

Higher diet quality relates to decelerated epigenetic aging

Am J Clin Nutr 2022;115:163–170.

Higher diet quality is associated with slower epigenetic age acceleration, and has beneficial effects on lifespan and health span.

Findings emphasize that adopting a healthy diet, mostly whole plants, is crucial for maintaining healthy aging.

Advantages of the DASH diet

- Low in salt and sodium
- Rich in fresh fruits and vegetables
- Rich in low fat or nonfat dairy products
- Rich in whole grains, beans, seeds and nuts
- Fish and poultry (low in red meat)
- Rich in heart healthy fats
- Rich in potassium and calcium
- Low in added sugars and sweets
- Avoid foods with additives/preservatives

Advantages of the Mediterranean diet

- Primarily plant-based foods, such as fruits, vegetables, whole grains, legumes and nuts
- Replacing butter with healthy fats, such as olive oil and canola oil
- Using herbs and spices instead of salt to flavor foods
- Limiting red meat to no more than a few times a month
- Eating fish and poultry at least twice a week
- Enjoying meals with family and friends
- Drinking red wine in moderation (optional; one glass for women, one to two for men)
- Emphasizes fresh foods, no packaged or processed foods
- Advocates for getting plenty of exercise

Carotenoids Are Associated With A Younger Epigenetic Age And A Reduced All-Cause Mortality Risk


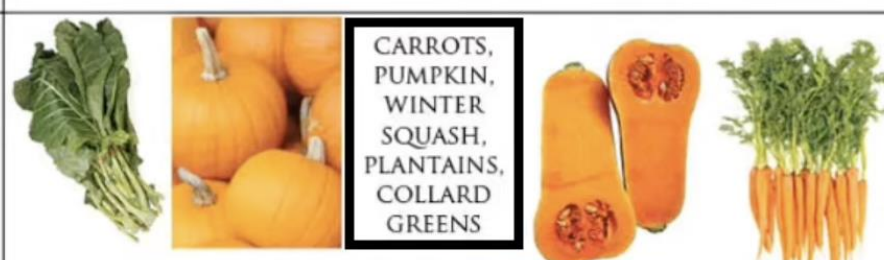
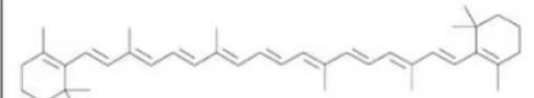

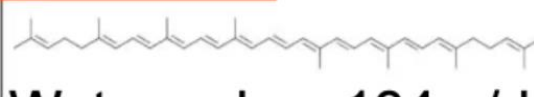

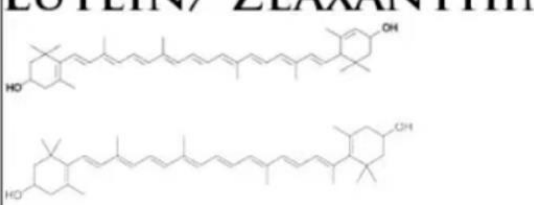

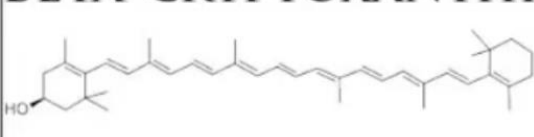

TYPE	CAROTENOID FOOD SOURCES
ALPHA-CAROTENE  Carrots: 416 g/d	 <p>CARROTS, PUMPKIN, WINTER SQUASH, PLANTAINS, COLLARD GREENS</p>
BETA-CAROTENE  Carrots: 416 g/d	 <p>CARROTS, LEAFY GREENS, SWEET POTATO, CANTALOUPE, PUMPKIN</p>
LYCOPENE  Watermelon: 134 g/d	 <p>TOMATOES, PAPAYA, GRAPEFRUIT, WATERMELON</p>
LUTEIN/ ZEAXANTHIN 	 <p>LEAFY GREENS, SUMMER/ WINTER SQUASH, BRUSSEL SPROUTS, YELLOW CORN</p>
BETA-CRYPTOXANTHIN 	 <p>PUMPKIN, PAPAYA, SWEET PEPPER, ORANGE, CARROT</p>

Image via shorturl.at/euLS

PLANT PROTEIN

per serving

ADVANTAGES

- Fiber
- Phytonutrients
- Vitamins & minerals
- Low or healthy fat profile
- No cholesterol

18g

Red Lentils
boiled, 1 cup



17g

Edamame
boiled, 1 cup



15g

Black Beans
cooked, 1 cup



6g

Almonds
1 oz



5g

Peas
cooked, 1 cup



5g

Baked Potato
1 medium



5g

Spinach
boiled, 1 cup



ANIMAL PROTEIN

per serving

DISADVANTAGES

- Cholesterol
- Saturated fat
- No fiber
- Higher in calories

6g

Egg
cooked, 1



20g

Salmon
cooked, 3 oz



25g

Steak
cooked, 3 oz



25g

Chicken
cooked, 3 oz



Eating minimally processed whole plant foods such as vegetables, fruits, whole-grains, legumes, and nuts lower the risk of diabetes, heart disease, cancer, and promote overall health.

Polyphenols



Dietary polyphenols influence gut microbiota composition in the host, maintain intestinal barrier integrity, improving the host's metabolism.

Microbiota metabolize polyphenols into bioactive metabolites that modulate the host's regulatory metabolism network, thus reducing inflammation and chronic disease risk.







Is the Use of Glyphosate in Modern Agriculture Resulting in Increased Neuropsychiatric Conditions Through Modulation of the Gut-brain-microbiome Axis?

Animal & Human Studies Suggest That Exposure to Glyphosate & Herbicide Adjuvants Can Induce Adverse Health Outcomes Mediated by the Microbiome

Environmental exposure to glyphosate and glyphosate-based herbicides has the potential to negatively influence neurodevelopment and behavior across generations indirectly through the gut-brain-microbiome axis. Potential mechanisms by which glyphosate may elicit these effects are through the disruption of the normally symbiotic relationship of the host and the gut microbiome. Given glyphosate can kill commensal members of the microbiome like *Lactobacillus* spp., Ruminococaceae and *Butyricoccus* spp., resulting in reductions in key microbial metabolites that act through the gut-brain-microbiome axis including indoles, L-glutamate and SCFAs. Glyphosate-resistant microbes in the gut have the potential to increase the production of pro-inflammatory cytokines and reactive oxygen species which may result in increased HPA activation, resulting in increased production of glucocorticoids which have implications on neurodevelopment. In addition, maternal transfer of the gut microbiome can affect immune and neurodevelopment, across generations.

The Health Effects of Genetically Modified Foods: a Brief Review



Genetically-modified foods have the potential to solve many of the world's hunger and malnutrition problems

The drawbacks can be expressed as environmental hazards, health hazards, economic concerns as well as legal issues.

The major health risks potentially associated with GM foods are toxicity, allergenicity, genetic hazards, and microbiome alterations.

A Plant-Forward Diet reduces the risk of CRC

- 123 773 participants of the Nurses' Health Study and the Health Professionals Follow-up Study
- (3 143 158 person-years)
- 3077 of them had developed CRC.
- Healthy and unhealthy plant-based diet indices were calculated using repeated food frequency questionnaire data.
- An unhealthy plant-based diet rich in refined grains and sugar is associated with higher CRC incidence.
- A healthy plant-based diet rich in whole grains, fruits and vegetables is associated with lower incidence of CRC, especially *KRAS*-wildtype CRC.
- Replacing refined grains with healthy plant foods such as whole grains, fruits and vegetables is associated with lower CRC incidence.

A plant-forward diet & lifestyle improves bowel cancer prognosis.

Published in final edited form as:
Cancer Epidemiol Biomarkers Prev. 2021 October ; 30(10): 1816-1825.
doi:10.1158/1055-9965.EPI-21-0120.

Adherence to the World Cancer Research Fund/American Institute for Cancer Research cancer prevention recommendations and colorectal cancer survival

Rui Song¹, Joshua Petimar^{2,4}, Molin Wang^{2,3}, Fred K. Tabung^{1,5}, Mingyang Song^{1,2}, Li Liu⁶, Dong Hoon Lee¹, Edward L. Giovannucci, MD^{1,2,6}, Xuehong Zhang, MD^{1,6}, Stephanie A. Smith-Warner^{1,2}

¹Department of Nutrition, Harvard T.H. Chan School of Public Health, Boston, MA

²Department of Epidemiology, Harvard T.H. Chan School of Public Health, Boston, MA

³Department of Biostatistics, Harvard T.H. Chan School of Public Health, Boston, MA

⁴Department of Population Medicine, Harvard Pilgrim Health Care Institute & Harvard Medical School, Boston, MA

⁵Division of Medical Oncology, Department of Internal Medicine, The Ohio State University College of Medicine and Comprehensive Cancer Center

⁶Channing Division of Network Medicine, Brigham and Women's Hospital and Harvard Medical School, Boston, MA

* These authors contributed equally to this work.

Abstract

Background: Cancer patients are recommended to follow cancer prevention guidelines due to inadequate evidence for specific recommendations for cancer survivors.

Methods: We examined whether diet and lifestyle scores measuring adherence to the 2018 World Cancer Research Fund/American Institute for Cancer Research (WCRF/AICR) cancer prevention guidelines were associated with colorectal cancer-specific and overall mortality among 1,491 colorectal cancer (CRC) patients in two prospective cohorts. Cox proportional hazards regression models were used to calculate the multivariable-adjusted hazard ratios (HRs) and 95% confidence intervals (CIs).

Results: During a median follow-up of 7.92 years, there were 641 deaths (179 CRC-specific deaths). Patients in the highest quartile of the post-diagnostic WCRF/AICR lifestyle score including diet, body mass index (BMI), and physical activity had a 24% lower risk (HR=0.76, 95% CI: 0.49-1.18) of CRC-specific mortality and a 37% lower risk (HR=0.63, 95% CI: 0.50-0.78) of overall mortality compared with the lowest quartile. When BMI was not included in the lifestyle score due to potential disease-related weight loss, stronger inverse associations were observed for both CRC-specific and overall mortality for the same comparison (CRC-specific: HR=0.50, 95% CI: 0.32-0.79; overall: HR=0.59, 95% CI: 0.47-0.75). The post-diagnostic WCRF/

Colorectal cancer-specific and overall mortality among 1,491 CRC patients in two prospective US cohorts

Follow-up for 7.9 years

High adherence to WCRF diet and lifestyle:
pre-diagnosis:

50% reduced risk of cancer-related mortality

41% reduced risk of all-cause mortality

Reductions when corrected for BMI:
24% reduced risk of CRC-related mortality
37% reduced risk of all-cause mortality

WHAT FOOD INCREASES THE RISK OF COLORECTAL CANCER?

MEAT



10–30% increased risk for each increment of 100g/day of total or red meat, with no clear limit threshold identifiable.

Chapelle N, et al. Gut. 2020

WHO classification of red and processed meats

IARC* Carcinogenic classification groups

Causes cancer

1

Probably causes cancer

2a

Possibly causes cancer

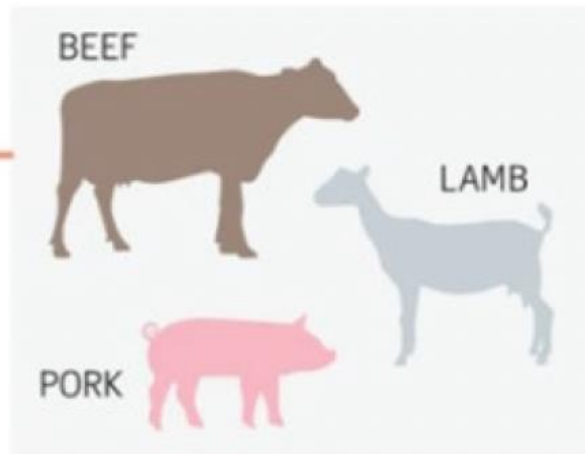
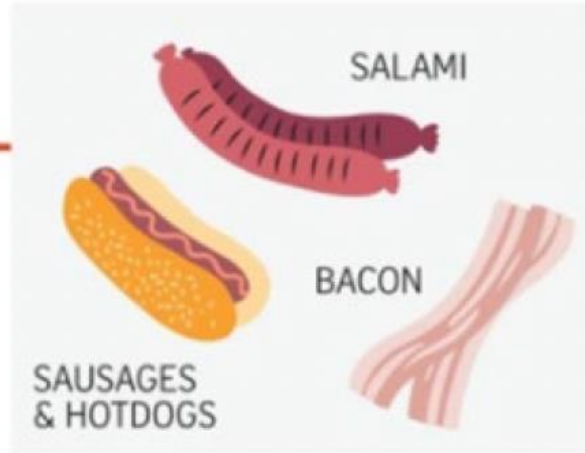
2b

Not classifiable as a cause of cancer

3

Probably not a cause of cancer

4



* International Agency for Research on Cancer

The Washington Post

Democracy Dies in Darkness

ECONOMIC POLICY

Hot dogs, bacon and other processed meats cause cancer, World Health Organization declares



By Peter Whoriskey

October 26, 2015 at 6:15 a.m. EDT



America's bacon obsession is more unhealthy than we thought

0:52

A new World Health Organization study found that processed meat like bacon and hot dogs cause cancer. It is the most prominent group to declare it a cause. (Video: Jenny Starns/The Washington Post)

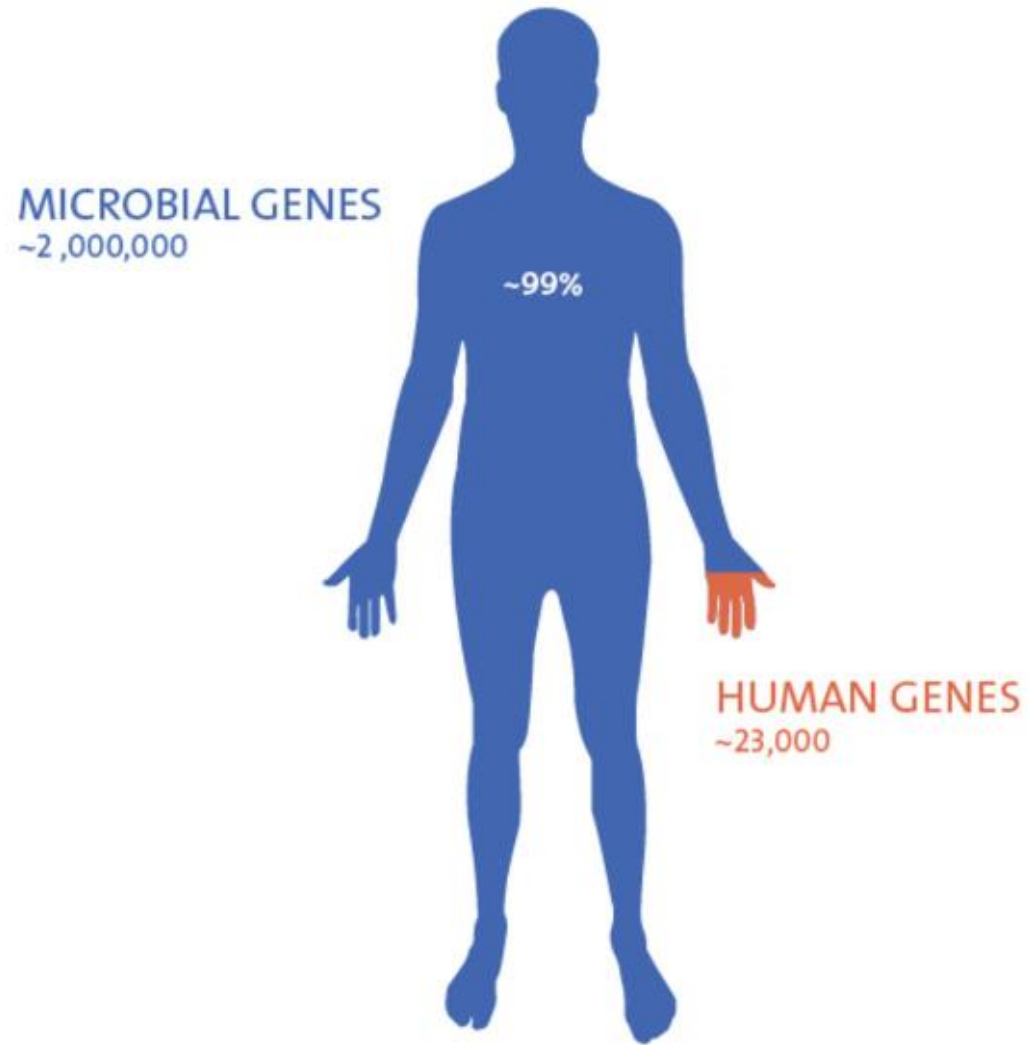
IARC, 2015



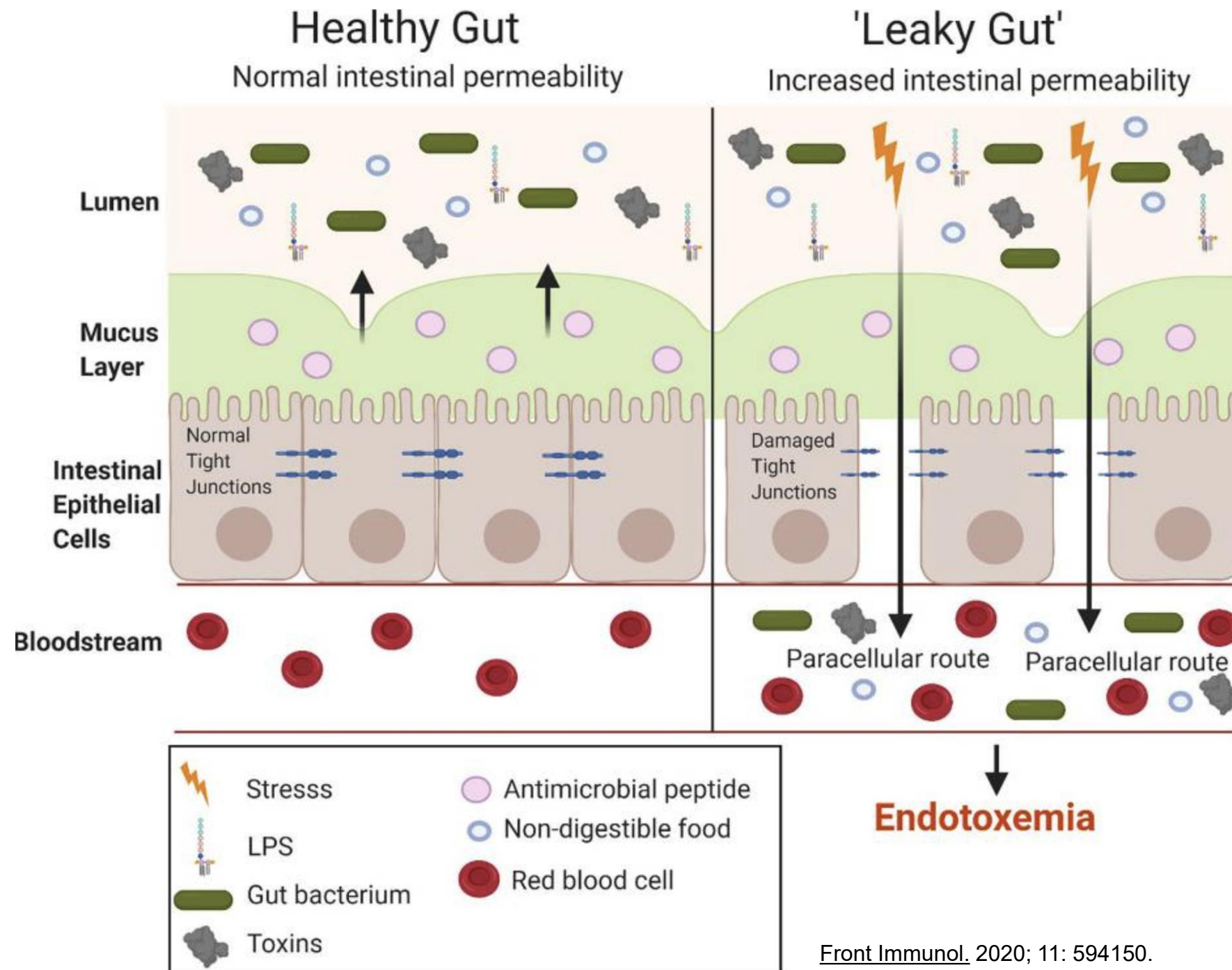
ALL DISEASE BEGINS IN THE GUT

HIPPOCRATES

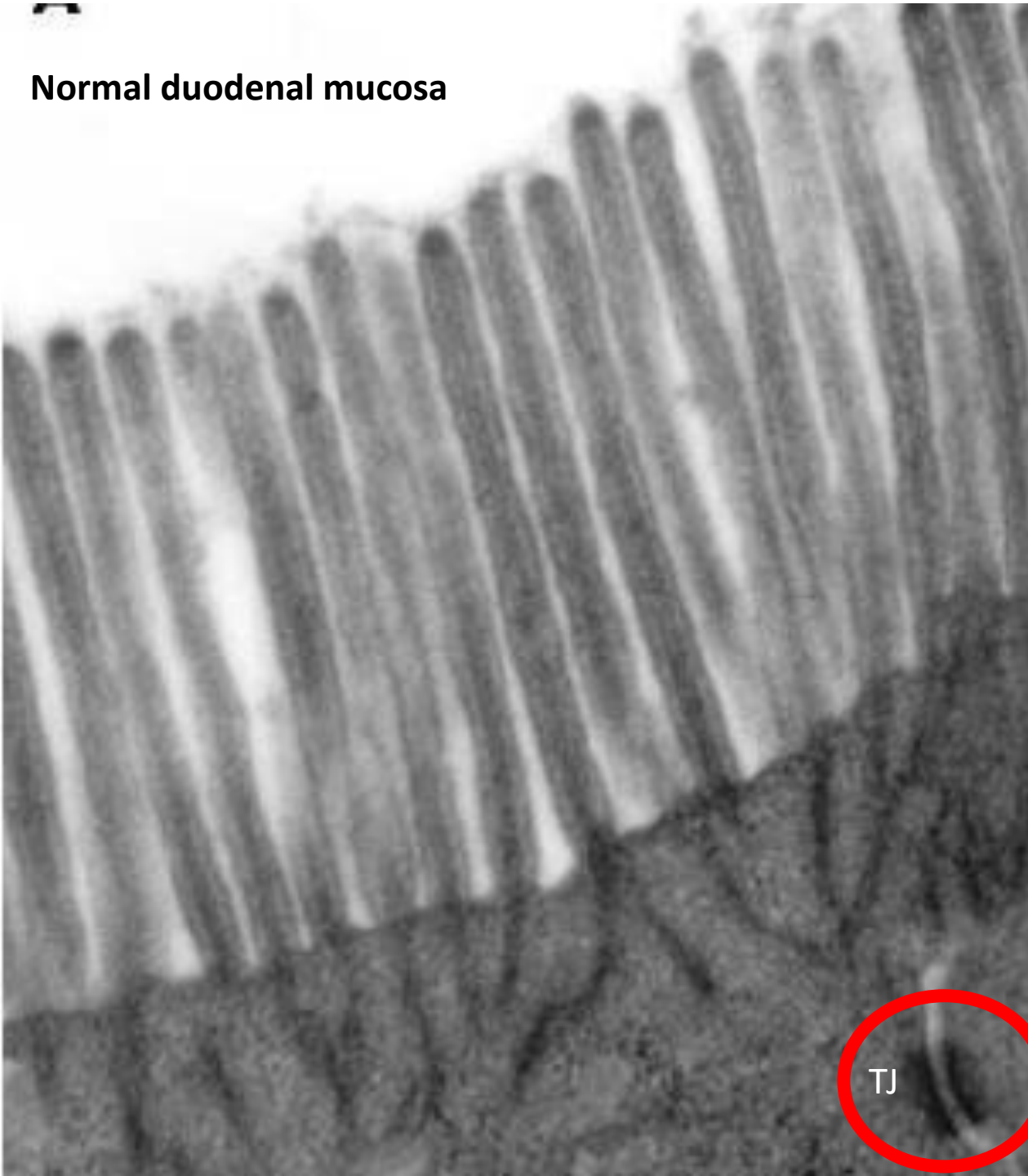
PROPORTION OF UNIQUE GENES IN THE HUMAN BODY



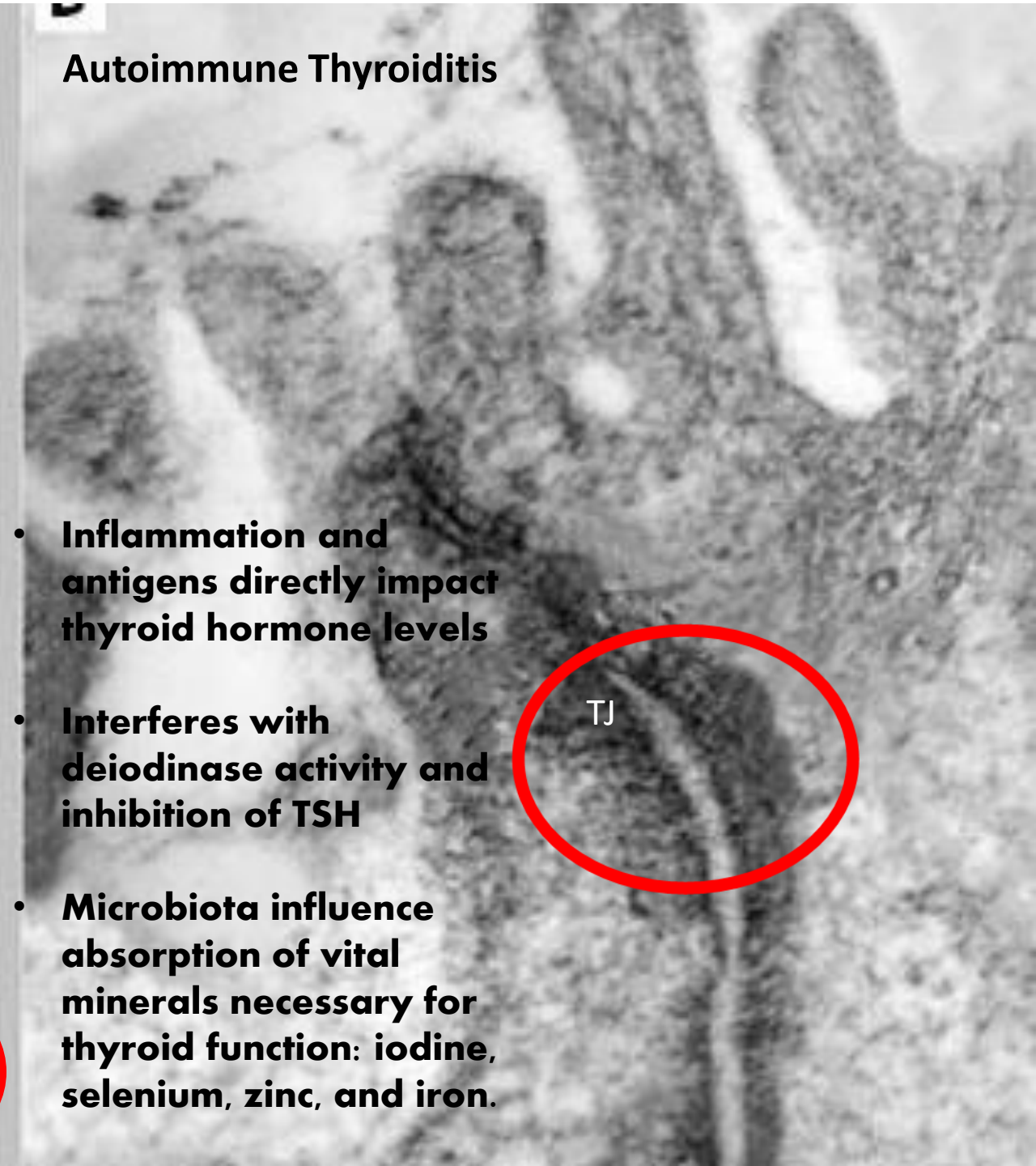
Ninety-nine percent of the unique genes in your body are bacterial. Only about one percent is human.



Normal duodenal mucosa



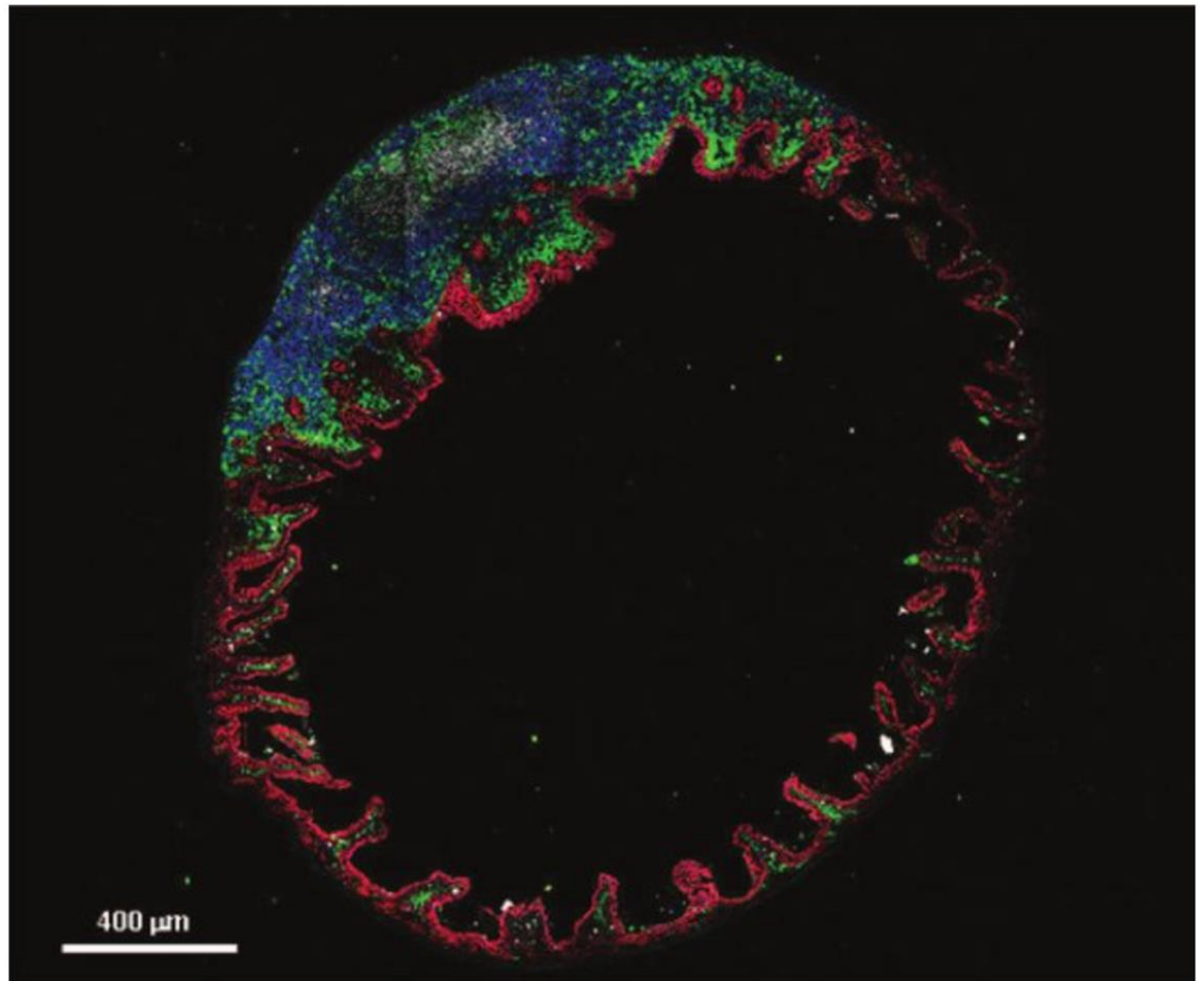
Autoimmune Thyroiditis



- **Inflammation and antigens directly impact thyroid hormone levels**
- **Interferes with deiodinase activity and inhibition of TSH**
- **Microbiota influence absorption of vital minerals necessary for thyroid function: iodine, selenium, zinc, and iron.**

Functional Interactions Between Enterocytes, Immune Cells, and Microbiota

- RED- Gut Epithelial Cells
- GREEN- Dendritic Cells
- BLUE- Beta Cells
- WHITE- T-Cells



Immune Dendritic Cell inserted
in the gut epithelial layer and
into intestinal lumen.

Dendritic cells are **central
to the initiation of
primary immune
responses** and are pivotal
in the generation of
adaptive immunity

Inflammatory bowel diseases 2010
Intestinal dendritic cells: Their role in bacterial
recognition, lymphocyte homing, and intestinal
inflammation

