

The Ferment About Fiber For Metabolic Disease

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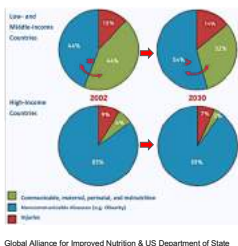
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Outline

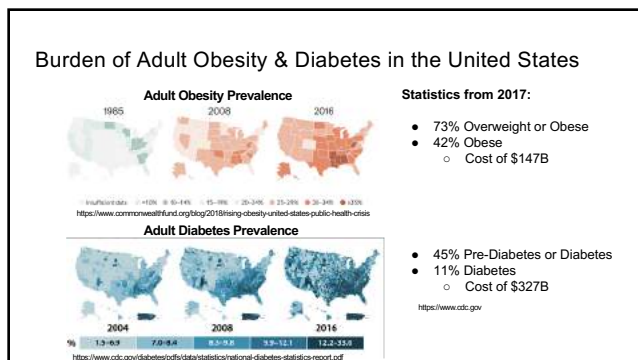
- Rising Incidence of Metabolic Disease
- Correlation with Ultra-Processed Foods
- Improvement on Whole-Food High-Fiber Diets
- Fiber Supplementation as Part of the Solution?

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Double Burden of Disease: Malnutrition ⇒ Obesity



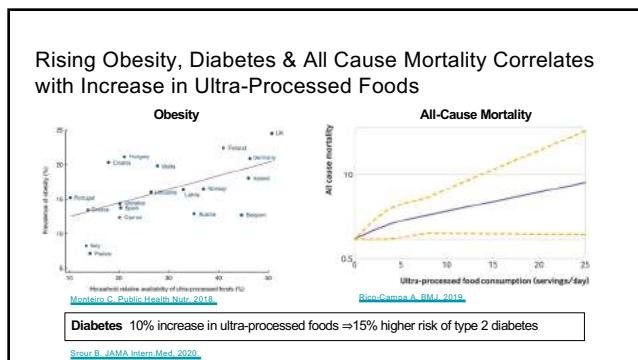
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Ultra-Processed Foods Lead to More Weight Gain

Ex. Ultra-Processed



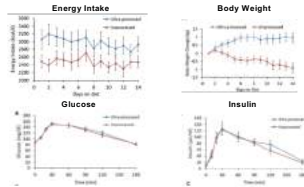
Ex. Whole-Food



[Hall K. Cell Metab. 2019.](#)

Study Design

- 20 weight stable (BMI 27) subjects admitted to a metabolic lab with all meals provided.
- Cross-over design with 2 weeks on each provided isocaloric/isonutrient diets. Folks allowed to eat *ad libitum*.



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Whole Food Diets Improve Glucose & HbA1c



- Summary of Whole Food Diets:**
- Diets effective in DM2 emphasize plant-based whole foods:
 - Increased whole grains fruits/vegetables, nuts/legumes
 - Decreased trans fat, saturated fat, refined grains and added sugars.
 - Collectively reduce HbA1c by an average of 0.8%.

[Richtler, C. Endocrinol Metab Clin North Am. 2014.](#)

[Benson, G. Diabetes Spectr. 2020.](#)

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Ultra-Processed Foods vs. Whole Foods



- Ultra-Processed Foods:**
- Metabolic Disease
 - Inflammatory Disease
 - Neurocognitive Disease
 - Cancer

- Longer Shelf Life
- Favorable Cost of Goods
- Convenient/Familiar

Whole Foods:

- Metabolic Balance
- Anti-inflammatory
- Neuroprotective
- Anti-neoplastic



- Perishable
- More expensive
- Less Convenient/Familiar

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What's Higher in Ultra-Processed Foods

| Nutritional Factor | Mean (SD) | Proportion of Ultra-processed Food in the Diet | |
|---------------------------------------|------------------|---|----------------------|
| | | Change in Nutritional Factor, β (SE) ^a | P Value ^b |
| FSA ^c -NPS dietary index | 6.59 (2.46) | 0.62 (0.01) | <.001 |
| Energy intake without alcohol, kcal/d | 1847.14 (459.86) | 29.95 (1.16) | <.001 |
| Alcohol intake, g/1000 kcal/d | 3.91 (5.53) | -0.50 (0.02) | <.001 |
| Sodium intake, mg/1000 kcal/d | 1479.10 (369.21) | 4.97 (1.20) | <.001 |
| Saturated fatty acids, g/1000 kcal/d | 17.78 (4.02) | 0.31 (0.01) | <.001 |
| Fiber, g/1000 kcal/d | 10.72 (3.57) | -0.78 (0.01) | <.001 |
| Sugar, g/1000 kcal/d | 50.59 (13.45) | 1.32 (0.04) | <.001 |
| Whole grains, g/1000 kcal/d | 16.96 (24.16) | -1.14 (0.08) | <.001 |
| Yogurt, g/1000 kcal/d | 33.88 (42.75) | -2.58 (0.14) | <.001 |
| Sugary drinks, g/1000 kcal/d | 24.94 (53.64) | 25.22 (0.15) | <.001 |
| Red and processed meat, g/1000 kcal/d | 40.01 (27.74) | 1.68 (0.09) | <.001 |
| Nuts, g/1000 kcal/d | 2.52 (5.40) | -0.49 (0.02) | <.001 |
| Fruits and vegetables, g/1000 kcal/d | 238.93 (129.04) | -37.54 (0.37) | <.001 |

Source: B. JAMA Intern Med. 2020

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Focus Has Been on **What to Avoid**



- Added Sugars (e.g. HFCS)
- Unhealthy Fats (e.g. Transfats)
- Additives (e.g. some emulsifiers)
- Salt

TAKING AWAY foods and nutrients increases cravings and alone **IS NOT** a sustainable solution.

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What's Lower in Ultra-Processed Foods

| Nutritional Factor | Mean (SD) | Proportion of Ultra-processed Food in the Diet | |
|---------------------------------------|------------------|---|----------------------|
| | | Change in Nutritional Factor, β (SE) ^a | P Value ^b |
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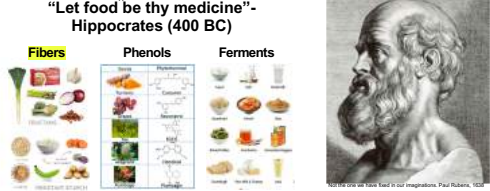
Source: B. JAMA Intern Med. 2020

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A Contextual Revision to a Focus on What to Add Back

Fibers, Phenols, & Ferments

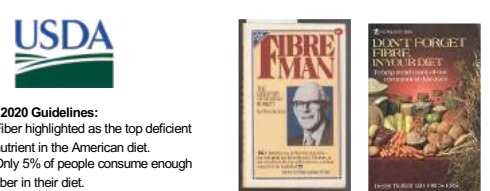
"Let food be thy medicine"- Hippocrates (400 BC)



ADDING BACK healthy foods and nutrients decreases cravings and **IS** a sustainable solution.

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2020 ⇒ 1980: The Fiber Gap & Burkitt's Hypothesis



USDA 2020 Guidelines:

- Fiber highlighted as the top deficient nutrient in the American diet.
- Only 5% of people consume enough fiber in their diet.
- USDA recommends at least 28 grams of fiber for women and 34 grams for men.

"America is a constipated nation.... If you pass small stools, you have to have large hospitals"

<https://dietaryguidelines.gov/>

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Gut Bacteria Selectively Promoted by Dietary Fibers Alleviate Type 2 Diabetes

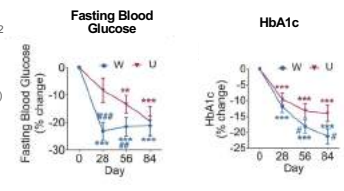
Study:

- Study in China in subjects with DM2, 12 week intervention.
- W: Acarbose + High Fiber Diet: prebiotics, whole grains and Chinese medical foods (27)
- U: Acarbose + Usual Dietary Care (16)

Results:

- Glucose: Decrease in Fasting Blood Glucose at 28, 56, and 84 days
- HbA1c: 8.3 to 6.4 (-1.9%) in high fiber + acarbose arm vs. 8.3 to 7 (-1.3%) in acarbose alone arm
- Difference in arms of -0.6%

[Zhou L. Science 2018](#)



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Muniq by UR Labs—Filling The Fiber Gap



Composition of Muniq:

- 15 g of a proprietary prebiotic fiber blend including RS and BG
- 15 g of Protein
- 4.5 g of Healthy Fats
- Vitamins & Minerals
- No Sugar

Extant Literature:

- Resistant Starch (RS) or Beta-Glucan (BG) alone: 0.6% HbA1c drop at 12 weeks.

15G RESISTANT STARCH PREBIOTIC FIBERS
15G PROTEIN (VEGAN & DAIRY OPTIONS)
4.5G HEALTHY FATS

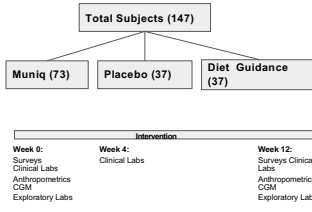
7G NET CARBS
26 VITAMINS & MINERALS
NON-GMO

NO SUGAR
NO ARTIFICIAL FLAVORS OR SWEETENERS
NO SOY

<https://www.muniqlife.com/>

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Double Blind Randomized Placebo Controlled Trial



Total Subjects (147)

- Muniq (73)**
- Placebo (37)**
- Diet Guidance (37)**

Intervention:

- Week 0:** Surveys, Clinical Labs, Anthropometrics, CGM, Exploratory Labs
- Week 4:** Clinical Labs
- Week 12:** Surveys, Clinical Labs, Anthropometrics, CGM, Exploratory Labs

Population: Individuals with DMII & overweight or obese

Intervention: Muniq shake containing prebiotic fiber blend in a 2:1:1 design for 3 months as a meal replacement

Control: Isocaloric/isoprotein placebo shake minus fiber & Dietary guidance alone

Outcomes:

- Primary:** Diabetes Quality of Life Score
- Secondary:** HbA1c, Fasting glucose/insulin, LFTs, Lipid Panel, CRP, CGM, BMI, Blood Pressure
- Exploratory:** Fecal Metagenome, Fecal & Serum SCFAs, Serum GLP-1 & Inflammatory Markers

<https://clinicaltrials.gov/ct2/show/NCT05110703?term=muniq&draw=2&rank=1>

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Summary

- Rising Incidence of Metabolic Disease**
 - A silent & insidious epidemic
 - Increasing prevalence across the World & US
- Correlation with Ultra-Processed Foods (UPF's)**
 - Associate with Obesity, Diabetes, & All Cause Mortality
 - Added Bad (e.g. sugar) AND Missing Good (e.g. Fiber)
- Improvement on Whole-Food High-Fiber Diets**
 - Mediterranean & DASH improve blood glucose control
 - Whole food diets alone may not be complete solution
- Fiber Supplementation as Part of the Solution?**
 - Fiber, through the microbiome, regulates glucose & appetite
 - Studies underway to evaluate fiber combinations

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