The Role of the Healthcare Professional in Functional Medicine

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Learning Objectives

• Describe functional medicine (FM) history, principles, diagnostics, interventions, controversies
• Review the role the gut microbiome to immune and mental health
• Examine the role of the FM HCP through a hypothetical case involving the treatment of depression
History of Functional Medicine

• In late 1970’s, Jeff Bland PhD former Professor of Chemistry at University of Puget Sound in Washington developed audio series called *Functional Medicine Updates*

• In 1984 Bland started to teach ‘practitioners’ how to implement preventive nutritional medicine in their practices
Institute for Functional Medicine

- Officially launched in USA in 1991 by Co-Founder Jeff Bland PhD FACN FACB

- Institute for Functional Medicine
  https://www.ifm.org/find-a-practitioner/
Functional Medicine

• Offers Personalized Care, Looks at How/Why Illness Occurs (Root Causes)

• Convergence of 3 Disciplines:
  – Natural Medicine
  – Systems Biology
  – Molecular Medicine
Natural Medicine

• Naturopathic medicine is a systems approach to diagnostics including lab testing that uses natural remedies to help the body heal itself.

• It embraces many therapies, including massage, acupuncture, exercise, environmental regulation, herbs/supplements, and nutritional counseling.
Systems Biology – Structure Determines Function In The Body

- Non-specific inflammatory biomarkers like ESR, hs-CRP, PCT (procalcitonin in response to tissue injury or infection)
Molecular Medicine

• A branch of medicine with methods to diagnose and treat disease by understanding the way proteins and cellular molecules may function

• Every symptom of disease arises from imperfect discharge of some function by its appropriate organ (metabolic tests like mDNA mitochondrial genetic tests for ATP energy level)
Is Functional Medicine *Holistic*?

Yes. Applies to states of health that span physiological, physical, cognitive, emotional, spiritual functioning domains to assess ‘whole person’ imbalances.

CLINICAL CONTROVERSY: Does accumulated loss of function across these areas define the early signs of what is later diagnosed as *pathology*? Are results from biomarker/added laboratory tests *clinically relevant* (cause/effect)?
Functional Medicine

• Multiple interventions address the underlying root cause(s) of chronic disease (imbalance)

• A condition (e.g., depression) can be the result of multiple causes (nutrition, sleep, lifestyle, stress),

• A cause (e.g., inflammation) may lead to a number of conditions/symptoms (poor digestion, migraines, heart disease)
Functional Medicine Looks for the Root Cause

- Insomnia
- Diabetes
- Brain Fog
- Allergies
- Weight Gain
- Anxiety/Depression
- Dermatitis/Psoriasis
- Autoimmune/Inflammatory Disorders
- Irritable Bowel Syndrome
- Achy Joints
- Thyroid Issues

Root Causes:
- Gluten Sensitivity
- Poor Diet
- Leaky Gut
- Stress
- Infection
- Fluoroquinolone Toxicity
- Nutrient Deficiencies
- MSG/Aspartame
- Food Intolerances
- Lack of Sleep
- GMO's
Functional Medicine (FM)

• Involves physical exam, assessing patient’s medical history, genetic tests, laboratory biomarker tests, patient’s environment, lifestyle choices, more…..

• Adopts an interview model and historical timeline based on antecedents, triggers, mediators

• Healthcare practitioner devises a diagnosis matrix incorporating these aspects as basis for her/his medical interventions/treatments
FUNCTIONAL MEDICINE MATRIX

Physiology and Function: Organizing the Patient’s Clinical Imbalances

Assimilation
(e.g., Digestion, Absorption, Microbiota/GL, Respiration)

Defense & Repair
(e.g., Immune, Inflammation, Infection/Microbiota)

Structural Integrity
(e.g., from Subcellular Membranes to Musculoskeletal Structure)

Mental
(e.g., cognitive function, perceptual patterns)

Energy
(e.g., Energy Regulation, Mitochondrial Function)

Communication
(e.g., Endocrine, Neurotransmitters, Immune messages)

Emotional
(e.g., emotional regulation, grief, sadness, anger, etc.)

Spiritual
(e.g., meaning & purpose, relationship with something greater)

Biotransformation & Elimination
(e.g., Toxicity, Detoxification)

Transport
(e.g., Cardiovascular Lymphatic System)

Modifiable Personal Lifestyle Factors
- Sleep & Relaxation
- Exercise & Movement
- Nutrition
- Stress
- Relationships

Nutrition Evaluation

Retelling the Patient’s Story
Antecedents
(Predisposing Factors—Genetic/Environmental)

Triggering Events
(Activators)

Mediators/Perpetuators
(Contributors)
Functional Medicine Laboratory Tests

Lab Tests Assess the Following for Imbalances:

- Immune and inflammatory imbalances
  - Food sensitivity testing (e.g., IgG)
  - High Sensitivity C-Reactive Protein (hsCRP)

- Oxidation problems
  - Oxidative stress markers (e.g., glutathione)

Others:
- Nutrigenomics: focuses on the effects of specific nutrients on the genome
- Pharmacogenomics: focuses on how DNA, or individual genes, may affect drug response
Your Functional Medicine Prescription

Patient Name ___________________________ Date of Birth ___________________

Functional Nutrition Prescription

☐ Phytonutrient Spectrum
☐ Core Food Plan (CFP)
☐ CFP modified: _________________________

First Step Interventions

☐ Elimination Diet
☐ Food Reintroduction
☐ Cardiometabolic Food Plan

Advanced Interventions

☐ GI Specific Food Plans
☐ Detox Food Plan
☐ Mito Food Plan

Personal Dietary Recommendations

Macronutrient Distribution:

☐ 45/25/30
☐ 40/30/30
☐ Mild/Strict Keto
☐ Intermittent Fasting _______ days/wk

Target Calories:

☐ 600
☐ 1000-1200
☐ 1200-1400
☐ 1400-1800
☐ 1800-2200
☐ 2200-2500

Lifestyle Prescription

☐ Sleep: _____________________________

☐ Exercise: Risk Assessment: __________________________

☐ Low Risk
☐ Medium Risk
☐ High Risk

Clearance:

☐ Yes
☐ No

Exercise Prescription:

<table>
<thead>
<tr>
<th></th>
<th>Cardio/Aerobic</th>
<th>Strength/Resistance</th>
<th>Flexibility/Stretching</th>
<th>Balance</th>
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<tbody>
<tr>
<td>F</td>
<td>Frequency (times per week)</td>
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<tr>
<td>I</td>
<td>Intensity (e.g., low, moderate, vigorous)</td>
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<td></td>
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<tr>
<td>T</td>
<td>Time/Duration (minutes each day)</td>
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<tr>
<td>T</td>
<td>Type (e.g., running, jogging, swimming)</td>
<td></td>
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</table>

Stress management:

Supplements/Medications Prescription

<table>
<thead>
<tr>
<th>Supplement/Medication</th>
<th>On Rising</th>
<th>Breakfast</th>
<th>Mid-Morning</th>
<th>Lunch</th>
<th>Mid-Afternoon</th>
<th>Dinner</th>
<th>Mid-Evening</th>
<th>Before Bed</th>
</tr>
</thead>
</table>

Additional Comments

Prescribed by ___________________________ Date ___________________

Follow-up Appointment ___________________________
### Institute for Functional Medicine

- Sets the gold standard for education, training, and clinical practice in functional medicine globally.

**Eligibility Requirements:**
- Hold at least a master’s level degree in a health-related field from an accredited university.
- Hold an active healthcare license to practice by the appropriate authority in the state, province, or country of the applicant’s clinical practice.

**Website:**
- https://www.ifm.org/

### University of Western States

**Programs:**
- Master of Science in Human Nutrition and Functional Medicine (MS-HNFM)
- Doctor of Clinical Nutrition (DCN)
- Graduate Certificate in Human Nutrition and Functional Medicine

**Prerequisite Entrance Requirements:**
- MS-HNFM: Bachelor’s degree (or foreign equivalent) or first professional degree.
- DCN: Master’s degree or equivalent in human nutrition
- Certificate program: Master’s or Doctoral degree in a healthcare discipline (DC, ND, MD, DO, NP, PA, etc.)

**Website:**
- https://www.uws.edu/
Controversy

In the USA, functional medicine (FM) practices have been ruled ineligible for course credits by the American Academy of Family Physicians because of concerns these FM practices may be harmful.
Controversies Surrounding Functional Medicine

- Research supporting the integration of this practice into community pharmacy is limited.
- Lack of standardization for pharmacists.
- Surrogate markers vs Diagnostic markers.
- Assesses for imbalances in the body potentially predictive of future diseases.
- Some may hesitate to fully accept functional medicine as a viable practice model.
### Functional Medicine Research

Showing: 1-10 of **33,961** studies  **10** studies per page

<table>
<thead>
<tr>
<th>Row</th>
<th>Saved</th>
<th>Status</th>
<th>Study Title</th>
<th>Conditions</th>
<th>Interventions</th>
<th>Locations</th>
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<tr>
<td>1</td>
<td></td>
<td>Recruiting</td>
<td>Diabetes: <strong>Functional Medicine Approach vs. Usual Care</strong></td>
<td>• Diabetes</td>
<td>• Dietary Supplement: <strong>Functional Medicine</strong></td>
<td>• The Cleveland Clinic Foundation Cleveland, Ohio, United States</td>
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<td>• Type 2 Diabetes</td>
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<td></td>
<td>• Type 2 Diabetes Treated With Insulin</td>
<td></td>
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</tr>
<tr>
<td>2</td>
<td></td>
<td>Active, not recruiting</td>
<td><strong>Functional Medicine</strong> in Asthma (FAst) Study</td>
<td>• Asthma</td>
<td>• Behavioral: Lifestyle Factors</td>
<td>• The Cleveland Clinic Foundation Cleveland, Ohio, United States</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>• Other: Customized use of Dietary Supplements</td>
<td>• Other: Currently Accepted Asthma Care Guidelines</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td></td>
<td>Active, not recruiting</td>
<td>Multidisciplinary Intervention for Mild Cognitive Impairment</td>
<td>• Mild Cognitive Impairment</td>
<td>• Behavioral: Cognitive training</td>
<td>• Gibson Institute of Cognitive Research Colorado Springs, Colorado, United States</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>• Dietary Supplement: Nutrition</td>
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THE NATIONAL MICROBIOME INITIATIVE
Microbiome

• The complete set of genes within microbiota (natural organisms) that live in and on the human body
• Our first exposures happen in utero and during birth through the birth canal
• Gut microbiome is constantly changing
• Even identical twins can have different gut microbiomes
• When human populations urbanize, microbial diversity declines
Human Microbiome Project 2008-2012

**Factors Affecting the Microbiome’s Composition:**

- Geography/Urbanization
- Health Status
- Stress
- Diet
- Age
- Gender
- Everything We Touch
Gut Microbiome

• Weighs bout 2 kg/4.4#
• Made up of trillions of bacteria, fungi, viruses, containing at least 150x more genes than the human genome
• Controls immune system because most of our immune system is in our gut (certain cells in the gut lining excrete antibodies)
Food Allergy, Sensitivity, Intolerance

**Food Allergy** – Eggs, Peanuts (immune, anaphylaxis, serious reactions, Type I hypersensitivity)

**Food Sensitivity** – Gluten [immune-related, delayed hypersensitivity (secondary response in asthma/IBD, etc)]

**Food Intolerance** – Lactose (inflammation, non-immune related, mainly affects digestion)
Blood Testing

A blood test can measure your immune system's response to particular foods by measuring the allergy-related antibody, immunoglobulin E (IgE) or sensitivity-related antibody, immunoglobulin G (IgG).

For these tests, a blood sample taken in your doctor's office is sent to a medical laboratory, where different foods can be tested.
Different From Nutrigenomics

Nutrigenomic testing identifies a patient's genetic protein variations to locate sites of metabolic weakness in the body (structure).

These key gene proteins are involved in signaling pathways in the cells, in enzyme conversion, and in nutritional delivery to the body (function).

Saliva test from 24Genetics, more........
The Gut Microbiome and Mental Health: Implications for Anxiety- and Trauma-Related Disorders

Stefanie Malan-Muller 1, Mireia Valles-Colomer 2 3, Jeroen Raes 2 3, Christopher A Lowry 4 5 6 7 8, Soraya Seedat 1, Sian M J Hemmings 1

- **Microbiota-Gut-Brain Axis** (Epicenter of a new approach to mental health)
- Bidirectional connection
- Influences mood
- Nutritional psychiatry
Functional Medicine Workup For Mild Depression -> Microbiota-Gut-Brain Axis

Patient AH: 38yof CEO depressed workaholic with identified DSM-5 depression criteria (no meds). Former military. Loves classical music.

GOAL: Find/tx root cause of her depression; address life balance.
• Hamilton Depression Rating Scale (HDRS)
• Beck Depression Inventory (BDI)
• Patient Health Questionnaire (PHQ)
• Major Depression Inventory (MDI)
• Center for Epidemiologic Studies Depression Scale (CES-D)
Functional Medicine Workup for Depression

Anceodents (genetic or acquired) – family history of depression (mom), military training, divorced

Mediators (biochem or psychosocial factors, perpetuators) – SAD, constant stress at work, marital problems, poor nutrition (gluten)/sleep, lack of exercise, time in nature, socialization

Triggers (provoke symptoms) – acute issue with her Board of Directors, concerns over war in Ukraine (some of her ancestors are from this country)
Laboratory Test/Biomarker Orders

ESR, hs-CRP (Inflammatory Markers)

Omega-3 Fatty Acid Index (PUFA/Inflammation)

25-OH-Vitamin D (Membrane Antioxidant)

Nutrigenomic Test/Gluten Sensitivity Hx
hs-CRP Quest Reference Range 1-10 mg/L

High Sensitivity C-Reactive Protein
Measures vascular inflammation in the body
AHA/CDC low risk < 1
Increases seen with recent illness (viral, bacterial), injury, periodontal disease, cardiovascular disease, not necessarily in depression
AH Results: 2
Elevated Erythrocyte Sedimentation Rate (ESR) may be related to any inflammatory condition (not specific):

- Infection
- Rheumatoid arthritis
- Rheumatic fever
- Vascular disease
- Inflammatory bowel disease
- Heart disease
- Kidney disease
- Certain cancers

AH Results: 55 mm/hr (High)
Quest Diagnostics Omega-3 Index

- Reference Range 1.4% – 4.9%
- CVD Risk
  - Optimal > 3.2%
  - Moderate 2.2-3.2%
  - High < 2.2%

EPA/Arachidonic Acid Ratio < 0.2%
EPA  0.2% – 1.5%
DHA 1.2 %– 3.9%

Potential Role: CVD to determine Rx and compliance, or risk reduction for age-related macular degeneration, RA, cancer (early data), not necessarily in depression or general health

AH Results: 4.0% Normal
25-OH-Vitamin D Level

• 25(OH)Vit D serum measurement does not reflect total body vitamin D status (Quest Reference Range 30 – 100 ng/mL)

• Measurement of 25(OH)Vit D is useful only in acquired and inherited disorders in the metabolism of 25(OH)Vit D and phosphate, including chronic kidney disease

• Recommended level for bone density health > 40-50 ng/mL. Any clinical correlation with depression (e.g., epidemiologic studies)?

• AH Results: 21 ng/mL (Low)
Serum 25-Hydroxyvitamin D in Patients with Major Depressive Disorder

Leila DANA-ALAMDARI, 1 Sorayya KHEIROURI, 1,* and Seyed Gholamreza NOORAZAR 2

Abstract

Background:

We investigated the association between serum 25(OH) D levels and depressive symptoms in patients with major depressive disorder (MDD).

Conclusion:

Serum 25(OH) D levels were not associated with depression. However, the inverse relationship between levels of vitamin D and depressive symptoms in current depression episodes and in sun-deprived season warrants further investigation.
Nutrigenomic Tests

AH Results: Gluten sensitivity
Mild Depression - FM Treatment

Gluten-free prebiotic/probiotic foods (support gut flora, build immune system, M-G-B axis)
Vitamin D3 supplement (antioxidant, bone health)
Mediterranean Diet/Gluten Elimination Diet (antioxidant/anti-inflammatory, build immune system, M-G-B axis)
Exercise Plan in Nature (general health/depression)
Tai Chi/Meditation (stress management for triggers, sleep hygiene)
Individual/Group ‘talk therapy’ for depression management, watch less news at night (e.g., psychologist or clinical counselor)
Music Therapy and Depression

- Meta-analysis: Nine studies with a total of 421 people of any age group (from adolescents to older people)
- Studies compared effects of music therapy versus treatment as usual
- Music therapy + treatment as usual (TAU) >>> TAU alone
  - TAU (as defined by trialist) = combination of different therapies or activities (e.g., psychotherapy, medication, collaborative care, occupational therapy, recreative activities)

<table>
<thead>
<tr>
<th>Primary Outcomes</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Severity of depression symptoms [clinician-rated:</td>
<td>Standardised mean difference (SMD): -0.98</td>
</tr>
<tr>
<td>Hamilton Rating Scale for Depression (HAM-D)]</td>
<td>95% confidence interval (CI): -1.69 to -0.27</td>
</tr>
<tr>
<td>P = 0.007</td>
<td>8 randomised controlled trials (RCTs), 1 clinical controlled trial (CCT), n = 219, moderate-quality evidence</td>
</tr>
<tr>
<td>Severity of depression symptoms [patient-reported:</td>
<td>SMD: -0.85</td>
</tr>
<tr>
<td>Beck Depression Inventory (BDI)]</td>
<td>95% CI: -1.37 to -0.34</td>
</tr>
<tr>
<td>P = 0.001</td>
<td>3 RCTs, 1 CCT, n = 142, moderate-quality evidence</td>
</tr>
<tr>
<td>Adverse events</td>
<td>No significant evidence that music therapy was associated with more or fewer adverse events than treatment as usual in the short term (odds ratio (OR): 0.45, 95% CI: 0.02 to 11.46, P = 0.63, n = 79, low-quality evidence)</td>
</tr>
</tbody>
</table>
Key Take-Aways

• FM is a health systems upstream approach to diagnosis and care

• ‘One condition, multiple causes vs one cause multiple conditions’ has generated clinical controversy in the medical community

• FM root cause analyses utilize more diagnostic tests at the molecular and immune level (e.g., biomarkers) than integrative medicine or traditional medicine; focused on prevention
Is/Does Functional Medicine…

- Reproducible from practitioner to practitioner?
- Evidence-based from clinical research studies?
- Have a place in traditional medicine therapy?