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Treating the Root Cause of Acne: the Gut-Skin Connection

Julie Greenberg, ND RH(AHG) MBA

September 25, 2024

DUTCH Labs



Dr. Julie Greenberg, ND, RH(AHG), MBA



- **Licensed Naturopathic Doctor:** (CA, OR, WA)
- **Registered Herbalist (RH):** American Herbalist Guild
- Specializing in Dermatology
- **The Center for Integrative & Naturopathic Dermatology Inc**
- **RootCauseDermatology.com**
- **ND**, Bastyr University
- **MBA**, Stanford University
- **BA**, Northwestern University

www.integrativedermatologycenter.com

www.rootcausedermatology.com

The Goal of Naturopathic/Functional Medicine

Symptoms



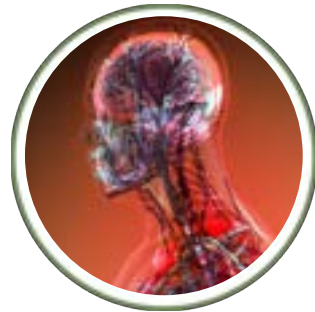
Root Causes



Gut/Skin Connection



**Gut
dysbiosis**



**Systemic
Inflammation**

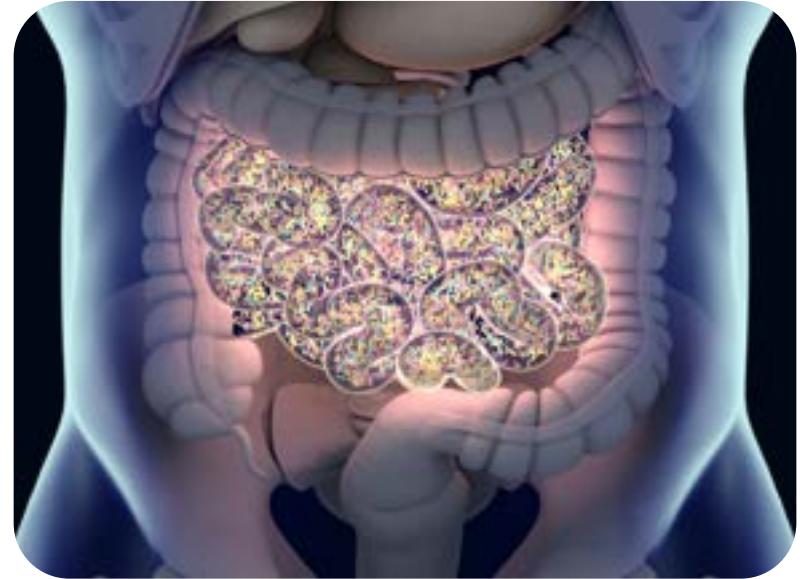


**Chronic
derm disease**

Test & Treat the Gut!

The Gut Microbiome

- The average human adult has **three to five pounds** of microbes in their gut!
- We house and feed them for free



Why Do We Have Gut Microbes?

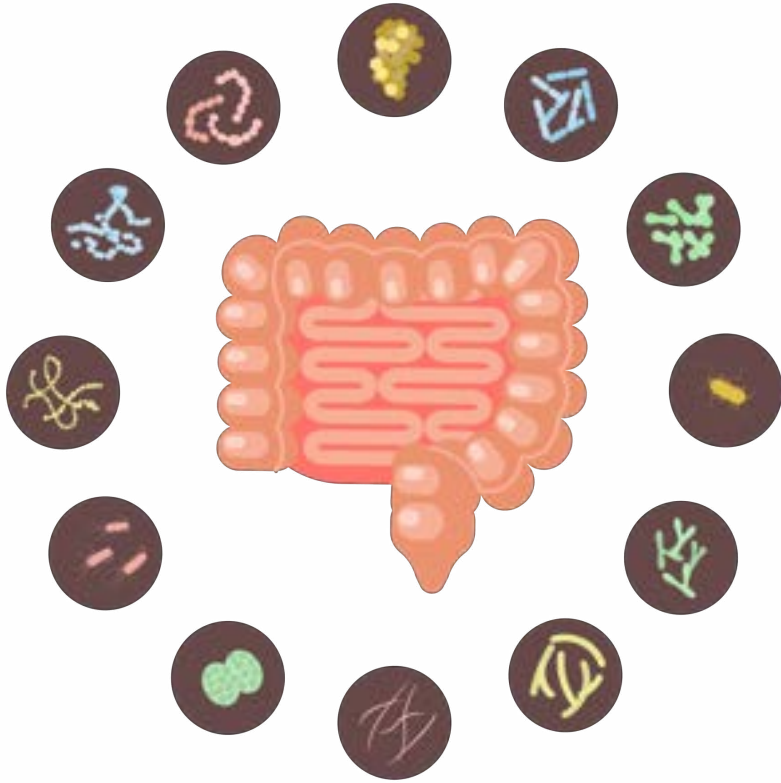
○ **What do we get out of this deal?**

We can't survive without them!

- They make things we need (such as Vitamin B12, butyrate)
- Crowd out pathogenic microbes
- Maintain a healthy ecosystem in the gut



Microbes in the Gut



Trillions of organisms live in the gut:

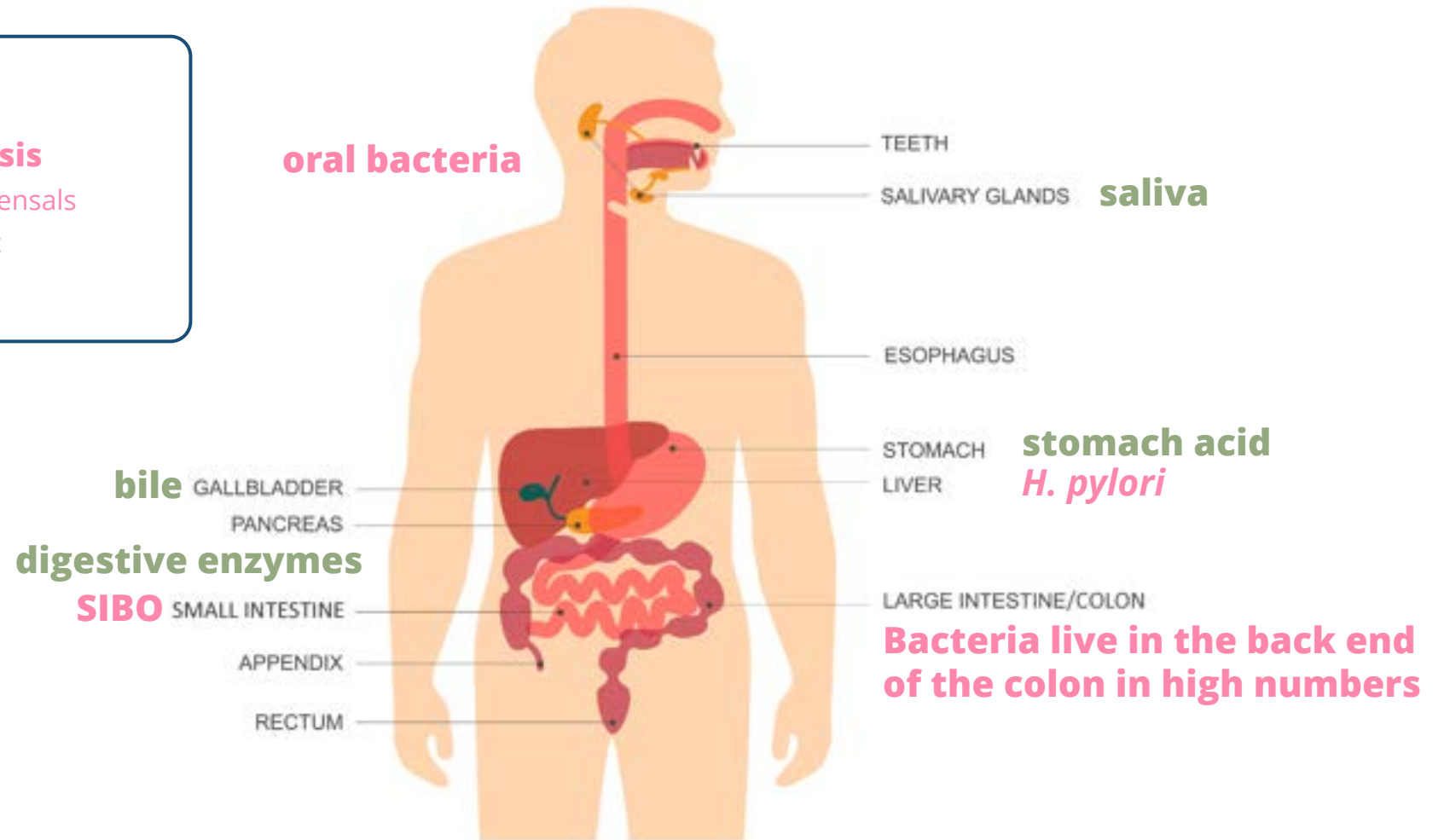
- **Bacterial**
- Fungal
- Viruses
- Archaea
- Bacteriophages
- Protozoa
- Worms

Test and Treat the Gut!

✓ Digestive function

✓ **Microbiome Dysbiosis**

- Overgrowth of commensals
- Growth of pathogenic
- Too little beneficial



What Are Functional Medicine Tests?



Urine Test



Stool Test



DNA Test

- Stool testing
- Organic acid testing (OAT)
- Adrenal testing
- Sex Hormone testing
- Mycotoxin testing
- Intestinal permeability testing
- SIBO
- Food sensitivity testing (IgG, IgA)

- Micronutrient testing
- Environmental toxin testing
- Heavy metal testing
- Lyme & co-infections testing
- DNA testing
- Thyroid panel testing
- and many, many more!



Blood Test

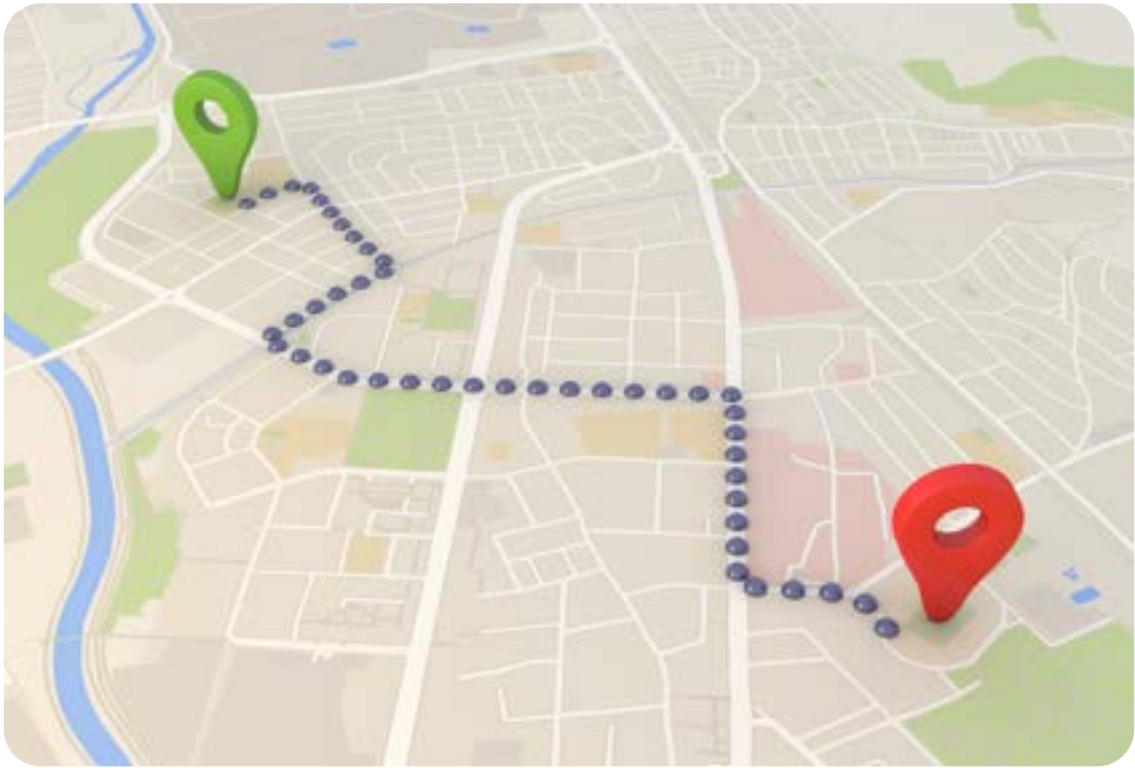


Saliva Test



Breath Test

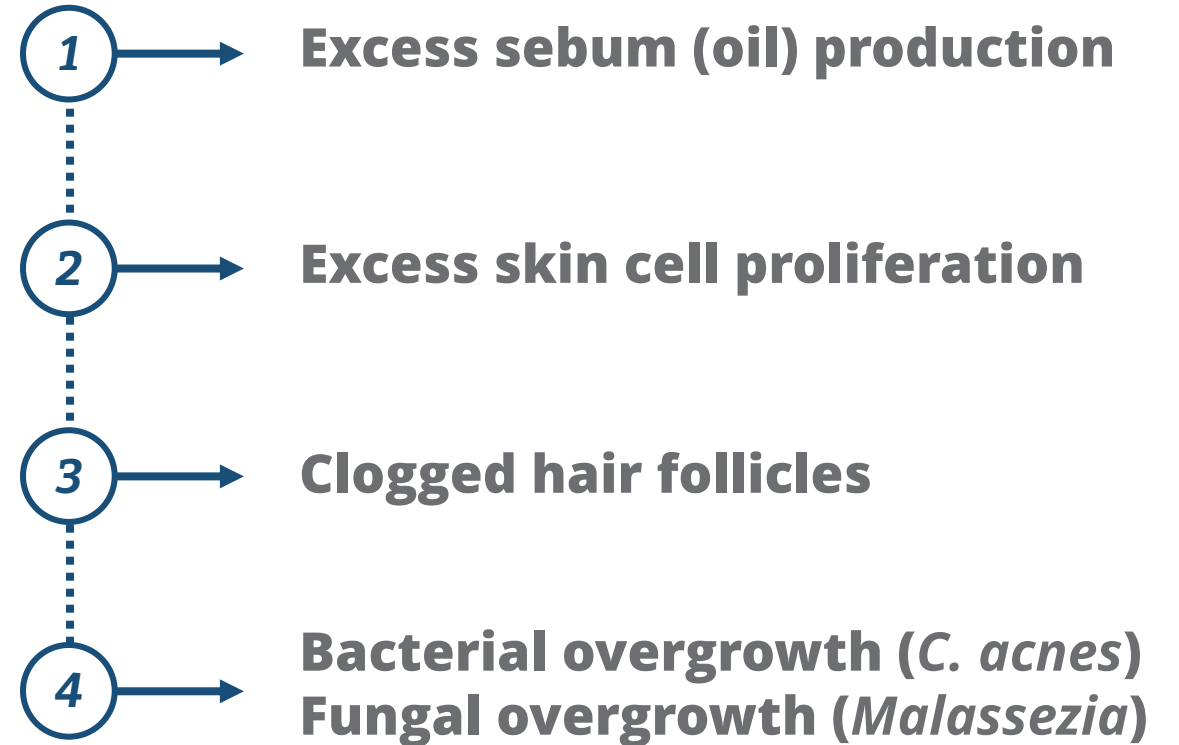
I Use Lab Tests as My Roadmap



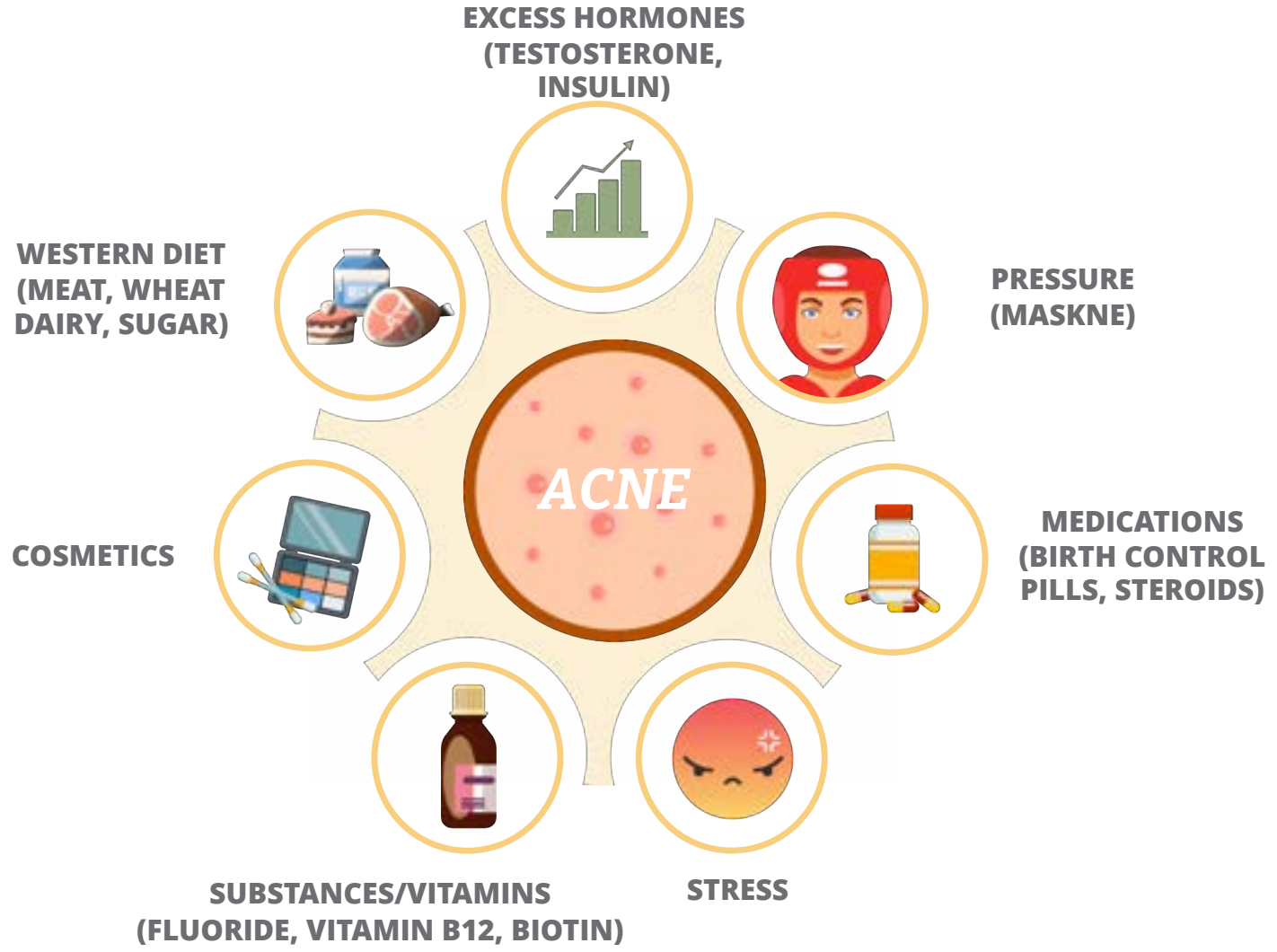
Acne



Pathophysiology of Acne



Acne Triggers



Functions of The mTOR Pathway

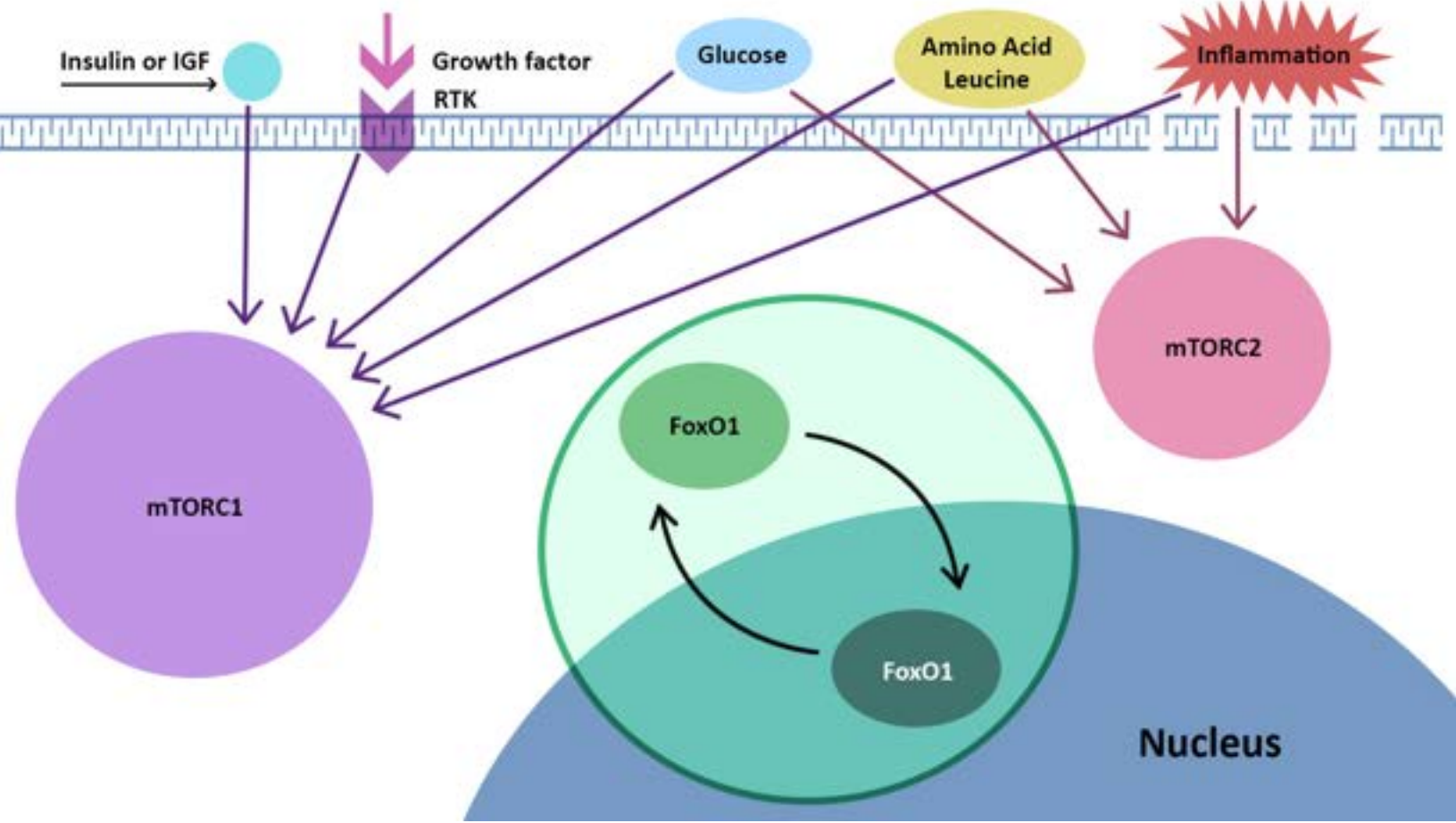
mTORC1	mTORC2
Cell growth	Cell growth
Cell metabolism	Cell metabolism
Lipid (sebum) synthesis	Cell polarity
Lipid (sebum) metabolism	Cytoskeletal regulation
Protein (skin) synthesis	
Autophagy	
Mitochondrial metabolism	
Mitochondrial biogenesis	
Microtubule organization	

Li T, Wang G. Computer-Aided Targeting of the PI3K/Akt/mTOR Pathway: Toxicity Reduction and Therapeutic Opportunities. *Int J Mol Sci*. 2014;15(10):18856-18891

Laplante M, Sabatini, David. mTOR signaling at a glance. *J Cell Sci*. 2009;122(20):3589-3594

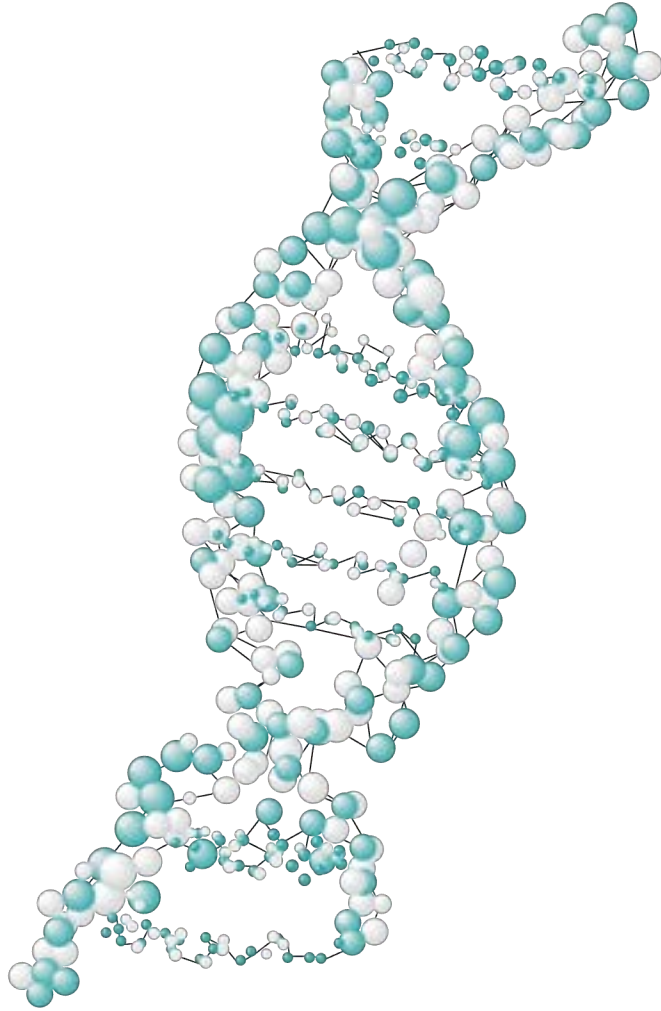
Monfrecola G, Lembo S, Caiazza G, Balato A, Fabbrocini G. Mechanistic target of rapamycin (mTOR) expression is increased in acne patients' skin

PI3k/Akt/mTOR Pathway



Xu, F., Na, L., Li, Y. *et al.* RETRACTED ARTICLE: Roles of the PI3K/AKT/mTOR signalling pathways in neurodegenerative diseases and tumours. *Cell Biosci* 10, 54 (2020). <https://doi.org/10.1186/s13578-020-00416-0>, Licensed with CC-BY 4.0: <http://creativecommons.org/licenses/by/4.0/>

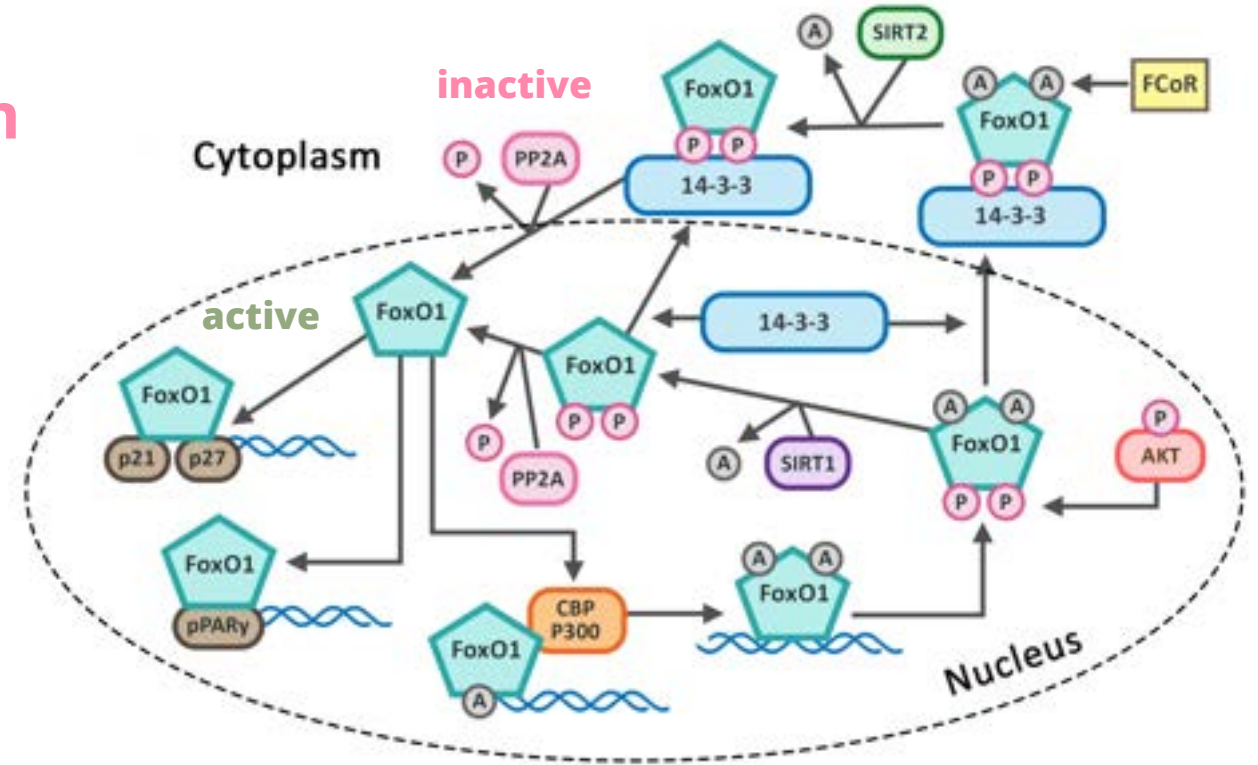
FoxO1 Functions



- Inhibits hepatic IGF-1 secretion
- Inhibits lipogenesis
- Suppresses androgen signaling
- Reduces oxidative stress
- Controls antimicrobial peptide synthesis

FoxO1: an mTOR Inhibitor

- **FoxO1 inhibited in the cytoplasm**
 - Phosphorylation of FoxO1 by Akt
 - Ex: insulin & IGF-1
 - **Cannot downregulate mTOR**
- **FoxO1 active in the nucleus**
 - **Downregulates mTOR**



Prevalence of Acne

Teens

About 85% of American teens are affected by acne

male

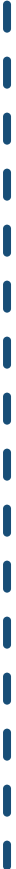


90%

female

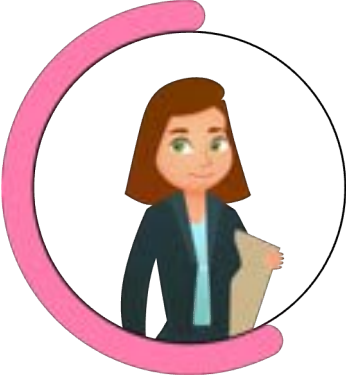


80%



Adults

Menstruating women prior to onset of menses



65%

Low grade, persistent acne

Age: 20 - 40



Between 40 to 55%

Women

Age: 40 - 49



Between 12 to 25%

Acne is a Disease of Westernized Societies

Ache people Paraguay (n=115)

Population repeatedly examined over 843-day period

Not a single papule, pustule or open comedone was observed in the entire population

Okinawa pre-WWII

Medical questionnaires administered to local physicians who had practiced from 8-41 years

“These people had no acne vulgaris”

Kitavan people Papua New Guinea (n=1200)

Population examined over 7 weeks

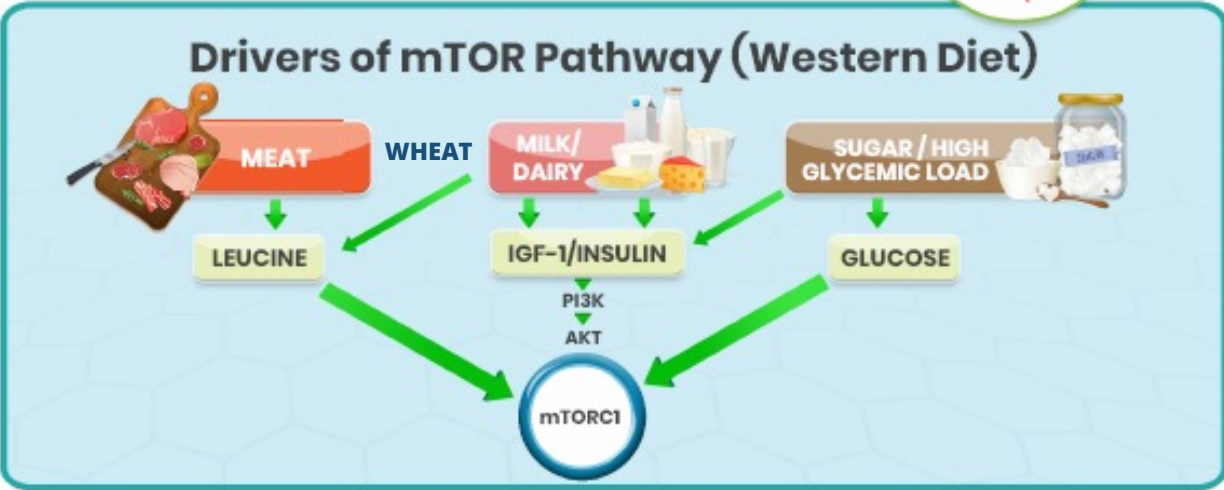
Not a single papule, pustule or open comedone was observed in the entire population.

Cordain, L., Lindeberg, S., Hurtado, M., Hill, K., Eaton, S. B., & Brand-Miller, J. (2002). Acne vulgaris: a disease of Western civilization. *Archives of dermatology*, 138(12), 1584-1590.

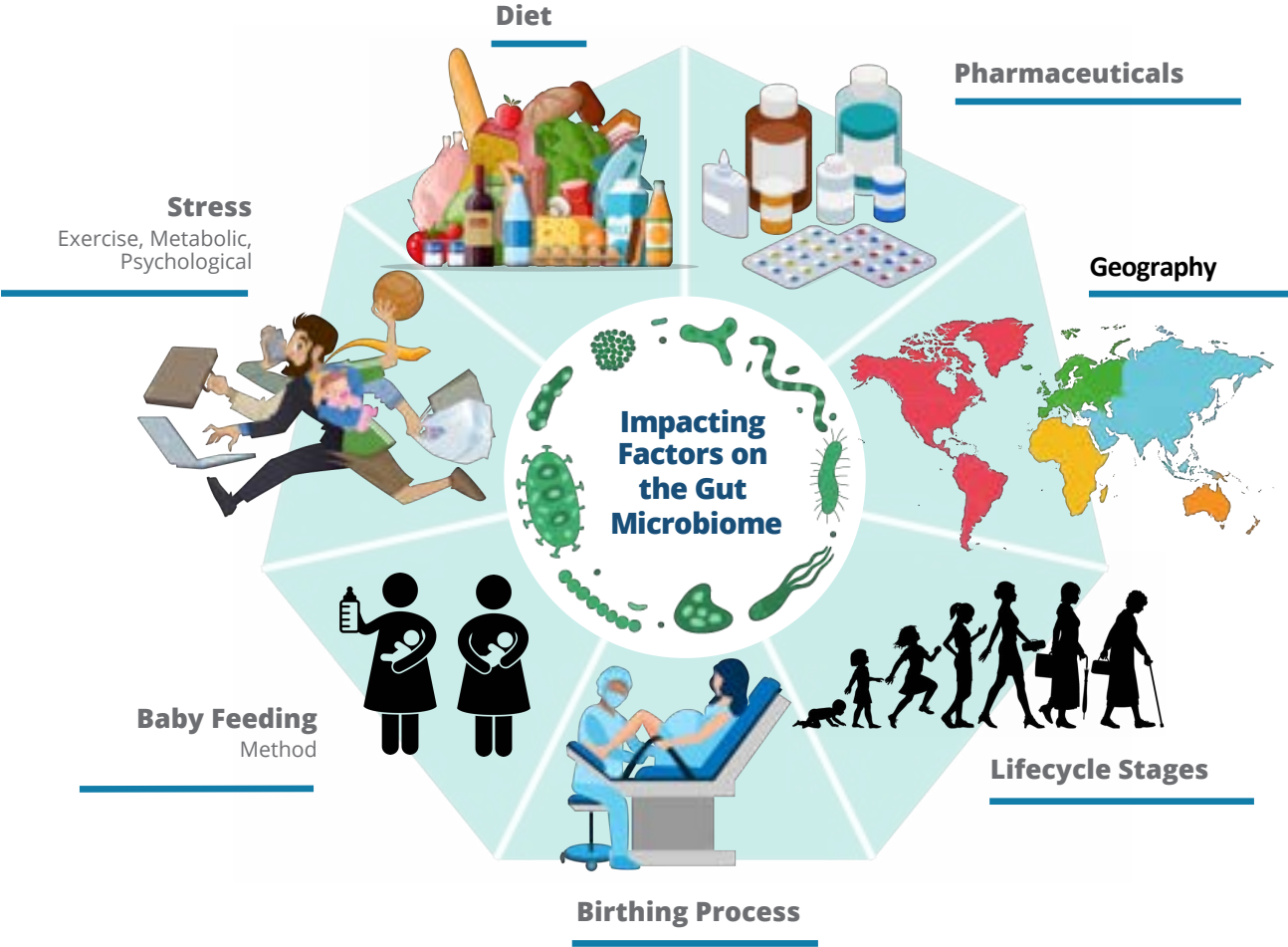
MTOR PATHWAY AND ACNE

mTOR Pathway Leads to

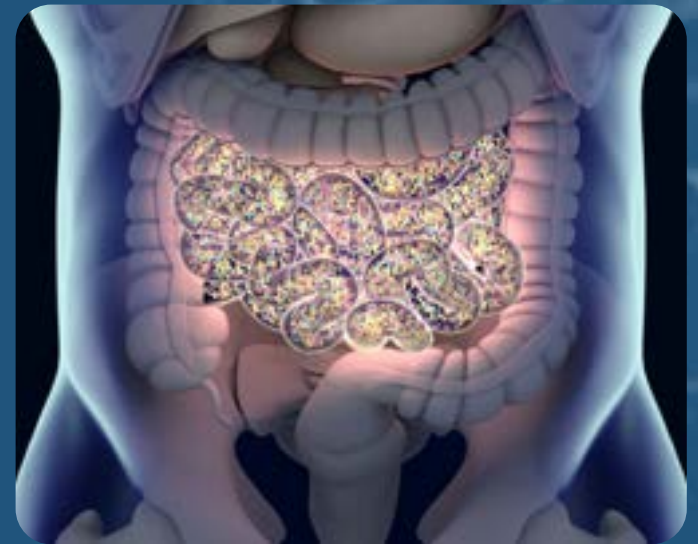
- 1 INCREASED SKIN CELL GROWTH AND PRODUCTION
- 2 INCREASED (SEBUM) OIL PRODUCTION



Influences on Gut Microbiome



*Acne:
The Gut Microbiome*

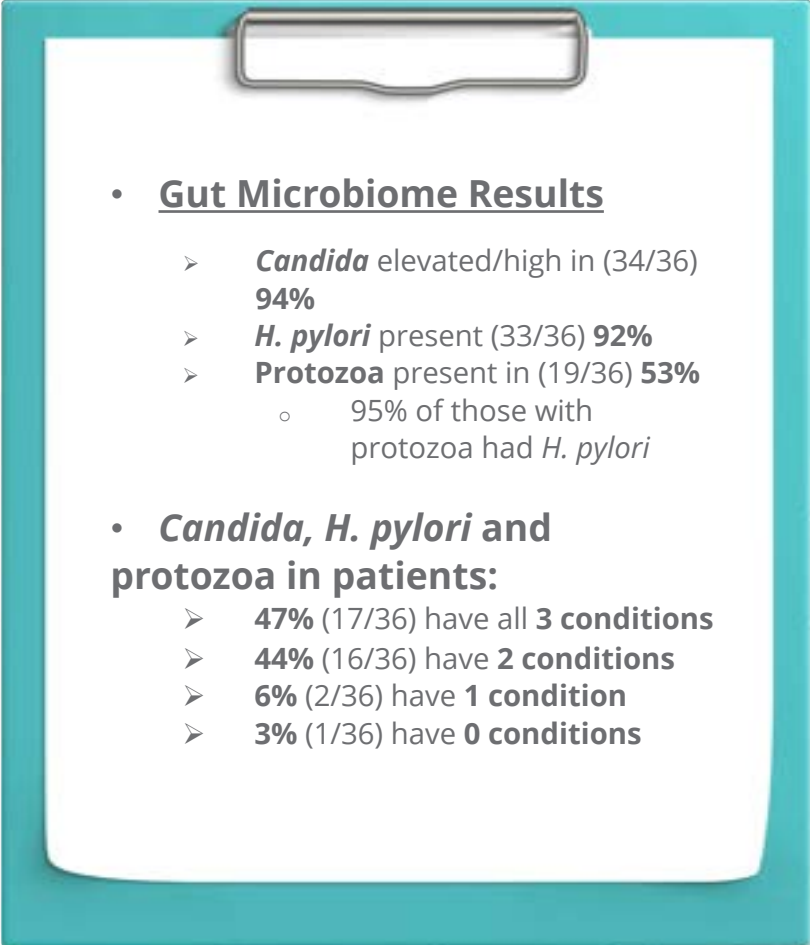


Acne-Gut Research Overview



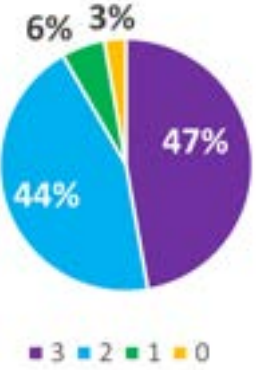
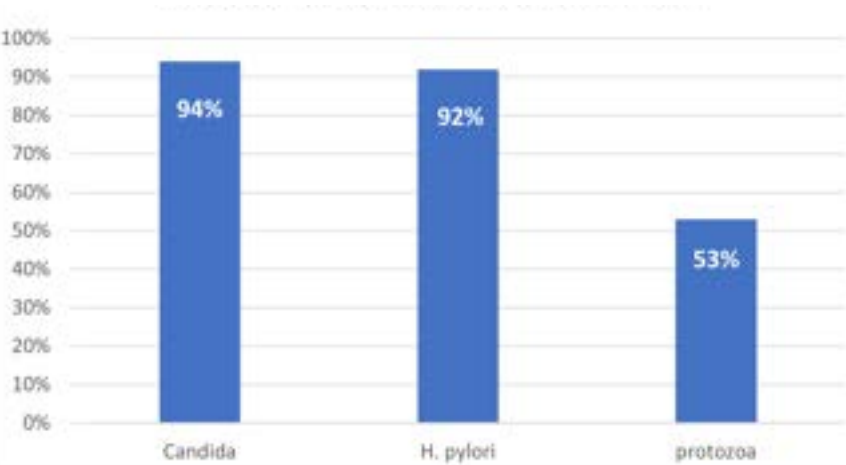
- **Background:** Dr. Greenberg sees hundreds of functional medicine gut microbiome tests and felt that her acne patients had a pattern **of higher levels of *Helicobacter pylori*, *Candida* and protozoa** than her other dermatological patients and has achieved high success rates of clearing acne by treating these conditions.
- **Objective:** To analyze the microbiome of acne patients using functional medicine tests (stool and organic acid tests) to reveal if there are specific patterns of dysbiosis in acne, including but not limited to *H. pylori*, *Candida* and protozoa.
- **Patient Demographics**
 - Total 36 patients: 28 females, 8 males
 - Ages 13-40; Mean=25 years old; Median=25 years old

Acne Gut Microbiome Results



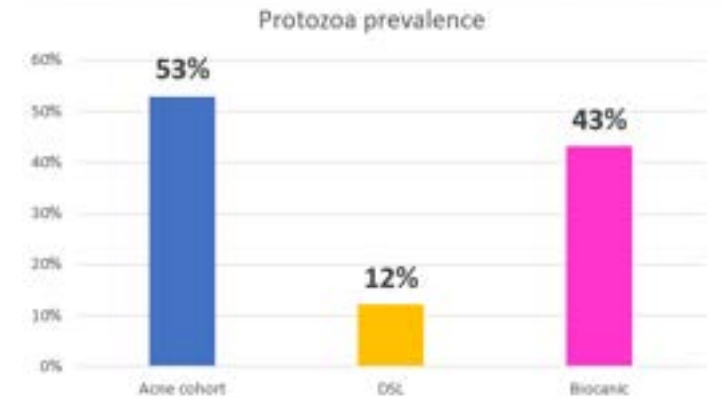
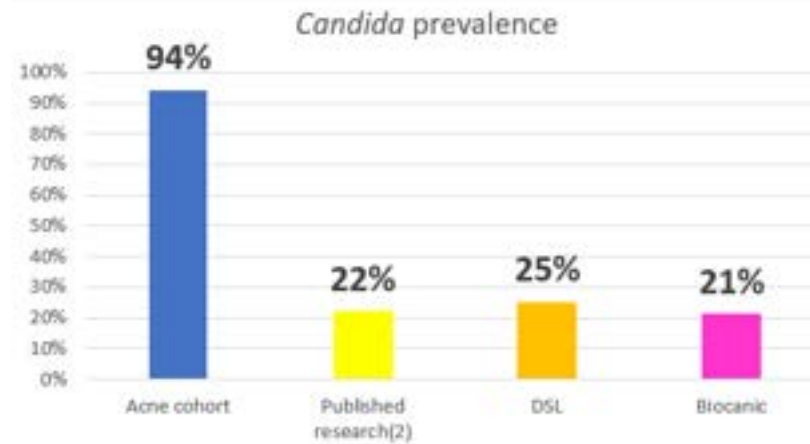
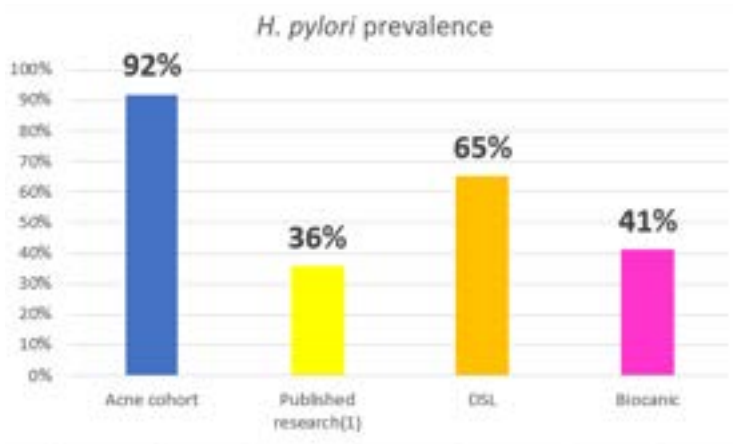
- **Gut Microbiome Results**
 - **Candida** elevated/high in (34/36) **94%**
 - **H. pylori** present (33/36) **92%**
 - **Protozoa** present in (19/36) **53%**
 - 95% of those with protozoa had *H. pylori*
- **Candida, H. pylori and protozoa in patients:**
 - **47%** (17/36) have all **3 conditions**
 - **44%** (16/36) have **2 conditions**
 - **6%** (2/36) have **1 condition**
 - **3%** (1/36) have **0 conditions**

% of Acne Patients with Each Condition
(Data from The Center for Integrative Dermatology, Dr. Julie Greenberg, ND)



**# of conditions positive per acne patient:
H. pylori, Candida, protozoa**

Comparison Data



Comparison Data

The 36 acne patients test results were compared against Diagnostic Solutions Laboratory datasets and published research.

Biocanic: a total of 2,940 GI-Map (Diagnostic Solutions Laboratory) were analyzed by Biocanic for comparison data for this poster.

DSL: a total of 18,390 ranging from Jan—March of 2021 were analyzed by DSL for comparison data for this poster.

Published Research: PubMed was searched to find healthy control data for comparison:

H. Pylori Published Research (1):

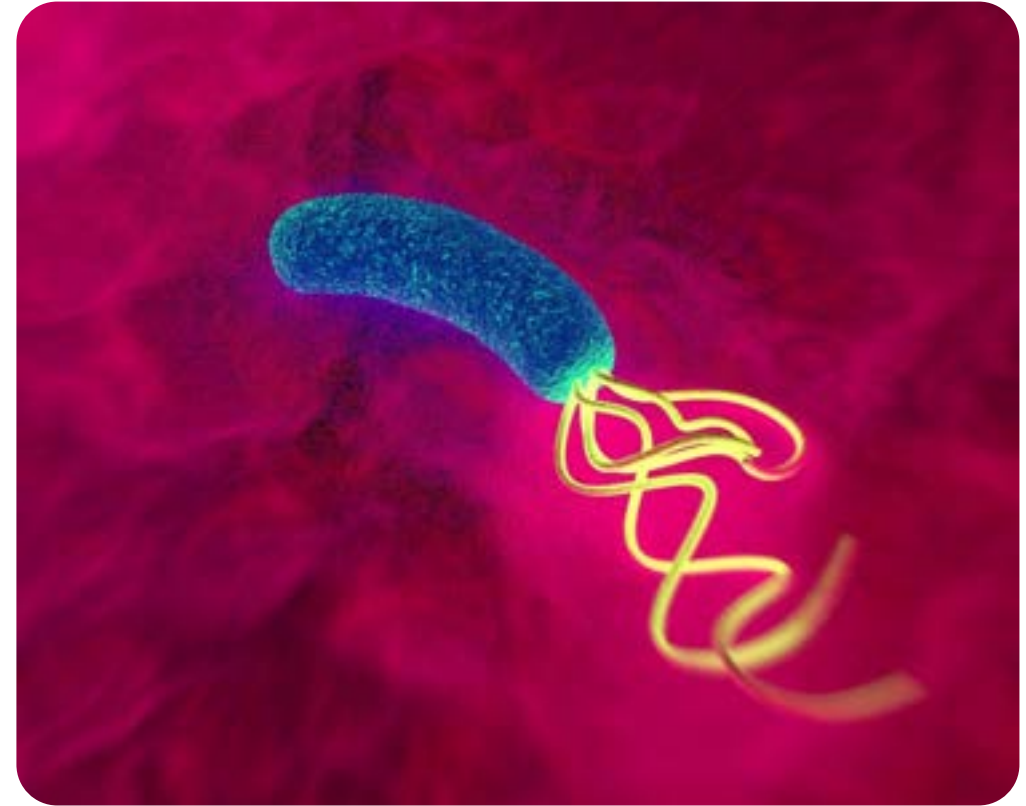
Hooi, James KY, et al. "Global prevalence of *Helicobacter pylori* infection: systematic review and meta analysis." *Gastroenterology* 153.2 (2017): 420-429.

Candida Published Research (2):

Standaert-Vitse, Annie, et al. "*Candida albicans* colonization and ASCA in familial Crohn's disease." *American Journal of Gastroenterology* 104.7 (2009): 1745-1753.

H. pylori & Acne

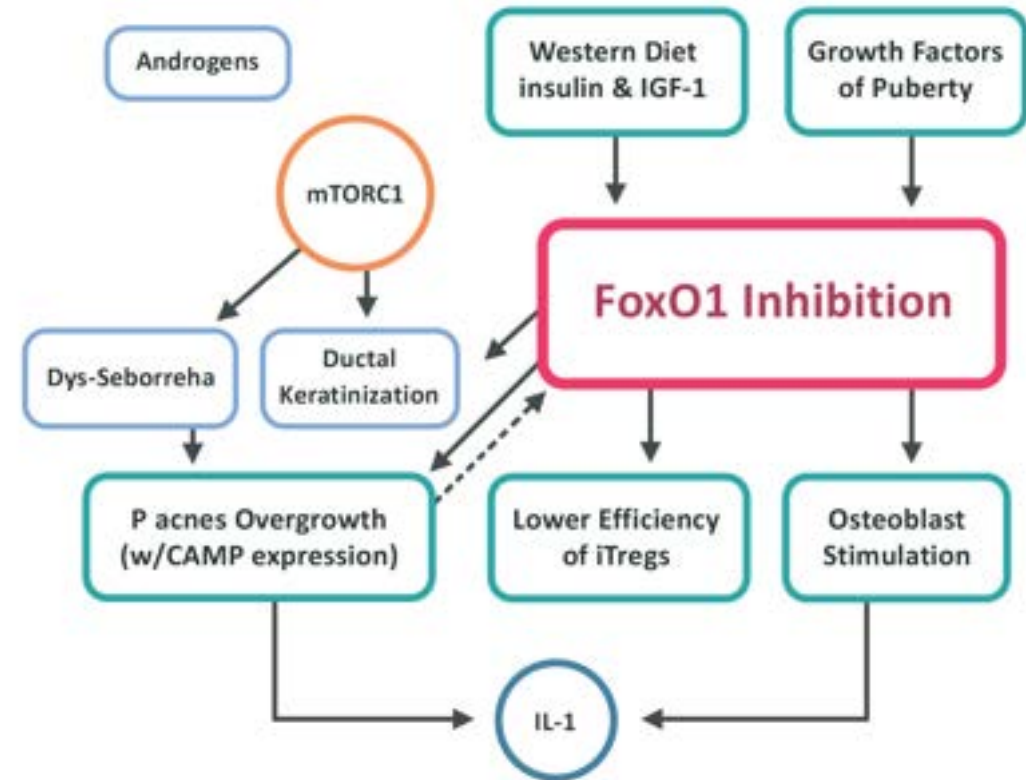
- Case controlled study, n=100 (25 controls, 75 acne patients)
- **Rate of H. pylori infection:**
 - 56% in the control group
 - **60%** in the cases with **mild** Acne vulgaris
 - **72%** in the cases with **moderate** Acne vulgaris
 - **88%** in the cases with **severe** Acne vulgaris



Effat Khodaeiani, Monireh Halimi and Amir Hagigi, 2014. Severe Acne Vulgaris is Associated with *Helicobacter pylori* Infection: First Report in the Literature. *Journal of Medical Sciences*, 14: 92-96.

FOXO1 Inhibition

- Acne may be due to a relative **deficiency of FoxO1** within the nucleus of sebocytes
 - *C. acnes* possibly contributes to FoxO1 downregulation
- *H. pylori* infection induces **nuclear inactivation of FoxO1** in human gastric cells



Berthelot, J. M., Corvec, S., & Hayem, G. (2018). SAPHO, autophagy, IL-1, FoxO1, and Propionibacterium (Cutibacterium) acnes. *Joint Bone Spine*, *85*(2), 171-176.

Tabassam, F. H., Graham, D. Y., & Yamaoka, Y. (2012). Helicobacter pylori-associated regulation of forkhead transcription factors FoxO1/3a in human gastric cells. *Helicobacter*, *17*(3), 193-202.

*Case Study:
30-Year-Old*

Case Study: “Emerson” (1st visit)

- 30 yo nonbinary individual; assigned female at birth; preferred pronouns- she or they.
- Onset: age 11, worse starting 3 months ago; bad several years ago in high school but never this bad
- Symptoms: painful nodules; “I don’t feel comfortable in my own skin”
- Tried: starting seeing dermatologists age 12
 - **Topicals:** clindamycin, salicylic acid, benzoyl peroxide, tretinoin, resorcinol, sulfur, tazarotene, adapalene, retinols, glycolic acid, lactic acid, natural products.
 - **Orals:** took antibiotics (doxy for 3 months) and Accutane (1 course; cut short after 4 months for mental health- acne was better), did spironolactone 200mg for 2 years (helped but d/c for side effects).
- Medications: Tazarotene Cream 0.1% 3x week
- Dx with PCOS, hirsutism
- Next steps: GI MAP, OAT and DUTCH ordered



Case Study: "Emerson" (1st visit)



GI Map Stool Test - Emerson

H. pylori		
	Result	Normal
<i>Helicobacter pylori</i>	<dl	<1.0e3

Normal Bacterial Flora		
	Result	Normal
<i>Bacteroides fragilis</i>	5.67e10	1.60e9 - 2.50e11
<i>Bifidobacterium spp.</i>	2.09e11	>6.70e7
<i>Enterococcus spp.</i>	6.07e6	1.9e5 - 2.00e8
<i>Escherichia spp.</i>	4.26e8	3.70e6 - 3.80e9
<i>Lactobacillus spp.</i>	3.92e9	8.6e5 - 6.20e8
<i>Clostridia (class)</i>	2.02e7	5.00e6 - 5.00e7
<i>Enterobacter spp.</i>	1.48e7	1.00e6 - 5.00e7
<i>Akkermansia muciniphila</i>	<dl	1.00e1 - 5.00e4
<i>Faecalibacterium prausnitzii</i>	4.78e6	1.00e3 - 5.00e8

Phyla Microbiota		
	Result	Normal
<i>Bacteroidetes</i>	1.62e12	8.61e11 - 3.31e12
<i>Firmicutes</i>	1.09e11	5.70e10 - 3.04e11

High

GI Map Stool Test - Emerson

Opportunistic Bacteria

Additional Dysbiotic/Overgrowth Bacteria	Result		Normal
<i>Bacillus spp.</i>	1.04e6	High	<1.50e5
<i>Enterococcus faecalis</i>	<dl		<1.00e4
<i>Enterococcus faecium</i>	7.10e4	High	<1.00e4
<i>Morganella spp.</i>	<dl		<1.00e3
<i>Pseudomonas spp.</i>	<dl		<1.00e4
<i>Pseudomonas aeruginosa</i>	<dl		<5.00e2
<i>Staphylococcus spp.</i>	<dl		<1.00e4
<i>Staphylococcus aureus</i>	1.50e4	High	<5.00e2
<i>Streptococcus spp.</i>	1.14e4	High	<1.00e3
<i>Methanobacteriaceae</i> (family)	1.10e8		<5.00e9

Fungi/Yeast

	Result		Normal
<i>Candida spp.</i>	3.66e4	High	<5.00e3

OAT - Emerson

Yeast and Fungal Markers



DUTCH - Emerson

Key (how to read the results):

Sex Hormones

See Pages 2 and 3 for a thorough breakdown of sex hormone metabolites

Estradiol(E2)

Progesterone
(Serum Equivalent, ng/mL)

Progesterone Serum Equivalent is a calculated value based on urine pregnanediol.

Testosterone

Adrenal Hormones

See pages 4 and 5 for a more complete breakdown of adrenal hormones

Daily Free Cortisol Pattern

Free cortisol best reflects tissue levels. Metabolized cortisol best reflects total cortisol production.

Total DHEA Production

Age	Range
20-39	1300-3000
40-60	750-2000
>60	500-1200

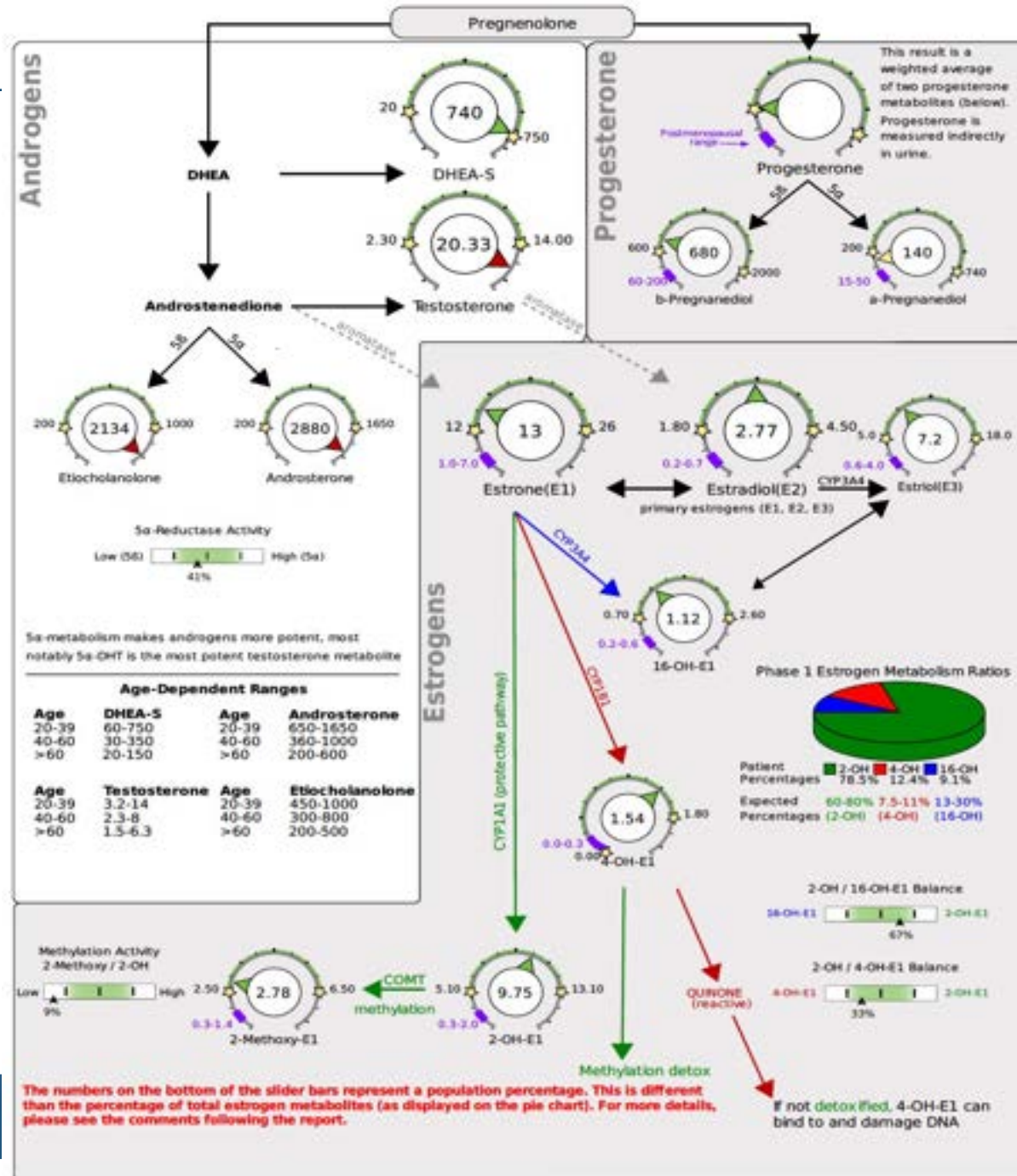
Total DHEA Production
(DHEAS + Etiocholanolone + Androsterone)

24hr Free Cortisol
(A+B+C+D)

→ cortisol metabolism

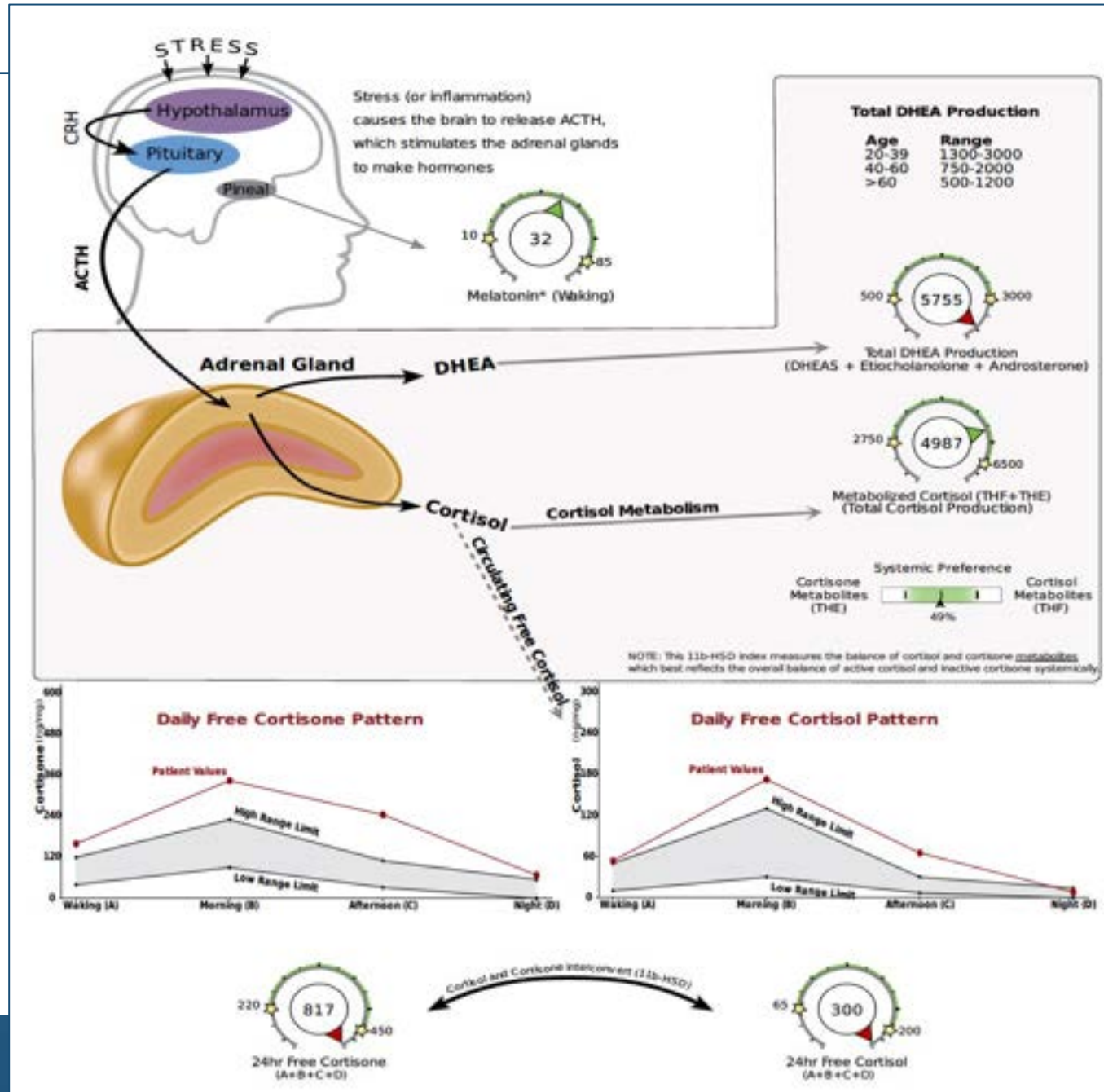
Metabolized Cortisol (THF+THE)
(Total Cortisol Production)

DUTCH - Emerson



Androgens and Metabolites (Urine)				
DHEA-S	High end of range	740.0	ng/mg	20 - 750
Androsterone	Above range	2880.4	ng/mg	200 - 1650
Etiocholanolone	Above range	2134.4	ng/mg	200 - 1000
Testosterone	Above range	20.33	ng/mg	2.3 - 14
5a-DHT	Above range	10.7	ng/mg	0 - 6.6
5a-Androstanediol	Above range	81.3	ng/mg	6 - 30
5b-Androstanediol	Above range	381.0	ng/mg	20 - 75
Epi-Testosterone	Within range	10.1	ng/mg	2.3 - 14

DUTCH - Emerson



Emerson – Lab Test Findings

- **Bacterial overgrowth**
 - Dysbiotic (Enterococcus, Staph, Strep)
- **Leaky gut**
 - No Akkermansia
- **Fungal overgrowth**
 - Candida elevated
 - Fusarium high
- **Hormones**
 - HIGH: testosterone, DHT, 5a-Androstenediol, DHEA, DHEA-S, Cortisol, Cortisone
 - LOW: progesterone



Key Issues & Treatment - Emerson

Issue	Treatment
Bacterial overgrowth	<input type="checkbox"/> Antibacterial herbs (Berberine Complex, Phytostan)
Candida overgrowth	<input type="checkbox"/> Antifungal herbs (Y Formula)
No Akkermansia	<input type="checkbox"/> Akkermansia probiotic
Low commensal bacteria	<input type="checkbox"/> Pomegranate, probiotics, 35g fiber/day, 30 plants/week
High androgens	<input type="checkbox"/> 5aRi herbs (saw palmetto, pygeum, nettle root)
High cortisol	<input type="checkbox"/> Cortisol balancing herbs: holy basil, rhodiola, ashwagandha
Topicals	<input type="checkbox"/> Botanical topicals to reduce sebum and heal skin

- *Protocols are individualized*
- *Plans change every 2-3 months*

Emerson

1st visit



2 mo



2 mo (4)



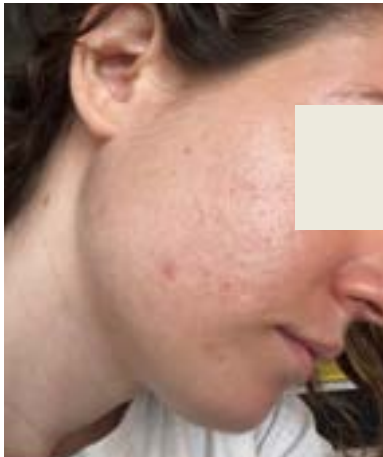
2.5 mo (6.5)



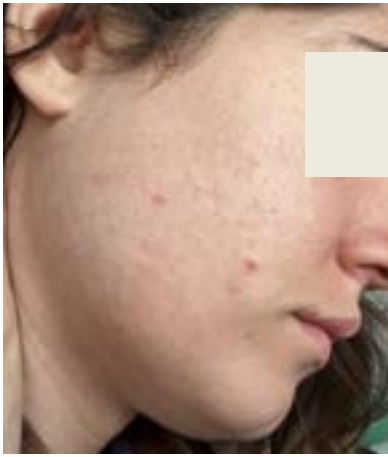
2.5 mo (9)



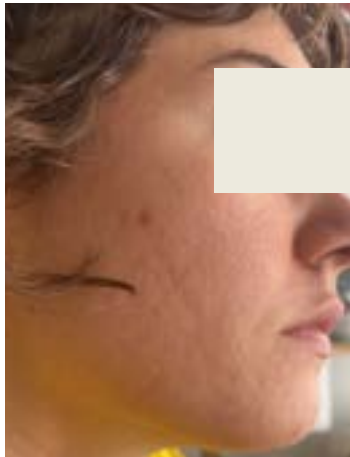
2.5 mo (18.5)



3 mo (16.5)



2 mo (13.5)



2.5 mo (11.5)

Emerson

1st visit



2 mo



2 mo (4)



2.5 mo (6.5)



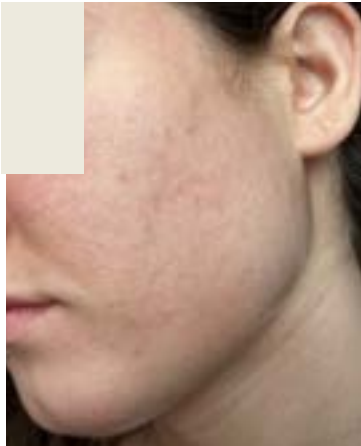
2.5 mo (9)



2.5 mo (18.5)



3 mo (16.5)



2 mo (13.5)



2.5 mo (11.5)

1st visit



2 mo (18.5)



Emerson

1st visit



2 mo (18.5)



Things to Consider

1. When treating skin, think of the gut!
2. Analyze all of the problems that you'll need to address on both gut test labs.
3. Decide what order you want to treat them.
DON'T TRY TO TREAT EVERYTHING ALL AT ONCE.
4. Learn the best protocols to treat each issue, both internal and topical.
5. Adjust based on the patient: infant, toddler, breastfeeding mom, allergies.
6. Move through different protocols every 2-3 months.
7. Treat beyond skin clearance



*Does it work for other
dermatological conditions?*

Does it work for other dermatological conditions?



Does it work for other dermatological conditions?



Does it work for other dermatological conditions?



Does it work for other dermatological conditions?



Does it work for other dermatological conditions?



Does it work for other dermatological conditions?



Does it work for other dermatological conditions?



Does it work for other dermatological conditions?



Does it work for other dermatological conditions?



Does it work for other dermatological conditions?



Does it work for other dermatological conditions?



Does it work for other dermatological conditions?



Does it work for other dermatological conditions?



Does it work for other dermatological conditions?



Does it work for other dermatological conditions?



Does it work for other dermatological conditions?



Does it work for other dermatological conditions?



Does it work for other dermatological conditions?



Does it work for other dermatological conditions?





The Way We Approach
Dermatological Conditions
Needs an Upgrade

Because a skin issue is
almost never *just* a skin
issue.

ROOT CAUSE FUNCTIONAL DERMATOLOGY PROFESSIONAL COURSES

Taught by Dr. Greenberg, ND

A Comprehensive Functional Medicine Training Course

- 35 Case Studies with labs, hundreds of treatment plans and photos
- Conditions:
 - Acne
 - Eczema
 - Seborrheic dermatitis
 - Psoriasis
 - Rosacea
 - Hair Loss
 - Keratosis pilaris

Advanced Functional Medicine Lab Training

- GI Map stool test
- OAT (Organic Acid Test)
- Mycotoxin test
- DUTCH Hormone test
- Gut dysbiosis (*including H. pylori & SIBO*)
- **And much more!**

GET MORE INFO: www.rootcausedermatology.com

GET MORE INFO:

rootcausedermatology.com/courses-for-medical-professionals/




LIVE 4-MONTH MENTORSHIP COHORT COURSE




SELF-PACED COURSE



ROOT CAUSE DERMATOLOGY COURSE OPTIONS

	LIVE 4-MONTH MENTORSHIP COHORT	SELF-PACED COURSE
REQUIREMENTS	Licensed health care professionals. Accepted degrees: CNS, TCM, DC, DO, MD, ND, NP, PA, RD (must submit proof of licensure and be accepted to a cohort)	Health care professionals who can order functional medicine labs (stool tests, DATs, etc)
PACE	4-month intensive. New content opens up each week.	Self-Paced. New content opens up every 5 days.
START DATE	Set cohorts - check schedule for start date.	Anytime
LESSONS	32 Recorded lectures with handouts 35 patient case studies	32 Recorded lectures with handouts 35 patient case studies
DERM CONDITIONS COVERED	Acne, eczema, seb derm, psoriasis, rosacea, hair loss, keratosis pilaris	Acne, eczema, seb derm, psoriasis, rosacea, hair loss, keratosis pilaris
PEER NETWORKING	You are part of a cohort. Participants get each other's contact info and meet every other week in a live Zoom session.	NONE
ADDITIONAL TOPICS COVERED	Business Overview: how Dr. Greenberg runs her practice. Telemedicine: how to treat chronic derm via telemedicine.	NONE
LIVE SESSIONS, Q&A	Live Zoom session with your cohort & Dr. Greenberg every other week: practice analyzing labs, additional case studies, students can bring their own cases, discussions with your peers	NONE
ROOT CAUSE DERMATOLOGY CERTIFIED	YES, once you pass quizzes for all the modules and submit a final case study.	NONE
GET NEW PATIENTS	Get listed in the "Find a Practitioner" database on RootCauseDermatology.com and get patients who are looking for this exact treatment!	NONE
PEER NETWORKING	Root Cause Dermatology Professionals Facebook group	NONE
COST	Download PDF for course pricing.	Download PDF for course pricing.

Thank You!

Julie Greenberg, ND RH(AHG) MBA

September 25, 2024

DUTCH Labs

dutchwebinars