Endobiogeny: Personalized Medicine for All:  
*Applied Global Systems Biology*

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President, American Society of Endobiogenic Medicine and Integrative Physiology  
Co-President, Systems Biology Research Group
INTRODUCTION: WHAT IS PERSONALIZED MEDICINE?
Goals

• Distinguish two approaches to Personalized Medicine
• Learn the difference between global and non-global systems approaches to human physiology
• Learn how to personalize the treatment of Thyroiditis and Anxiety
PERSONALIZED MEDICINE: HYPE OR HOPE?
3 women divorce at menopause

Stress
- Anxiety
- MS

Stress
- Anxiety
- Hashimoto

Stress
- Joy
- UTI
Personalized medicine: risk prediction, targeted therapies and mobile health technology

Daniel F Hayes¹, Hugh S Markus², R David Leslie³ and Eric J Topol⁴

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Abstract

Personalized medicine is increasingly being employed across many areas of clinical practice, as genes associated with specific diseases are discovered and targeted therapies are developed. Mobile apps are also beginning to be used in medicine with the aim of providing a personalized approach to disease management. In some areas of medicine, patient-tailored risk prediction and treatment are applied routinely in the clinic, whereas in other fields, more work is required to translate scientific advances into individualized treatment. In this forum article, we asked specialists in
Foundation of a Genetic Approach

Gene “X” single protein $\rightarrow$ cells metabolism
   $\rightarrow$ tissues function
   $\rightarrow$ whole system
   $\rightarrow$ Disease Y.

_Ergo: gene “X” is the cause of disease “Y”_
Perils of Genetic Approach

• Billions spent, very little clinical treatments

• Correlation vs. Causation
  – Retrospective studies positive\(^1\)
  – Prospective studies non-significant\(^2-4\)

Putting *Person* in Personalized Medicine

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INTRODUCTION TO ENDOBIOGENY
ENDOBIODYGENY

Reductionism

- Quantitative
- Function of the parts
- Hierarchy
- Categorical
- Separate
- Independent
- Static
- Control

Holism

- Qualitative
- Function of System
- Relationships
- Individualized
- Interconnected
- Interdependence
- Dynamic
- Creative chaos

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Regulation of Terrain

Concept of terrain

Endobiogeny: theory of how terrain manages metabolism

Terrain: Ceaseless Metabolism

Endocrine System: manages metabolism

Endocrine System manages terrain
### Elements of the Terrain: Metabolism

<table>
<thead>
<tr>
<th>CATABOLISM</th>
<th>ANABOLISM</th>
<th>CATABOLISM</th>
<th>ANABOLISM</th>
</tr>
</thead>
<tbody>
<tr>
<td>CRH</td>
<td>GnRH</td>
<td>TRH</td>
<td>GHRH</td>
</tr>
<tr>
<td>ACTH</td>
<td>FSH, LH</td>
<td>TSH</td>
<td>GH, PL</td>
</tr>
<tr>
<td>ADRENALS</td>
<td>GONADS</td>
<td>THYROID</td>
<td>PANCREAS</td>
</tr>
<tr>
<td>Corticotropic</td>
<td>Gonadotropic</td>
<td>Thyrotropic</td>
<td>Somatotropic</td>
</tr>
<tr>
<td>Nutrients</td>
<td>Proteins</td>
<td>Lipids</td>
<td>Lipids, Carbs</td>
</tr>
</tbody>
</table>

**ENDOCRINE MANAGEMENT**

- **Corticotropic**
  - CRH
  - ACTH
  - ADRENALS

- **Gonadotropic**
  - GnRH
  - FSH
  - LH
  - GONADS

- **Thyrotropic**
  - TRH
  - TSH
  - THYROID

- **Somatotropic**
  - GHRH
  - GH
  - PL
  - PANCREAS

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Elements of Terrain: ANS

Para Sympathetic: 
*Rest and Assimilation*

Beta Sympathetic: 
*Action, Expression*

Alpha Sympathetic: 
*Alertness, Focus*

SEROTONIN

HISTAMINE
Emunctories

• an organ that drains and excretes waste products.
Emunctory-Endocrine relationships

Catabolism

CRH
ACTH
Adrenals

Corticotropic

TRH
TSH
Thyroid

Thyrotropic
Endocrine Axes and Glands

- Catabolism
  - CRH
  - ACTH
  - Adrenals

- Anabolism
  - GnRH
  - FSH
  - LH
  - Gonads

- Catabolism
  - TRH
  - TSH
  - Thyroid

- Anabolism
  - GHRH
  - GH
  - PL
  - Pancreas

- Corticotropic
- Gonadotropic
- Thyrotropic
- Somatotropic

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Stress: General Considerations

Psychic stress

Physiologic stress

Central Nervous System

Neuro-Endocrine Emunctories

Stressor

Who?

Why?

What?

How?

Stress

MECHANISMS
Reductionist Medicine

EFFECT

RESPONSE

AGENT

CAUSE

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Global Systems Personalized Approach to Stress

Terrain
- CNS: Mental & Emotional Regulation
- Endocrine
- ANS
- Emunctories
- Immunity
- Organs
- Lymphatics

External Environment
- Epigenetics

Genotype
- Life Phase
- Auto-Pathogenicity

Phenotype
- Microbiome
- Alimentation
- Rhythmic living

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ENDOBIIOGENIC APPROACH TO EVALUATION AND TREATMENT
Approaching Clinical Certainty

History

Physical

BoF

Probable Certainty

Corroboration
Overview of the History

- Present illness
- Past Medical History
- Childhood
  - Conception, Birth, Delivery
  - Infancy, Childhood, Adolescence
- Adulthood
  - Illnesses
  - Surgeries
- Traumas

Information
- Onset
- Duration
- Frequency
- Factors
  - Ameliorating
  - Aggravating
- Other
  - Evaluations
  - Treatments

Format
- Timeline
- By Illness

Family history

Parental health

Diet

Illnesses

Development

Temperament

ROS

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The endobiogenic consultation creates a dynamic, historical, holographic and hierarchical assessment of the patient as a living being moving through space and time in constant and dynamic action and reaction to its internal and external environments.
Elements of the History

1. Present illness
2. Review of systems
3. Past history
4. Family history

Call forth a story from the person seeking healing.
Neuroendocrine trajectories

- Fetal
- Infancy
- Childhood
- Adolescence
- Adulthood

Materno-infant interaction

Adverse Childhood Event (ACE): Hyper-adaptation

Blocked Adaptation

ACE: Hypo-adaptation

Temperament

Personality

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# Matrix of PMH factors

<table>
<thead>
<tr>
<th>Category</th>
<th>Sub-Category</th>
<th>Genetic</th>
<th>Epigenetic</th>
<th>Pheno-type</th>
<th>Culture</th>
<th>Environment</th>
<th>Geography</th>
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<tbody>
<tr>
<td>Childhood</td>
<td>Conception</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Birth</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Infancy</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td></td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td></td>
<td>Toddlerhood</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td></td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td></td>
<td>Adolescence</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td></td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td>Medical</td>
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<td>•</td>
<td>•</td>
<td></td>
<td></td>
<td>•</td>
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<tr>
<td>Surgical</td>
<td>N/A</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td></td>
<td></td>
<td>•</td>
</tr>
<tr>
<td>Family history</td>
<td>N/A</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
</tr>
</tbody>
</table>
Seasons and Chronobiology

Thyroid metabolic

Adrenal Cortex

Spring
  Pre-Summer
Summer
  Pre-Autumn
Autumn
  Pre-Winter
Winter
  Pre-Spring

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Figure 3. Phylum level taxa abundances differ by season.


http://journals.plos.org/plosone/article%3Fid=10.1371/journal.pone.0090731
Examination

Expert opinion only: based on superficial referral points of viscera

Thyroid
Pancreas
Adrenals
Liver
Blood Analysis: Biology of Functions

• Standard blood tests
  – Objective
  – Reproducible

• Physiologic analysis
  – Upstream/Downstream
  – Qualitative
  – Quantitative
Blood Work

Image 2: (left to right) Erythrocytes, Thrombocytes, Leukocytes
Table 1: Biomarkers

<table>
<thead>
<tr>
<th>Origin</th>
<th>Biomarker</th>
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</thead>
<tbody>
<tr>
<td>Bone Marrow</td>
<td>Red blood cell</td>
</tr>
<tr>
<td></td>
<td>White blood cell, total</td>
</tr>
<tr>
<td></td>
<td>Neutrophil</td>
</tr>
<tr>
<td></td>
<td>Lymphocytes</td>
</tr>
<tr>
<td></td>
<td>Eosinophils</td>
</tr>
<tr>
<td></td>
<td>Monocytes</td>
</tr>
<tr>
<td></td>
<td>Basophils</td>
</tr>
<tr>
<td></td>
<td>Hemoglobin</td>
</tr>
<tr>
<td></td>
<td>Platelets</td>
</tr>
<tr>
<td>Marrow-Blood interaction</td>
<td>Erythrocyte sedimentation rate</td>
</tr>
<tr>
<td>Bone Stroma Enzymes</td>
<td>Osteocalcin</td>
</tr>
<tr>
<td></td>
<td>Alkaline phosphatase bone isoenzyme</td>
</tr>
<tr>
<td>General Enzymes</td>
<td>Lactate dehydrogenase</td>
</tr>
<tr>
<td></td>
<td>Creatine phosphokinase</td>
</tr>
<tr>
<td>Endocrine: Pituitary</td>
<td>Thyroid stimulating hormone</td>
</tr>
<tr>
<td>Electrolytes</td>
<td>Potassium</td>
</tr>
<tr>
<td></td>
<td>Calcium, total serum</td>
</tr>
</tbody>
</table>
Upstream/Downstream: Direct

**UPSTREAM**

Increased Oxidative Demand

**Downstream**

Reduced Oxidative Demand

Cell

Upstream: T4, T3

Downstream: ??

↑ LDH

↓ LDH

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Upstream/Downstream: Inverse

**UPSTREAM**

Efficient Thyroid Metabolic

**Cell**

![Cell diagram](image)

Inefficient Thyroid Metabolic

**DOWNSTREAM**

![CK diagram](image)

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Direct ratio

Thyroid Metabolic Index

- Metabolic activity of thyroid hormones

\[ \text{= LDH / CK} = 3.5-5.5 \]
Clinical Observations

<table>
<thead>
<tr>
<th>Condition</th>
<th>LDH</th>
<th>CPK</th>
<th>Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hyperthyroidism</td>
<td>233.80</td>
<td>88.37</td>
<td>2.65</td>
</tr>
<tr>
<td>Sub-clinical Hyperthyroidism</td>
<td>227.81</td>
<td>105.98</td>
<td>2.15</td>
</tr>
<tr>
<td>Normal controls</td>
<td>202.85</td>
<td>102.19</td>
<td>1.99</td>
</tr>
<tr>
<td>Sub-clinical hypothyroidism</td>
<td>340.38</td>
<td>179.8</td>
<td>1.89</td>
</tr>
<tr>
<td>Hypothyroidism</td>
<td>421.00</td>
<td>389.90</td>
<td>1.08</td>
</tr>
</tbody>
</table>

Modified from McGrowder, DA et al., Nig J Clin Pract, 14(4), 2011
Endobiogenic Indices:
Higher orders of observation

Simple direct → Metaindices

- Neutrophil to Lymphocyte Ratio = Genito-Thyroid index
- Catabolism/Anabolism Index
  - Cortisol index
  - Adrenal Cortex Index
  - Metabolic yield
  - Somatostatin index
  - Histamine index
  - Ischemia Index
What is the patient’s diagnosis?

**CBC With Differential/Platelet**
- WBC: 4.4
- RBC: 4.62
- Hemoglobin: 13.8
- Hematocrit: 40.8
- MCV: 88
- MCH: 29.9
- MCHC: 33.8
- RDW: 14.0
- Platelets: 218
- Neutrophils: 59
- Lymphs: 32
- Monocytes: 6
- Eos: 2
- Basos: 1
- Neutrophils (Absolute): 2.6
- Lymphs (Absolute): 1.4
- Monocytes (Absolute): 0.3
- Eos (Absolute): 0.1
- Baso (Absolute): 0
- Immature Granulocytes: 0
- Immature Grans (Abs): 0

**Comp. Metabolic Panel (14)**
- Glucose, Serum: 92
- BUN: 8
- Creatinine, Serum: 0.83
- eGFR If NonAfrican Am: 94
- eGFR If African Am: 108
- BUN/Creatinine Ratio: 10

**Lipid Panel**
- Cholesterol, Total: 156
- Triglycerides: 74
- HDL Cholesterol: 57

**Comment**
- According to ATP-III Guidelines, HDL is a negative risk factor for CHD.
- VLDL Cholesterol Cal: 15
- LDL Cholesterol Calc: 84

**Alk Phos Isoenzyme**
- Liver Fraction: 56
- Bone Fraction: 28
- Intestinal Frac.: 16

**Thyroxine (T4) Free, Direct, S**
- T4, Free (Direct): 1.19

**CEA**
- 0.7
- Roche ECLIA met:

**CA 19–9**
- 10
- Roche ECLIA methodology

**TSH**
- 2.140

**Osteocalcin, Serum**
- 16.1
  - Pre-men:
  - Post-me:
Therapeutics

Probability of cure

Buffering capacity

Posology

Alimentation and Lifestyle

Oligoelements

Medicinal plants

Amino Acids, Vitamins, Antioxidants

Pharmaceuticals

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Activity of *Salvia officinalis* (Sauge)

**ENDOCRINE MANAGEMENT**

- **CATABOLISM**
  - CRH
  - ACTH
  - ADRENALS

- **ANABOLISM**
  - GnRH
  - FSH
  - LH
  - Estrogens

- **CATABOLISM**
  - TRH
  - TSH
  - THYROID

- **ANABOLISM**
  - GHRH
  - GH
  - PL
  - PANCREAS

**ANS**

- **Corticotropic**
- **Gonadotropic**
- **Thyrotropic**
- **Somatotropic**

**FUNCTIONS**

- **Digestion, Metabolism, Drainage**
- **Memory, Mood**
- **Inflammation, Mucous**

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Global Systems Approach to Personalized Medicine

SCALE

$>10^0 \text{m}$: Macroscopic
  • Cosmobiologic
  • Symbiotic
  • Social

$10^{-3}-10^{-1} \text{m}$: Mesoscopic
  • Organism
  • Organs
  • Tissues

$10^{-6}-10^{-3} \text{m}$: Microscopic
  • Cellular
  • Subcellular
  • DNA

Interrelations

Phenomenological

Mind

Modified from Looijestijn et al.
PERSONALIZED MEDICINE:
CASE STUDY
Case Study

• 55 yo female, post menopausal
• CC: Hashimoto’s thyroiditis, post divorce at 48
• Other:
  – Anxiety
  – Poor sleep: intense dreams
  – Mucous congestion with dairy
  – Pre-diabetic (HgA1c 6.2%)
## Understanding Symptoms

<table>
<thead>
<tr>
<th>Symptom</th>
<th>TRH</th>
<th>TSH</th>
<th>Pancreas</th>
<th>Endocrine</th>
<th>Exocrine</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anxiety with tremors</td>
<td>↑</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intense Dreams</td>
<td>↑</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pre-diabetic</td>
<td>↑</td>
<td></td>
<td></td>
<td>Endocrine</td>
<td></td>
</tr>
<tr>
<td>Mucous with dairy</td>
<td></td>
<td>↑</td>
<td></td>
<td>Exocrine</td>
<td></td>
</tr>
</tbody>
</table>

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TSH → Thymus gland → Digestive Enzymes → Proteins → Immune factors: Hyperimmunity → Insulin → Inflammation → Thyroiditis

Exocrine Pancreas-CNS 2

Liver congestion: Secretory
Liver congestion: Circulatory
Splanchnic congestion → hepato-pancreatic blockage

Murphy’s Point: Congestion: Sphincter of Oddi

Hepatic congestion, extra-hepatic: Sphincter of Oddi, Splanchnic congestion, Duodenal plexus

General pancreatic congestion
Exocrine pancreatic congestion

Endocrine pancreas overtaxed

Zone of distress

Expert opinion only: based on superficial referral points of viscera

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# Treatment

<table>
<thead>
<tr>
<th>Symptom</th>
<th>TRH</th>
<th>TSH</th>
<th>Pancreas</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anxiety with tremors</td>
<td>Motherwort</td>
<td></td>
<td>GABA, 50 mg TID</td>
</tr>
<tr>
<td>Intense Dreams</td>
<td>Motherwort</td>
<td></td>
<td>GABA, 50 mg TID</td>
</tr>
<tr>
<td>Pre-diabetic</td>
<td>Motherwort</td>
<td></td>
<td>GABA, 50 mg TID</td>
</tr>
<tr>
<td>Mucous with dairy</td>
<td>Milky Oat</td>
<td>Milky Oat</td>
<td>Avoid Dairy, Gluten</td>
</tr>
</tbody>
</table>
Sample prescriptions
GABA$^{1,2}$ 50 mg TID +

**Tincture**
- Motherwort MT 60 ml
- Milky oat MT 60 ml
- Lavender EO 4 ml

**DOSE:**
- 2 ml with breakfast
- 2 ml with dinner,
- 4 ml qHS

**Tisane (Medicinal Tea)**
- Motherwort 8 oz
- Milky oat 4 oz
- Passionflower 4 oz

**DOSING**
- Breakfast: 10 minute steep
- Lunch: 10 min steep
- Bedtime: 15 min steep

---

Leonurus cardiaca (Motherwort)

- **Parts used**: Whole plant
- **Galenic**: MT, DE, bulk herb
- **Summary**:
  - Anxiety
  - Insomnia
  - Explosive anger
  - Dysrhythmias
  - Blood sugar disturbance
Leonurus cardiaca (Motherwort)

Actions: ENDO

• Thyroid:
  – TRH antagonist
  – TSH antagonist

• Cortico:
  – Inhibits cortisol

• NEURO:
  – CNS sedative
  – α-sympatholytic
  – beta-blocker

• CV:
  – Cardiosedative
  – Antiarrhythmic
  – Hypotensive
  – Bradycardic
  – Inotrope (+)
  – Chronotrope (-)
  – Bathmotrope (-)


Avena sativa (Milky oat)

• **Part used:**
  – Fruit, Aerial parts, Seeds

• **Galenic:** MT, DE, Bulk herb

• **Summary:**
  – Thyroid imbalances
  – Estrogen-Thyroid imbalances
  – Digestive disorders
  – ENT disorders
**Avena sativa** (Milky oat)

**ACTION: ENDO:**

- **Thyroid:**
  - Thyroid stimulant (T4, T3)
  - Reduces TSH by feedback regulation
- **Gondotropic**
  - Stimulates ovaries FSH-E2 efficiency
  - Mild LH stimulant
- **Gonado-Thyrotropic**
  - Regulates the thyroid activity to the needs of estrogen
- **Somatotropic**
  - Endocrine pancreas regulation, indirect

Avena sativa (Milky oat)

ACTION:

• **Metabolic**: hypoglycемant, hypolipemiant
• **GI**: Pancreas, **Exo**: carbohydrate metabolism
• **Lymph**: lymphatic drainage
• **CV**: anti-atherosclerotic
• **ANS/NEURO**: Neuro-Regulatory
• **RENAL**: Diuretic
Follow up

• D1: Sleep quality improved
• 1 mo: Reduced anxiety, still daily
• 2 months: Dreams less intense
• 3 months:
  – Tremors resolved
  – Anxiety intermittent
• 6 months: HgA1c 6.4 $\rightarrow$ 5.2%
Questions and Comments

To learn more

- [info@endobiogeny.com](mailto:info@endobiogeny.com)
- [www.endobiogeny.com](http://www.endobiogeny.com)
- [www.learnendo.lt](http://www.learnendo.lt)