

THE GUT-THYROID CONNECTION

THE OVERLOOKED KEY TO HEALING

DR. MICHAEL RUSCIO, DNM, DC



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THE PROBLEMS WITH A THYROID-CENTRIC MODEL OF CARE

- Symptoms aren't helpful to diagnose hypothyroidism
- Subclinical hypothyroidism is over-treated
- Many are on thyroid medication unnecessarily
- True hypothyroidism is rare

THE SOLUTION?

A gut-centric approach to improving “thyroid” symptoms



ARE SYMPTOMS A RELIABLE WAY TO DIAGNOSE A THYROID CONDITION?



SYMPTOMS DON'T PREDICT SUBCLINICAL HYPOTHYROIDISM

Symptom comparison between:

- Subclinical hypothyroid patients
- Euthyroid controls

Results

- Subclinical hypothyroidism patients did NOT have more thyroid symptoms than controls

Survey study: N = 376 patients

The image shows a screenshot of a PubMed article page. At the top, there is a blue header with the NIH logo and the text "National Library of Medicine National Center for Biotechnology Information". Below this is the PubMed logo and a search bar. A blue diagonal banner across the page reads "Survey study: N = 376 patients". To the right of the banner are "Save" and "Email" buttons. The article title is "Does Subclinical Hypothyroidism Add Any Symptoms? Evidence from a Danish Population-Based Study". Below the title is the journal information: "> Am J Med. 2021 Sep;134(9):1115-1126.e1. doi: 10.1016/j.amjmed.2021.03.009. Epub 2021 Apr 16." The authors listed are Allan Carlé¹, Jesper Scott Karmisholt², Nils Knudsen³, Hans Perrild³, Bettina Heinsbæk Thuesen⁴, Lars Ovesen⁵, Lone Banke Rasmussen³, and Inge Bülow Pedersen². At the bottom, there is a section for "Affiliations + expand" and the PMID: 33872585 and DOI: 10.1016/j.amjmed.2021.03.009.

SYMPTOMS DON'T PREDICT OVERT HYPOTHYROIDISM

Symptom comparison between:

- Hypothyroid patients
- Euthyroid controls

Results

- Symptoms were **NOT** a reliable predictor of hypothyroidism

whereas **70.0% of controls reported one or more symptoms associated with hypothyroidism.** The simple

Case-control study: N = 140 hypothyroid patients

The image shows a screenshot of a PubMed search result. At the top, the NIH National Library of Medicine logo is visible. Below it, the PubMed logo is displayed. A search bar is present, and a 'Save' button is visible. The main text of the search result reads: '> Eur J Endocrinol. 2014 Nov;171(5):593-602. doi: 10.1530/EJE-14-0481. Hypothyroid symptoms and the likelihood of overt thyroid failure: a population-based case-control study'. Below the title, the authors are listed: 'Allan Carlé¹, Inge Bülow Pedersen², Nils Knudsen², Hans Perrild², Lars Ovesen², Peter Laurberg³'. At the bottom, there are links for 'Affiliations + expand', 'PMID: 25305308', and 'DOI: 10.1530/EJE-14-0481'.



**DOES TREATING
ELEVATED TSH IMPROVE
“THYROID” SYMPTOMS?**



TREATMENT OF SUBCLINICAL HYPOTHYROIDISM

Patients with:

- Subclinical hypothyroidism

Intervention

- Placebo
- Levothyroxine

What did they find? →

Meta-analysis: 21 RCTs, N = 2,192 patients

The image shows a screenshot of a PubMed search result. At the top, the NIH logo and 'National Library of Medicine' are visible. Below that is the PubMed logo and the text 'Advanced'. There are 'Save' and 'Email' buttons. The main text of the result reads: 'Review > JAMA. 2018 Oct 2;320(13):1349-1359. doi: 10.1001/jama.2018.13770.' Below this is the title of the article: 'Association of Thyroid Hormone Therapy With Quality of Life and Thyroid-Related Symptoms in Patients With Subclinical Hypothyroidism: A Systematic Review and Meta-analysis'.

“The use of thyroid hormone therapy was **NOT** associated with improvements in general quality of life or thyroid-related symptoms. These findings **do not support the routine use of thyroid hormone therapy** in adults with subclinical hypothyroidism.”



ARE THYROID CONDITIONS OVER-DIAGNOSED?



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IS THYROID MEDICATION BEING OVERPRESCRIBED?

Patients were:

- Taking levothyroxine
 - ... with no clear hypothyroid diagnosis

All stopped medication

Results? →

The image shows a screenshot of a PubMed search result. At the top, the NIH National Library of Medicine logo is visible. Below it, the PubMed logo is displayed. A blue diagonal banner across the top of the search results area reads "Observational study: 291 patients". The search results include a link to a study titled "Levothyroxine Replacement Therapy and Overuse: A Timely Diagnostic Approach" by Sarantis Livadas, Christina Bothou, Ioannis Androulakis, Anastasios Boniakos, Nicholas Angelopoulos, and Leonidas Duntas. The study is dated 2018 Nov 30 and has a DOI of 10.1089/thy.2018.0014. The PMID is 30351232 and the DOI is 10.1089/thy.2018.0014. The search interface also shows a search bar, a "Save" button, and an "Email" button.

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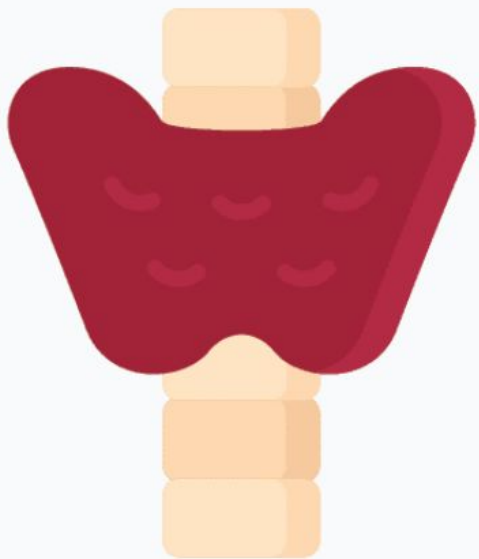
Save Email

> Thyroid. 2018 Nov 30. doi: 10.1089/thy.2018.0014. Online ahead of print.

Levothyroxine Replacement Therapy and Overuse: A Timely Diagnostic Approach

Sarantis Livadas ¹, Christina Bothou ², Ioannis Androulakis ¹, Anastasios Boniakos ¹, Nicholas Angelopoulos ¹, Leonidas Duntas ³

Affiliations + expand
PMID: 30351232 DOI: 10.1089/thy.2018.0014



39%



39% became *hypothyroid*

61%



61% had *normal lab tests* and were able to stop medication

IS THYROID MEDICATION BEING OVERPRESCRIBED?

Patients were:

- Taking various thyroid hormone medications
 - *Levothyroxine (T4)*
 - *Liothyronine (T3)*
 - *Combination therapy (T4/T3)*

All stopped medication

After stopping medication,
37% of patients maintained
normal thyroid function



The image shows a screenshot of a PubMed article page. At the top, the NIH National Library of Medicine logo is visible. Below it, the PubMed logo is present. A large, diagonal blue banner with white text reads "Meta-analysis: 17 studies, N = 1,103 patients". The article title is "Clinical Outcomes After Discontinuation of Thyroid Hormone Replacement: A Systematic Review and Meta-Analysis". The authors listed are Nydia Burgos, Freddy J K Toloza, Naykky M Singh Ospina, Juan P Brito, Ramzi G Salloum, Leslie C Hassett, and Spyridoula Maraka. The PMID is 33161885, the PMCID is PMC8110016, and the DOI is 10.1089/thy.2020.0679.

**GI DYSFUNCTION IS
MORE COMMON THAN
THYROID DYSFUNCTION**



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HOW COMMON IS OVERT AND SUBCLINICAL HYPOTHYROIDISM

STUDY	PARTICIPANTS	PREVALENCE
NHANES (1988-1994)	N = 16,533	0.3%
NHANES (2007-2012)	N = 10,457	0.2%
Meta-analysis	N = 752,773	0.37%

Average = 0.29% overt hypothyroidism
= 3.9% subclinical hyperthyroidism

Prevalence of Gut Dysfunction

Functional digestive disorders present in:

- ~40% of participants

Survey Study: N = 73,076 participants

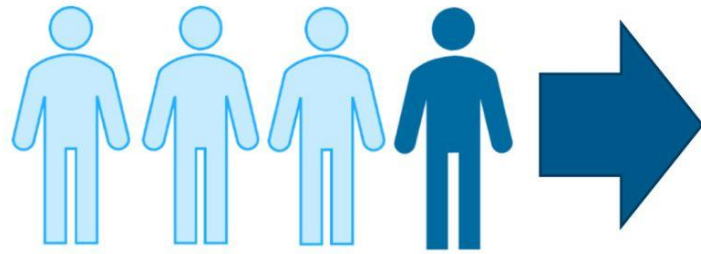


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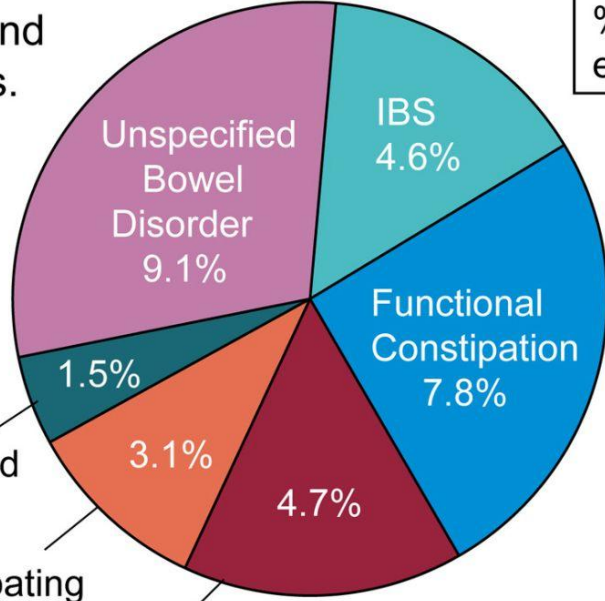
GUT PROBLEMS ARE FAR MORE LIKELY

Prevalence of Functional Bowel Disorders

More than **1 in every 4 adults** in the U.S., Canada and the U.K. has one of the six functional bowel disorders.



Pie chart:
% of adults with each disorder



Opioid-induced constipation

Functional Bloating

Functional Diarrhea

Gastroenterology

GUT-THYROID SYMPTOM OVERLAP

“Hypothyroid symptoms” can also be from poor GI health

IBS & SIBO have been associated with increased:

- Fatigue
- Depression
- Anxiety
- Sleep disturbances

Review Paper

The screenshot shows the PubMed interface. At the top is the NIH logo and the text 'National Library of Medicine National Center for Biotechnology Information'. Below that is the PubMed logo and a search bar with the word 'Advanced' underneath. To the right of the search bar are 'Save' and 'Email' buttons. The main content area shows a 'Review' link followed by the citation: 'Nutrients. 2022 Aug 30;14(17):3572. doi: 10.3390/nu14173572.' The title of the article is 'The Relationship between Gastrointestinal Health, Micronutrient Concentrations, and Autoimmunity: A Focus on the Thyroid'. Below the title are the authors: 'Michael Ruscio¹, Gavin Guard¹, Gabriela Piedrahita², Christopher R D'Adamo^{2 3}'. There is also a link for 'Affiliations + expand', the PMID (36079838), the PMCID (PMC9460308), and the DOI (10.3390/nu14173572). At the bottom, there is a link for 'Free PMC article'.

NUTRIENT-GASTROINTESTINAL- THYROID AXIS

Up to 40% of hypothyroid patients struggle with “thyroid” symptoms

...despite being biochemically euthyroid when on thyroid replacement therapy

Gastrointestinal health can serve as a therapeutic target for improving:

Thyroid health

Thyroid nutrient status

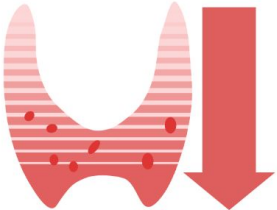
Nutrient-Gut-Thyroid Connection →



The image shows a screenshot of a PubMed article page. At the top, there is a dark blue header with the NIH logo and the text 'National Library of Medicine National Center for Biotechnology Information'. Below this is a search bar with the PubMed logo and a search button labeled 'Advanced'. A blue diagonal banner with the text '2022 Review' is overlaid on the search bar area. To the right of the search bar are 'Save' and 'Email' buttons. The main content area shows the article title 'The Relationship between Gastrointestinal Health, Micronutrient Concentrations, and Autoimmunity: A Focus on the Thyroid' and the authors 'Michael Ruscio¹, Gavin Guard¹, Gabriela Piedrahita², Christopher R D'Adamo^{2, 3}'. Below the authors are the fields 'Affiliations + expand', 'PMID: 36079838', 'PMCID: PMC9460308', and 'DOI: 10.3390/nu14173572'. At the bottom of the article preview is a link for 'Free PMC article'.

WHY GUT HEALTH MATTERS FOR THE THYROID

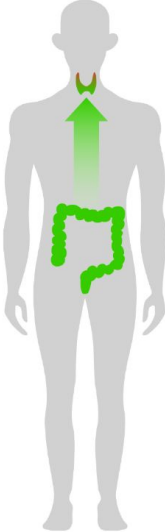
1. GI CONDITIONS CAN LOWER THYROID-SPECIFIC NUTRIENTS



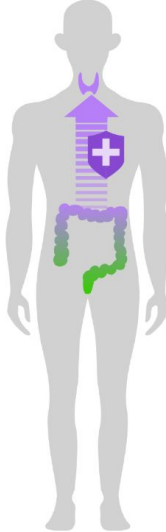
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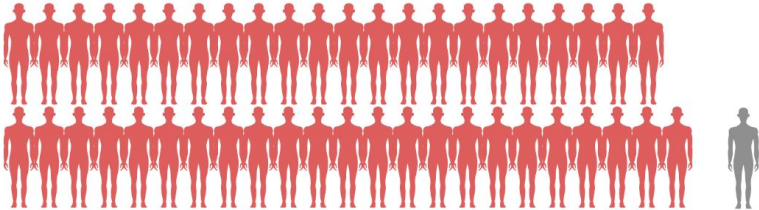
4. GI CARE CAN RESOLVE SYMPTOMS THOUGHT TO BE FROM "THYROID DYSFUNCTION"



5. GI HEALTH CAN AFFECT THYROID AUTOIMMUNITY



3. GI CONDITIONS ARE AT LEAST 45X MORE COMMON THAN HYPOTHYROIDISM



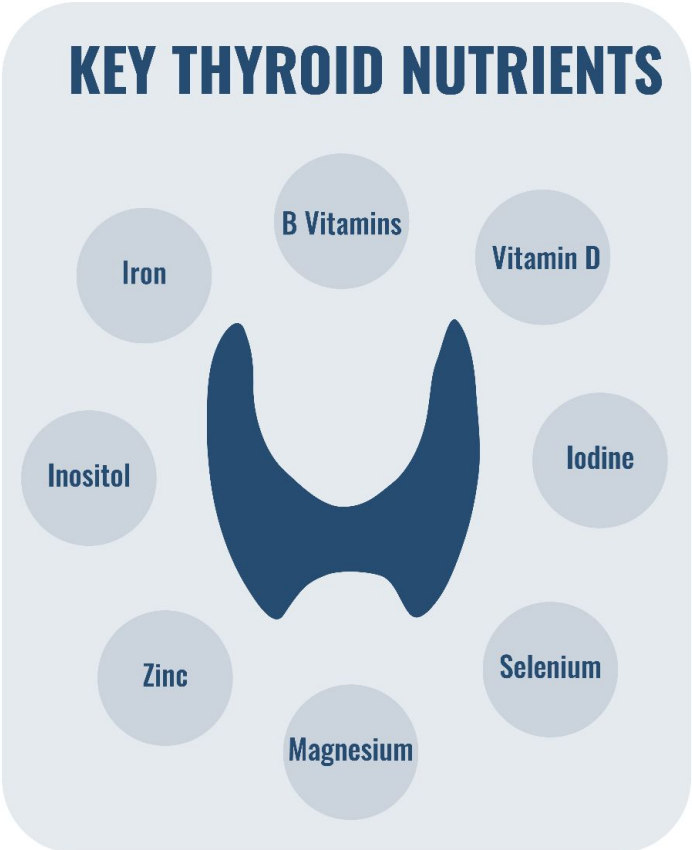
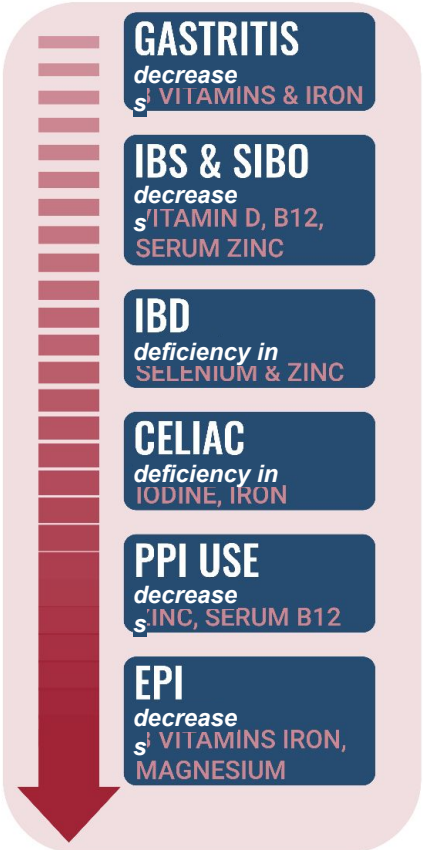


GI CONDITIONS AND THYROID HEALTH



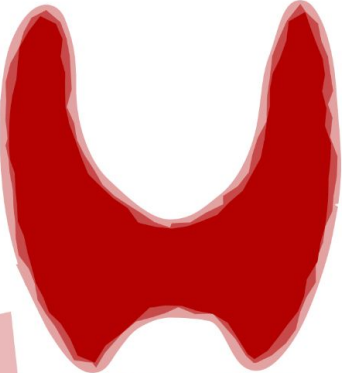
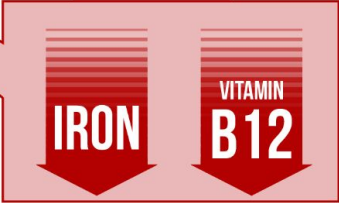
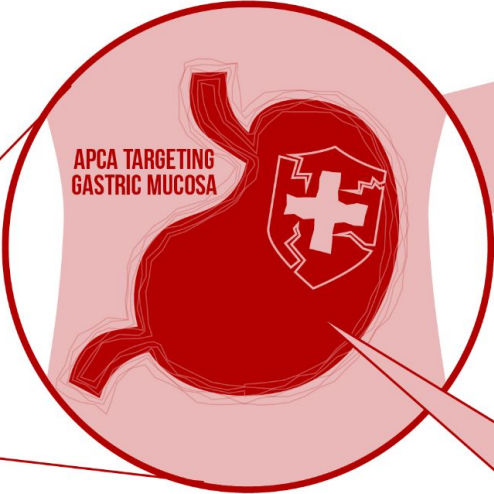
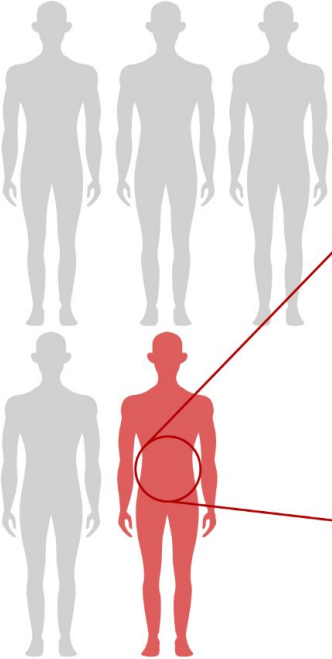
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GI HEALTH, THYROID DYSFUNCTION, AND NUTRIENT INSUFFICIENCY



GI HEALTH, THYROID DYSFUNCTION, AND NUTRIENT INSUFFICIENCY

1 IN 5 WITH HASHIMOTO'S HAVE APCA



**HYPOTHYROID
SYMPTOMS**



GI CARE IMPROVES STATUS OF THYROID-SPECIFIC NUTRIENTS



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KEY THYROID NUTRIENTS

Iron

B Vitamins

Vitamin D

Inositol

Iodine

Zinc

Selenium

Magnesium

PROBIOTICS

increase micronutrient levels: vitamin B12, calcium, folate, iron, zinc

ELEMENTAL DIET

drastic reduction in malnourishment rates

IMMUNO-GLOBULINS

improve nutrient absorption

**GI CARE CAN RESOLVE
SYMPTOMS THOUGHT TO BE
FROM THYROID DYSFUNCTION**



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GI CARE CAN RESOLVE “THYROID SYMPTOMS”

Intervention	Symptom(s) Improved
Low FODMAP diet	Pain, anxiety and quality of life
Probiotics	Depression, anxiety, cognitive function
Elemental diet	Quality of life
Rifaximin	Cognitive function
Fecal microbiota transplant	Fatigue, quality of life
Intestinal permeability support	Chronic fatigue

“The Relationship Between Gastrointestinal Health, Micronutrient Concentrations, and Autoimmunity: A Focus on the Thyroid”
References: 104, 105, 106, 107, 108, 109, 110, 111, 112, 113, 114, 116, 117, 118, 119, 120, 121, 122



GI THERAPIES IMPROVE EXOGENOUS THYROID HORMONE ABSORPTION



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PROBIOTICS IMPROVE THYROID MEDICATION ABSORPTION

Participants given:

- Placebo
- Synbiotic
 - *Lacto/bifido + streptococcus thermophilus* (53 billion CFU)
 - *Fructooligosaccharide*

Compared to placebo, synbiotics led to:

- Lower levothyroxine dose required
- Reduced TSH levels
- Improved Fatigue

RCT: N = 60 hypothyroid patients

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Randomized Controlled Trial > Complement Ther Med. 2020 Jan;48:102234.
doi: 10.1016/j.ctim.2019.102234. Epub 2019 Nov 3.

The effects of synbiotic supplementation on thyroid function and inflammation in hypothyroid patients: A randomized, double-blind, placebo-controlled trial

Sepide Talebi¹, Mozghan Karimifar², Zahra Heidari³, Hamed Mohammadi⁴, Gholamreza Askari⁵

Affiliations + expand

PMID: 31987229 DOI: 10.1016/j.ctim.2019.102234

IMPACT OF GI SYSTEM ON AUTOIMMUNITY AND THYROID AUTOIMMUNITY



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GUT INFECTIONS & THYROID AUTOIMMUNITY

Helicobacter pylori infections increase the risk of:

- Autoimmune thyroid disease by 2.2x
 - Hashimoto's thyroiditis by 2x
 - Graves' disease by 2.8x

Treating *H. pylori* reduced thyroid antibodies →

The image shows a screenshot of a PubMed search result. At the top, the NIH logo and 'National Library of Medicine' are visible. Below that is the PubMed logo. A blue diagonal banner across the top of the search result area reads 'Meta-analysis: 15 studies, N = 3,046 patients'. The search result itself is for a paper from Oncotarget, dated 2017 Dec 4;8(70):115691-115700. The title of the paper is 'Meta-analysis of the correlation between Helicobacter pylori infection and autoimmune thyroid diseases'. The authors listed are Yi Hou, Wen Sun, Chengfei Zhang, Tieshan Wang, Xuan Guo, Lili Wu, Lingling Qin, and Tonghua Liu. The PMID is 29383192, the PMCID is PMC5777804, and the DOI is 10.18632/oncotarget.22929.

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Meta-analysis: 15 studies, N = 3,046 patients

Save

> Oncotarget. 2017 Dec 4;8(70):115691-115700. doi: 10.18632/oncotarget.22929.
eCollection 2017 Dec 29.

**Meta-analysis of the correlation between
Helicobacter pylori infection and autoimmune
thyroid diseases**

Yi Hou ^{# 1 2}, Wen Sun ^{# 1}, Chengfei Zhang ^{1 2}, Tieshan Wang ³, Xuan Guo ^{1 2}, Lili Wu ³,
Lingling Qin ⁴, Tonghua Liu ¹

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PMID: 29383192 PMCID: PMC5777804 DOI: 10.18632/oncotarget.22929

IMPROVING GUT REDUCES THYROID ANTIBODIES

Decrease in thyroid autoantibodies after eradication of *Helicobacter pylori* infection.

Clin Endocrinol (Oxf). 2004 Nov;61(5):650-2. PMID: 15521972

- 10 patients with Hashimoto's and an *H. Pylori* infection were studied.

TPO Start

TPO at 20 Months

Patient 1: 4745
Patient 2: 966
Patient 3: 1456
*2389

Patient 1: 45
Patient 2: 312
Patient 3: 724
*360

Treatment Group

Δ 2029 ea.

Patient 1: 1410
Patient 2: 3440
Patient 3: 4924
*3268

Patient 1: 1270
Patient 2: 2285
Patient 3: 4667
*2740

Non-Treatment Group

Δ 528 ea.

GUT TREATMENTS IMPROVE THYROID HEALTH



Improve absorption of
thyroid medication



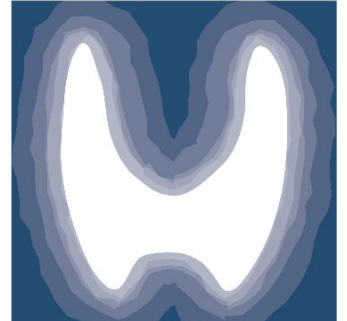
Reduce symptoms
of fatigue, brain
fog, depression,
and anxiety

TSH

Reduce TSH levels



Reduce thyroid
antibodies



Reduce thyroid
inflammation

American College of Gastroenterology

'IBS is a very common disorder and evidence suggests that about 10% to 15% of people in the United States have it.'

Gut-Thyroid Symptom Overlap

“Hypothyroid symptoms” can also be from **poor GI health**

IBS & SIBO have been associated with increased:

- Fatigue
- Depression
- Anxiety
- Sleep disturbances

Review Paper



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Review > Nutrients. 2022 Aug 30;14(17):3572. doi: 10.3390/nu14173572.

The Relationship between Gastrointestinal Health, Micronutrient Concentrations, and Autoimmunity: A Focus on the Thyroid

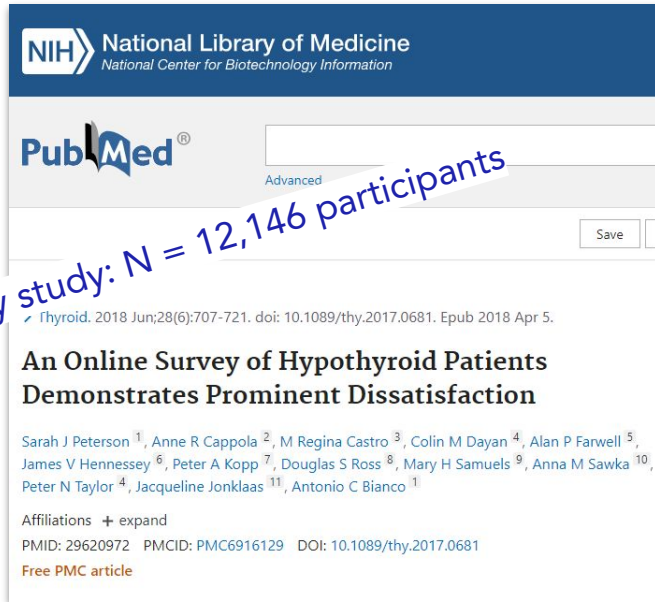
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Affiliations + expand

PMID: 36079838 PMCID: PMC9460308 DOI: 10.3390/nu14173572

[Free PMC article](#)

Gut-Thyroid Symptom Overlap



Patients often struggle with “thyroid” symptoms

...despite being **biochemically euthyroid** when on thyroid replacement therapy

response indicating treatment satisfaction was 5 (IQR = 3–8; [Table 1](#)). Among those who were frustrated with their hypothyroidism treatment, the relevant areas identified as causing dissatisfaction were weight management (69%), fatigue or energy level (77%), mood (45%), and memory or other problems thinking (58%). The median response describing satisfaction with the

Nutrient-Gastrointestinal-Thyroid Axis

Up to 40% of hypothyroid patients struggle with “thyroid” symptoms

...despite being biochemically euthyroid when on thyroid replacement therapy

Gastrointestinal health can serve as a therapeutic target for improving:

Thyroid health

(Thyroid) nutrient status

Nutrient-Gut-Thyroid Connection →



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The Relationship between Gastrointestinal Health, Micronutrient Concentrations, and Autoimmunity: A Focus on the Thyroid

Michael Ruscio¹, Gavin Guard¹, Gabriela Piedrahita², Christopher R D'Adamo^{2 3}

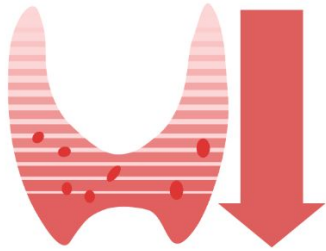
Affiliations + expand

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[Free PMC article](#)

Why Gut Health Matters for the Thyroid

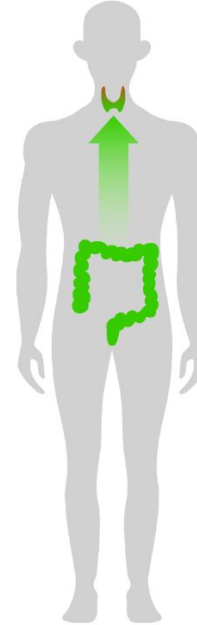
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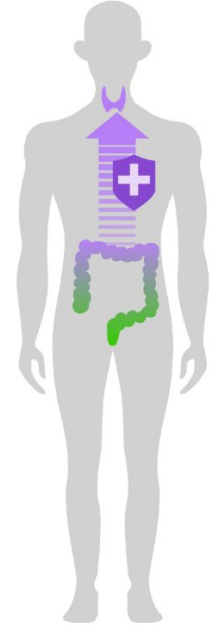
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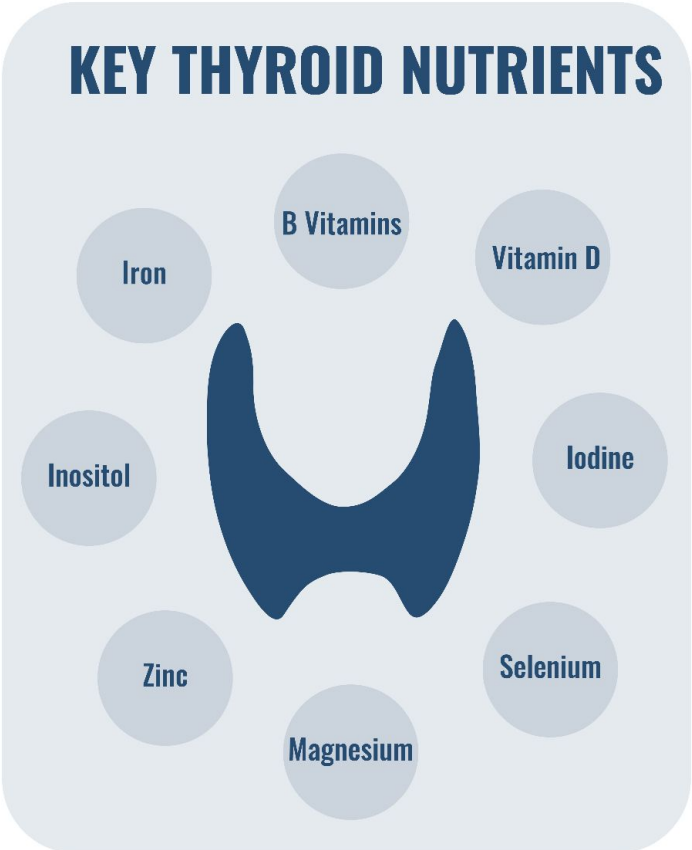
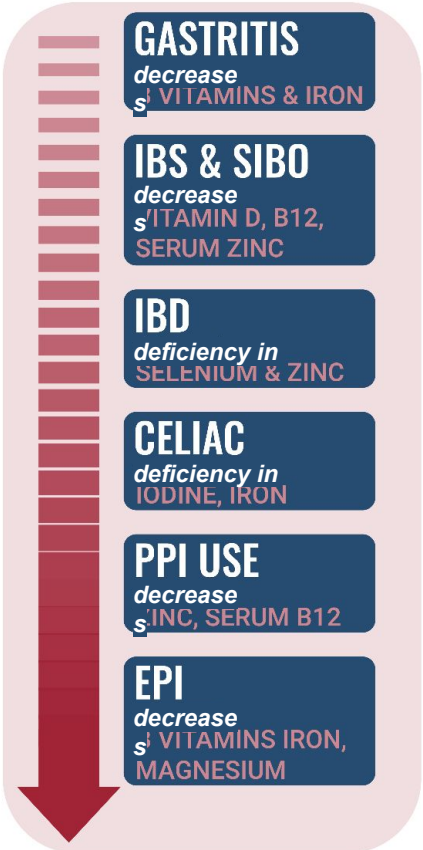


GI Conditions and Thyroid Health

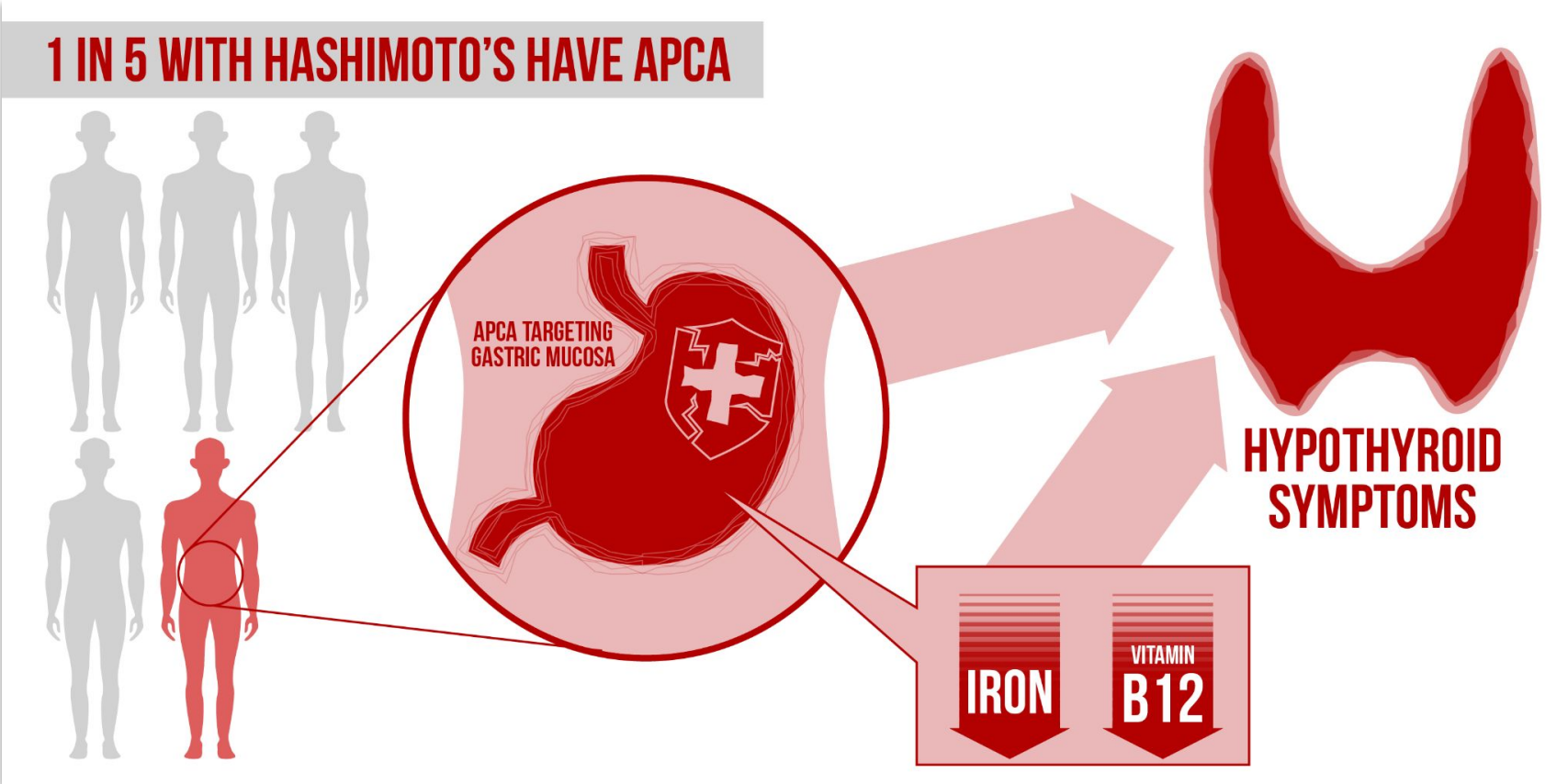


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GI HEALTH, THYROID DYSFUNCTION, AND NUTRIENT INSUFFICIENCY



GI Health, Thyroid Dysfunction, and Nutrient Insufficiency



GI Care Improves Status of Thyroid-Specific Nutrients

KEY THYROID NUTRIENTS



PROBIOTICS

increase micronutrient levels:
vitamin B12, calcium, folate,
iron, zinc

ELEMENTAL DIET

drastic reduction in
malnourishment rates

IMMUNO- GLOBULINS

improve nutrient absorption



GI Care Can Resolve Symptoms Thought to Be from Thyroid Dysfunction

GI Care Can Resolve “Thyroid Symptoms”

Intervention	Symptom(s) Improved
Low FODMAP diet	Pain, anxiety and quality of life
Probiotics	Depression, anxiety, cognitive function
Elemental diet	Quality of life
Rifaximin	Cognitive function
Fecal microbiota transplant	Fatigue, quality of life
Intestinal permeability support	Chronic fatigue

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References: 104, 105, 106, 107, 108, 109, 110, 111, 112, 113, 114, 116, 117, 118, 119, 120, 121, 122

GI Therapies Improve Exogenous Thyroid Hormone Absorption

Probiotics and Thyroid Medication Absorption

Participants given:

- Placebo
- Synbiotic
 - *Lacto/bifido + streptococcus thermophilus* (53 billion CFU)
 - *Fructooligosaccharide*

Compared to placebo, synbiotics led to:

- Lower levothyroxine dose required
- Reduced TSH levels
- Improved Fatigue

RCT: N = 60 hypothyroid patients

The image shows a screenshot of a PubMed search result. At the top, the NIH logo and 'National Library of Medicine National Center for Biotechnology Information' are visible. Below that is the PubMed logo and a search bar. A red text overlay reads 'RCT: N = 60 hypothyroid patients'. The search result is for a 'Randomized Controlled Trial' titled 'The effects of synbiotic supplementation on thyroid function and inflammation in hypothyroid patients: A randomized, double-blind, placebo-controlled trial'. The authors listed are Sepide Talebi, Mozghan Karimifar, Zahra Heidari, Hamed Mohammadi, and Gholamreza Askari. The publication details include 'Complement Ther Med. 2020 Jan;48:102234.' and 'doi: 10.1016/j.ctim.2019.102234. Epub 2019 Nov 3.' There are also buttons for 'Save' and 'Email'.

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National Center for Biotechnology Information

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Randomized Controlled Trial > Complement Ther Med. 2020 Jan;48:102234.
doi: 10.1016/j.ctim.2019.102234. Epub 2019 Nov 3.

The effects of synbiotic supplementation on thyroid function and inflammation in hypothyroid patients: A randomized, double-blind, placebo-controlled trial

Sepide Talebi ¹, Mozghan Karimifar ², Zahra Heidari ³, Hamed Mohammadi ⁴, Gholamreza Askari ⁵

Affiliations + expand

PMID: 31987229 DOI: 10.1016/j.ctim.2019.102234

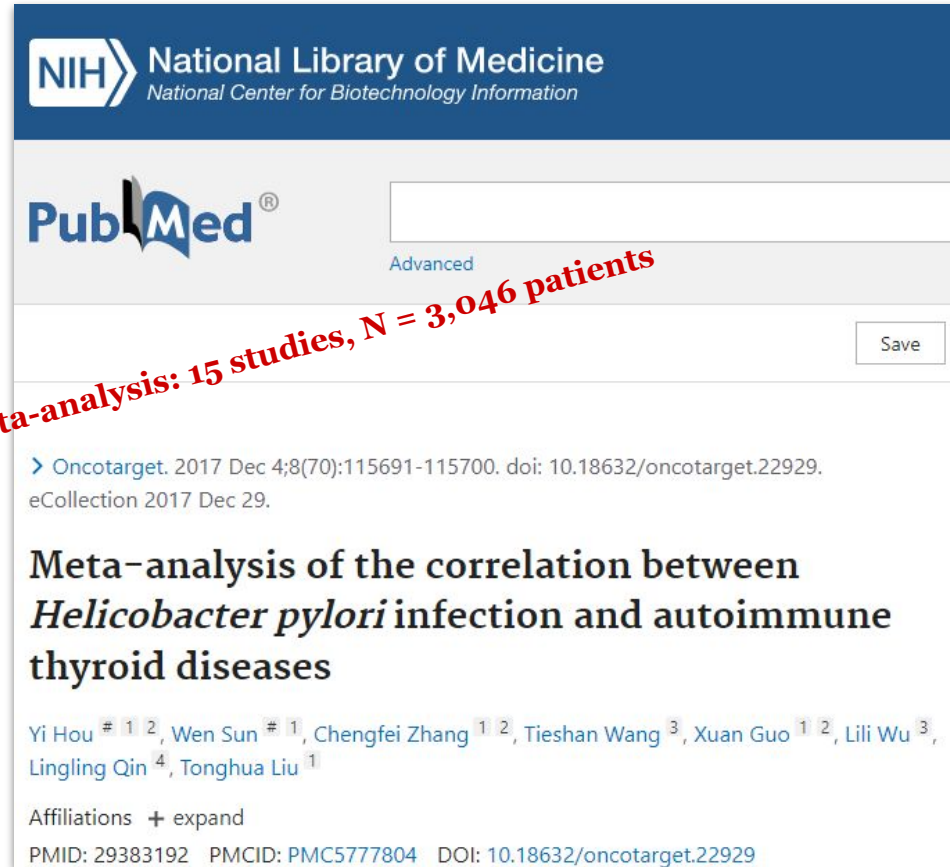
Impact of GI System on Autoimmunity and Thyroid Autoimmunity

Gut Infections and Thyroid Autoimmunity

Helicobacter pylori infections increase the risk of:

- Autoimmune thyroid disease **by 2.2x**
 - Hashimoto's thyroiditis by 2x
 - Graves' disease by 2.8x

Treating *H. pylori* reduced thyroid antibodies →



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> Oncotarget. 2017 Dec 4;8(70):115691-115700. doi: 10.18632/oncotarget.22929. eCollection 2017 Dec 29.

Meta-analysis of the correlation between *Helicobacter pylori* infection and autoimmune thyroid diseases

Yi Hou ^{# 1 2}, Wen Sun ^{# 1}, Chengfei Zhang ^{1 2}, Tieshan Wang ³, Xuan Guo ^{1 2}, Lili Wu ³, Lingling Qin ⁴, Tonghua Liu ¹

Affiliations + expand

PMID: 29383192 PMCID: PMC5777804 DOI: 10.18632/oncotarget.22929

Meta-analysis: 15 studies, N = 3,046 patients

Improving Gut Reduces Thyroid Antibodies

Decrease in thyroid autoantibodies after eradication of *Helicobacter pylori* infection.

Clin Endocrinol (Oxf). 2004 Nov;61(5):650-2. PMID: 15521972

- 10 patients with Hashimoto's and an *H. Pylori* infection were studied.

TPO Start

TPO at 20 Months

Patient 1: 4745
Patient 2: 966
Patient 3: 1456
*2389

Patient 1: 45
Patient 2: 312
Patient 3: 724
*360

Treatment
Group

Δ 2029 ea.

Patient 1: 1410
Patient 2: 3440
Patient 3: 4924
*3268

Patient 1: 1270
Patient 2: 2285
Patient 3: 4667
*2740

Non-
Treatment
Group

Δ 528 ea.

Gut Treatments Improve Thyroid Health



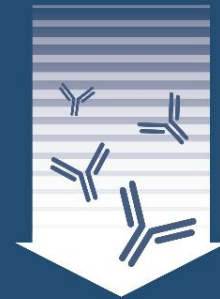
Improve absorption of thyroid medication



Reduce symptoms of fatigue, brain fog, depression, and anxiety

TSH

Reduce TSH levels



Reduce thyroid antibodies



Reduce thyroid inflammation