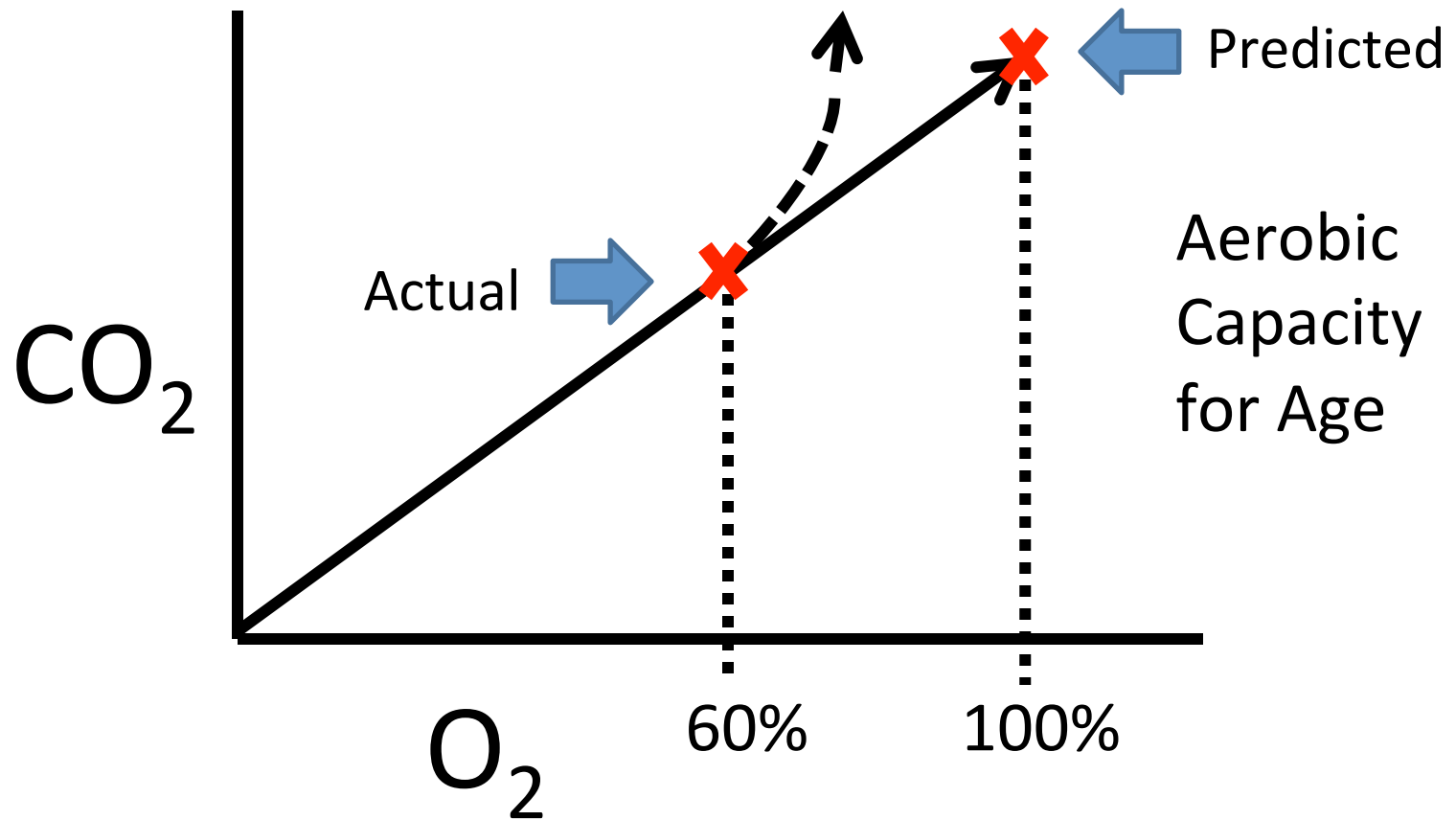


Increasing CO₂ output – Better oxygen exchange

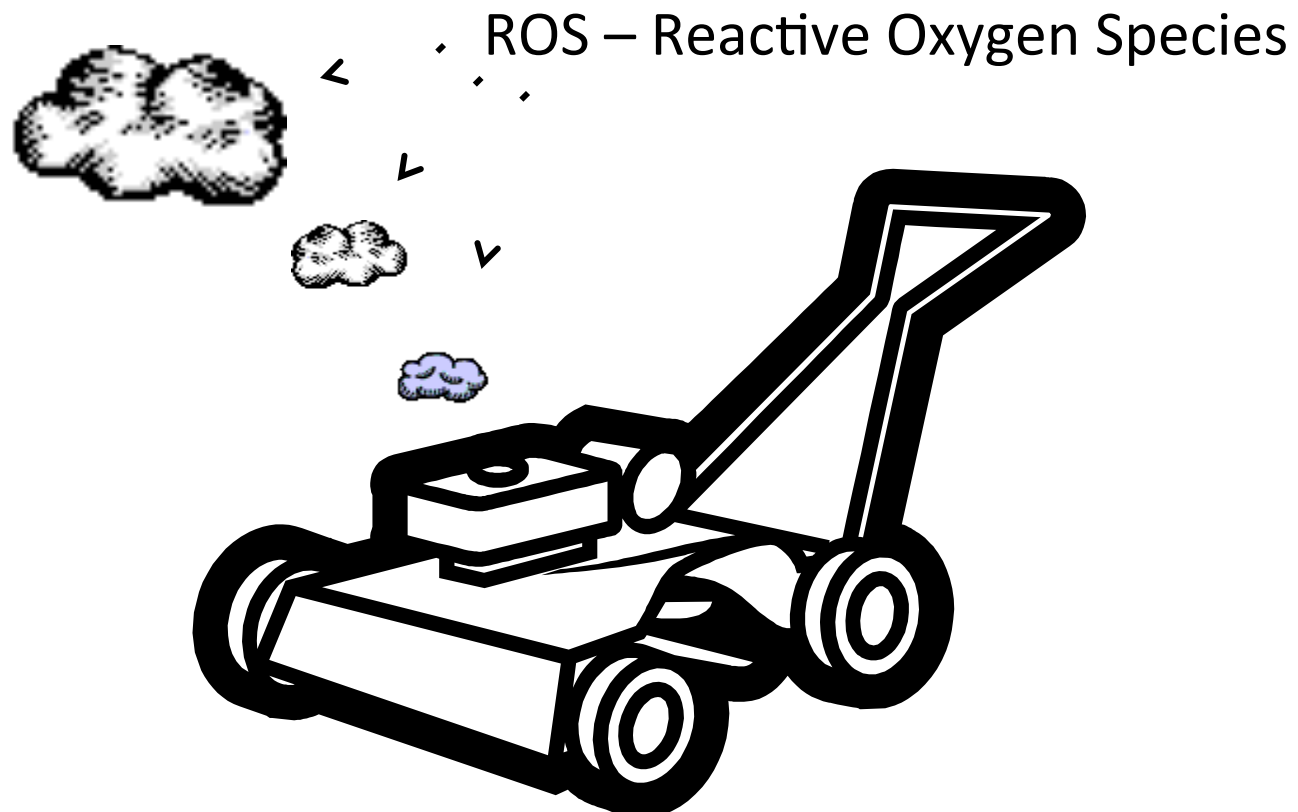
Which First? Chicken or Egg?



Decreased Oxygen Utilization = Mitochondrial Dysfunction

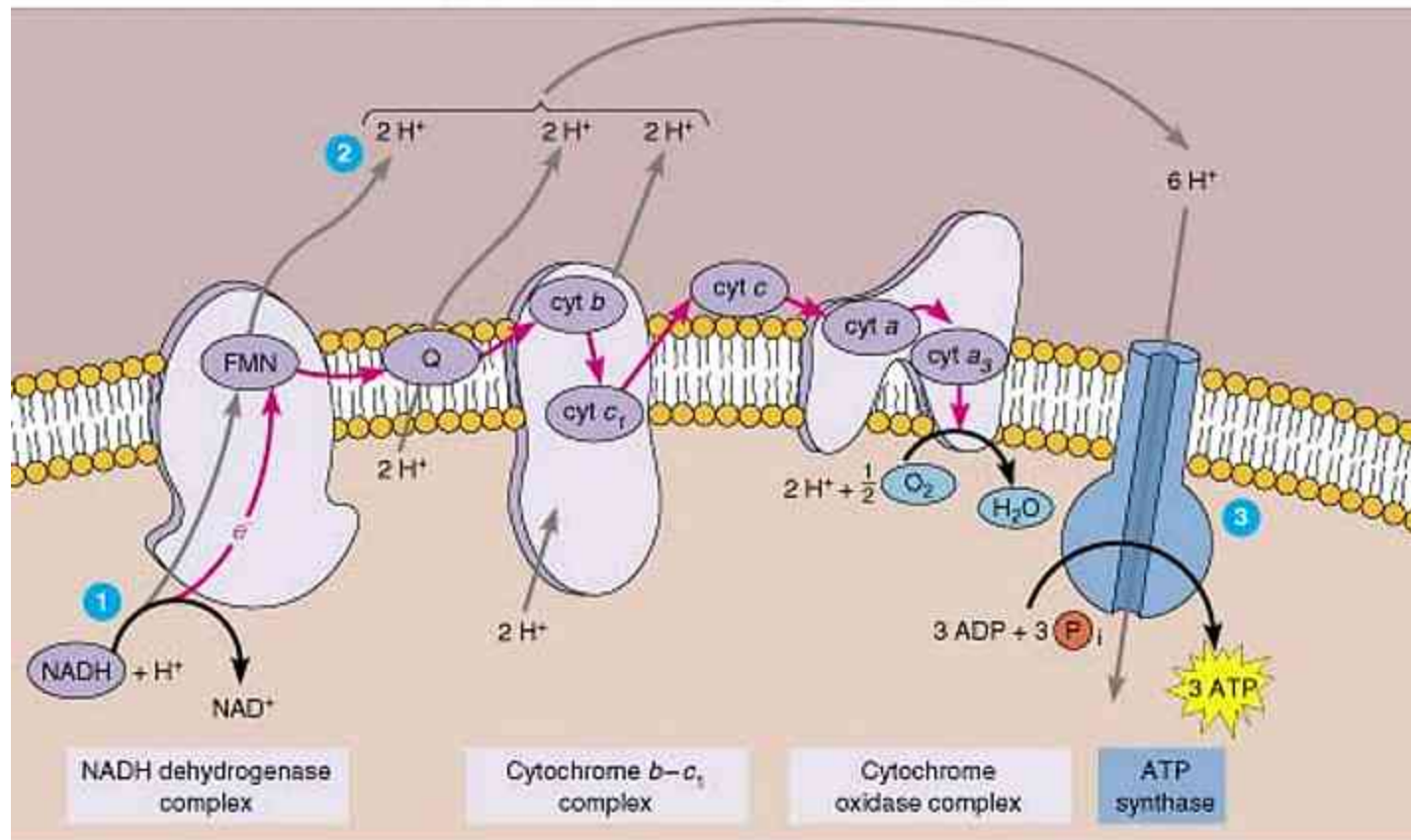


Slow Metabolic Idle



Relieving the Proton Gradient

ELECTRON TRANSPORT CHAIN



The Proton Gradient Across the Mitochondrial Membrane

The first four complexes of the Mitochondrial Respiratory Chain (MPC) use oxygen to pump protons out of the mitochondria membrane interspace between the inner and outer layers

1. Complex Five converts ADP to ATP –

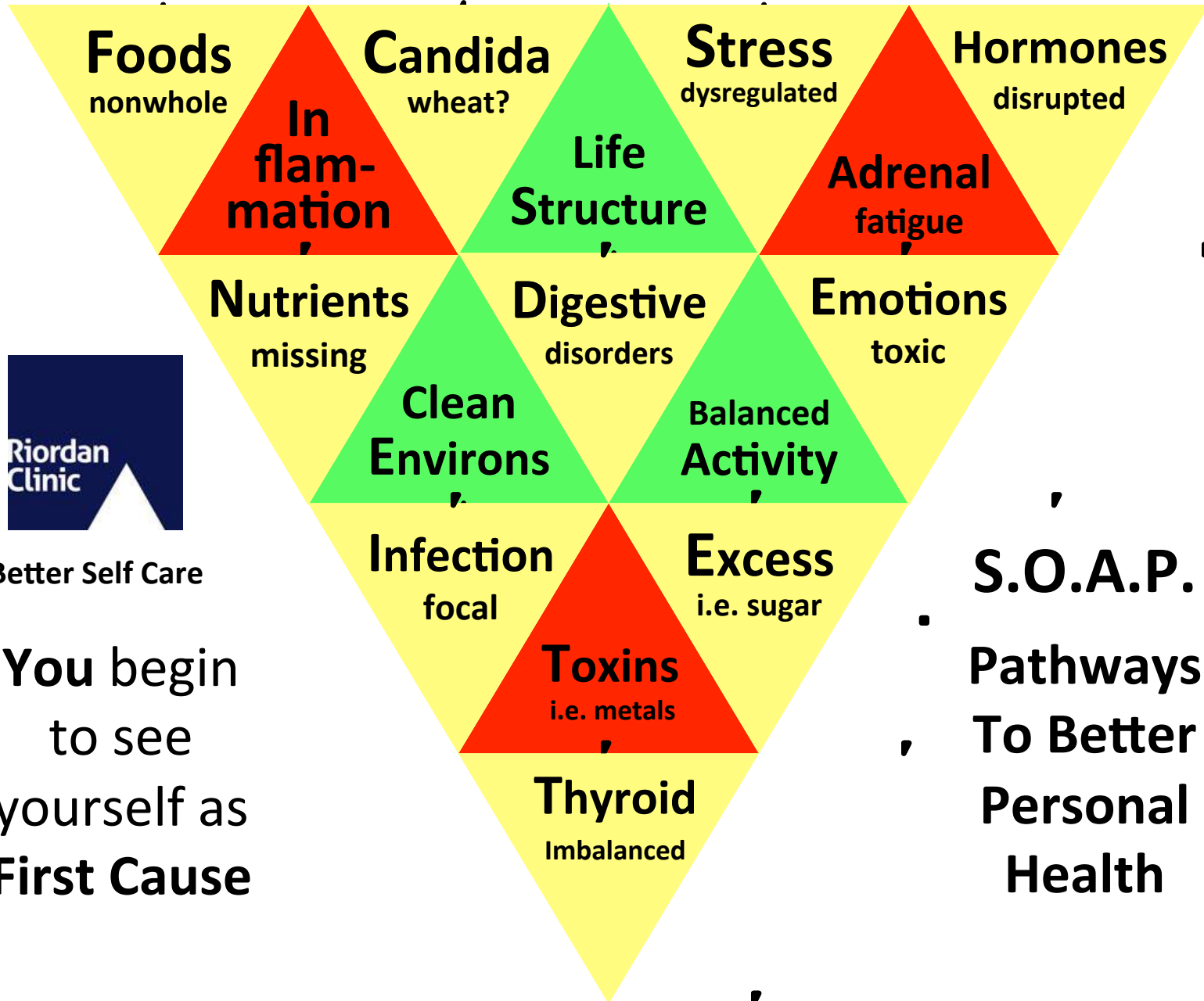
but many of the Root Causes deplete ADP

1. Shut down of MPC allow passive diffusion → ROS
2. Activation of uncoupling proteins

The Most Active Uncoupling Protein

- Uncoupling proteins allow protons to re-enter the mitochondria **without ADP**
- The most active uncoupling protein is **UPC3**
- **Triiodothyronine (T3) regulates UPC3**
- **T3 acts in this way to INCREASE OXYGEN UTILIZATION**
- **T3 regulation is a potent LINK to the major ROOT CAUSES of Chronic Illness and Cancer**

Root Causes: Detect & Correct



Better Self Care

You begin to see yourself as **First Cause**

S.O.A.P.
Pathways
To Better
Personal
Health

Dr. Broda Barnes...

did his PhD research at the University of Chicago,
just a few years after Otto Warburg,
in Germany, had demonstrated
the role of a "respiratory defect" in cancer:

▫ “ If hypothyroid people don't die young from infectious diseases, such as tuberculosis, they die a little later from cancer or heart disease.”

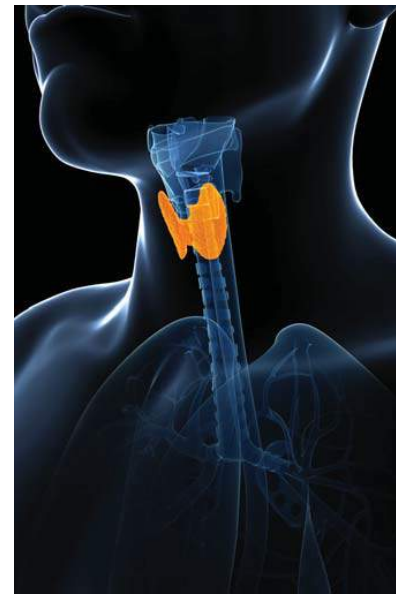
Thyroid Symptoms Signature

- ✓ - Fatigue
- ✓ - Headaches
- Migraines
- ✓ - PMS
- ✓ - Irritability
- ✓ - Fluid retention
- ✓ - Anxiety
- Panic attacks
- ✓ - Hair loss
- ✓ - Depression
- ✓ - Decreased memory
- ✓ - Decreased concentration
- ✓ - Decreased sex drive
- ✓ - Unhealthy nails
- ✓ - Low motivation
- Constipation
- ✓ - Irritable bowel syndrome
- ✓ - Inappropriate weight gain
- ✓ - Dry skin
- ✓ - Dry hair
- ✓ - Insomnia
- ✓ - Falling asleep during the day
- ✓ - Arthritis and joint aches
- Allergies
- ✓ - Asthma
- ✓ - Muscle aches
- ✓ - Itchiness
- ✓ - Elevated cholesterol
- Ulcers
- ✓ - Increased nicotine, caffeine use
- ✓ - Abnormal throat sensations
- ✓ - Sweating abnormalities
- ✓ - Heat and/or cold intolerance
- Low self esteem
- ✓ - Irregular periods
- ✓ - Severe menstrual cramps
- ✓ - Low blood pressure
- ✓ - Frequent colds & sore throats
- Frequent urinary infections
- ✓ - Lightheadedness
- ✓ - Ringing in the ears
- ✓ - Slow wound healing
- ✓ - Easy bruising
- Acid indigestion
- ✓ - Flushing
- ✓ - Frequent yeast infections
- ✓ - Cold hands and feet
- Poor coordination
- ✓ - Slow development as a child
- ✓ - Infertility
- ✓ - Hypoglycemia
- Increased skin infections – acne
- ✓ - Abnormal swallowing
- Changes in skin pigmentation
- ✓ - Prematurely gray hair
- ✓ - Excessively tired after eating
- Carpal tunnel syndrome
- ✓ - Dry eyes – blurry vision
- ✓ - Hives
- Bad breath

Mayo Clinic Publication

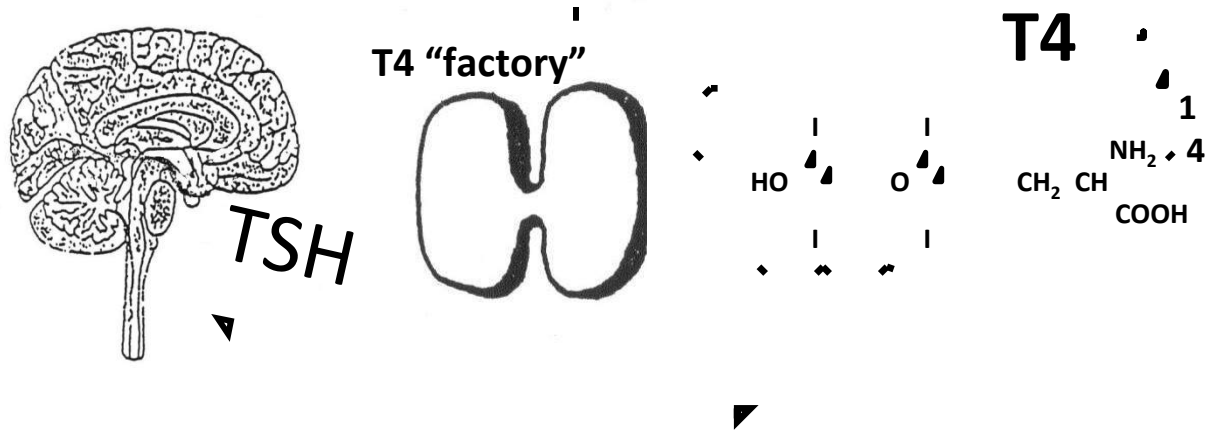
- Fatigue
- Increased cold sensitivity
- Constipation
- Dry skin
- Unexplained weight gain
- Puffy face
- Hoarseness
- Muscle weakness
- Elevated cholesterol
- Muscle achiness
- Pain, stiffness or swelling in your joints
- Heavier than normal or irregular menstrual periods
- Thinning hair
- Slowed heart rate
- Depression
- Impaired memory

If My Thyroid Is "Normal," Why Do I Feel so Bad?



The Thyroid Glandular Regulation System

Glandular Regulation



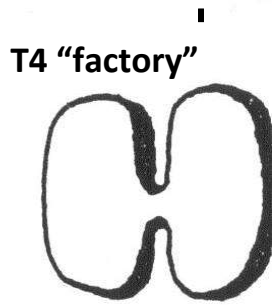
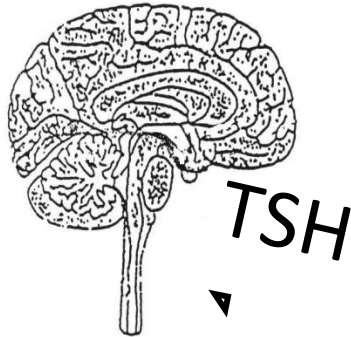
TSH = Thyroid Stimulating Hormone

Your TSH is in
the normal
range. Your
thyroid is OK.

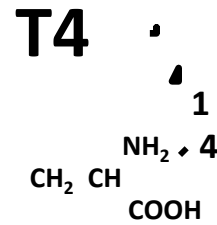


The Thyroid-Metabolic Regulation System

Glandular Regulation



Peripheral Regulation



Stress
Infection
Toxins
mercury
plastics
pesticides

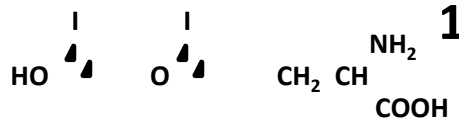
5'
deiodinase

Fasting

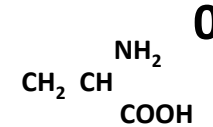
Inflammation

5-deiodinase

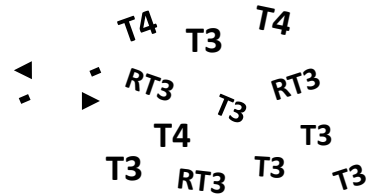
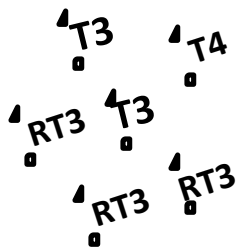
T3



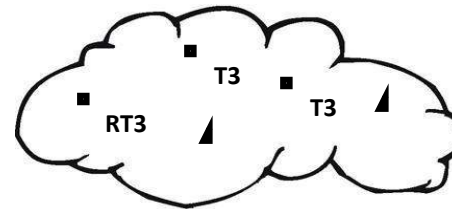
RT3



Type 2 Hypothyroidism



Unbound Hormones

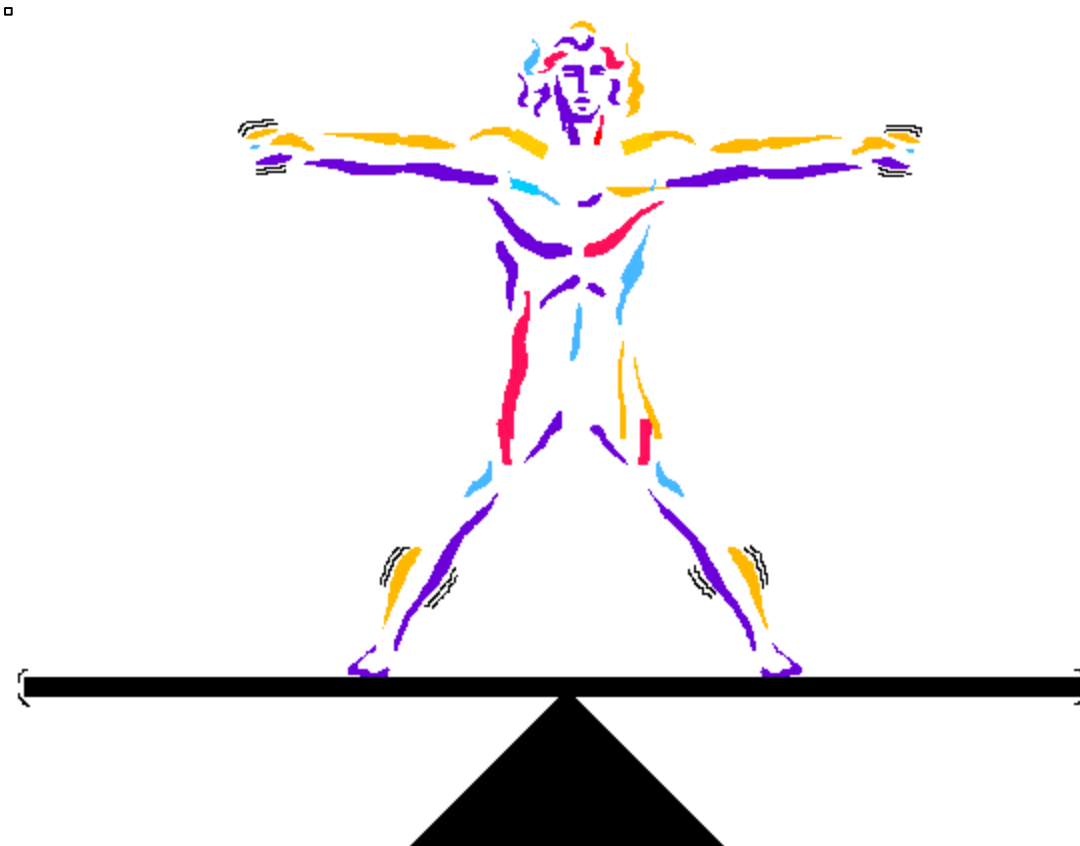


Thyroid Binding Globulin

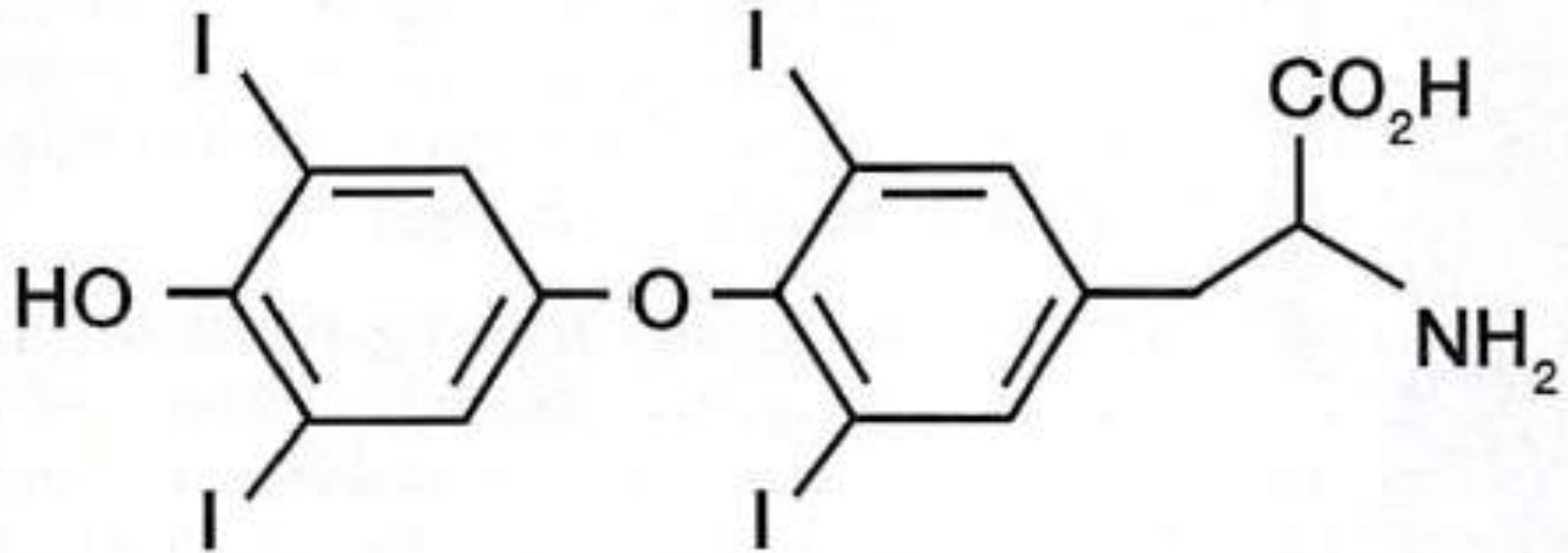
5'
deiodinase

T2

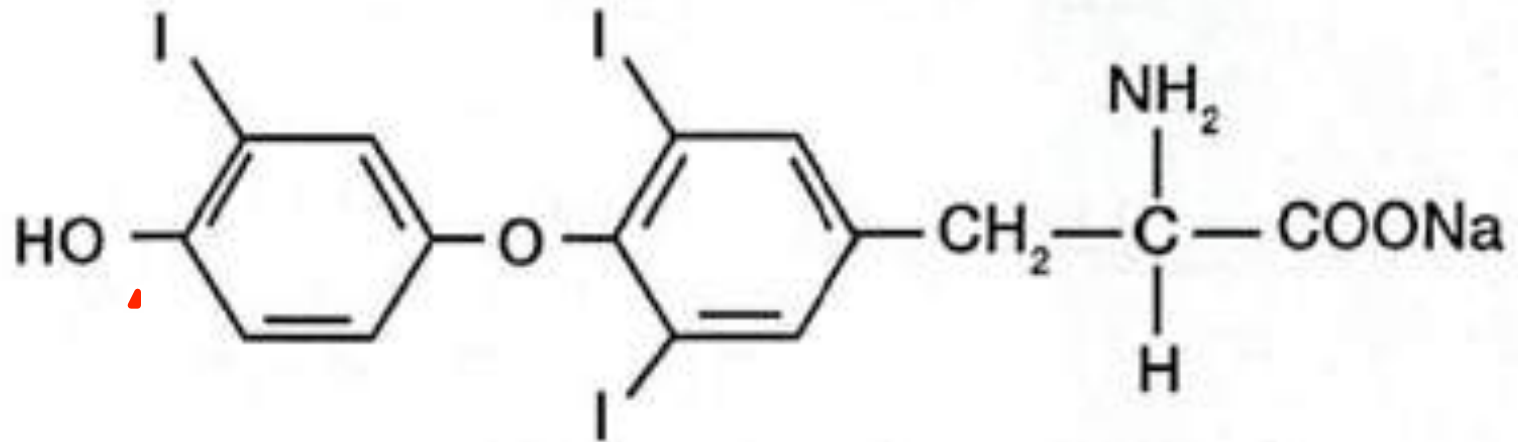
Molecular Homeostasis



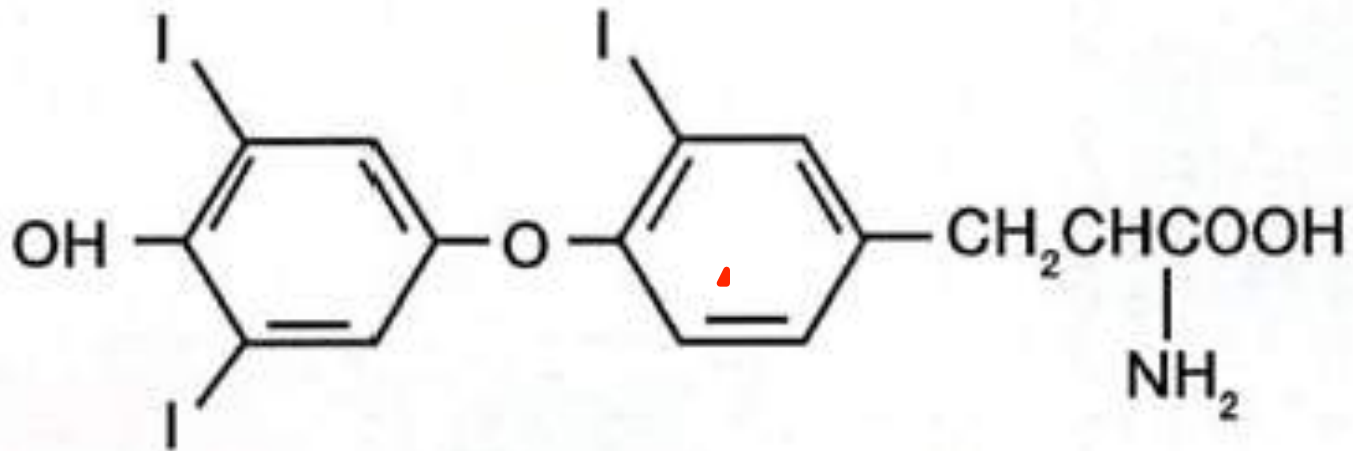
thyroxin - T4 - levothyroxine



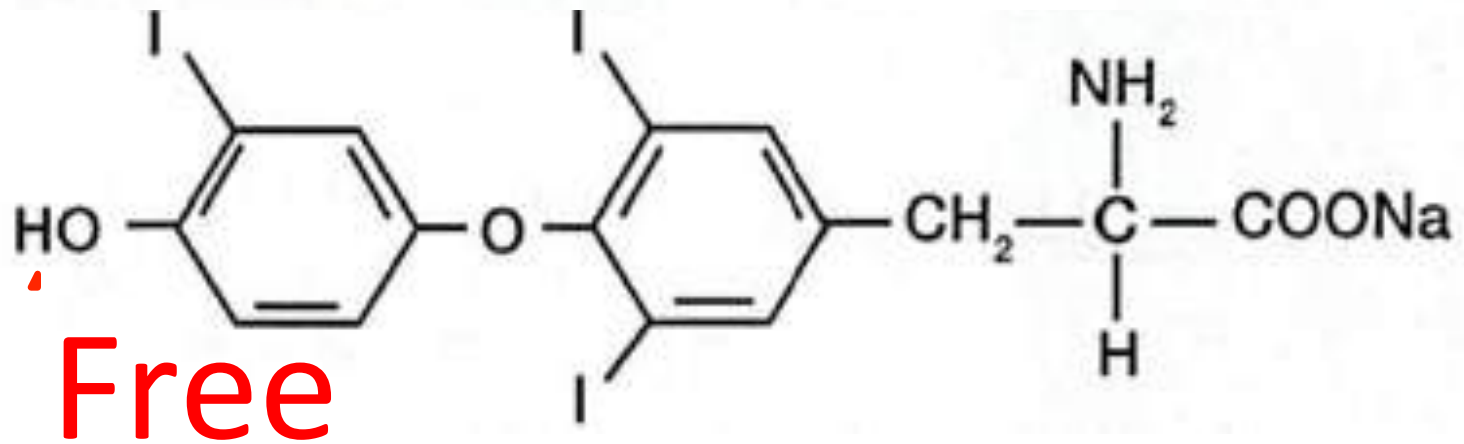
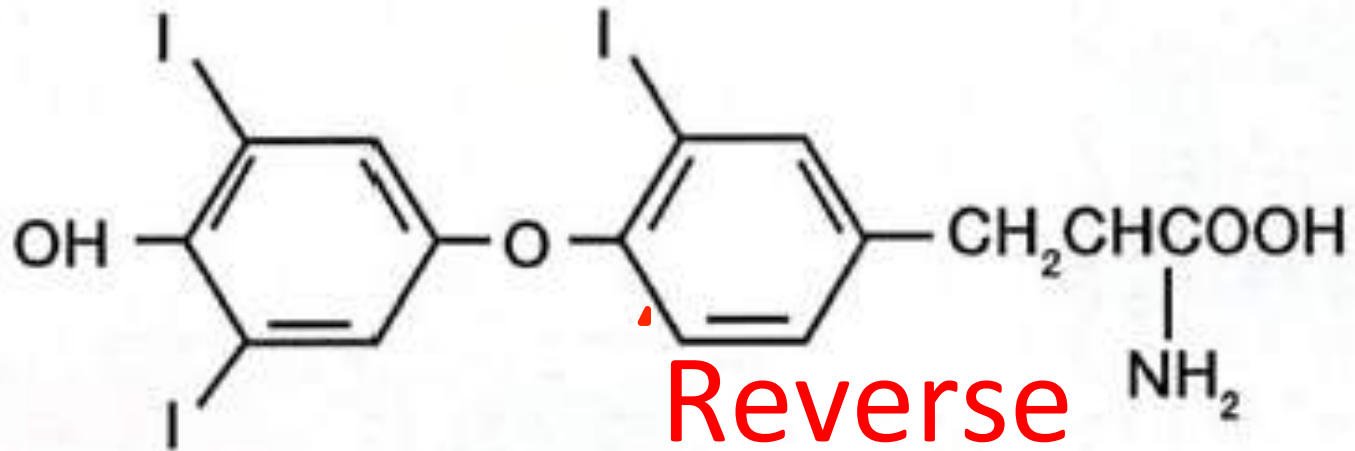
T3 – liothyronine



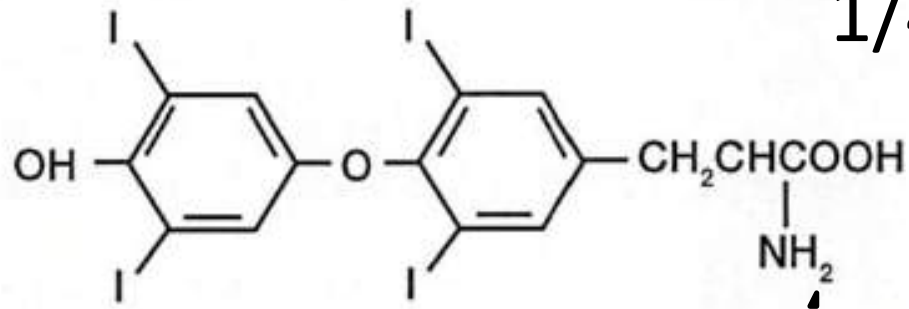
Reverse T3



Reverse T3 vs. Free T3

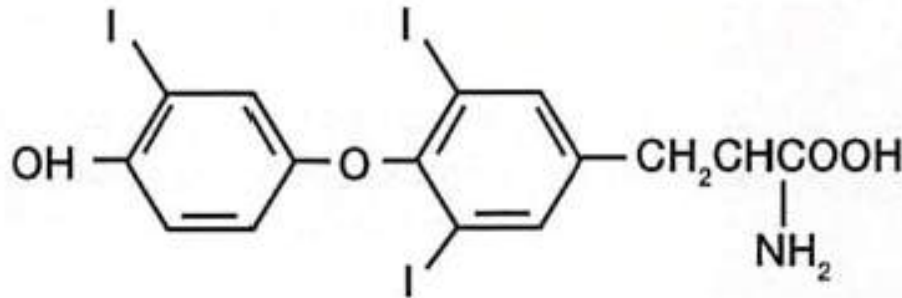


T4 •



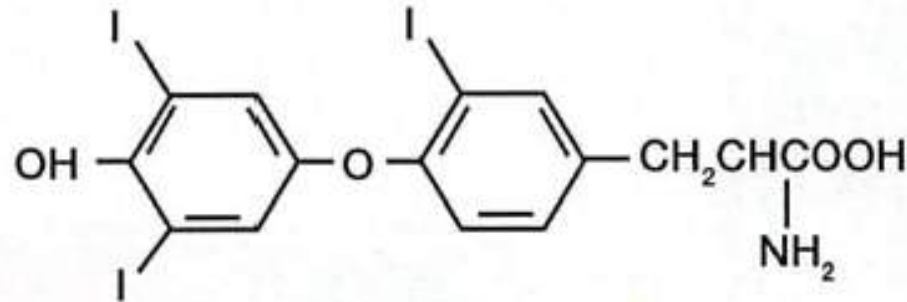
1/4

T3 •



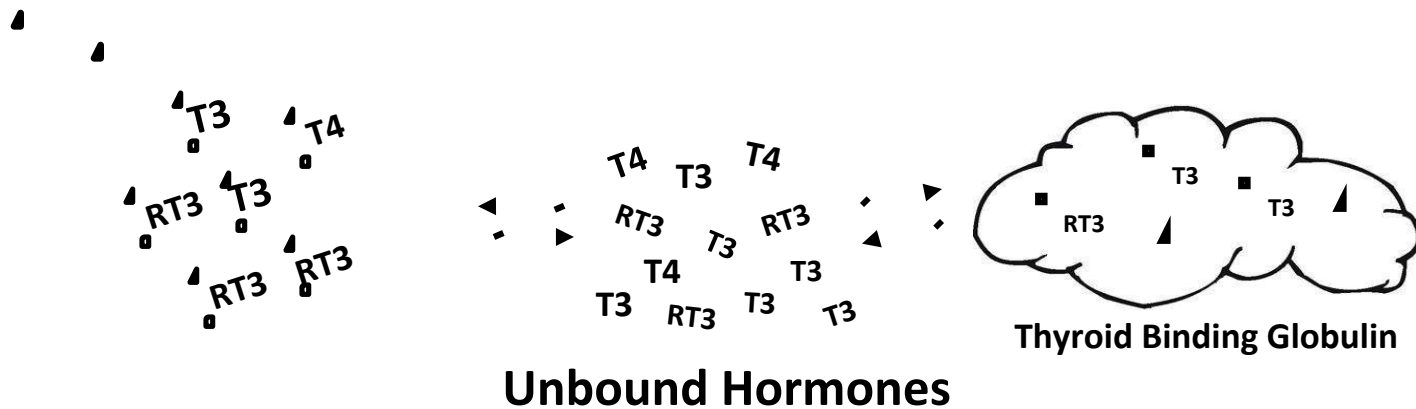
1

rT3 •



0

Thyroid hormones are delivered to EVERY CELL IN THE BODY!



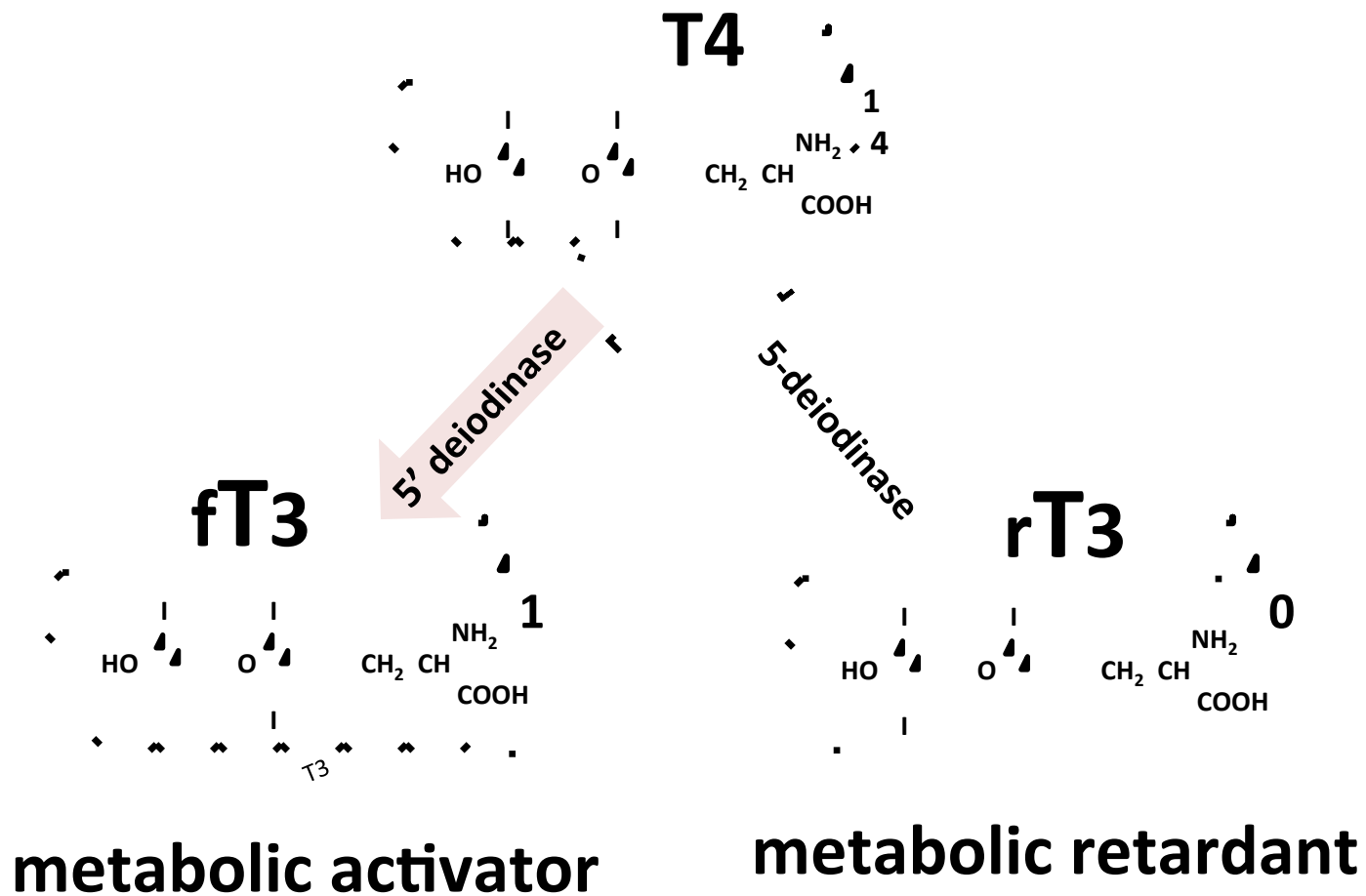
$fT3/rT3$ Ratio = Oxygen utilization?



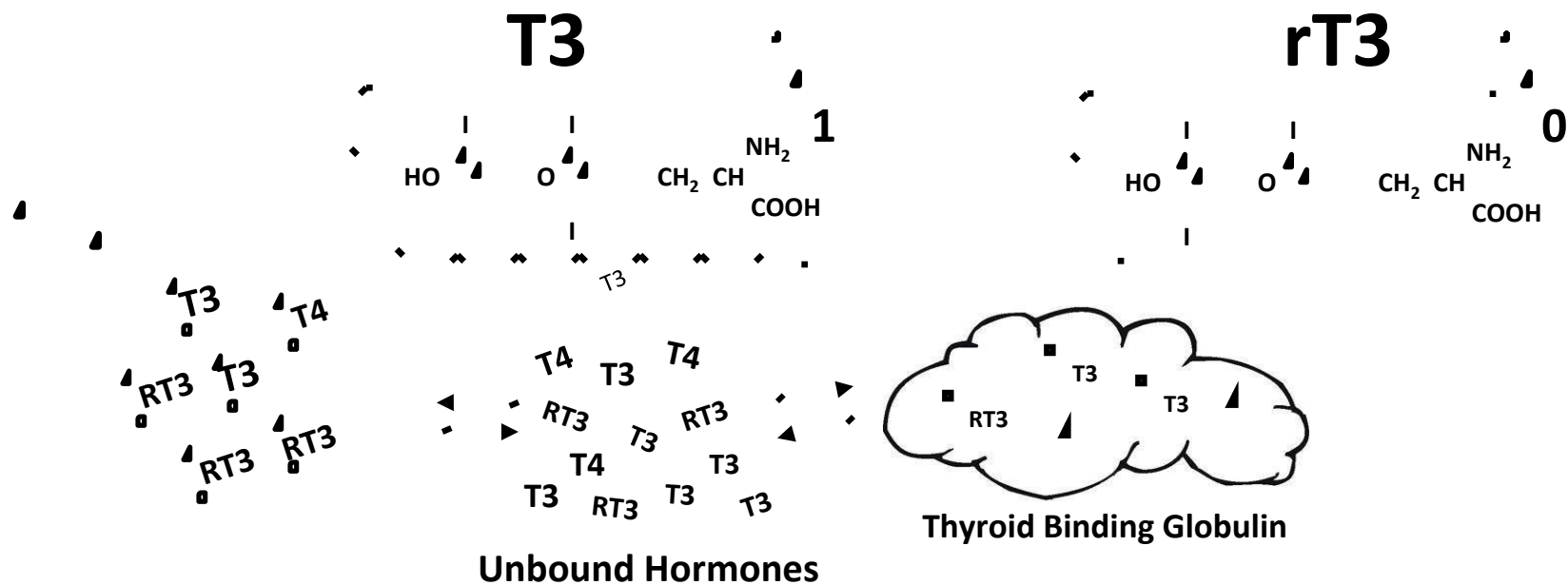
* For extensive references go to www.nahypothroidism.org

The Thyroid-Metabolic Regulation System

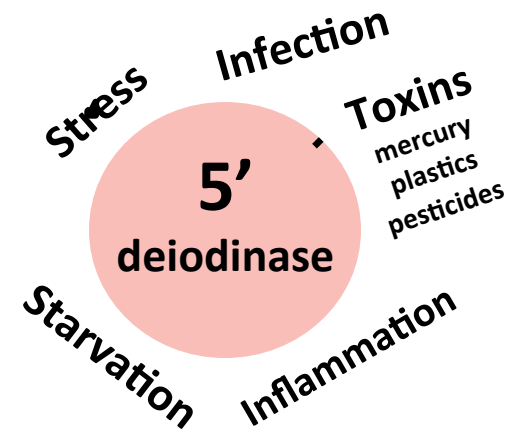
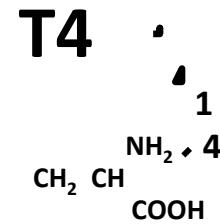
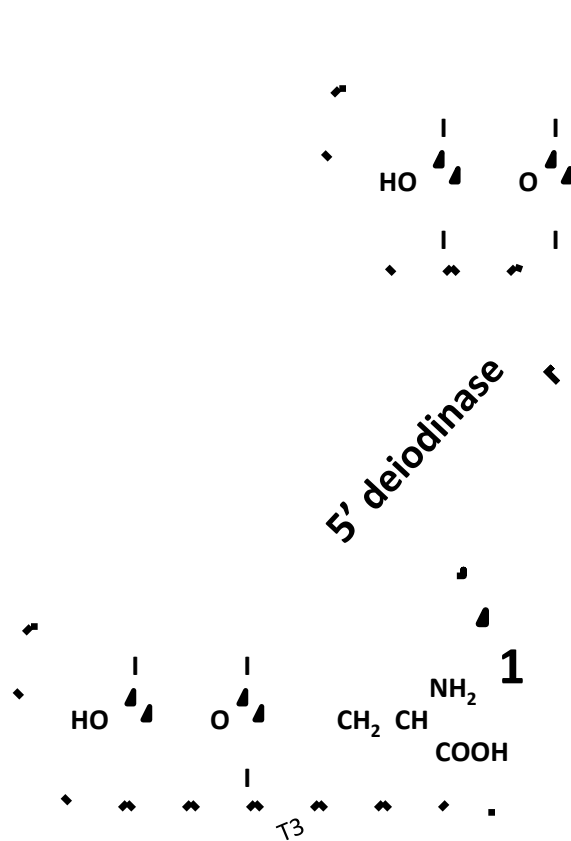
Peripheral Regulation



The **rT3** has **ZERO** activity once
in the cellular receptor.
This is “**Competitive Inhibition**”



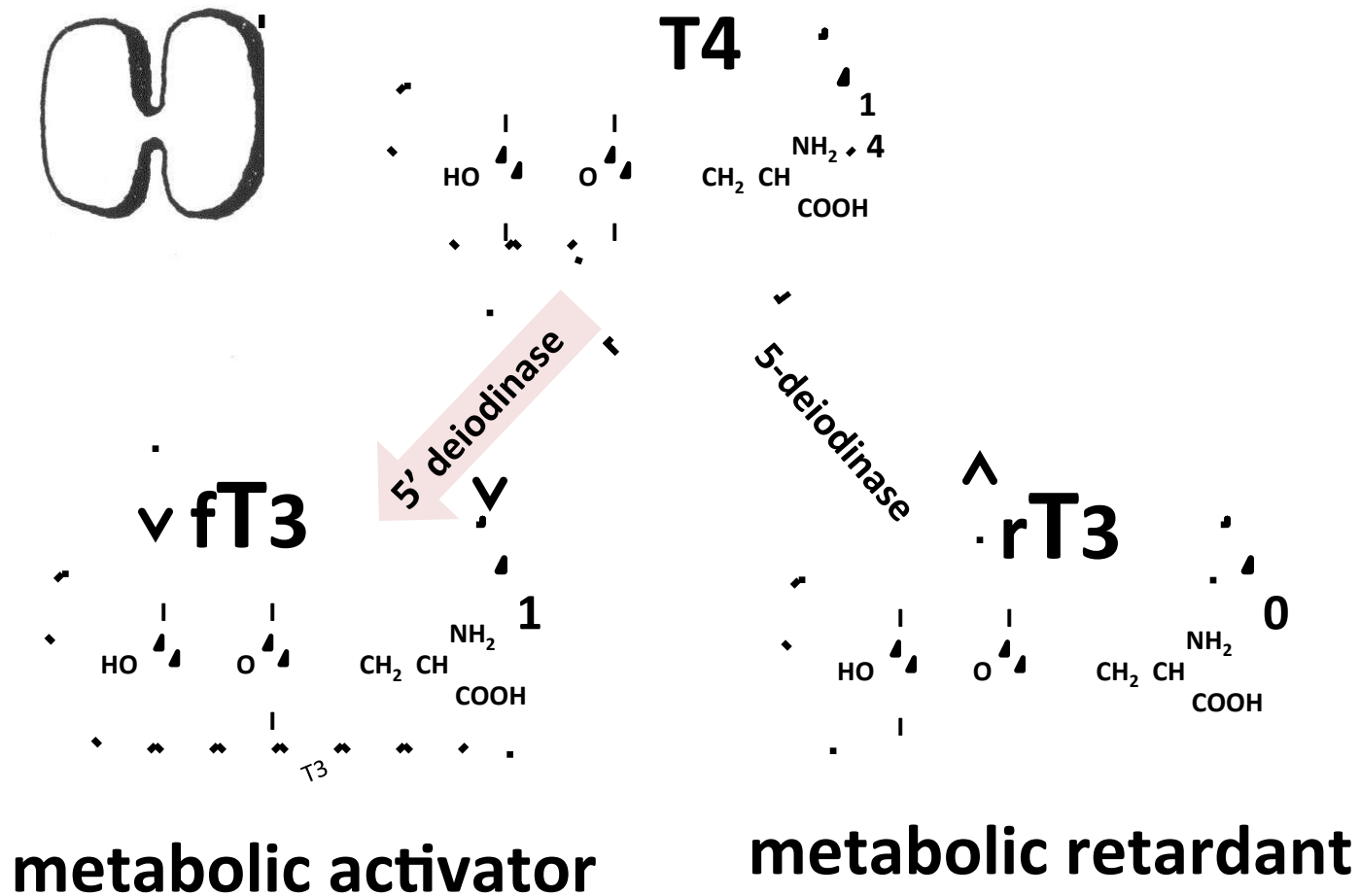
Environmental Factors REGULATE Enzyme Kinetics



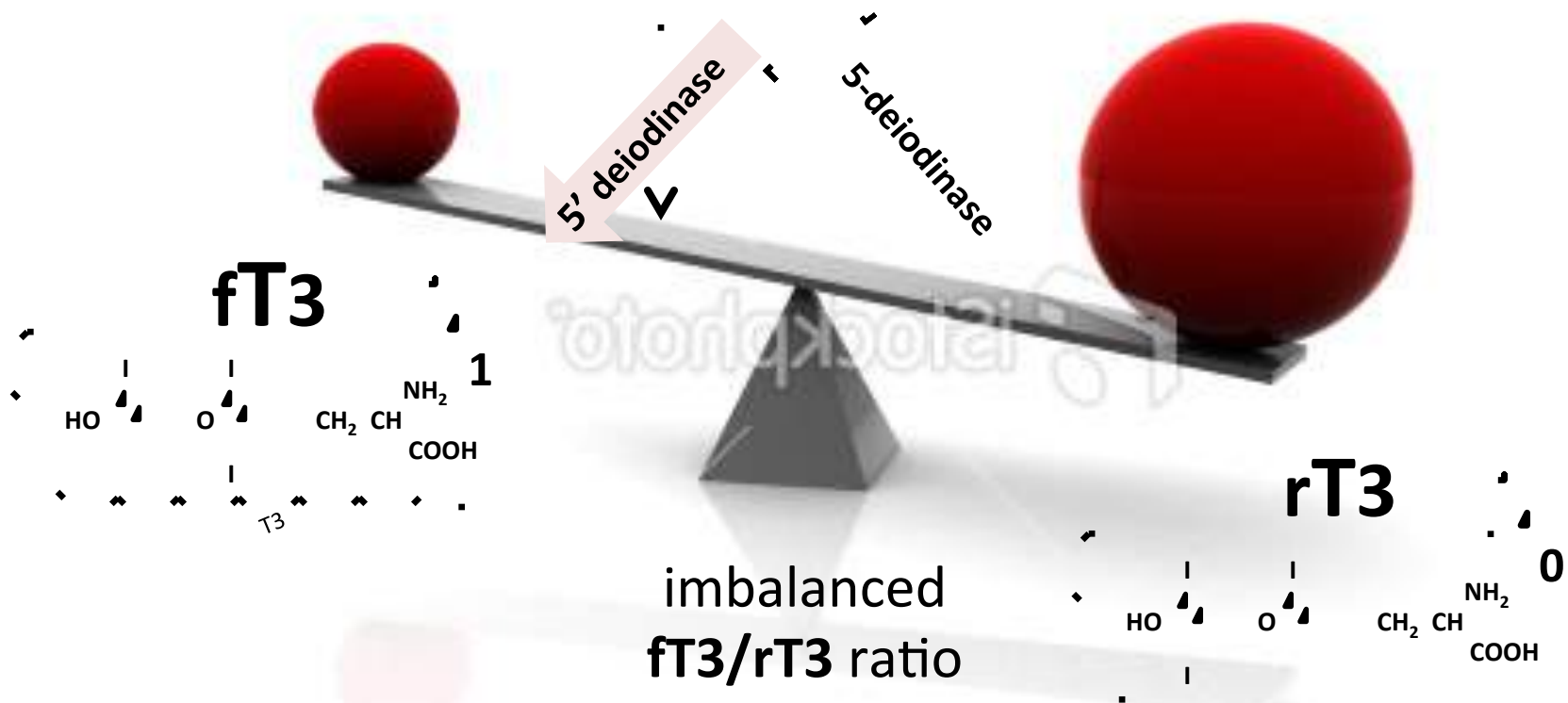
**EPIGENETIC
Root Causes?**

The Thyroid-Metabolic Regulation System

Peripheral Regulation

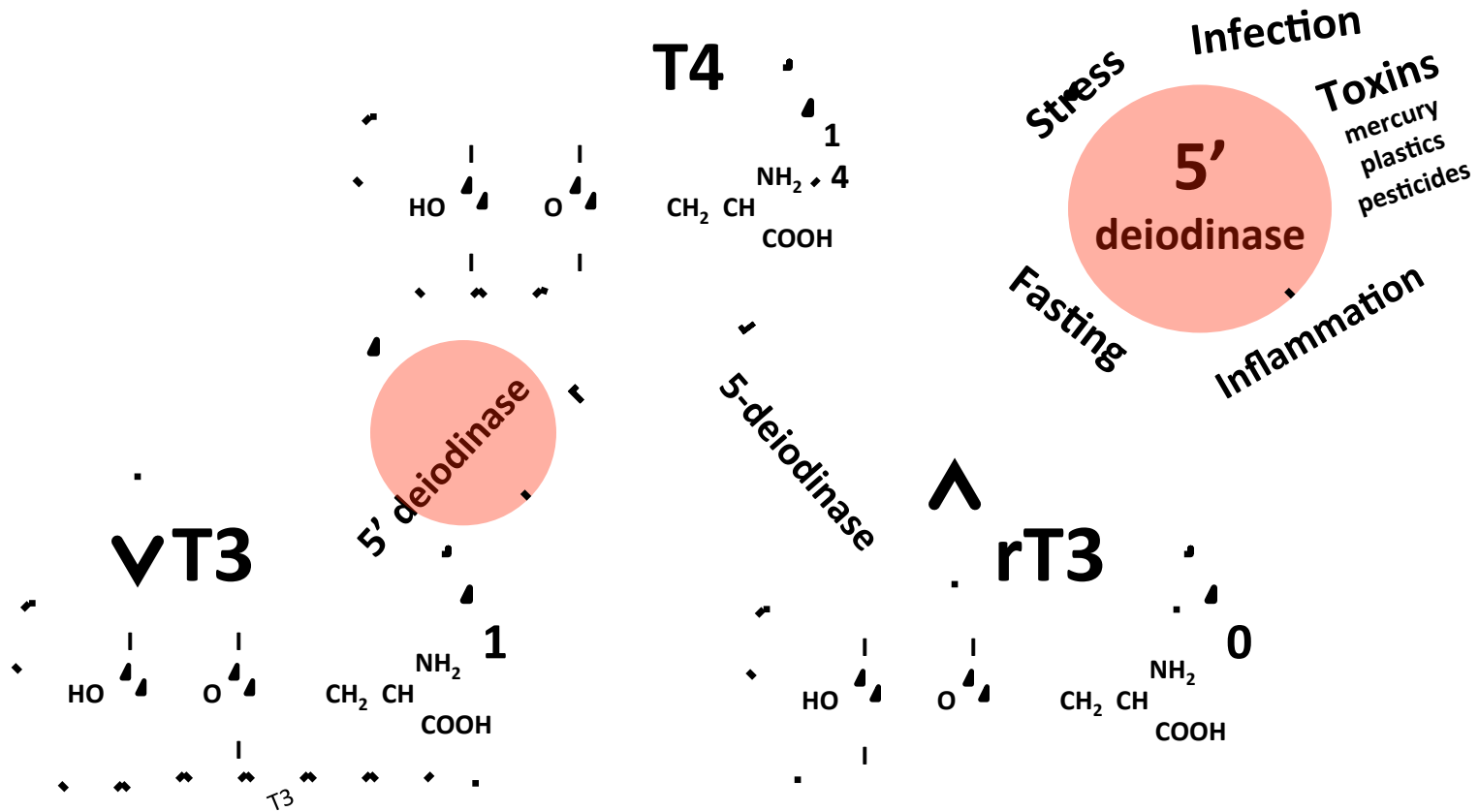


Environment Stressors SHIFT Balance to rT3:



The Thyroid-Metabolic Regulation System

Peripheral Dysregulators

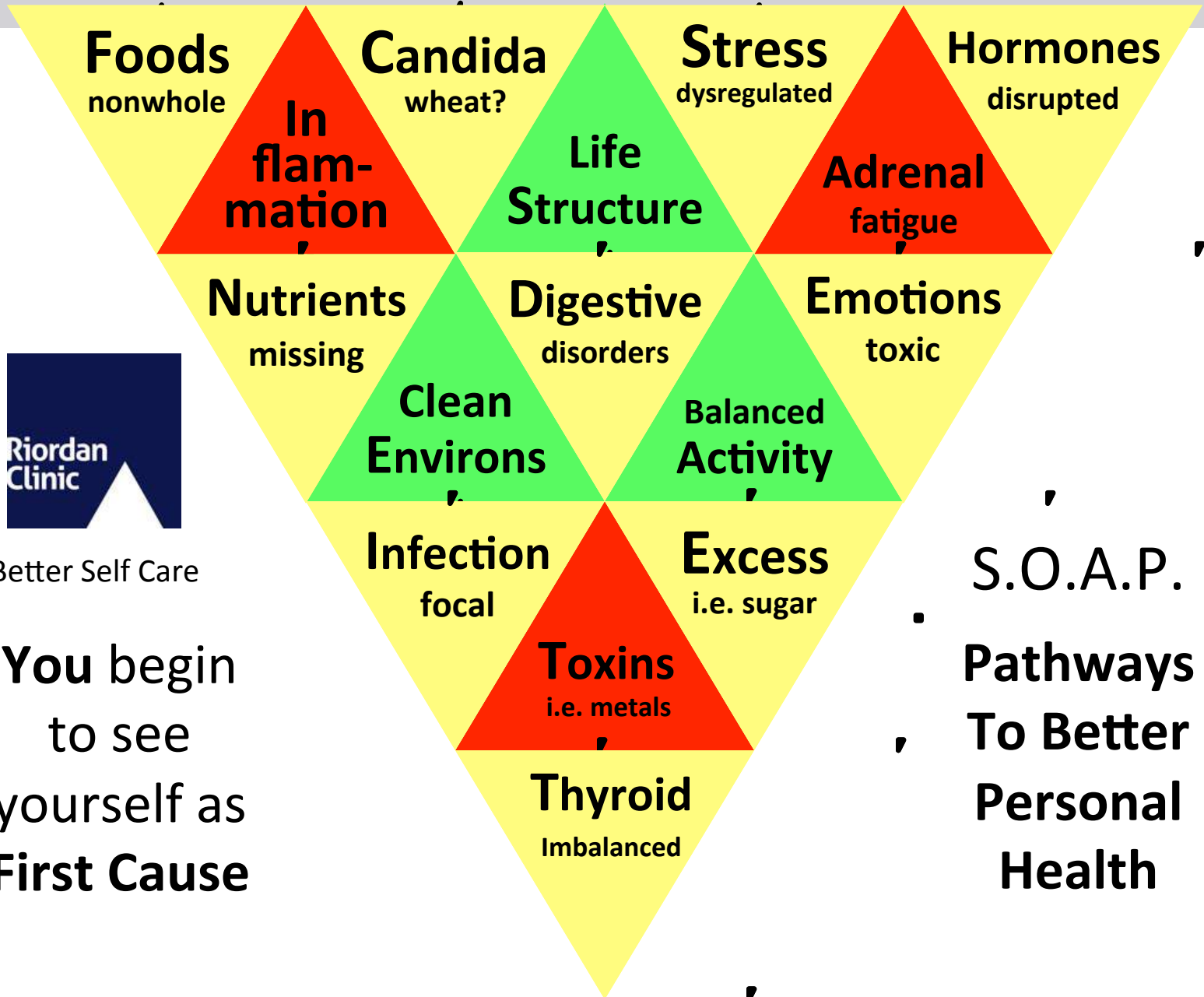


Abnormal fT3/rT3 = "Dysregulation"

fT3/rT3 Dysregulators

Epigenetic Factors that Retard Metabolism

High cortisol	Low nutrients:	Inflamed NF kappa-B	Severe illness	Toxins Metals
Infection, Injuries	Vitamin D Iodine	High hsCRP	Frost bite Hemorrhage	Bisphenol-A Phthalates
Insulin resistance	B12 B6	Free radicals	Chronic hepatitis	Pb, Hg, etc. Obesity
Diabetes High Hba1c	Zinc Chromium	Chronic pain	Alcoholism Drug abuse	Leptin resistance
Aging Surgery	Iron Selenium	ICU syndrome	Hormonal disorders	Starvation Diets



Better Self Care

You begin
to see
yourself as
First Cause

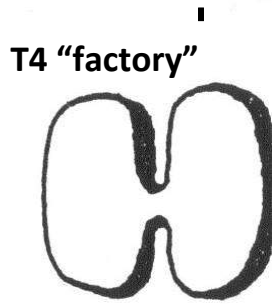
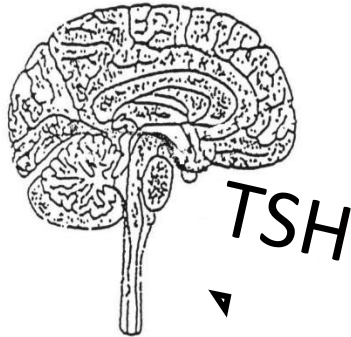
S.O.A.P.
Pathways
To Better
Personal
Health

The Goal of Therapy is to Restore Metabolic Homeostasis (Balance)

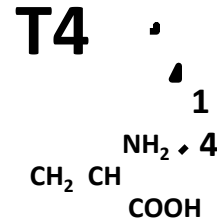


The Thyroid-Metabolic Regulation System

Glandular Regulation



Peripheral Regulation



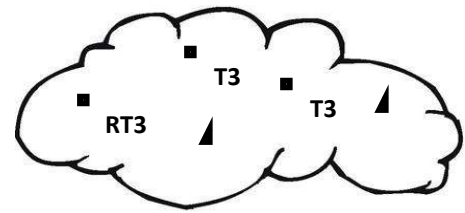
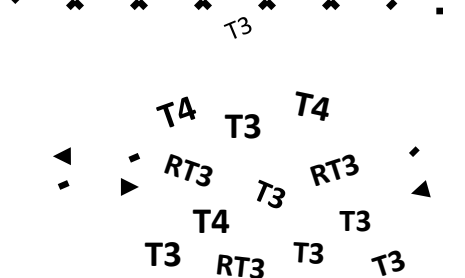
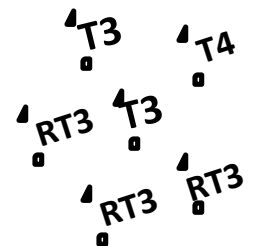
Stress
Infection
Toxins
 mercury
 plastics
 pesticides

5'
deiodinase

Fasting
Inflammation



Type 2 Hypothyroidism



Unbound Hormones



Reverse T3 is a “blank key”

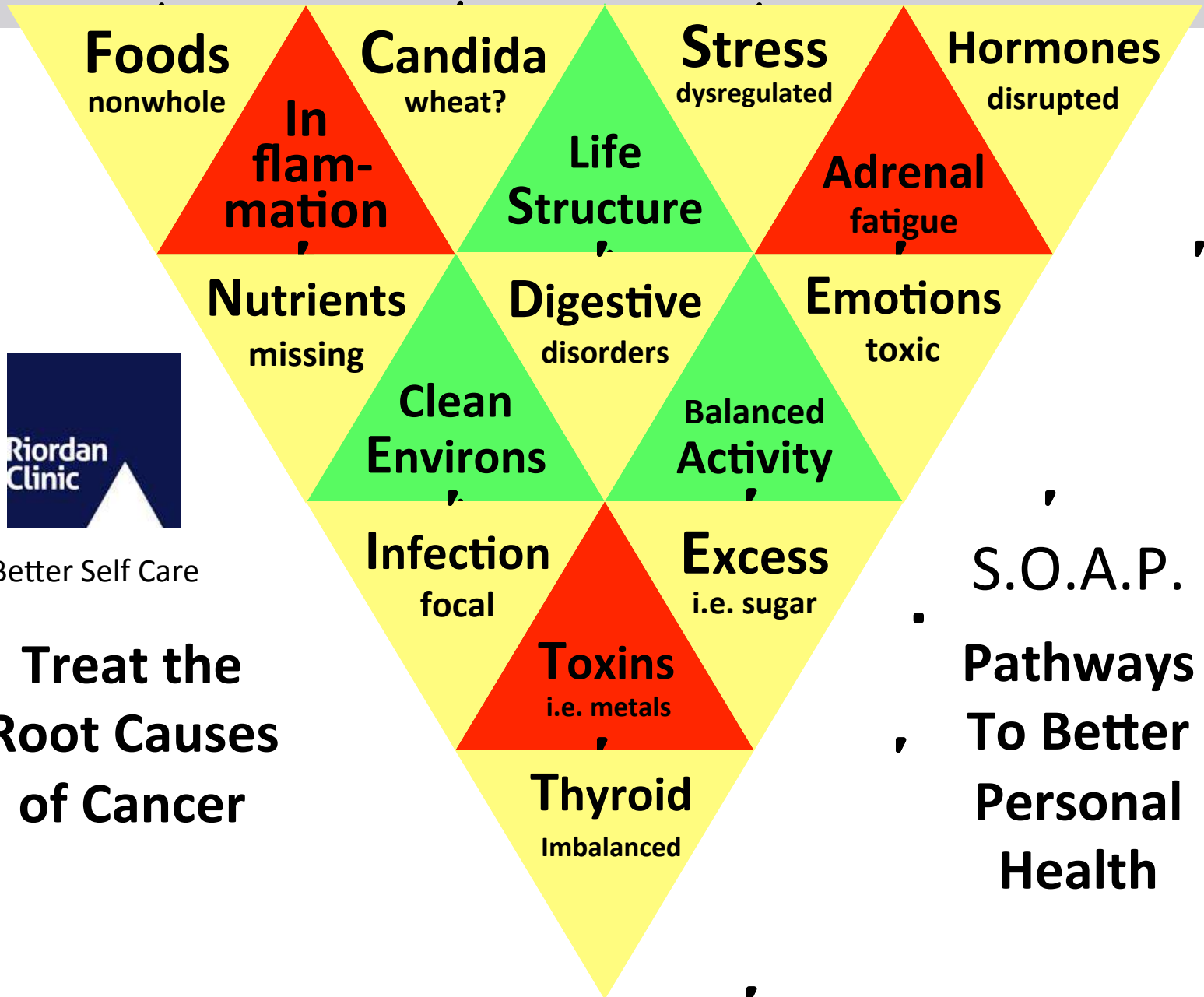
- **rT3** occupies **but does not stimulate** thyroid nuclear receptors
 - this is how **rT3** retards metabolic activity by “competitive inhibition”
 - however, the degree of metabolic retardation is NOT DETERMINED BY rT3 alone
- Free T3 activation is reduced when 5’deiodinase is blocked by the **dysregulation effect**
- As Free T3 drops and Reverse T3 rises – the net result is a **lowering** of the **fT3/rT3 ratio**

Cellular Hypothyroidism

- The Reverse T3 level inversely correlates with levels of **intracellular T3** (metabolic activator)
- Reverse T3 (metabolic retardant) is a marker for **cellular hypothyroidism** (TSH & fT4 are normal)
- Cellular or tissue hypothyroidism:
 - **Higher levels of Reverse T3**
 - **Lower Free T3/Reverse T3 ratio [ratio < 18/1]**

Treat the Underlying Dysregulators

- Improving the fT3/rT3 ratio will improve metabolic function and reduce the symptoms of thyroid dysregulation
- Addressing and correcting THYROID DYSREGULATORS will stabilize the metabolic improvements of an improved fT3/rT3 ratio
- Pragmatically, use T3 to improve metabolism...
- Then work on ROOT CAUSES to obviate the need for supplemental T3



Better Self Care

**Treat the
Root Causes
of Cancer**

**S.O.A.P.
Pathways
To Better
Personal
Health**

The Metabolism is a Unified System

- There are several feedback loops that tie the thyroid-metabolic system together
- “Pull one leg of the three-legged stool and the whole stool moves in unison.”
- To achieve a healthy system, **begin** correcting the dysregulated parts of an individual’s system
- This takes time, knowledge, commitment to better self care, and good wellness coaching

Antibiotics

Infection

Germs

Inflammation

Stress

Cytokines

Toxins

**Pot
Belly**

Cortisol

5' deiodinase

X

Insulin

T3 metabolism

Resistance

The Thyroid is One Part of an Even Greater Array of Epigenetic Challenges

- As depicted in the following chart, life is lived in a vast array of epigenetic challenges (LOOPS)
- **The trick is to find a way to GET STARTED!**
- With each new health enhancement, the individual breaks free of old loops and engages previously dysfunctional healing mechanisms
- An “upward spiral” of better health becomes self-reinforcing and re-regulating

In the meantime...

- Because metabolism generates energy...
- Because energy is a necessary for health restoration...
- It makes sense to improve the fT3/rT3 ratio in order to help the individual recover enough energy to initiate other efforts at self care
- The quickest way to improve this ratio is to add small doses of T3 (2.5-5.0 mcg) in conjunction with nutrient replacement and detoxification
- Use ½ - 1 grain desiccated thyroid = (2.5-5.0mcg)

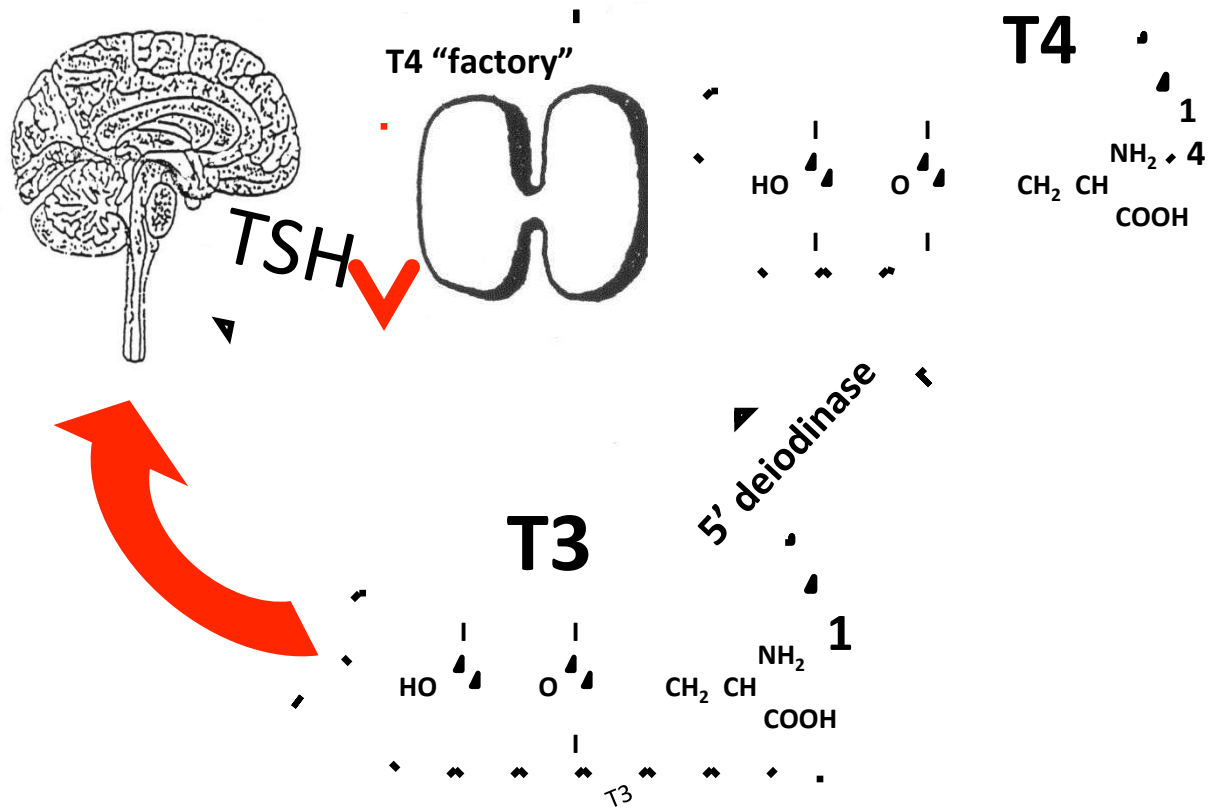
Add Small Amounts of T3 Thyroid in order to Improve the fT3/rT3 ratio

Desiccated Thyroid (30 mg) contains about 5 mcg of T3 and almost 20 mcg of T4






$$\text{fT3} / \text{rT3} = \frac{18-21}{1}$$

Cytomel (pure T3) comes in 5 mcg tablets (no T4)


Glandular Regulation



■ Needs Improvement
 ■ Within Acceptable Range (+ 2 Standard Deviations)
 ■ Beyond the Expected Range
 * Below Detectable Limits

		Result	Expected Range	Units
THYROID TESTING				
Reverse T3 <small>[3]</small>	 H	39.7	9.2 - 24.1	ng/dL
Free T3		2.72	1.71 - 3.71	pg/mL
TSH	 L Result is less than 0.1 uIU/mL	0.1	0.4 - 2.8	uIU/mL
Free T4		0.83	0.71 - 1.85	ng/dL

SPECIAL ASSAYS

CRP-hs	 H	14.2	0.0 - 1.9	mg/L
C-Reactive Protein (CRP) Risk Factors < 0.7 mg/L Lowest Risk 0.7 - 1.1 mg/L Low Risk 1.2 - 1.9 mg/L Moderate Risk 2.0 - 3.8 mg/L High Risk > 3.8 mg/L Highest Risk				

Vitamin K
[19]


[3] Performed by LabCorp., 1447 York Ct., Burlington, NC 27215
[19] Performed by Genova Diagnostics, 3425 Corporate Way Duluth, GA 30096

See Report


[Maybe our new diagnostic chelation would help us determine if

Inflammation is still causing you to run a high Reverse T3. Do you have root canals

■ Needs Improvement
 ■ Within Acceptable Range (+ 2 Standard Deviations)
 ■ Beyond the Expected Range
 * Below Detectable Limits

		Result	Expected Range	Units
THYROID TESTING				
Reverse T3 <small>[3]</small>		22.5	9.2 - 24.1	ng/dL

SPECIAL ASSAYS

CRP-hs		H	7.7	0.0 - 1.9	mg/L
C-Reactive Protein (CRP) Risk Factors < 0.7 mg/L Lowest Risk 0.7 - 1.1 mg/L Low Risk 1.2 - 1.9 mg/L Moderate Risk 2.0 - 3.8 mg/L High Risk > 3.8 mg/L Highest Risk					

[3] Performed by LabCorp., 1447 York Ct., Burlington, NC 27215

10/29/2013

$$\frac{fT3 \times 100}{rT3} = \frac{272}{39.7} = \frac{6.8}{1}$$

1/08/2014

$$\frac{fT3 \times 100}{rT3} = \frac{292}{22.5} = \frac{13}{1}$$

**10
Keys
To Balance**

**Root
Causes
6**

Food
GI

Better Self Care

- **Maintain a healthy FT3/RT3 Ratio!**

- **IVC First!**

