Bridging nutrition and medicine: Fasting Mimicking Diets as Food is Medicine

William C. Hsu, MD

Disclosure

- Current role
  Chief Medical Officer, L-Nutra

- Former role
- Vice President, Harvard's Joslin Diabetes Center
- Assistant Professor, Harvard Medical School
- Endocrinologist

Today's Paradigm

A 61 y.o. woman walks into her primary care doctor's office with hypertension, dyslipidemia and an A1c of 7.2.

She came for healing. What does she get?

1. 17-minutes visit
2. An ACE Inhibitor
3. A Statin
4. Metformin
5. 3 min lifestyle counseling

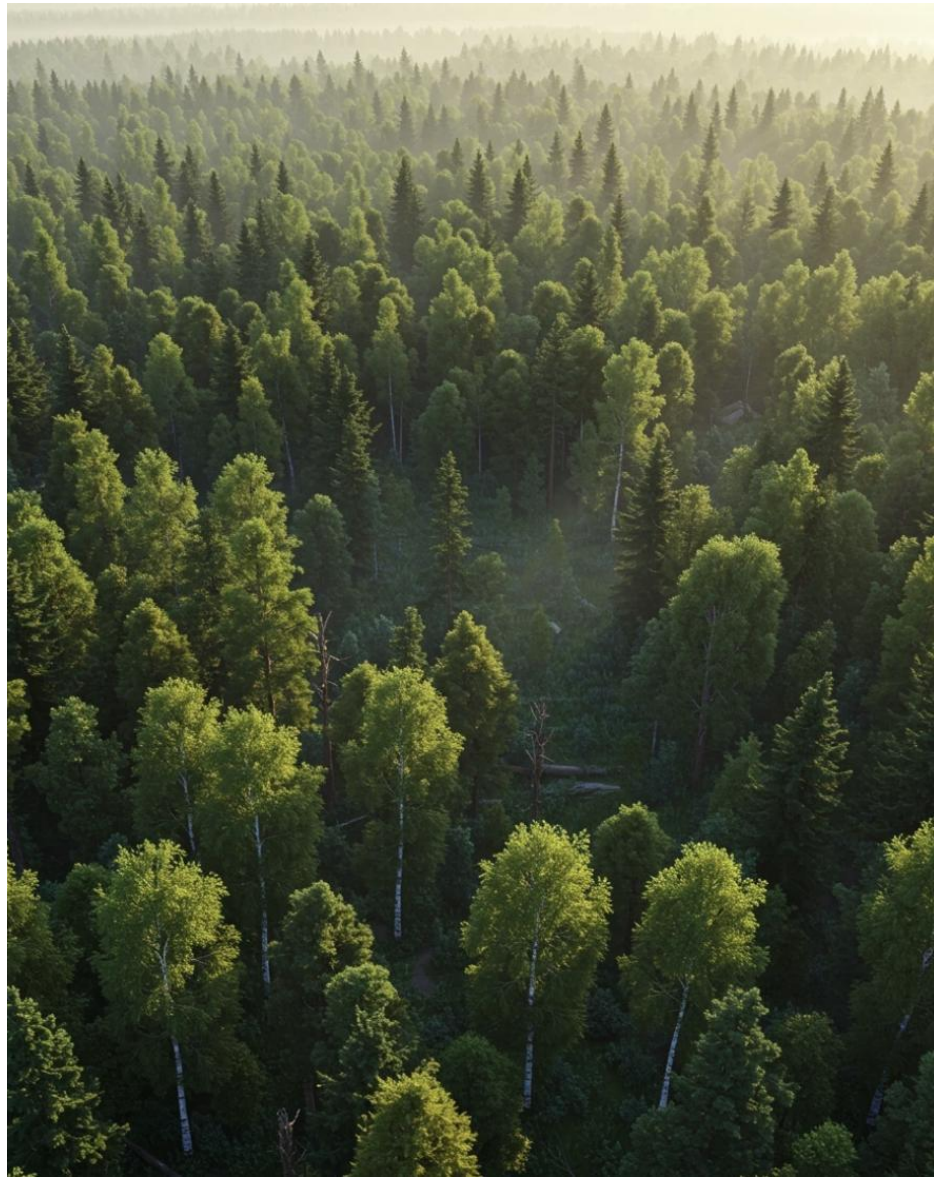
She left with a drug prescription plan for life.

Marvel for modern medicine?

What if healing began not with a prescription pad, but with Medical Nutrition that reprograms biology?

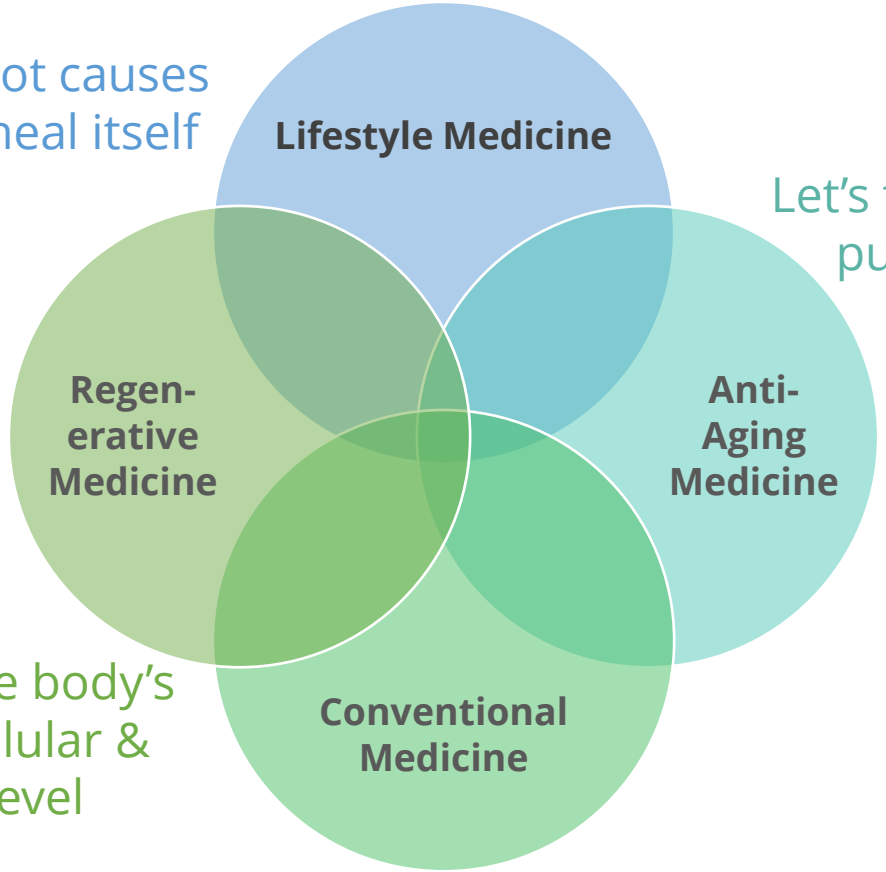
How We Got Here: the Path to Prescription Centric Care

1. Lifestyle challenging to implement on population level
2. Drug development targets molecules, not meals
3. Broccoli does not fund RCTs
4. What gets regulated becomes the standard of care
5. Medical school teaches pharmacology, not behavioral change
6. Chronic disease is lucrative when managed, not reversed



Better Together: Food As Medicine

Let's treat root causes to let body heal itself



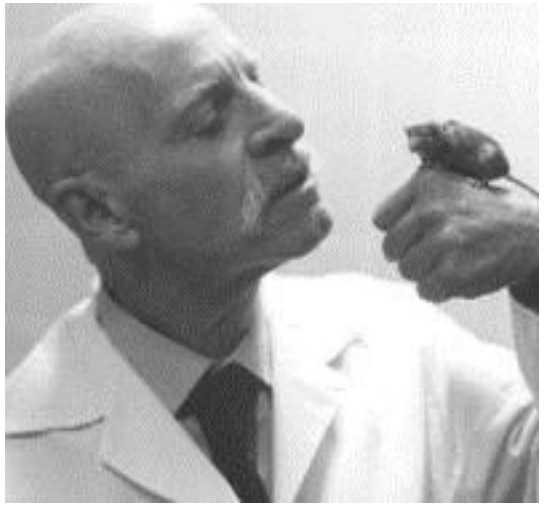
Let's turn the age clock to push for healthspan

Let's rebuild the body's systems at cellular & structural level

Let's manage disease by reducing M&M, guided by evidence

Each medical paradigm highlights what the others tend to overlook

From Biosphere to Breakthrough: How Early Experiments Shaped Modern Medicine

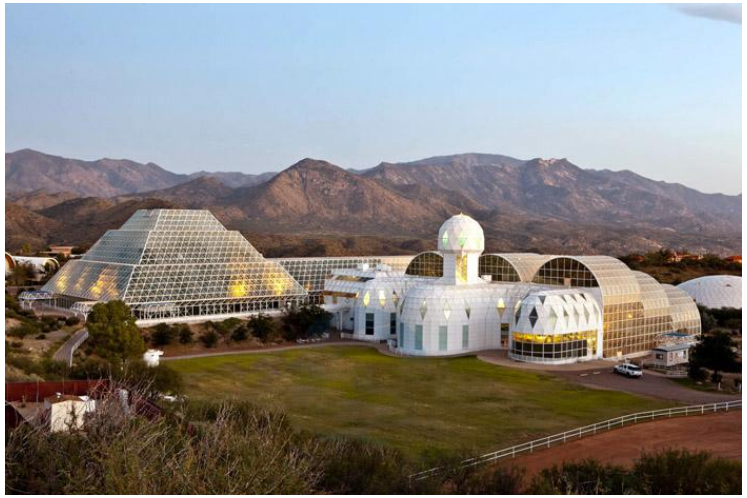


“He found that restricting the calorie intake of young mice could increase their lifespan by 50%.”

“…the diet could prolong the lifespan of middle-aged mice by 10–20%.”

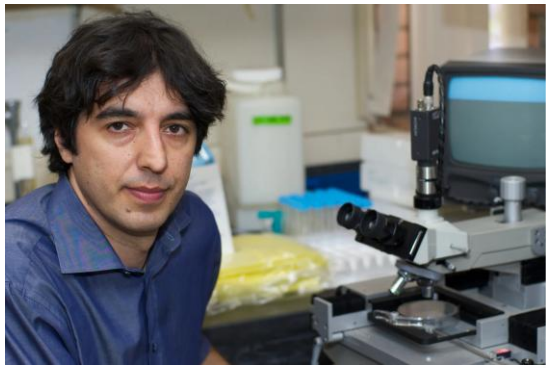
The Lancet, Volume 363, Issue 9425, 2003

In 1991, Walford entered Biosphere 2, a glass enclosed human experiment outside Tucson, Arizona.

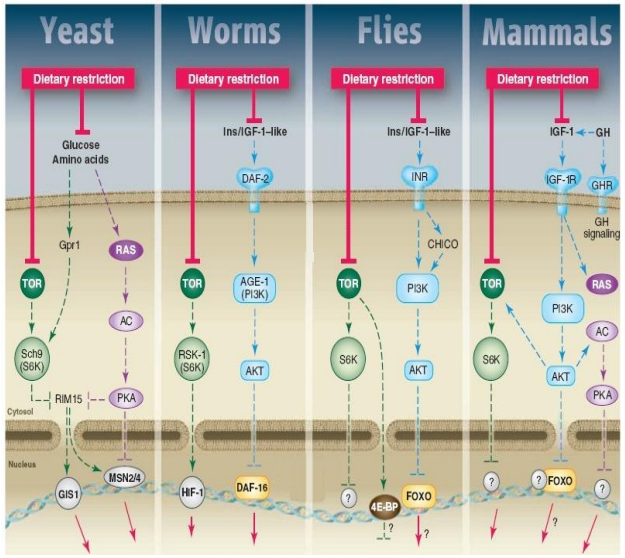


“The haunting true story of a man who spent two years in a self-contained 'Biosphere' and nearly fell apart” – Business Insider

History of Fasting Mimetics



Longo who earned PhD at UCLA, was inspired by Walford idea that nutrient scarcity activates longevity mechanisms



Science. 2010 Apr 16;328(5976):321-6.

Longo dissected the molecular pathways—IGF-1, TOR, PKA, and AMPK— that mediate those effects. Lead to $36MM NIH & EU research funding

GHRD individuals are protected from <u>cancer</u> and diabetes-uncovering how longevity mechanisms lower disease risk

www.impactaging.com AGING, December 2009 Vol.1 No 12

Research paper

Fasting and Cancer Treatment in Humans: A Case series report

Fernando M. Safdie[1,6], Tanya Dorff [2,3,6], David Quinn[2,3], Luigi Fontana[4], Min Wei[1], Changhan Lee[1], Pinchas Cohen[5], and Valter D. Longo[1]

Short-term fasting (48–140 hours) before and/or after chemotherapy appeared safe and feasible in cancer patients, reducing fatigue and GI side effects without diminishing treatment efficacy. IRBs and researchers resistant at first.

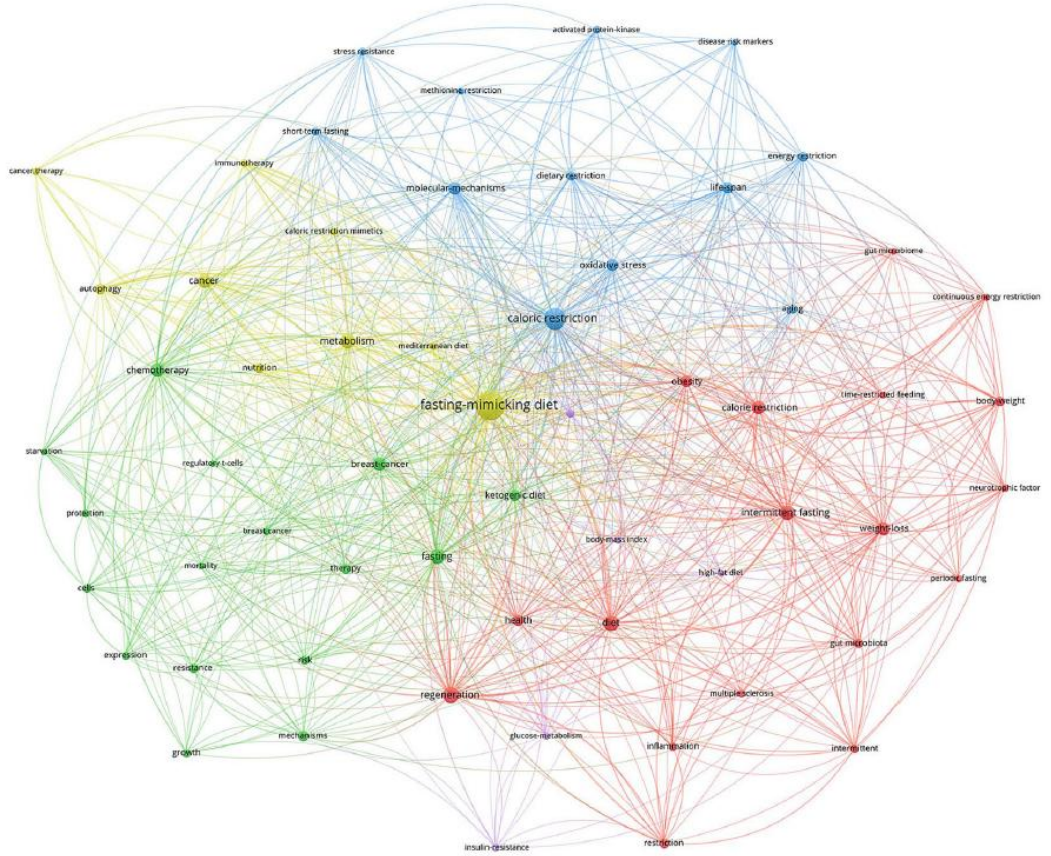
What Is the Fasting-Mimicking Diet (FMD)

A periodic, **5-day structured meal plan:**

- 5-day medical nutrition to deliver the benefits of a prolonged fast
- Protein 9-11%, Complex carbs 43-47%, 44-46% Fat, Calorie 700-1,100
- Unique macros & ingredients to **evade nutrient sensing**, not for nutrient values as everyday nutrition
- Provides nutrients to avoid malnourishment and to increase adherence
- FMD **standardized** and tested through clinical trials to achieve consistent results

FMD: Science & Global Research

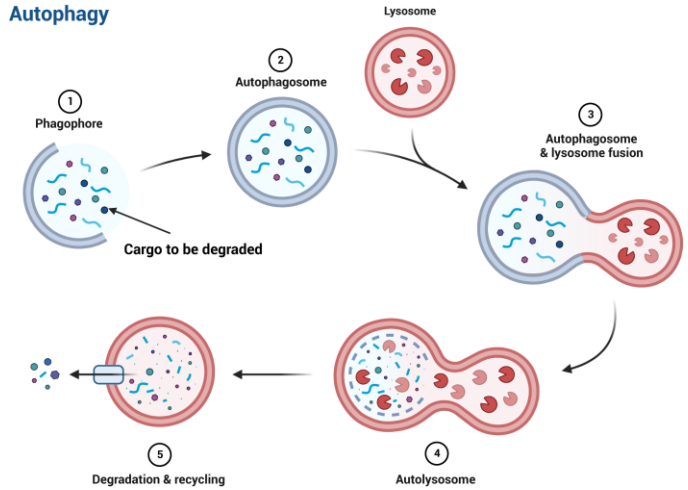
Researchers around the globe partnered to test FMD in various age-related chronic diseases
– up to 48 completed or active clinical trials



Testing of FMD in multiple fields
Front. Nutr. 11:1328450

FMD Mechanism of Action: Nutrient-Sensing to Systemic Repair

- Depletion Phase: Low calories/protein suppress growth signals, trigger ketogenesis, immune shifts, and activate repair, autophagy, and regeneration.
- Molecular Targeting: FMD hits nutrient-sensing hubs (mTOR, IGF-1, AMPK), mimicking fasting to induce stress resilience and autophagy.
- Beyond Gradual Nudges: Unlike WFPB diets, FMD flips metabolic switches rapidly — triggering genetic programs for longevity and repair.
- Cyclic, Not Chronic: FMD works through periodic stress–recovery cycles, avoiding the downsides of continuous restriction.
- Refeeding Phase: Normal intake restarts rebuilding — stem cells activate, damaged cells clear, metabolism and immunity reset.
- System-Wide Effects: By influencing fundamental biological programs, FMD shows pleiotropic benefits across organ systems.

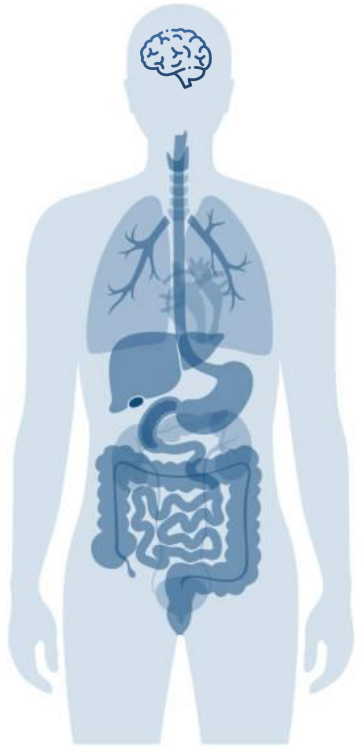


Sci Data **10**, 806 (2023).

One Intervention. Pleiotropic Effects

Systemic Cellular Rejuvenation through Fasting-mimicking mechanisms Impacts Multiple Organ Systems

1. Neurodegenerative
2. Autoimmune
3. Cancer Biology
4. Cardiometabolic



1. Neurogenerative Diseases

FMD Reduces Neuroinflammation and Cognitive Decline in Alzheimer's Models

Clinical and Translational Report

Cell Metabolism

A Periodic Diet that Mimics Fasting Promotes Multi-System Regeneration, Enhanced Cognitive Performance, and Healthspan

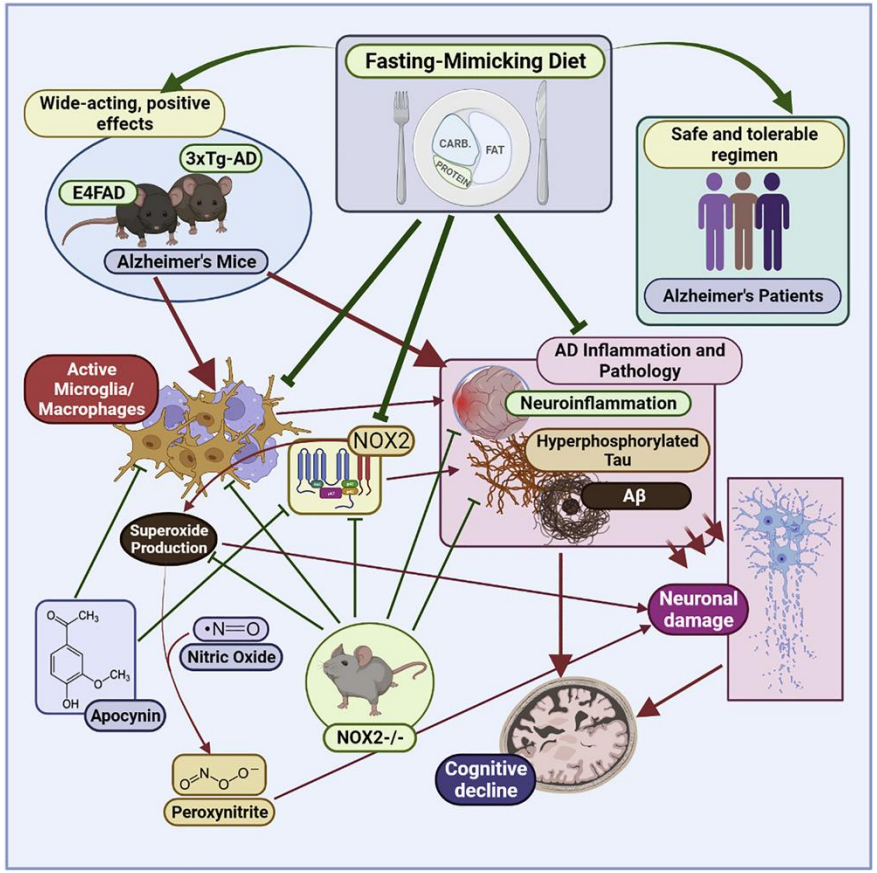
Aging Cell (2013) **12**, pp257–268 Doi: 10.1111/acel.12049

Protein restriction cycles reduce IGF-1 and phosphorylated Tau, and improve behavioral performance in an Alzheimer's disease mouse model

Article

Cell Reports

Fasting-mimicking diet cycles reduce neuroinflammation to attenuate cognitive decline in Alzheimer's models



Cell Rep. 2022 Sep 27;40(13):111417.

2. Autoimmune - FMD Rejuvenates the Immune System

Increases lymphoid-to-myeloid ratio and promotes immune regeneration in human

Cell Stem Cell

Cell Stem Cell
Article

Prolonged Fasting Reduces IGF-1/PKA to Promote Hematopoietic-Stem-Cell-Based Regeneration and Reverse Immunosuppression

Cell Reports

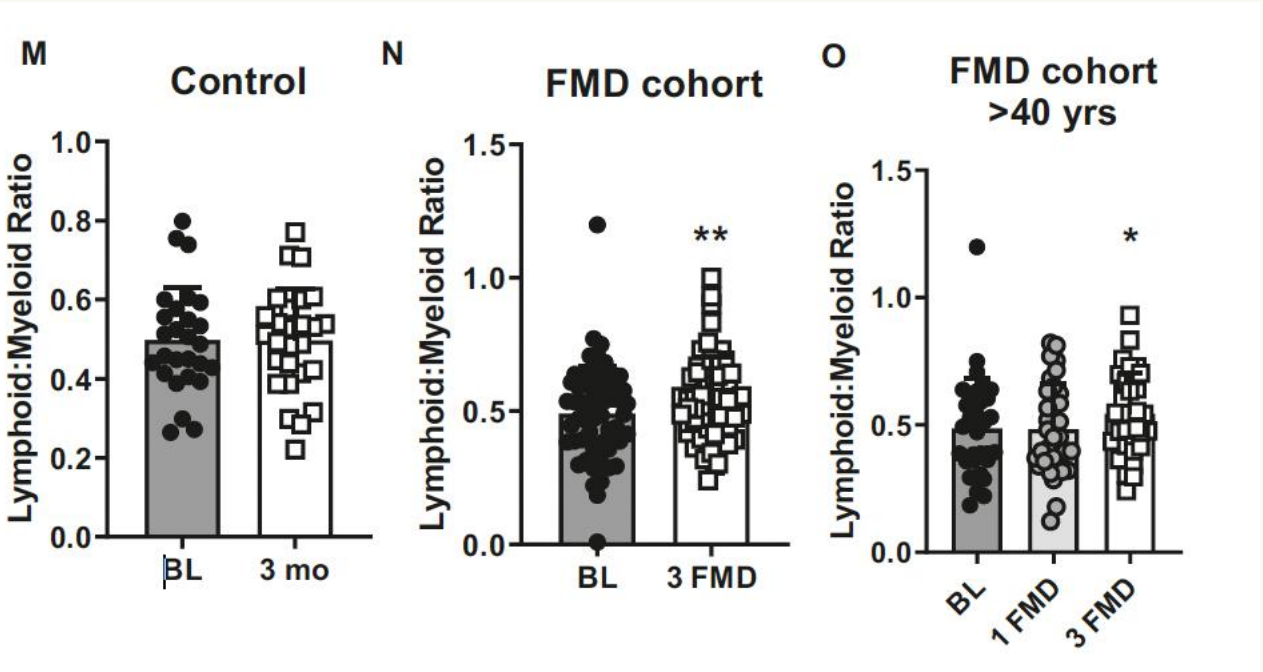
Report

A Diet Mimicking Fasting Promotes Regeneration and Reduces Autoimmunity and Multiple Sclerosis Symptoms

Cell Reports

Article

Fasting-Mimicking Diet Modulates Microbiota and Promotes Intestinal Regeneration to Reduce Inflammatory Bowel Disease Pathology



Nat Commun. 2024 Feb 20;15(1):1309.

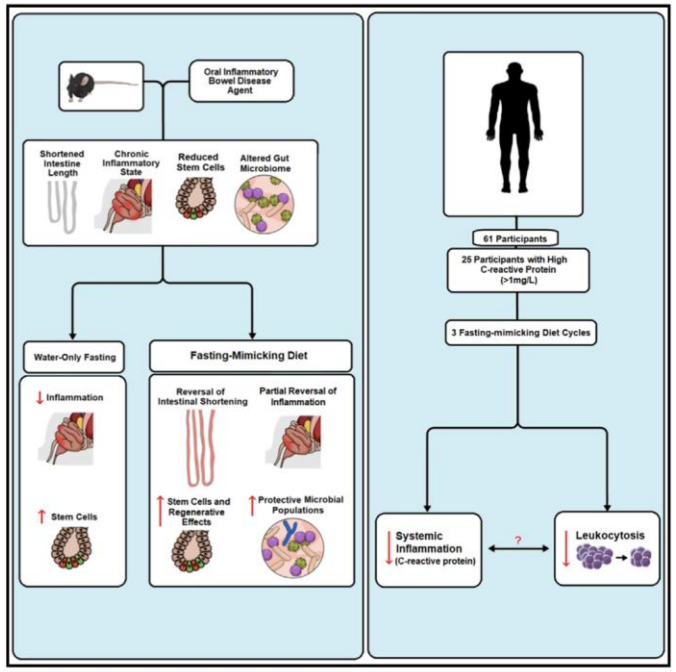
2. Autoimmune - FMD Modulates Gut Microbiota and Promotes Intestinal Regeneration in IBD Model

Article

Cell Reports

Fasting-Mimicking Diet Modulates Microbiota and Promotes Intestinal Regeneration to Reduce Inflammatory Bowel Disease Pathology

Graphical Abstract



Authors

Priya Rangan, Inyoung Choi, Min Wei, ..., Vanessa Ocon, Maya Abdulridha, Valter D. Longo

Correspondence

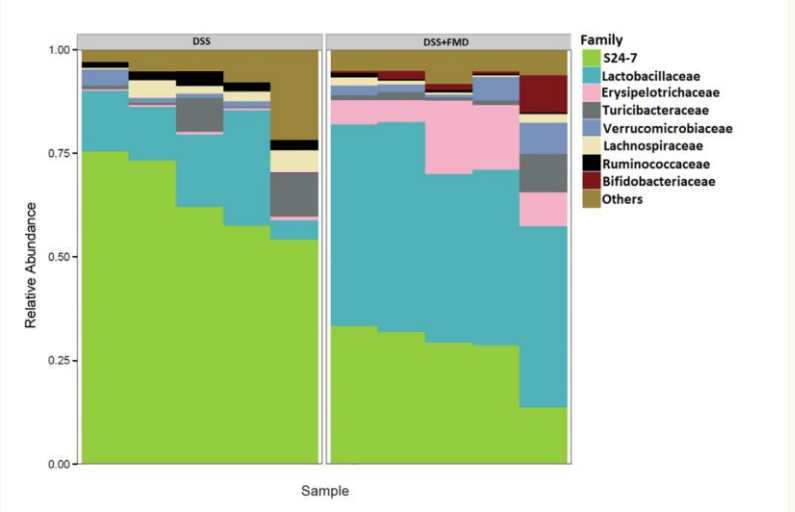
vlongo@usc.edu

In Brief

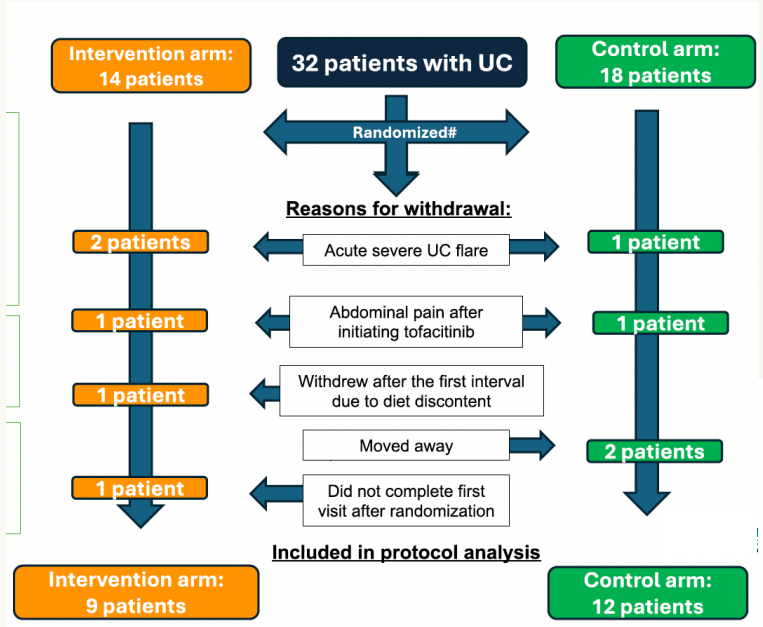
Rangan et al. show that cycles of a fasting-mimicking diet (FMD) ameliorate intestinal inflammation, promote intestinal regeneration, and stimulate the growth of protective gut microbial populations in a mouse model displaying symptoms and pathology associated with IBD. They also show that a similar FMD is safe, feasible, and effective in reducing systemic inflammation and the consequent high levels of immune cells in humans.

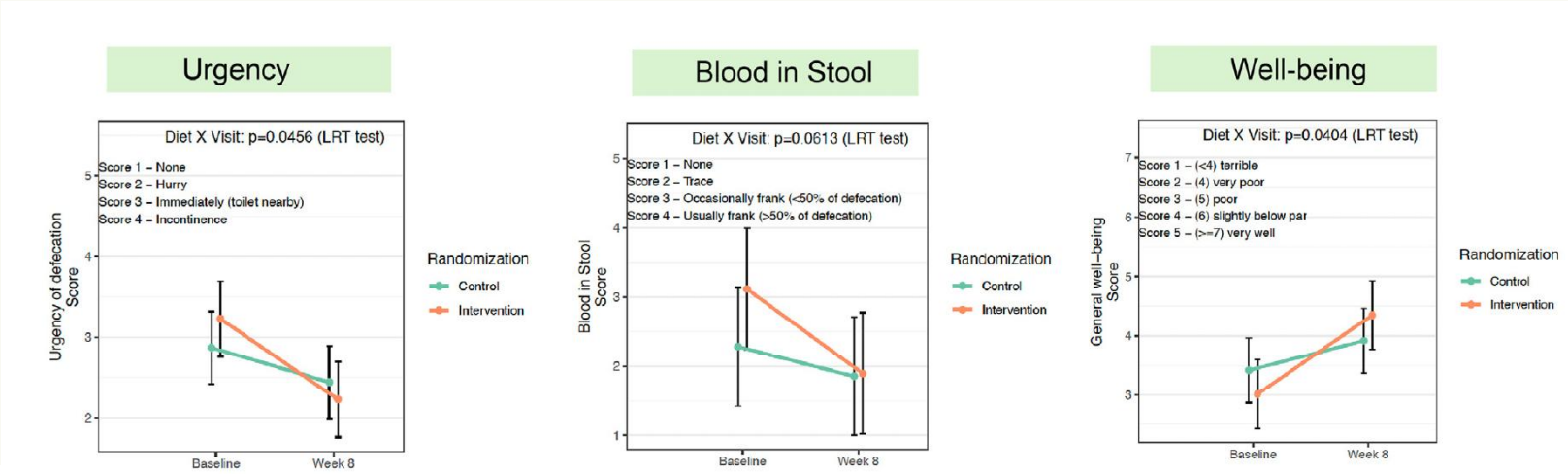
Highlights

- FMD cycles partially reverse IBD-related pathology compared to water-only fasting
- FMD cycles reduce intestinal inflammatory and immune and increase regenerative markers
- FMD cycles promote the expansion of *Lactobacillaceae* and *Bifidobacteriaceae*
- FMD cycles can reduce systemic inflammation and consequent leukocytosis in humans



2. Autoimmune - FMD Enhances symptom Relief, Lowers Inflammation, and Reduces Prednisone Use in Ulcerative Colitis



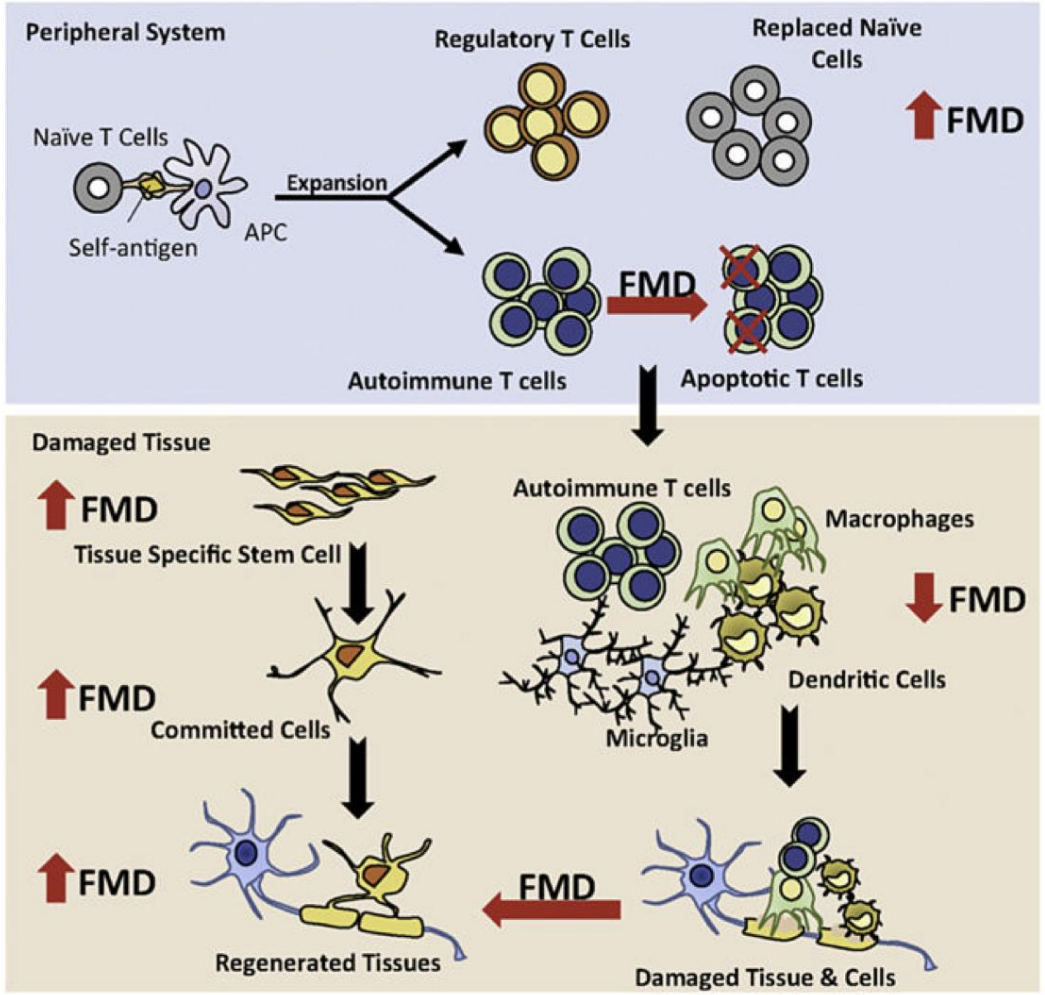


	Diet Intervention (n = 6)		Control Diet (n = 6)	
	Baseline	Week 8	Baseline	Week 8
C-reactive protein mg/dL	0.45 (0.33–0.73)	0.09 (0.09–0.25)	2.10 (1.25–3.33)	1.10 (0.53–2.73)
Fecal calprotectin μg/g	16,179 (8174–17,328)	847 (544–6764)	6,281 (3018–10,096)	8,435 (3964–12,373)
Serum amyloid A protein ng/mL	2294 (2265–2646)	1512 (1111–1630)	3050 (2909–3050)	2997 (2924–3050)
Prednisone use	7/9 (78)	2/9 (22)	9/12 (75)	8/12 (67)

Clin Gastroenterol Hepatol. 2025 May 14:S1542-3565(25)00408-2.

2. Autoimmune

MOA- FMD Modulates Autoimmunity by Suppressing Pathogenic T Cells and Promoting Regeneration



FMD-dependent modulation of autoimmunity and tissue-specific regeneration of damaged cells

- FMD causes a systemic anti-inflammatory effect and specific suppression of autoimmune cells whereas the re-feeding period stimulates hematopoietic cells to generate naïve cells to replace the immune cells eliminated. FMD also promotes tissue-specific stem cells that repair the damaged sites.

Cell Endocrinol. 2017 Nov 5;455:4-12.

3. Cancer Biology

Clinical studies show FMD enhances cancer treatment response, and reduces toxicity across multiple cancer types

ELSEVIER

European Journal of Cancer

Volume 172, September 2022, Pages 300-310

Original Research

Exceptional tumour responses to fasting-mimicking diet combined with standard anticancer therapies: A sub-analysis of the NCT03340935 trial

CANCER DISCOVERY

RESEARCH ARTICLES | JANUARY 12 2022

Fasting-Mimicking Diet Is Safe and Reshapes Metabolism and Antitumor Immunity in Patients with Cancer

cancers

MDPI

Article

Safety and Feasibility of Fasting-Mimicking Diet and Effects on Nutritional Status and Circulating Metabolic and Inflammatory Factors in Cancer Patients Undergoing Active Treatment

RESEARCH ARTICLE

Cancer Therapy and Prevention

IJC INTERNATIONAL JOURNAL of CANCER

Adding fasting-mimicking diet to first-line carboplatin-based chemotherapy is associated with better overall survival in advanced triple-negative breast cancer patients: A subanalysis of the NCT03340935 trial

ARTICLE OPEN

Clinical Research

Check for updates

The impact of a fasting mimicking diet on the metabolic health of a prospective cohort of patients with prostate cancer: a pilot implementation study

Breast Cancer Research and Treatment (2021) 185:741–758

https://doi.org/10.1007/s10549-020-05991-x

CLINICAL TRIAL

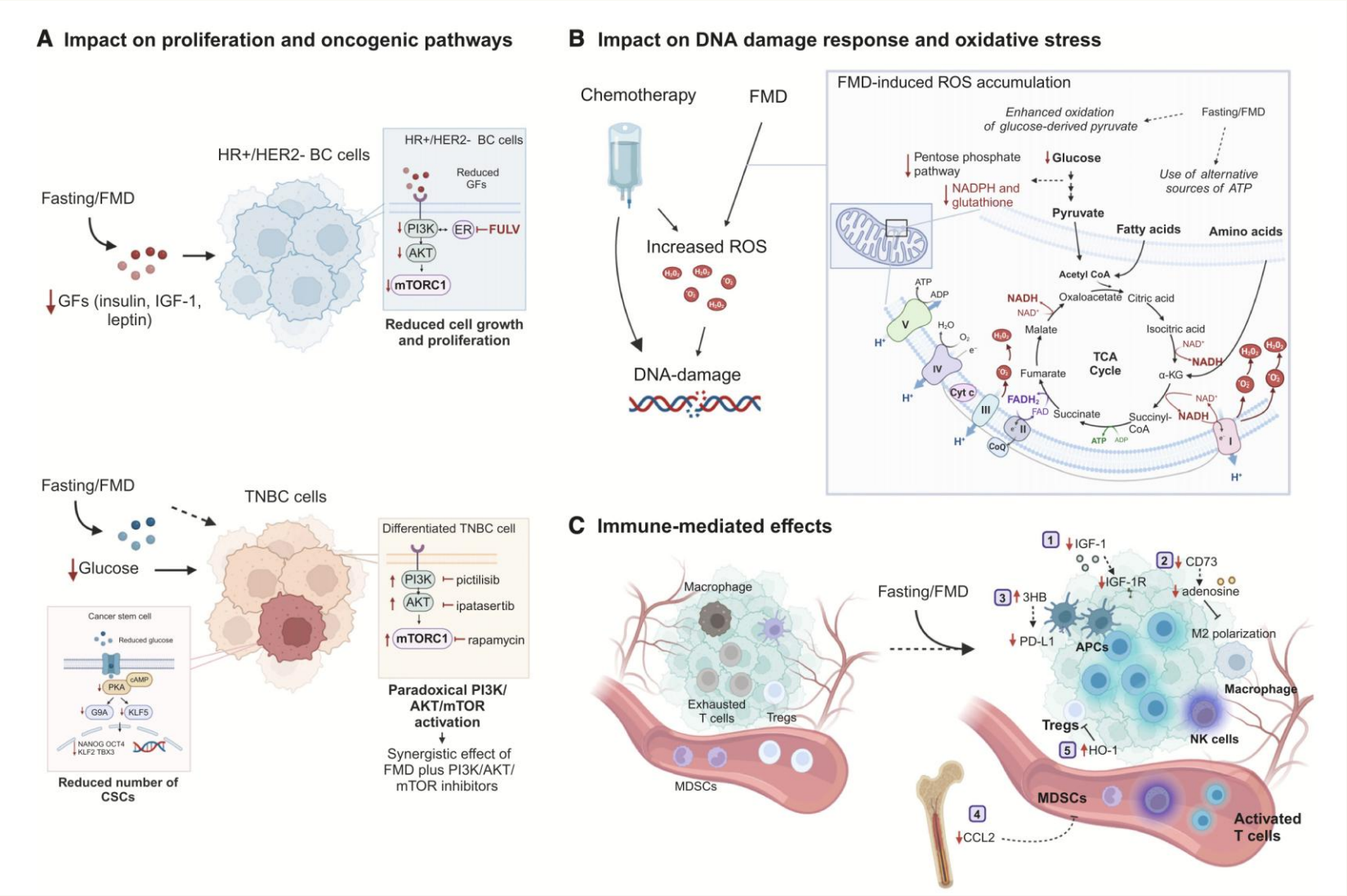
Check for updates

Quality of life and illness perceptions in patients with breast cancer using a fasting mimicking diet as an adjunct to neoadjuvant chemotherapy in the phase 2 DIRECT (BOOG 2013–14) trial

nature COMMUNICATIONS

Fasting mimicking diet as an adjunct to neoadjuvant chemotherapy for breast cancer in the multicentre randomized phase 2 DIRECT trial

3. Cancer Biology
Mechanisms of Antitumor fasting/FMD



Cell Metab. 2024 Aug 6;36(8):1644-1667.

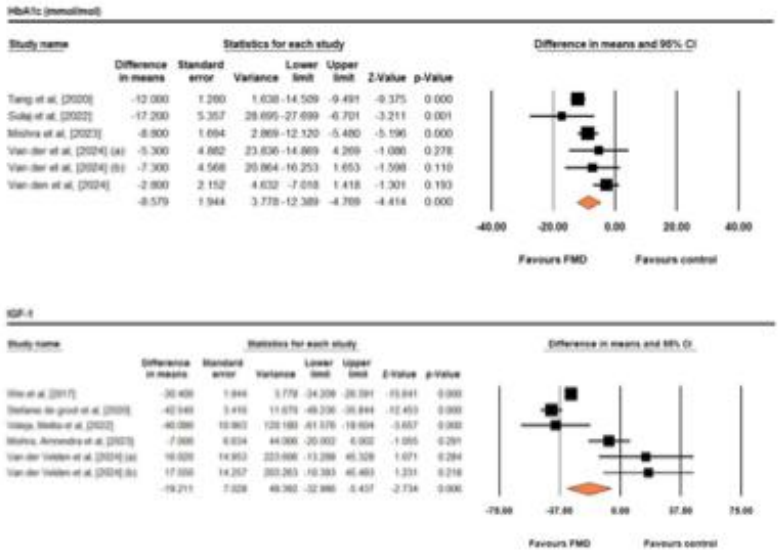
4. Cardio-Metabolic

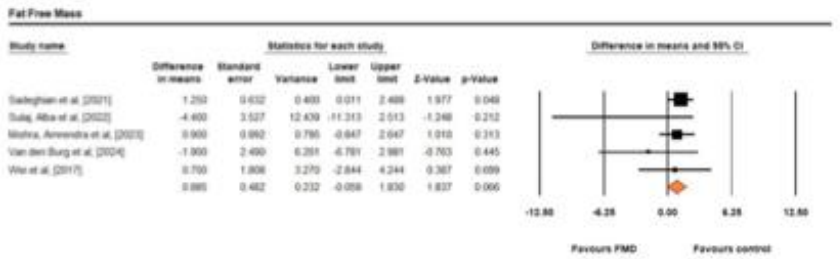
Systematic Review & Meta-analysis Confirm FMD's Broad Cardiometabolic Therapeutic Role

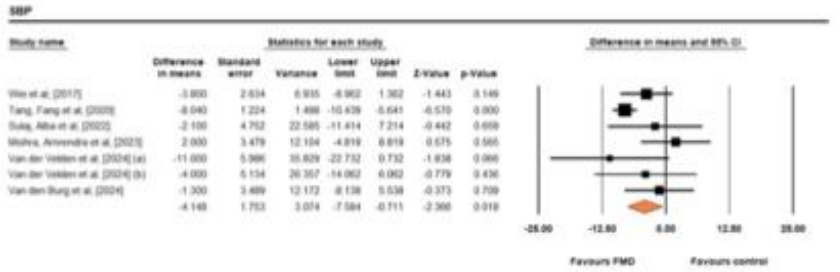
Diabetology & Metabolic Syndrome

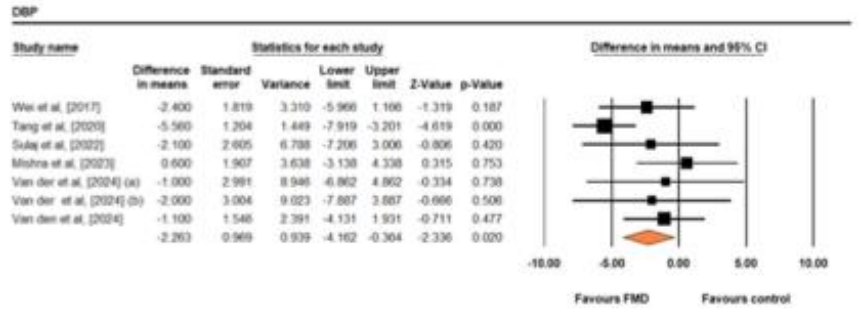
REVIEW Open Access

Impact of Fasting Mimicking Diet (FMD) on cardiovascular risk factors: a systematic review and meta-analysis of randomized control trials



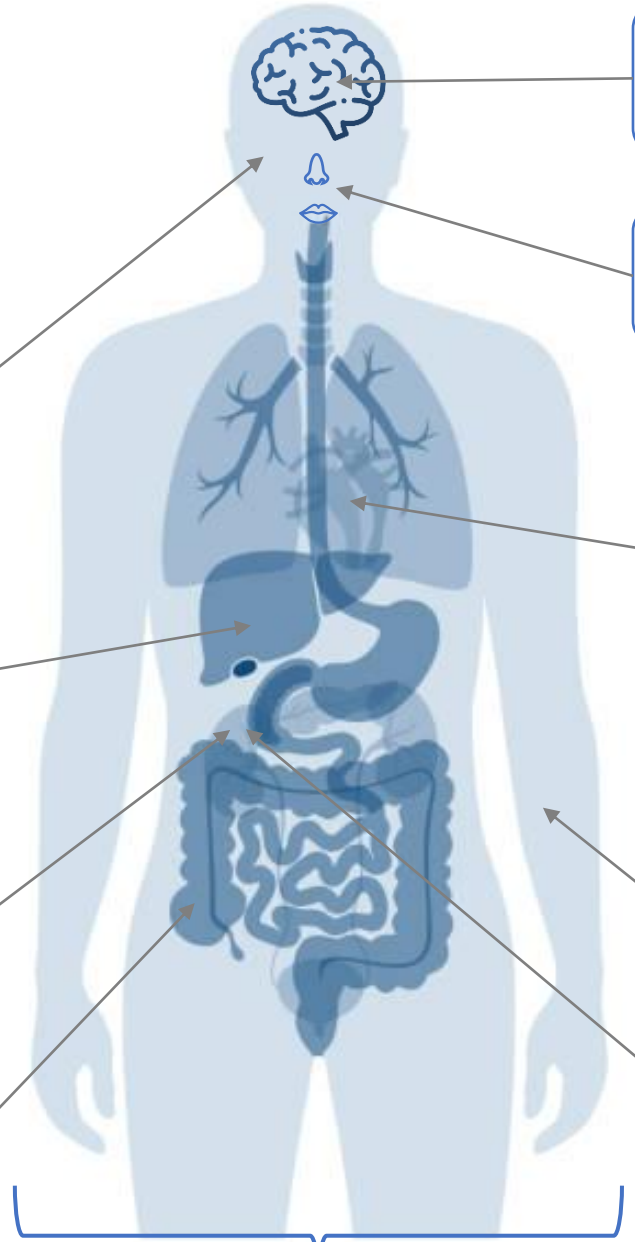






Diabetol Metab Syndr. 2025 Apr 26;17(1):137

FMD's Pleiotropic Effect Drives Multi-system Rejuvenation and Systemic Health Benefits



Reduce **Neuro**inflammation
Attenuate Cognitive Decline
Cell Rep. 2022 Sep 27;40(13):111417

Improve **Chemosensory** Perception
Cell Rep Med. 2025 Feb 18;6(2):101971

Enhance **Skin** Hydration & texture
Eur J Appl Physiol. 2022 Mar;122(3):651-661

Improve **Cardiometabolic Parameters**
Diabetologia. 2024 Jul;67(7):1245-1259
J Clin Endocrinol Metab. 2022 Jul 14;107(8):2167-81

Reduce **Liver** & **Visceral Fat**
Lowers IGF-1 & **Inflammation**
Clin Nutr. 2025 Apr;47:136-145
Nat Commun. 2024 Feb 20;15(1):1309
Sci Transl Med. 2017 Feb 15;9(377)

Restore **Renal** Function in Glomerulopathy
Improve Microalbuminuria
Sci Transl Med. 2024 Oct 30;16(771)
J Clin Endocrinol Metab. 2022 Jul 14;107(8):2167-2181

Preserve **Muscle** Mass & Function
Eur J Appl Physiol. 2022 Mar;122(3):651-661

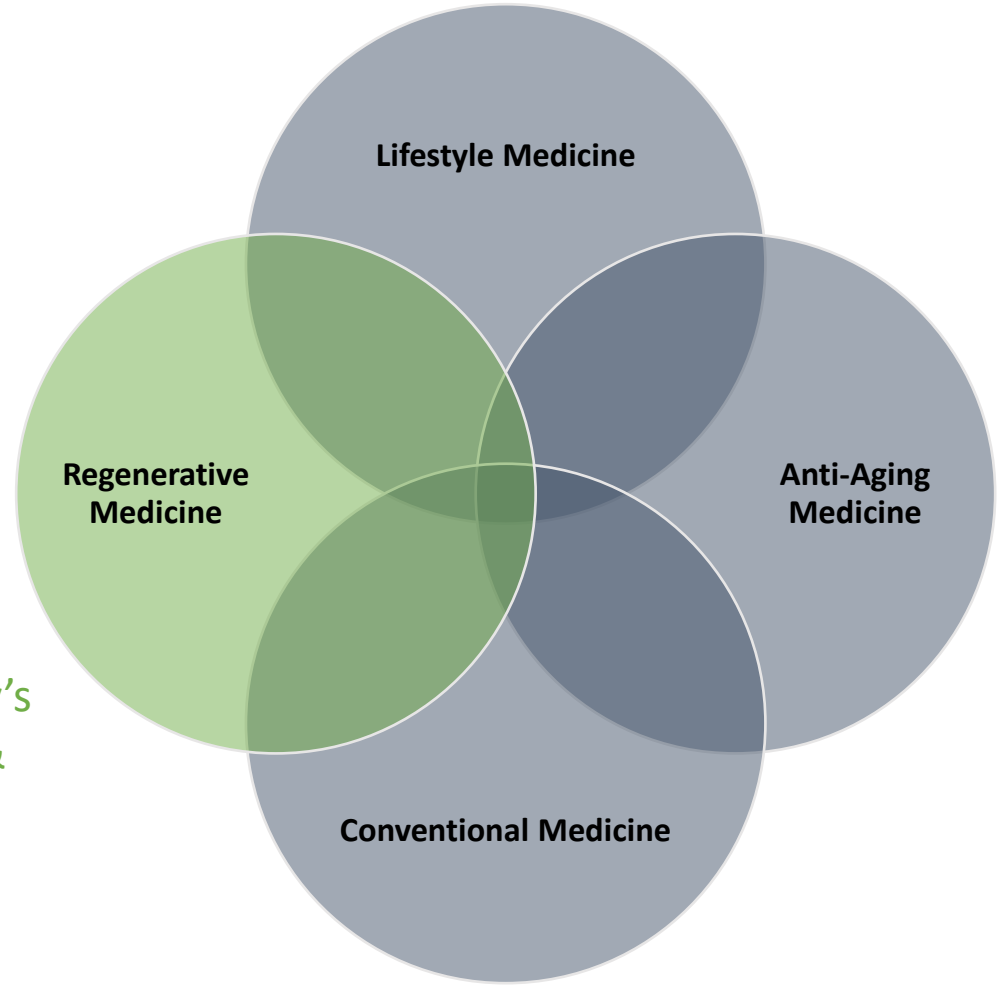
Promote **β-Cell** Regeneration
to Reverse Diabetes
Cell. 2017 Feb 23;168(5):775-788

Remodel **Gut** Microbiota
Cell Rep. 2019 Mar 5;26(10):2704-2719.e6

Lower **Biological Age**
Nat Commun. 2024 Feb 20;15(1):1309

Multi-System Cellular Rejuvenation with FMD

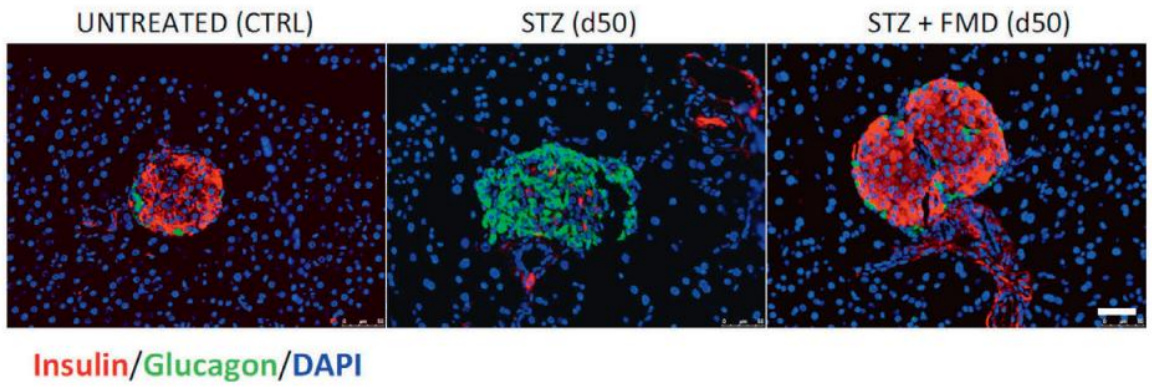
Let’s rebuild the body’s systems at cellular & structural level

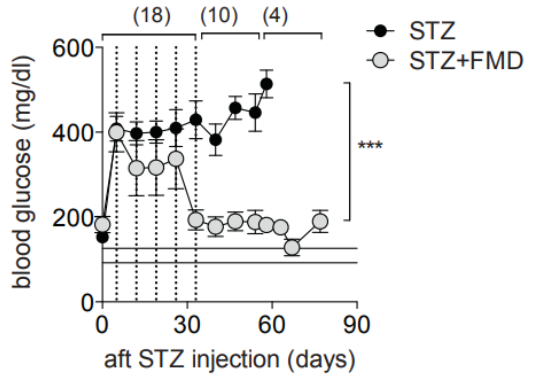


FMD Promotes Beta-Cell Regeneration and Restores Insulin Secretion in Diabetes Models

Type 1 diabetes

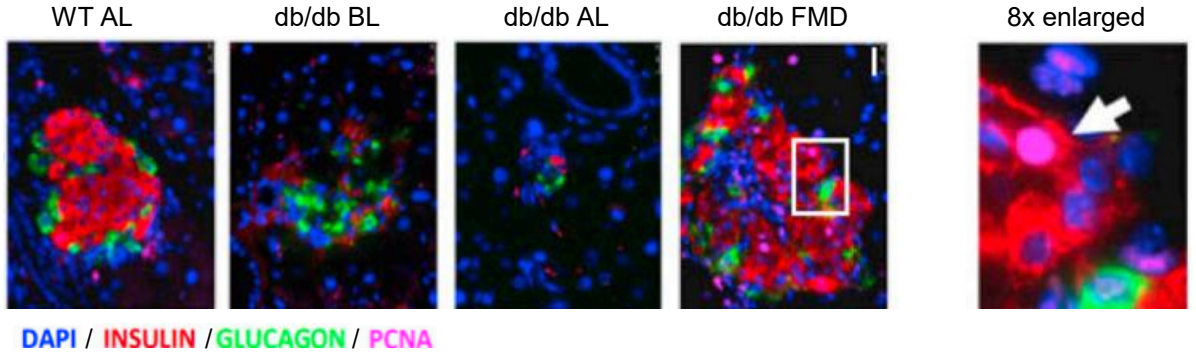
(STZ model)

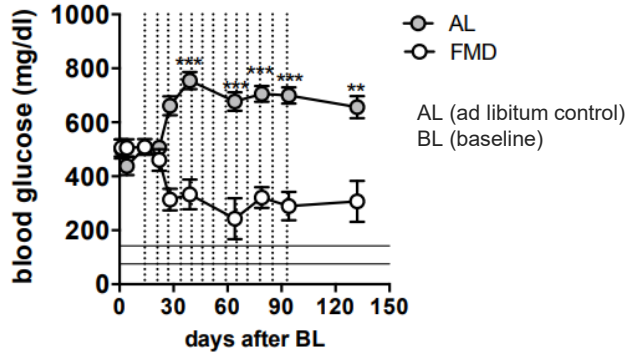




Type 2 diabetes

(genetic model)





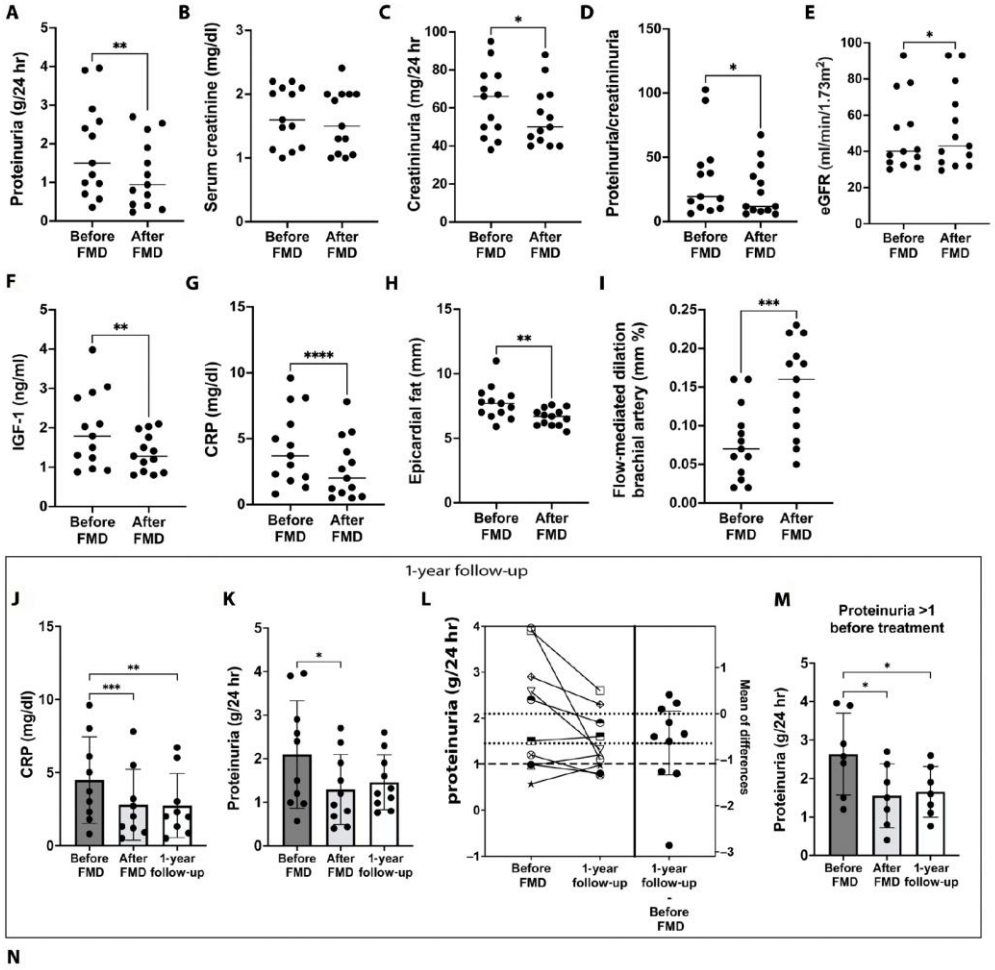
Cheng et al., 2017 Cell 168, 775-788

FMD Promotes Renal Protection via Podocyte Reprogramming and Endothelial Repair

SCIENCE TRANSLATIONAL MEDICINE | RESEARCH ARTICLE

KIDNEY DISEASE

A kidney-specific fasting-mimicking diet induces podocyte reprogramming and restores renal function in glomerulopathy



Sci Transl Med. 2024 Oct 30;16(771):eadl5514.

Regenerative Effects Observed in Taste, Smell, and Cardiometabolic Markers After Cycles of Fasting-Mimicking Diet

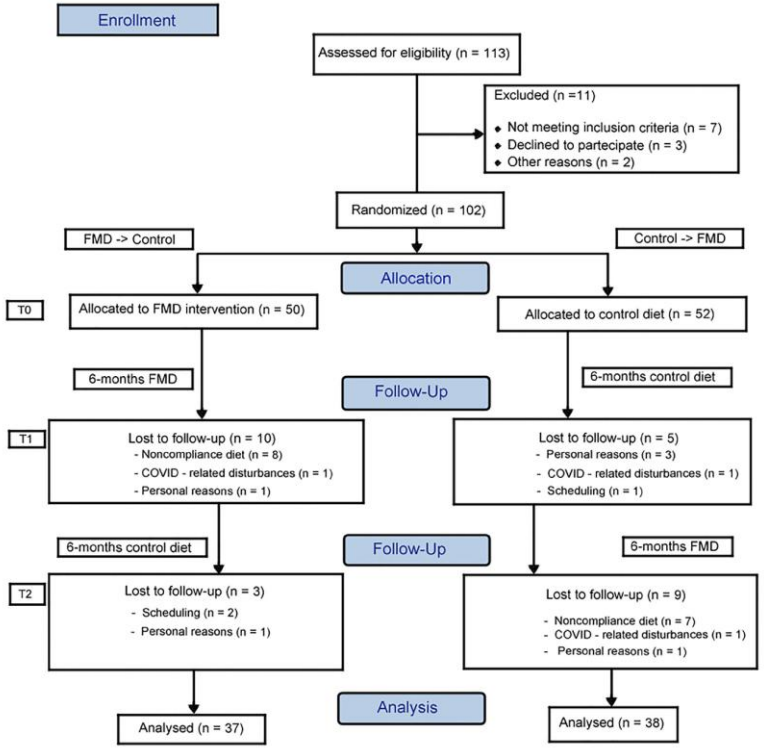
Cell Reports
Medicine

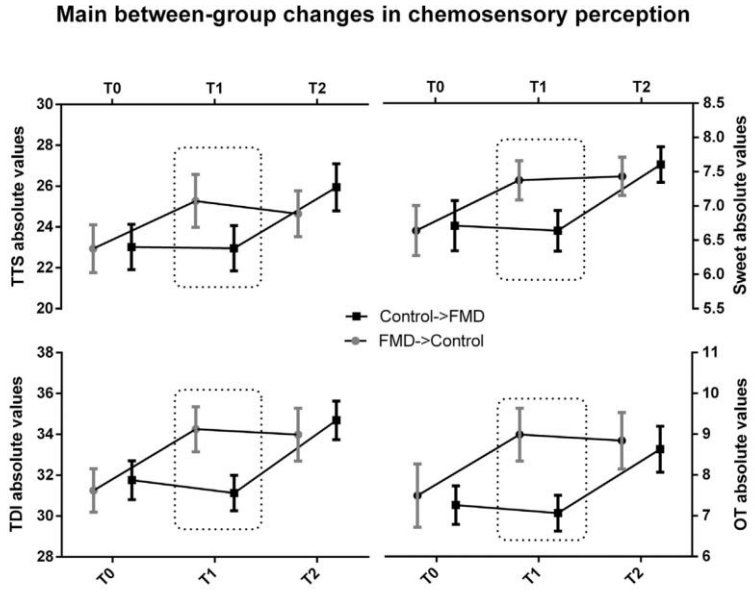
Article

Chemosensory and cardiometabolic improvements after a fasting-mimicking diet: A randomized cross-over clinical trial

Highlights

- Obesity is associated with a decrease in chemosensory perception acuity
- Obese participants followed six monthly cycles of a fasti mimicking diet
- A fasting-mimicking diet reduces the number of hyposmi subjects from 38.1% to 6.4%
- A fasting-mimicking diet reduces cardiometabolic marke and diabetic drug use



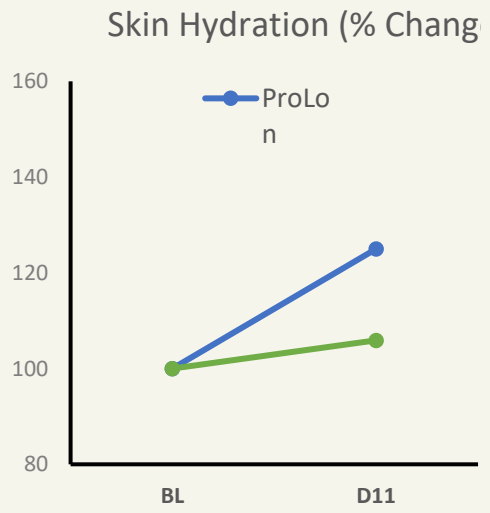


Cell Rep Med. 2025 Feb 18;6(2):101971

FMD Promotes Skin Rejuvenation

Clinical evidence shows enhanced hydration, smoothness, and overall skin appearance after FMD cycles

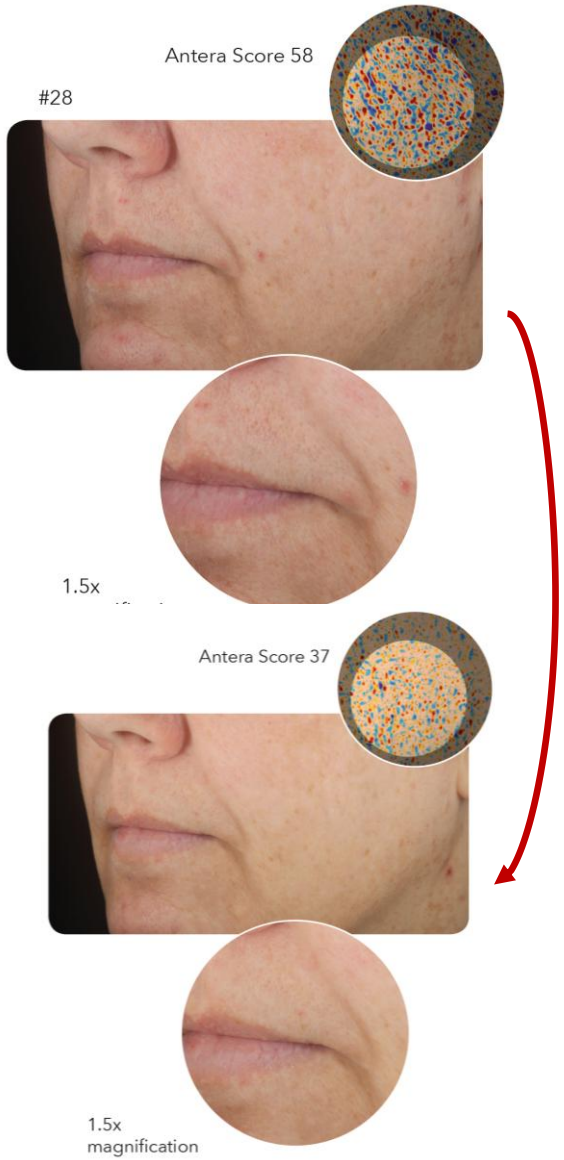
- 45 individuals were randomized to either 3 consecutive months of 5-day Fasting Mimicking Diet or regular diet
- Skin was evaluated by skin experts who were blinded to group assignment



Corneometer, % Improvement BL to Day 11

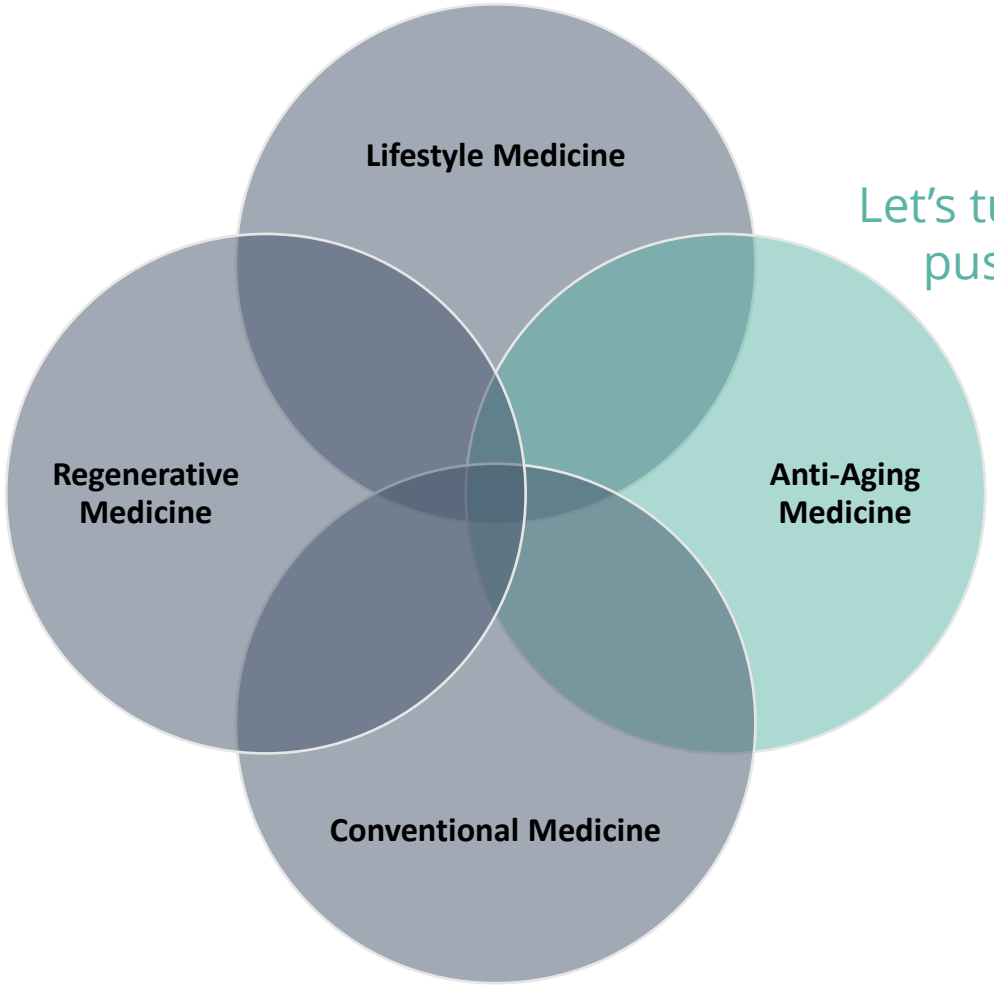
25% improvement in hydration after just 1 cycle

Clinical grading parameters	Outcome
Skin smoothness (visual)-cheeks	**FMD >** Control
Skin smoothness (tactile)-cheeks	**FMD >** Control
Dry fine lines-Global face	**FMD >** Control
Clarity-Global face	**FMD >** Control
Radiance-Global face	**FMD >** Control
Overall appearance-Global face	**FMD >** Control



J. Clin. Med. **2023**, 12, 1710.

FMD and the Biology of Time: Reversing the Aging Clock



Let’s turn the age clock to push for healthspan

FMD Reverses Biological Age and Lowers Disease Risk

Three FMD cycles reduced biological age by 2.5 years

nature communications

Article

https://doi.org/10.1038/s41467-024-45260-9

Fasting-mimicking diet causes hepatic and blood markers changes indicating reduced biological age and disease risk

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Accepted: 18 January 2024

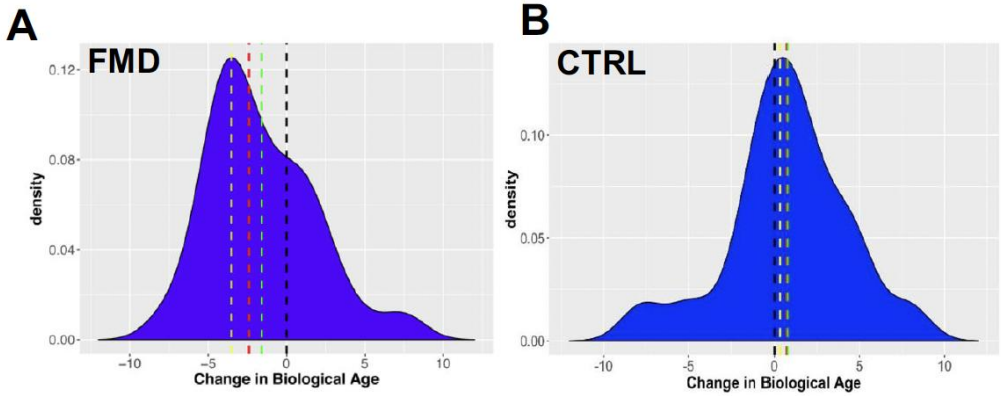
Published online: 20 February 2024

Sebastian Brandhorst[1,8], Morgan E. Levine[2,8], Min Wei[1], Mahshid Shelehchi[1], Todd E. Morgan[1], Krishna S. Nayak[3], Tanya Dorff[4], Kurt Hong[5], Eileen M. Crimmins[1,6], Pinchas Cohen[1] & Valter D. Longo[1,7]

In mice, periodic cycles of a fasting mimicking diet (FMD) protect normal cells while killing damaged cells including cancer and autoimmune cells, reduce inflammation, promote multi-system regeneration, and extend longevity. Here, we performed secondary and exploratory analysis of blood samples from a randomized clinical trial (NCT02158897) and show that 3 FMD cycles in adult study participants are associated with reduced insulin resistance and other pre-diabetes markers, lower hepatic fat (as determined by magnetic resonance imaging) and increased lymphoid to myeloid ratio: an indicator of immune system age. Based on a validated measure of biological age predictive of morbidity and mortality, 3 FMD cycles were associated with a decrease of 2.5 years in median biological age, independent of weight loss. Nearly identical findings resulted from a second clinical study (NCT04150159). Together these results provide initial support for beneficial effects of the FMD on multiple cardiometabolic risk factors and biomarkers of biological age.

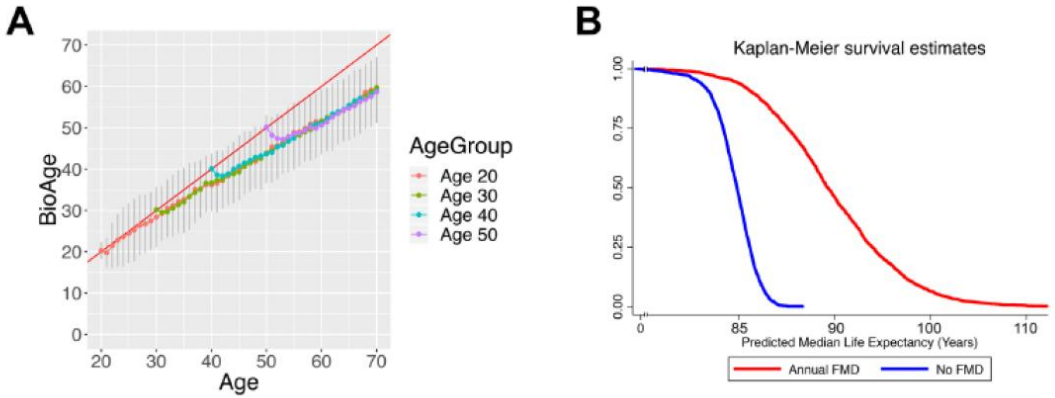
Supplementary Table 2: Parameters for Estimation of Levine Biological Age

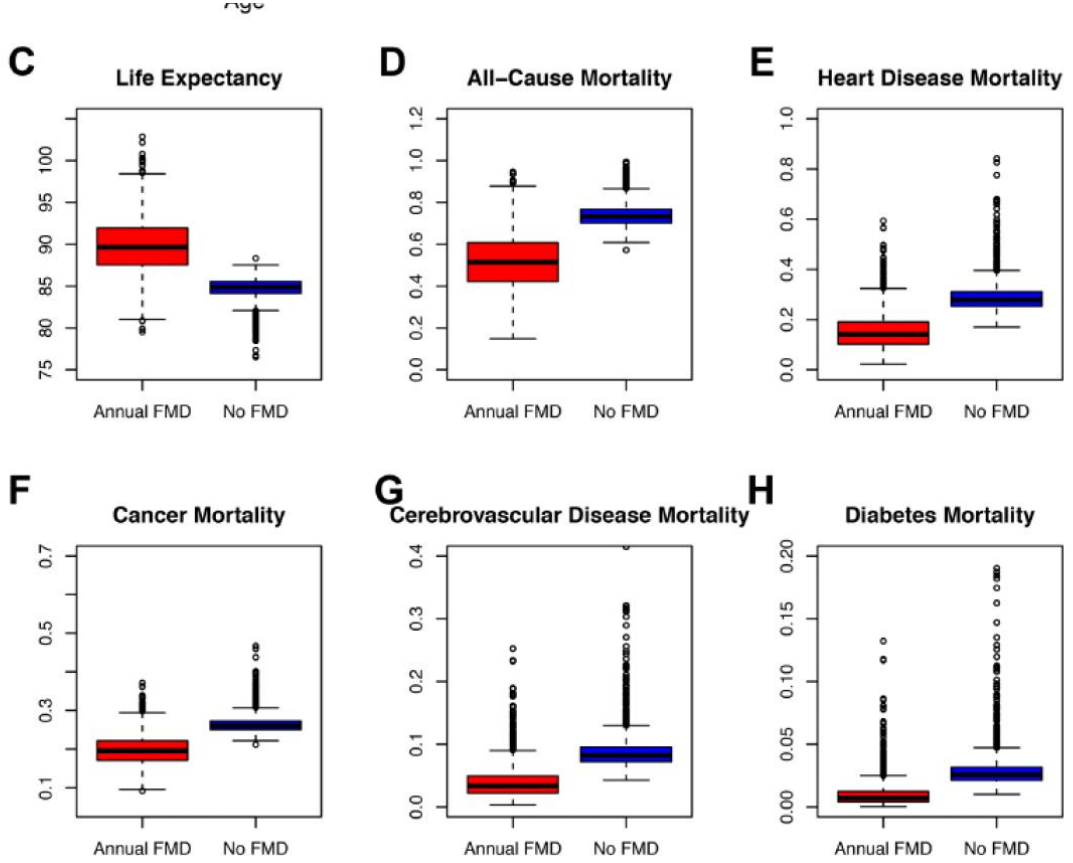
Biomarker	Units	sj	kj	qj
Albumin	g/dL	0.334481	-0.00544	4.423451
Alkaline Phosphatase	u/L	29.44492	0.443863	60.44123
Creatinine (Serum)	mg/dL	0.271155	0.003463	0.908423
CRP	mg/dL	0.615577	0.004941	0.179063
Hba1c	%	0.943548	0.017761	4.5679
Systolic BP	mmHg	14.94318	0.677014	90.99925
Total Cholesterol	mg/dL	40.3238	0.793224	170.8787



Nat Commun. 2024 Feb 20;15(1):1309.

Three to Four FMD cycles Reduce Disease Mortality



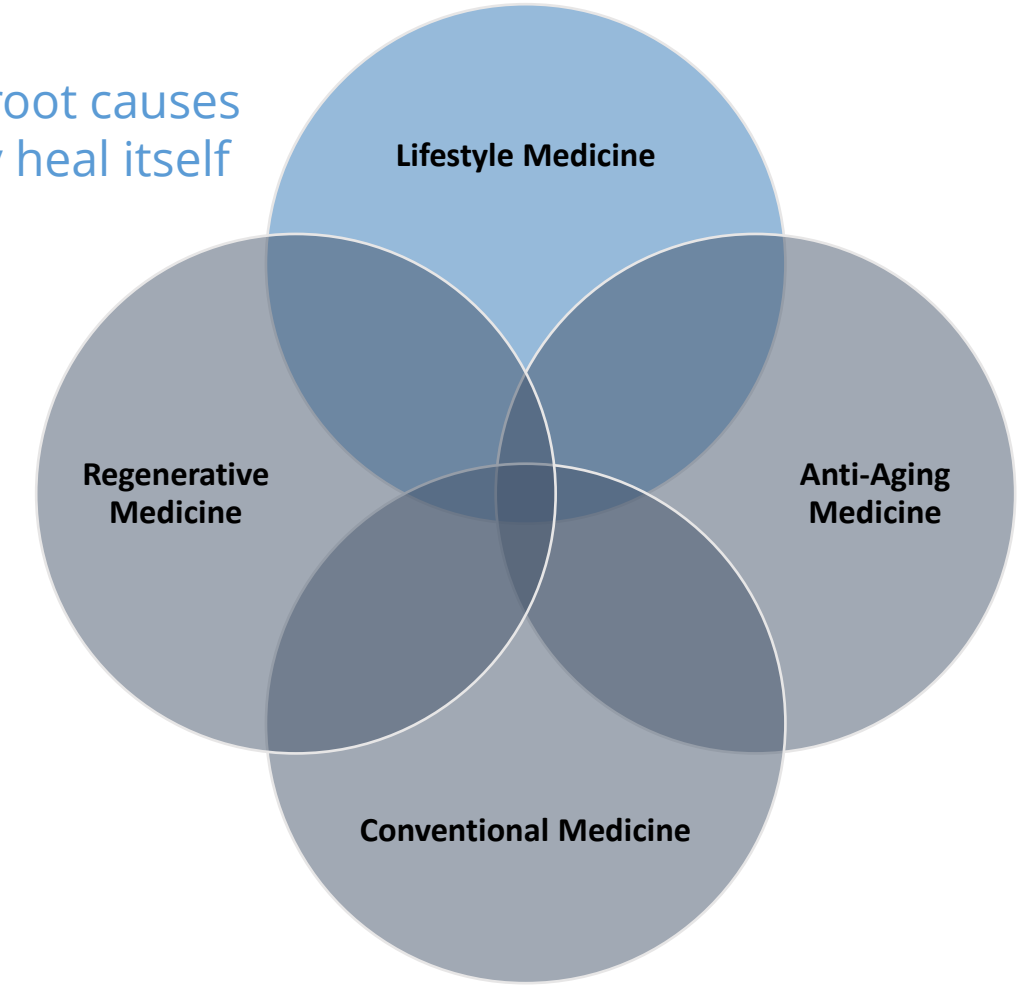


A) Biological Age projection assuming that people ages 20, 30, 40, and 50 would undergo 3 FMD cycles/year until they reach age 70. The red line indicates if every year the person gained 1 year of biological age and 1 year of chronological age chronological age. Mean ± SEM. **B**) Kaplan-Meier life expectancy estimated at age 70, assuming either no FMD (blue) vs. FMD starting at age 50 (red). After aging participants (based on N=51 biologically independent samples) in these simulations up to age 70 (chronologically), we estimated their **C**) median life expectancies, and **D**)-**H**) 20-year cause-specific mortality risks based on models from NHANES III assuming that participants had performed 3 cycles of FMD annually (red) or that participants did not undergo FMD (blue). Center line = median, box bounds= interquartile range (IQR, 25th and 75th percentile), whiskers are 1.5xIQR.

Nat Commun. 2024 Feb 20;15(1):1309.

FMD: A Lifestyle Reset with Measurable Impact

Let's treat root causes to let body heal itself



FMD Empowers Sustainable Lifestyle Change: Supporting Healthier Eating and Activity Patterns

van den Burg *et al. BMC Primary Care* (2024) 25:148
https://doi.org/10.1186/s12875-024-02405-5

BMC Primary Care

RESEARCH Open Access

Self-initiated lifestyle changes during a fasting-mimicking diet programme in patients with type 2 diabetes: a mixed-methods study

BMC Prim Care. 2024 May 2;25(1):148.

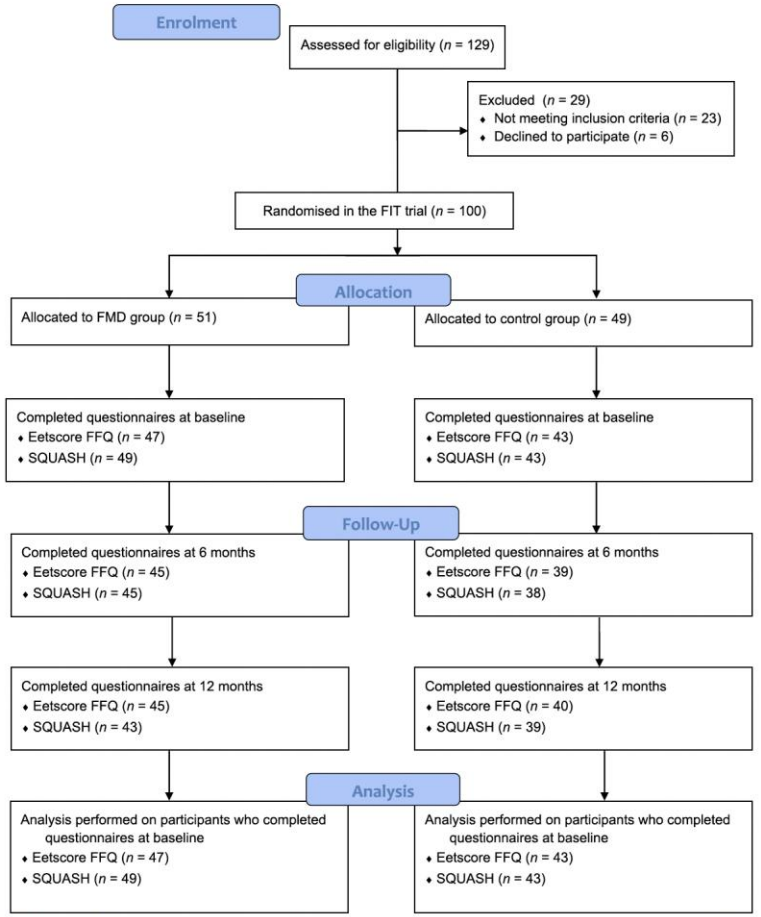
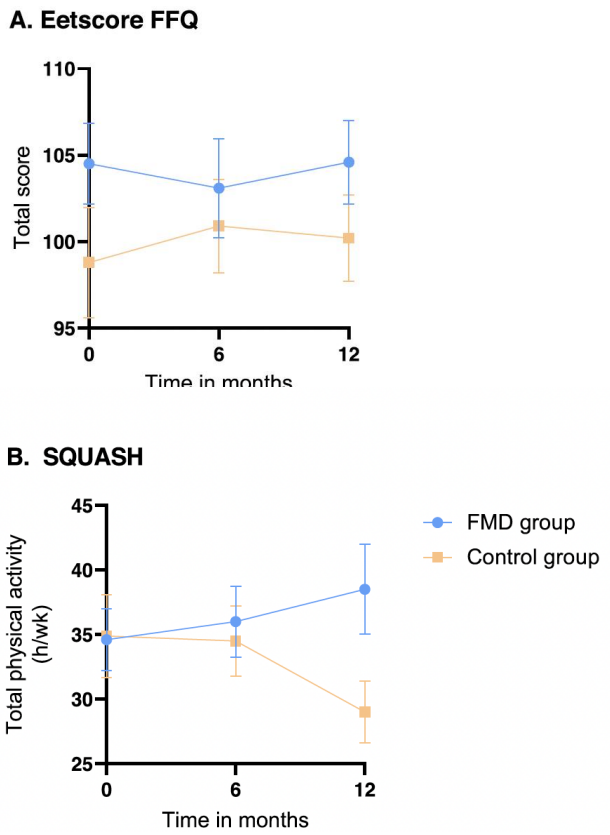
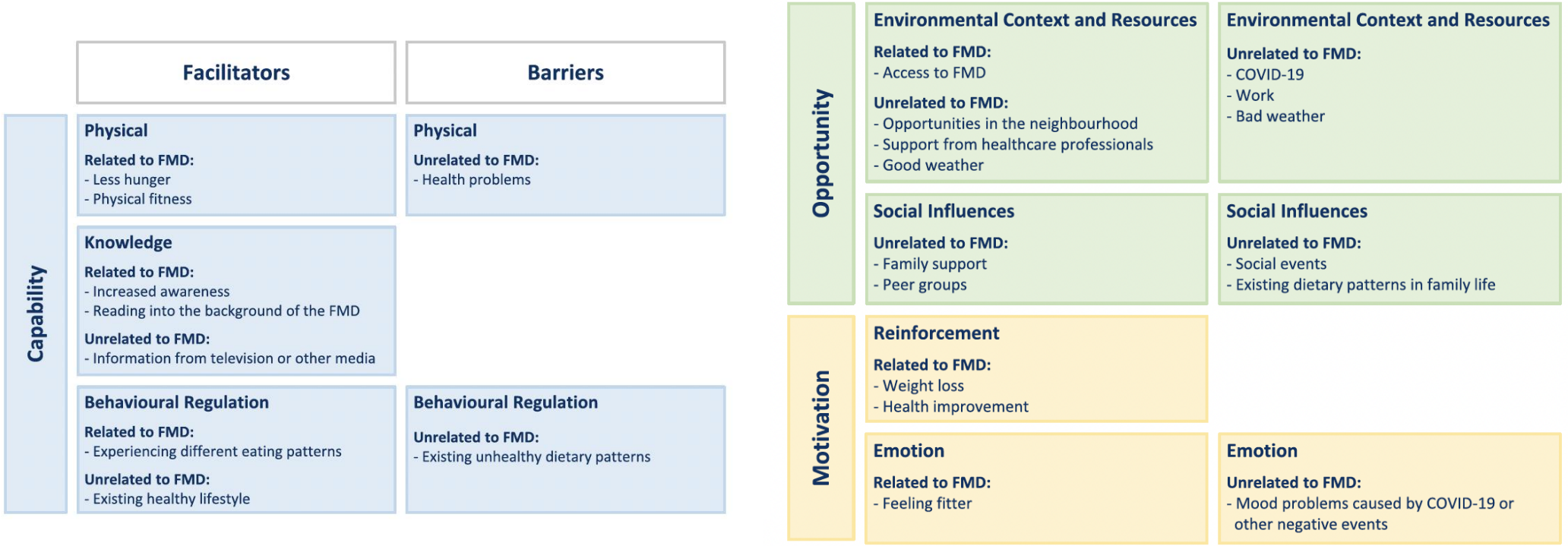


Fig. 1 Flow chart of participant inclusion in the FIT trial, followed by number of participants who completed the Eetscore FFQ and the SQUASH at baseline, six months and twelve months

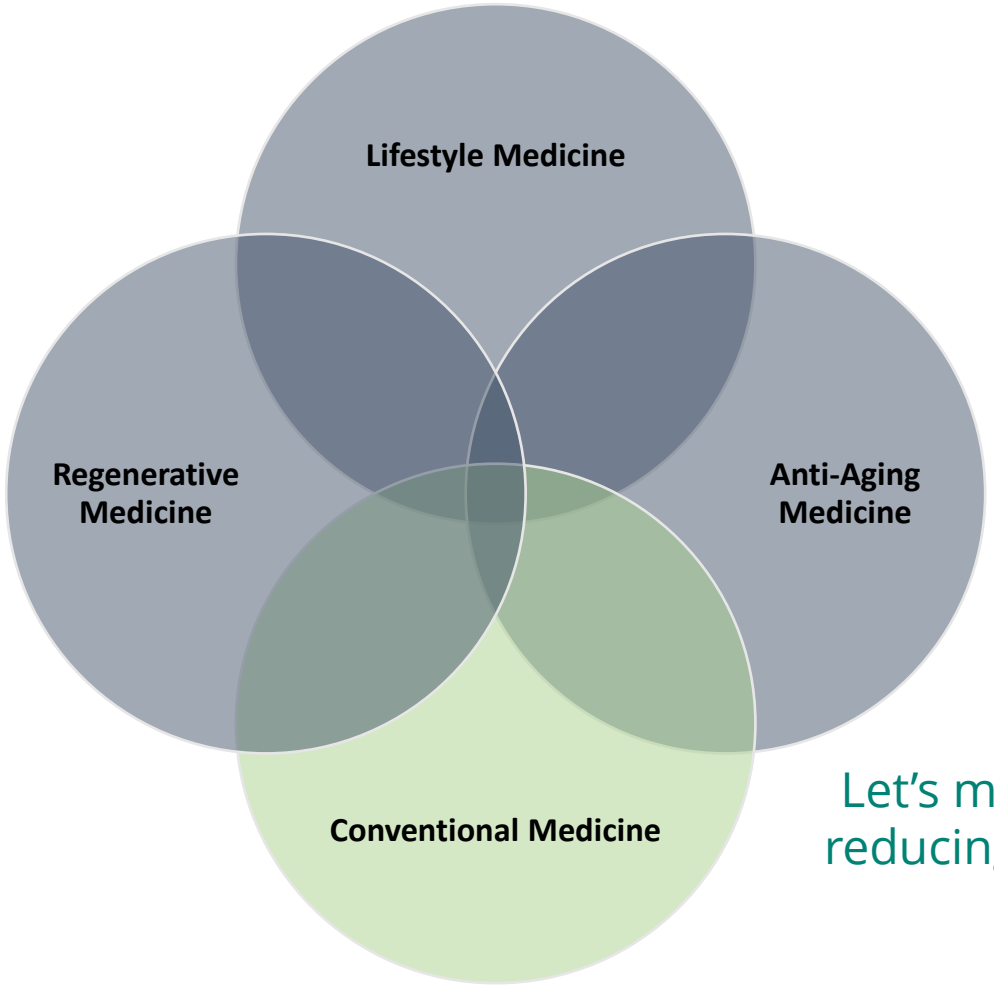


What Enables FMD Success? Behavioral Drivers and Real-World Barriers



BMC Prim Care. 2024 May 2;25(1):148.

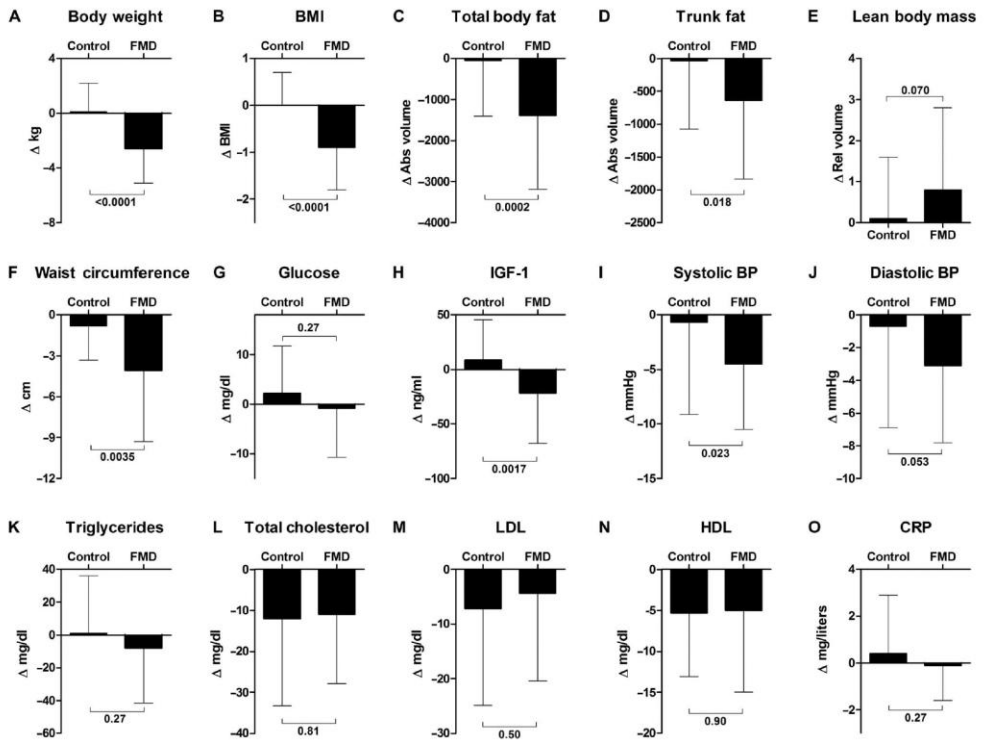
Clinically Tested: FMD Meets the Standards of Conventional Medicine

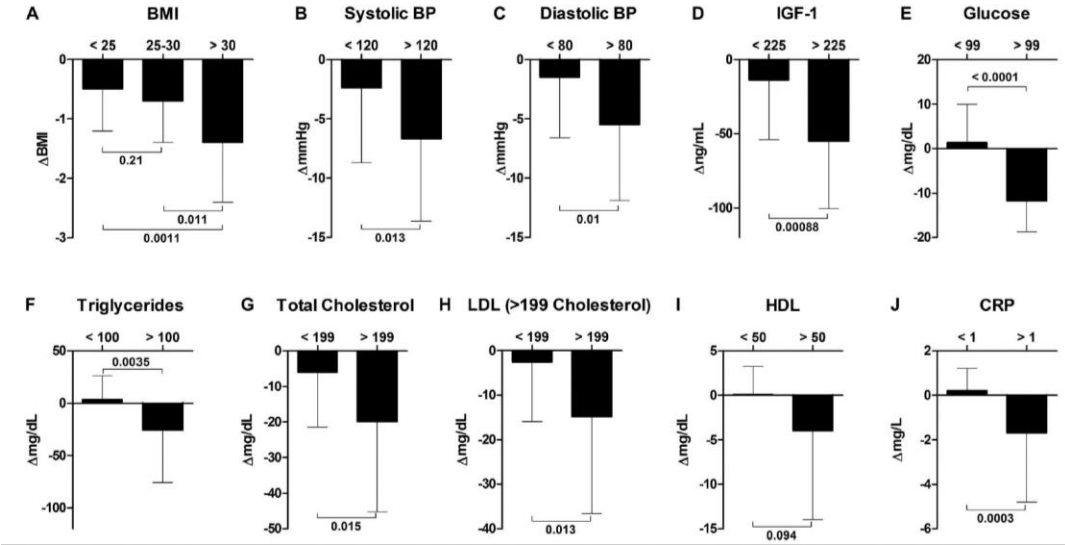


Let’s manage disease by reducing M&M, guided by evidence

FMD Reduces Markers for Aging, Diabetes, Cancer and Cardiovascular Disease

Three Cycle Study – Efficacy & Safety





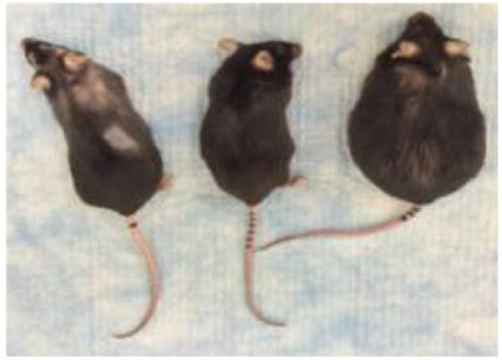
Transl Med. 2017 Feb 15;9(377):eaai8700.

Just 5 Days a Month: A Practical Lifestyle Strategy

FMD cycles promote cardiometabolic health and longevity, even against a high-fat diet background

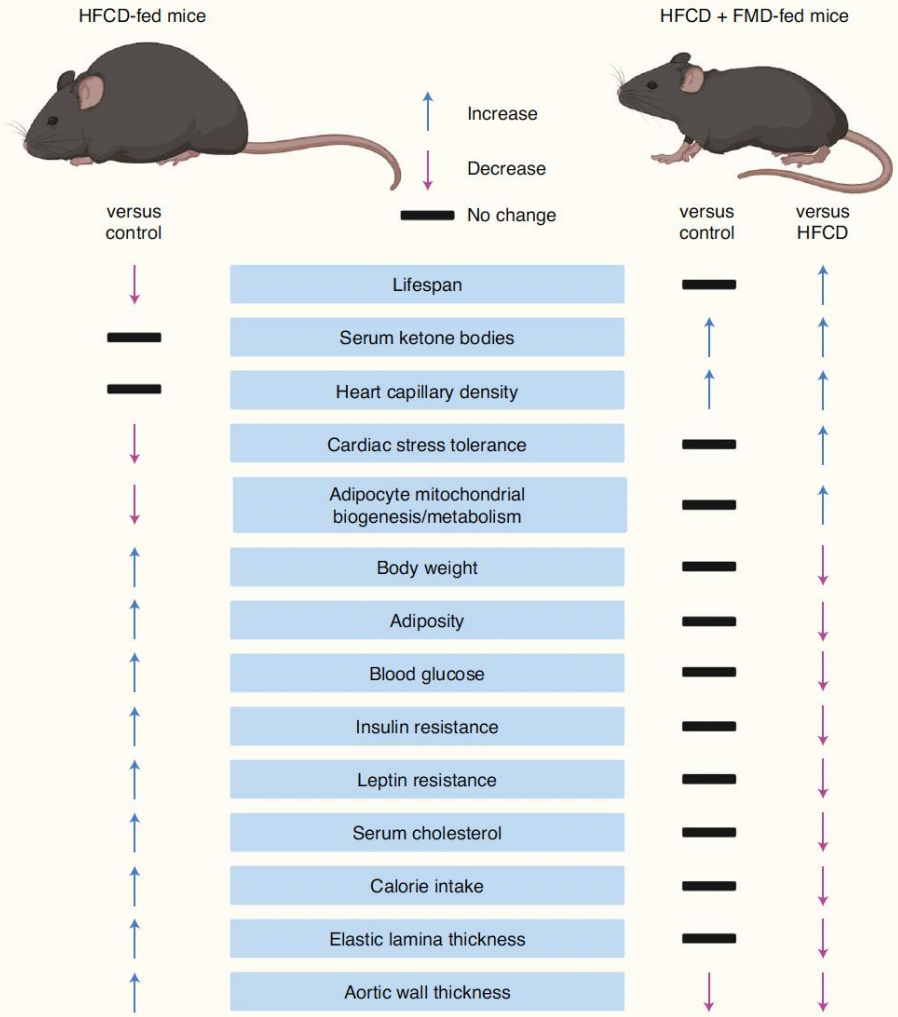
nature metabolism ARTICLES
https://doi.org/10.1038/s42255-021-00469-6
Check for updates

Fasting-mimicking diet prevents high-fat diet effect on cardiometabolic risk and lifespan



Control HFD + FMD HFD

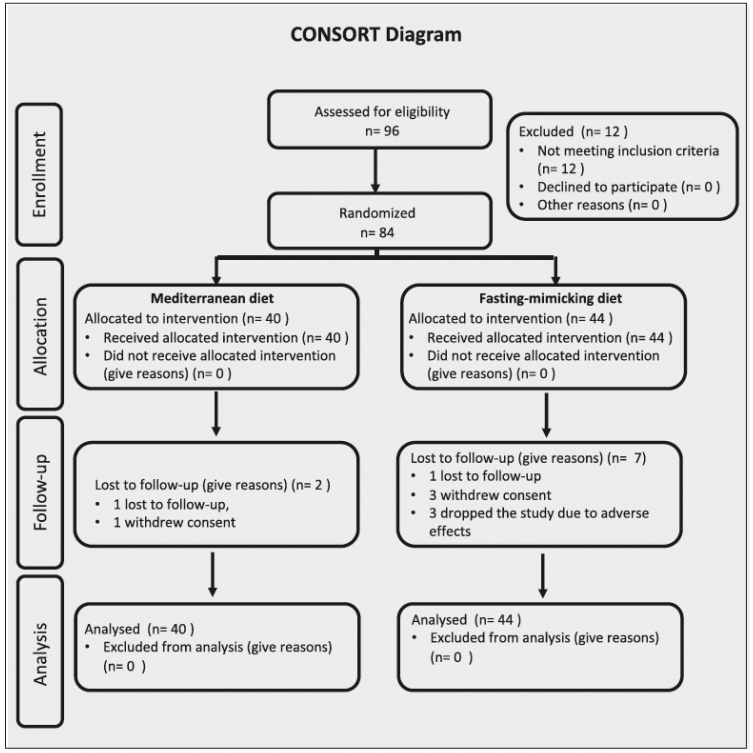
5-day FMD every 4 weeks

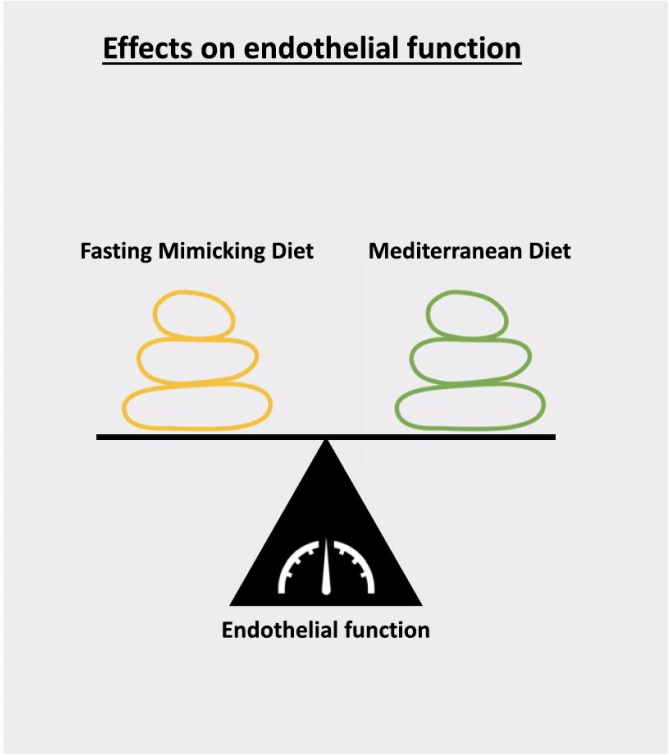


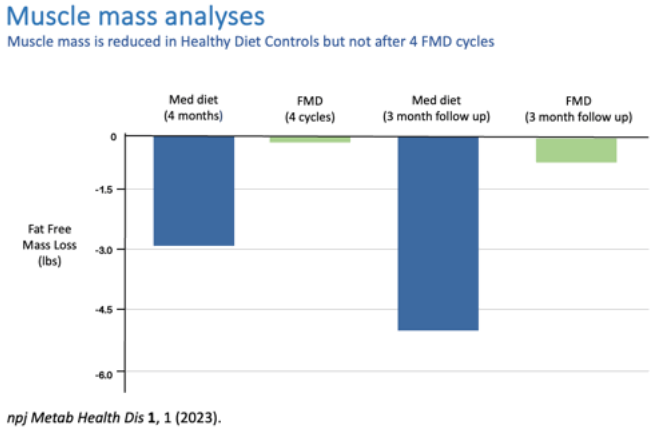
Nat Metab **3**, 1342–1356 (2021)

Four Cycle of FMD Is As Effective As Everyday Mediterranean Diet for 120 Days

Four Cycle Study – As Cardiometabolic Protective As Everyday MD



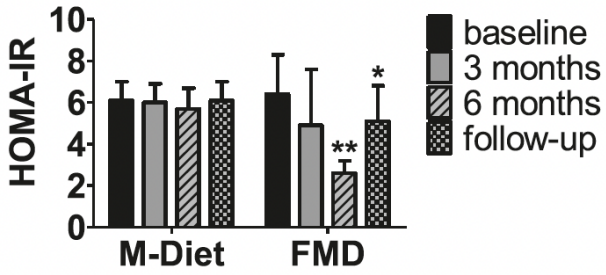


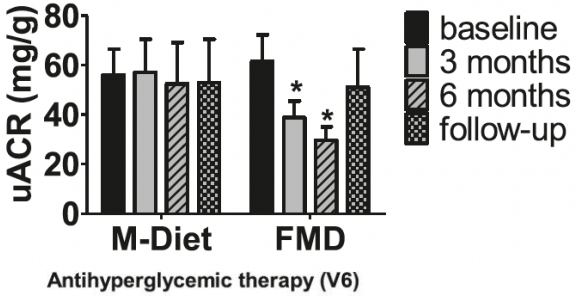


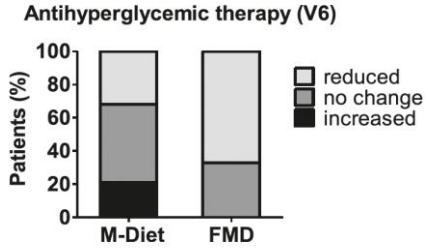
NPJ Metab Health Dis. 2023 Dec 13;1(1):1.

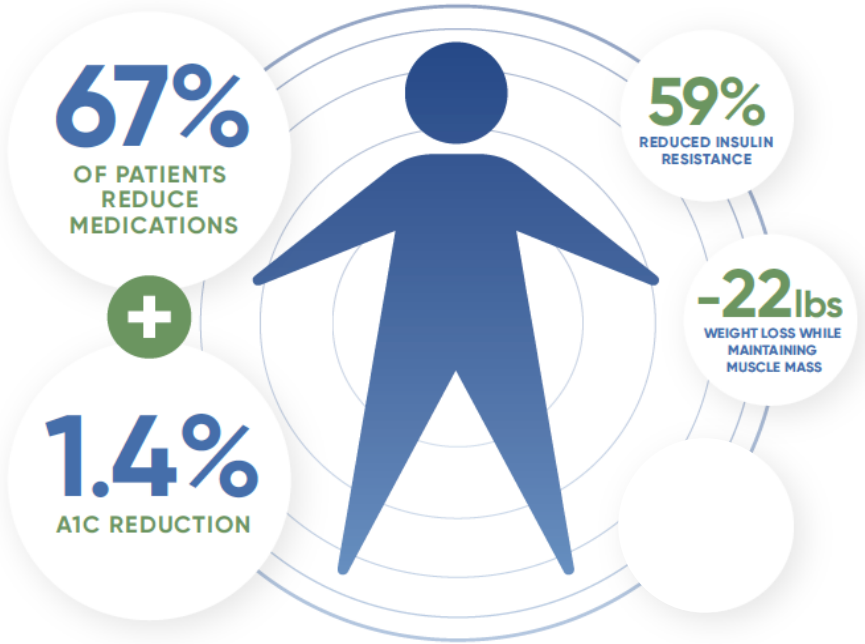
Six Cycles of FMD Reduced Microalbuminuria, HbA1c, HOMA IR, Increased Metabolic Flexibility

Six Cycle Study in type 2 DM –

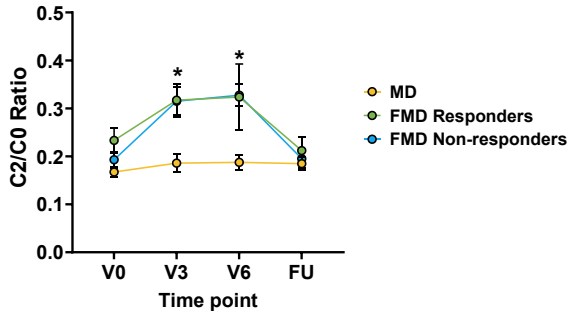




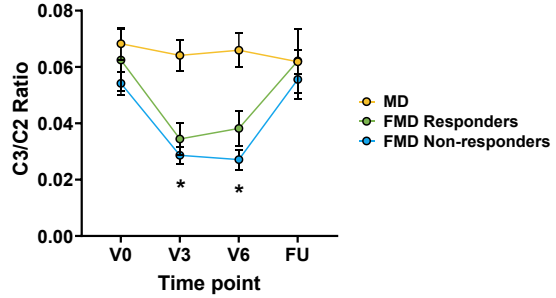




Increased lipid oxidation, enhanced utilization of fatty acids



Increased gluconeogenesis and sparing muscle protein during fasting

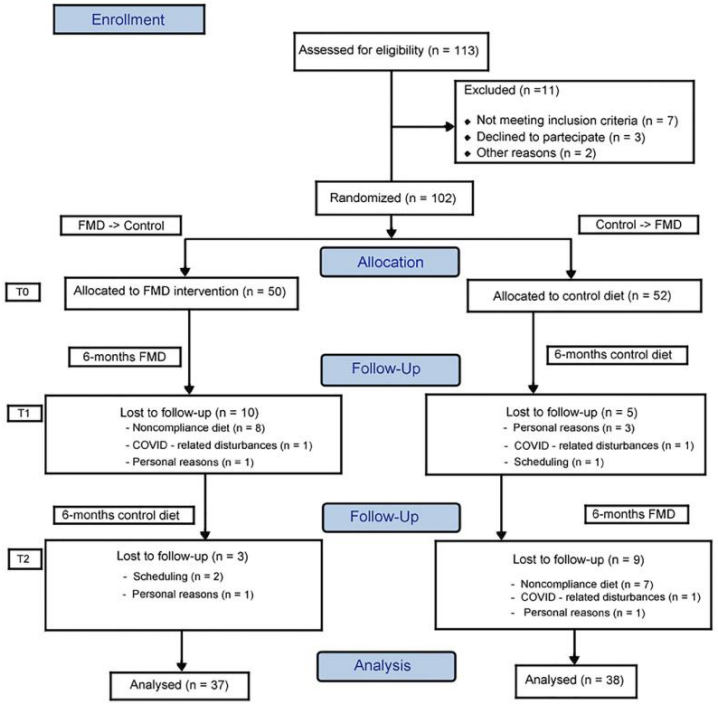


J Clin Endocrinol Metab. 2022 Jul 14;107(8):2167-2181

Mol Metab. 2025 Sep 24;102:102257.

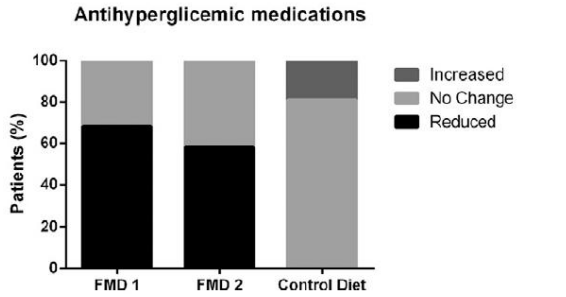
FMD Lowers Drug Dependence, Improves Metabolic-Sensory Perception, Lowers Cholesterol

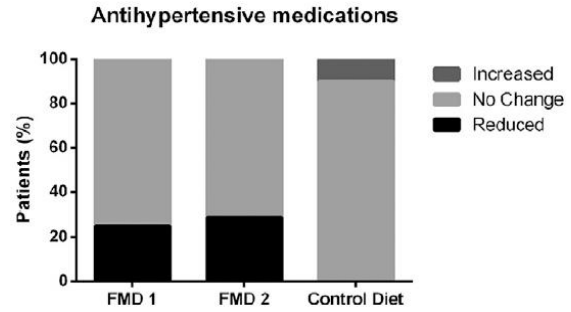
Six-Cycle Randomized Crossover Study in Obesity



Highlights

- Obesity is associated with a decrease in chemosensory perception acuity
- Obese participants followed six monthly cycles of a fasting-mimicking diet
- A fasting-mimicking diet reduces the number of hyposmic subjects from 38.1% to 6.4%
- A fasting-mimicking diet reduces cardiometabolic markers and diabetic drug use



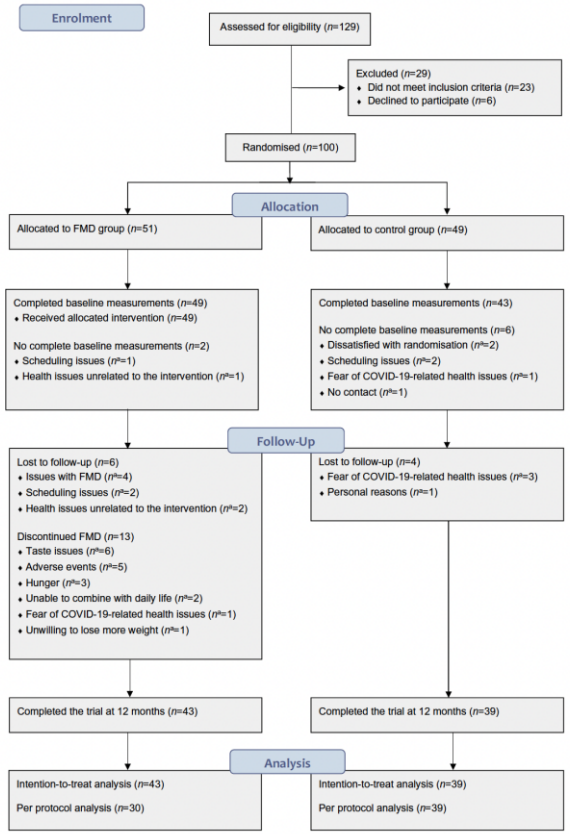


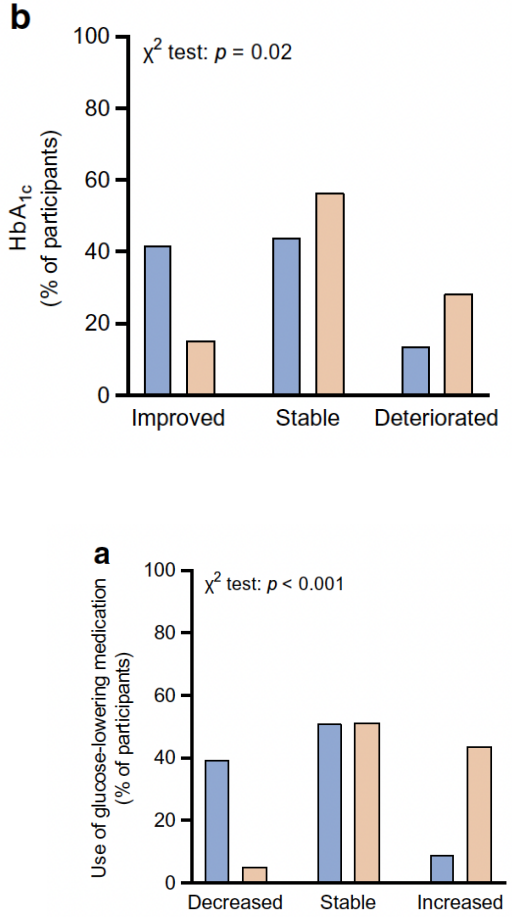
	T0		p	T1		p	T2		p
	FMD->Control (n = 50)	*Control->FMD (n = 52)*		FMD->Control (n = 40)	Control->FMD (n = 47)		FMD->Control (n = 37)	Control->FMD (n = 38)	
	Mean ± SD (CI)/median (IQR)	Mean ± SD (CI)/median (IQR)		Mean ± SD (CI)/median (IQR)	Mean ± SD (CI)/median (IQR)		Mean ± SD (CI)/median (IQR)	Mean ± SD (CI)/median (IQR)	
Total cholesterol (mg/dl)	223.28 ± 38.36 (212.64 - 233.91)	219.59 ± 36.3 (209.72 - 229.46)	0.61	195.6 ± 31.19 (185.93 - 205.26)	217.51 ± 33.44 (207.94 - 227.07)	0.002	195.13 ± 34.23 (184.1 -206.16)	182.15 ± 30.09 (172.58 -191.72)	0.08
LDL (mg/dl)	142.32 ± 37.93(131.8 - 152.83)	140.78 ± 35.27 (131.2 - 150.37)	0.83	123.05 ± 24.48 (115.46 - 130.63)	138.93 ± 33.33 (129.4 - 148.46)	0.014	127.64 ± 29.14 (118.25 - 137.03)	100.21 ± 29.78 (90.74 -109.68)	< 0.001
HDL (mg/dl)	55 (22.759	52 (19.25)	0.4	57 (15.25)	52 (20)	0.2	55 (11)	60 (15)	0.02
TGs (mg/dl)	111 (76.25)	115 (41.25)	0.69	91 (49.25)	114 (36.75)	0.07	94 (47)	92.5 (55.5)	0.63

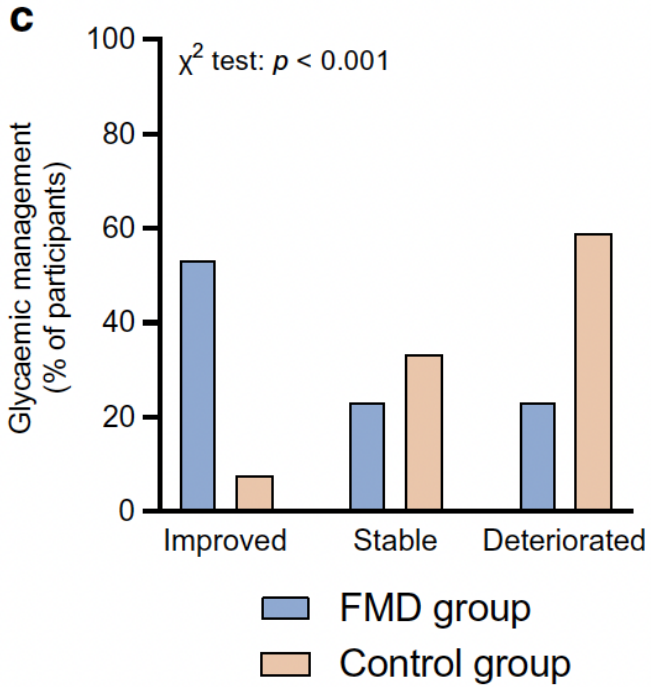
Cell Rep Med. 2025 Feb 18;6(2):101971

Integration of A FMD Program in Primary Care for Type 2 Diabetes Reduces the Need for Medication and Improves Glycemic Control

Twelve Cycle FMD







Diabetologia. 2024 Jul;67(7):1245-1259

FMD Cycles Reduces Liver, Abdominal Fats and Myocardial Triglyceride While Preserving Muscle Mass

Twelve Cycle FMD

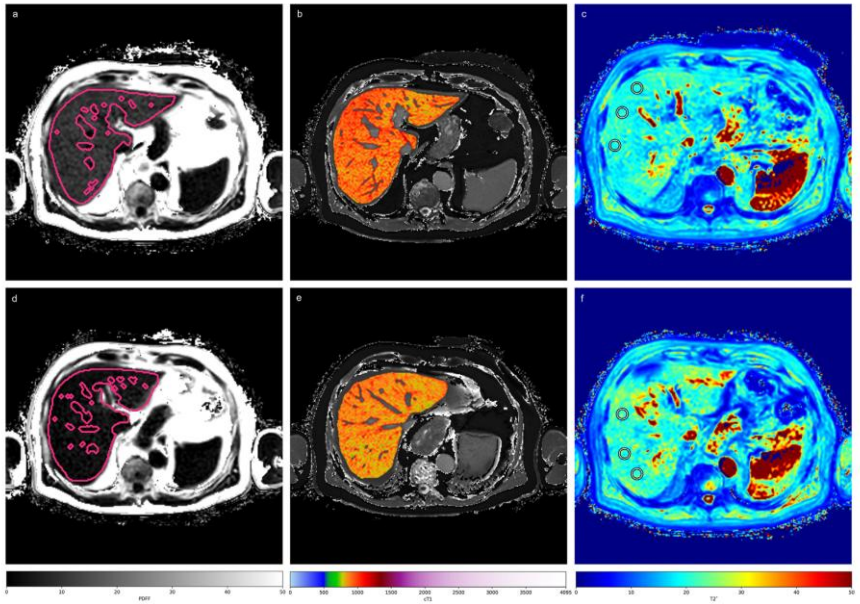
Contents lists available at ScienceDirect

Clinical Nutrition

journal homepage: http://www.elsevier.com/locate/clnu

Randomized Control Trials

A fasting-mimicking diet programme reduces liver fat and liver inflammation/fibrosis measured by magnetic resonance imaging in patients with type 2 diabetes



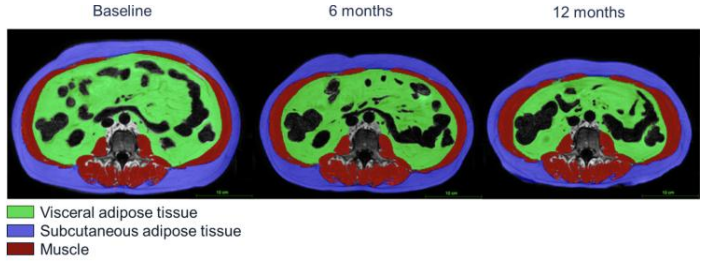
Clin Nutr. 2025 Apr;47:136-145

Contents lists available at ScienceDirect

Nutrition, Metabolism and Cardiovascular Diseases

journal homepage: www.elsevier.com/locate/nmcd

A fasting-mimicking diet programme reduces abdominal adipose tissue while preserving abdominal muscle mass in persons with type 2 diabetes



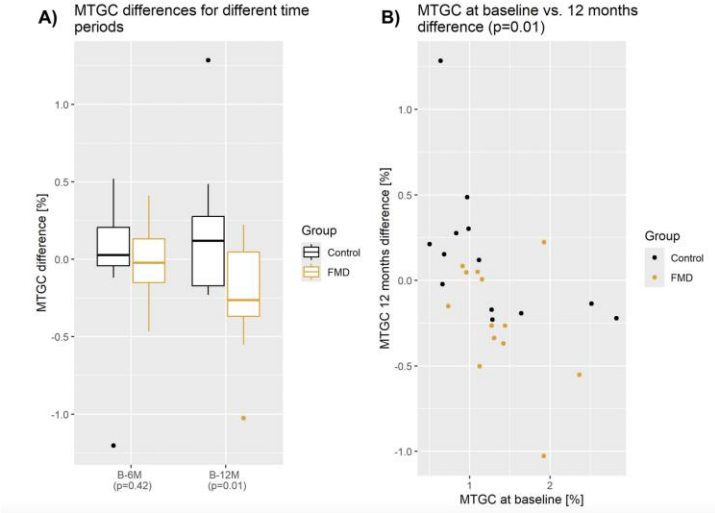
Nutr Metab Cardiovasc Dis. 2025 Oct;35(10):104111

Contents lists available at ScienceDirect

Nutrition, Metabolism and Cardiovascular Diseases

journal homepage: www.elsevier.com/locate/nmcd

Fasting-mimicking diet in type 2 diabetes reduces myocardial triglyceride content: A 12-month randomised controlled trial



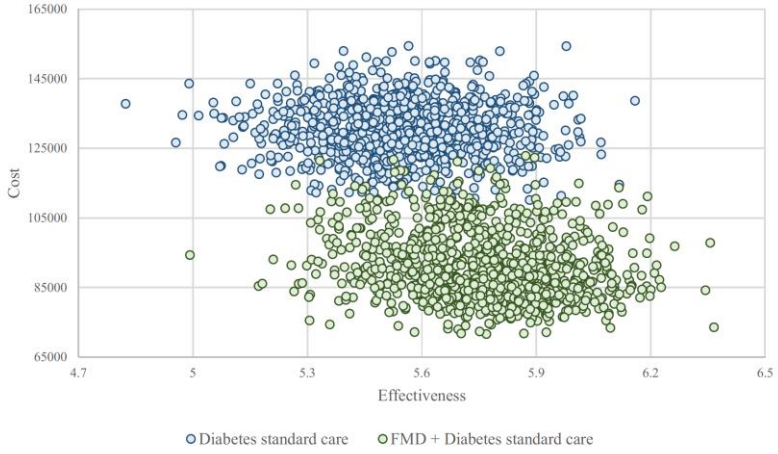
Nutr Metab Cardiovasc Dis. 2025 Jul;35(7):103860

FMD is a cost-effective intervention compared to standard care in diabetic patients, offering improved quality-adjusted life years (QALYs) at a lower overall healthcare cost.

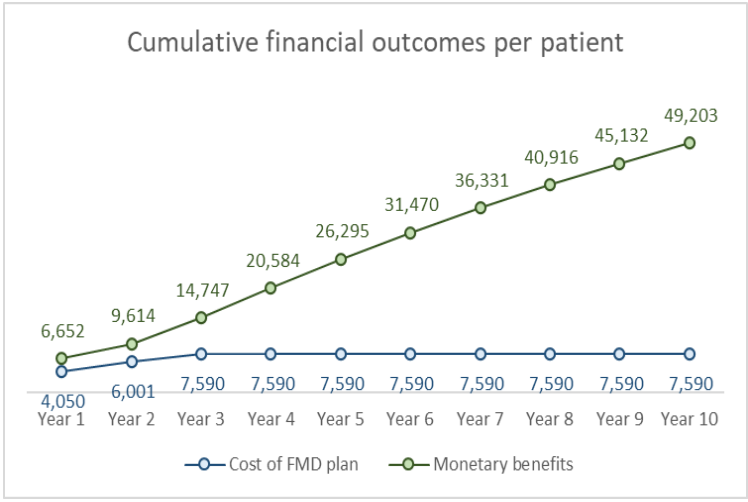
Economic Evaluation

Economic Evaluation of Fasting Mimicking Diet vs Standard Care in Diabetic Patients on Dual or Triple Medications at Baseline in the United States: A Cost-Utility Analysis

Figure 3. Monte Carlo cost-effectiveness scatterplot. The TreeAge generated cost-effectiveness scatterplot shows the results of 1000 probabilistic sensitivity analysis simulations. A net distinction in the simulations between the Fasting Mimicking Diet and the standard care alone groups is observed.



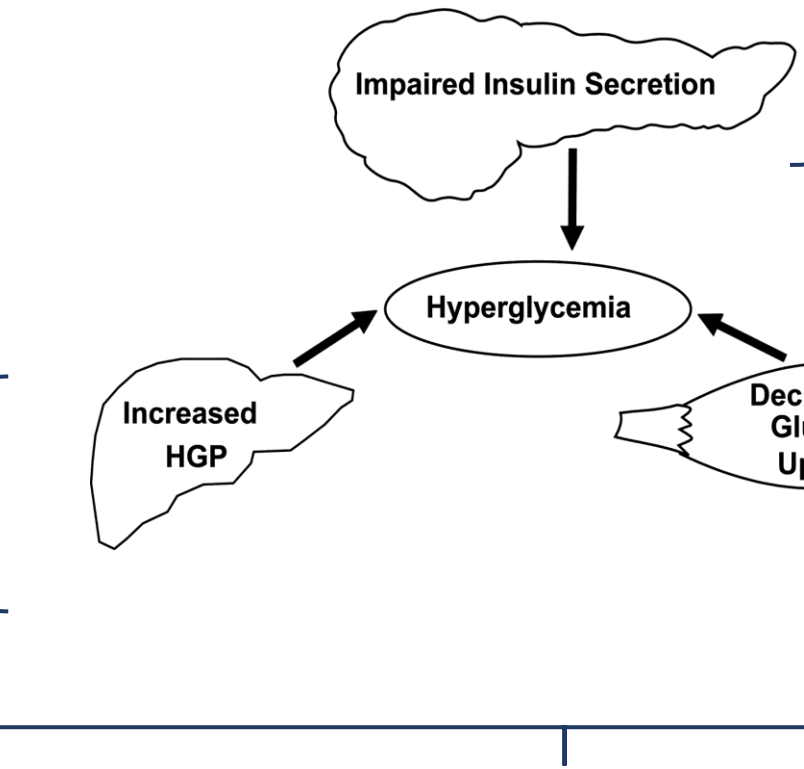
- 11.4% fewer diabetes complications
- 67.2% less medication use
- 45.0% fewer hypoglycemia events over 10 years
- Additional 0.211 QALYs
- Net monetary benefit of $41,613 per patient



VALUE HEALTH. 2025; 28(1):51–59

Reimagine Diabetes Care

5. A Single Non-pharmacological Intervention



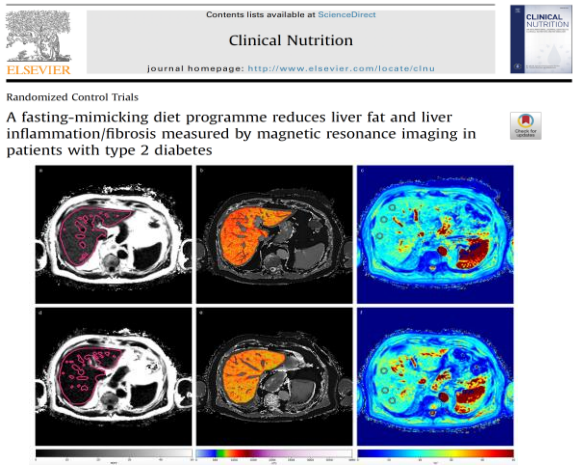
2. Reprogramming of Beta Cells

3. Reducing liver fat
Decreasing Inflammation

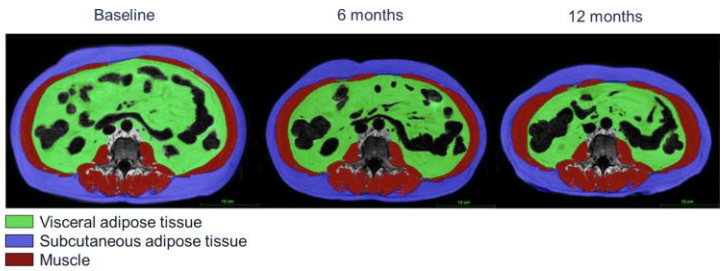
1. Maintaining muscle mass
Enhancing glucose disposal

4. Decreasing Biological Aging

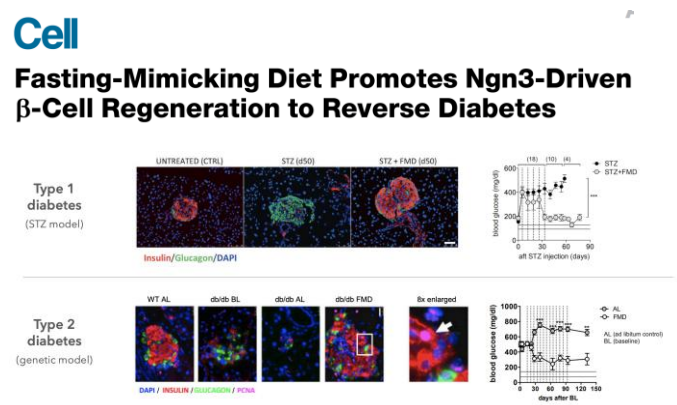
Diabetes. 2009;58(4):773-795



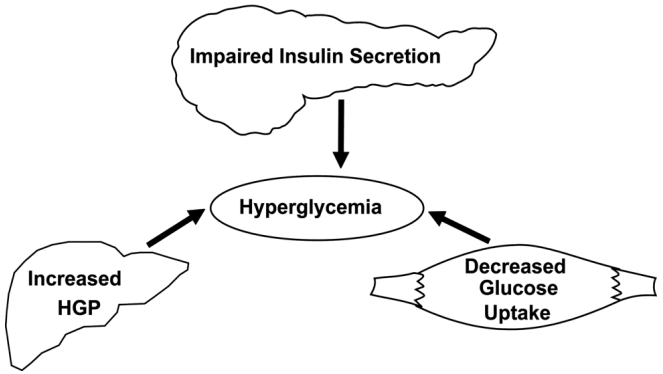
Clin Nutr. 2025 Apr;47:136-145.

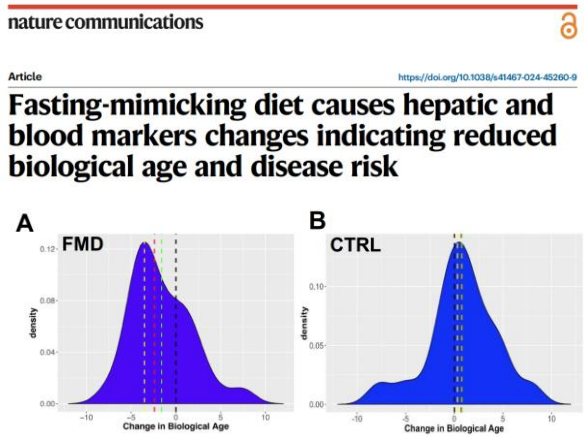


Nutr Metab Cardiovasc Dis. 2025 Apr 30:104111.

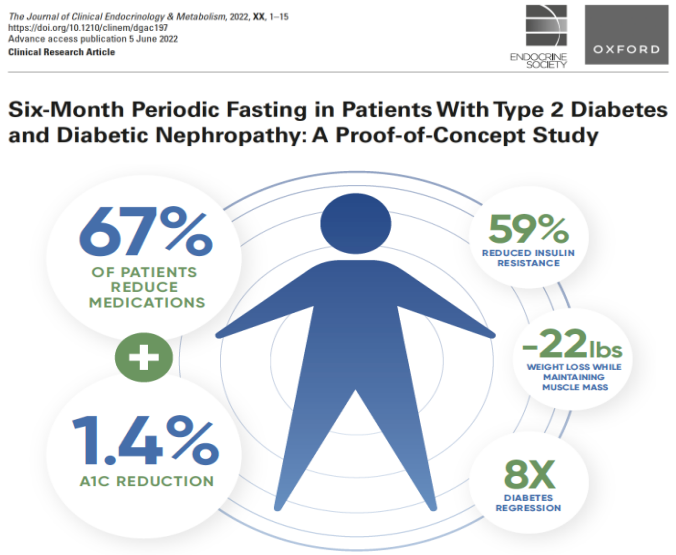


Cell. 2017 Feb 23;168(5):775-788.e12.





Nat Commun. 2024 Feb 20;15(1):1309.



J Clin Endocrinol Metab. 2022 Jul 14;107(8):2167-2181

Tomorrow's Paradigm

A 61 y.o. woman walks into her primary care doctor's office with hypertension, dyslipidemia and an A1c of 7.2.

She came for healing. What does she get?

1. 17-minutes visit
2. An ACE Inhibitor
3. A Statin
4. Metformin
5. 3 min lifestyle counseling

Marvel for modern medicine?

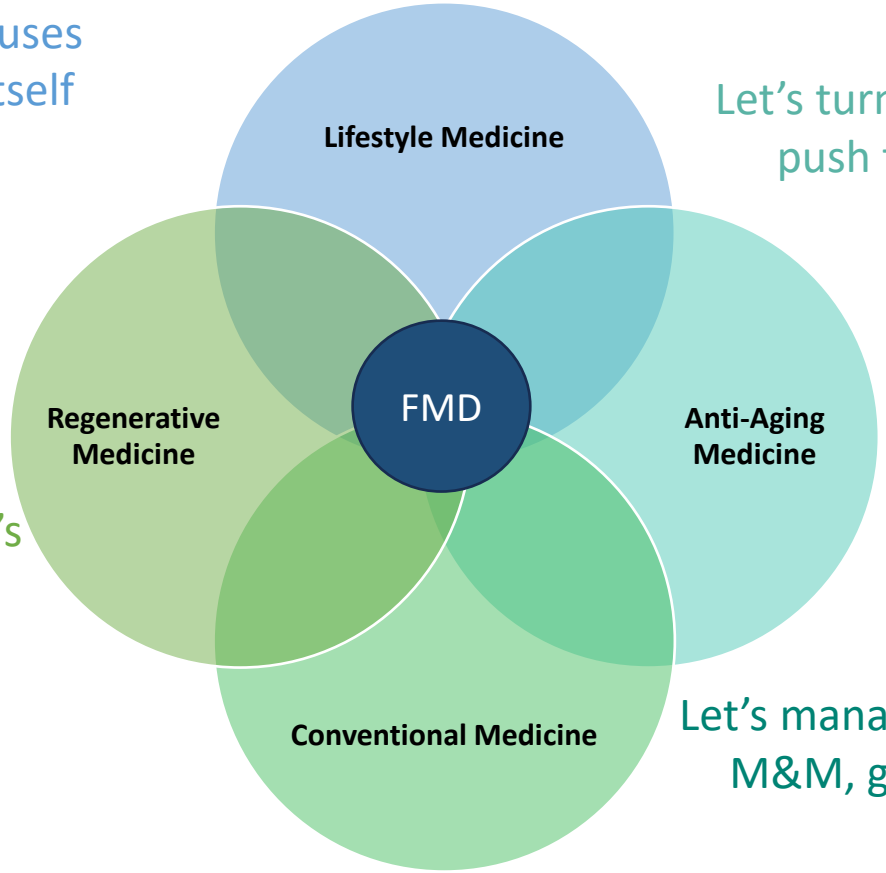
MNT
+ Everyday Good Diet (MTM)
+ FMD

FMD Bridges Key Medical Paradigms - A Model for Good Medicine

- A Medical Nutrition Bridging Preventive to Therapeutic Care

Let's treat root causes to let body heal itself

Let's turn the age clock to push for healthspan



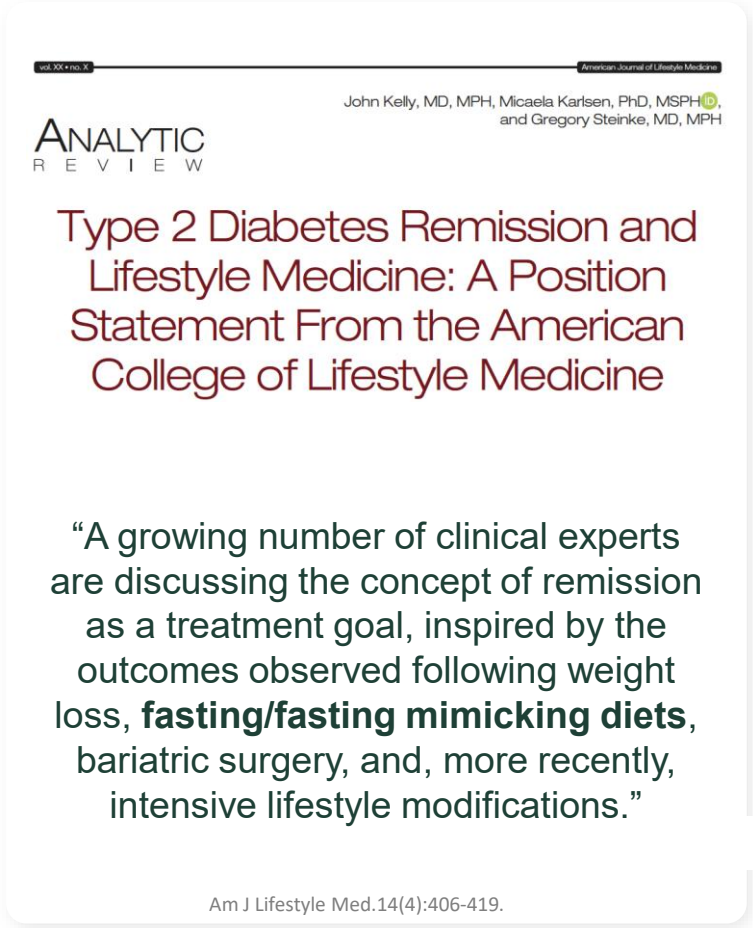
Let's rebuild the body's systems at cellular & structural level

Let's manage disease by reduce M&M, guided by evidence

FMD Is Optimally Delivered in Partnership with A Clinician:

- Medical Oversight for Safety
- Personalized Adjustments
- Behavioral & Educational Support
- Medication Management
- Integrated MNT Model

The Fasting Mimicking Diet is Food As Medicine



vol. XX • no. X American Journal of Lifestyle Medicine

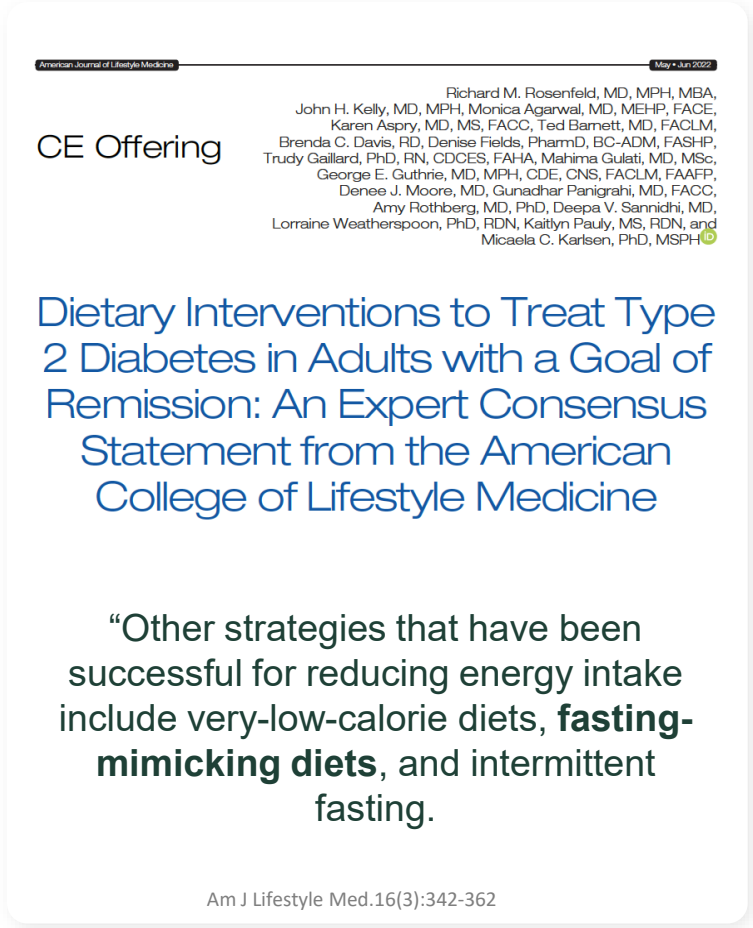
John Kelly, MD, MPH, Micaela Karlsen, PhD, MSPH, and Gregory Steinke, MD, MPH

ANALYTIC REVIEW

Type 2 Diabetes Remission and Lifestyle Medicine: A Position Statement From the American College of Lifestyle Medicine

"A growing number of clinical experts are discussing the concept of remission as a treatment goal, inspired by the outcomes observed following weight loss, **fasting/fasting mimicking diets**, bariatric surgery, and, more recently, intensive lifestyle modifications."

Am J Lifestyle Med.14(4):406-419.



American Journal of Lifestyle Medicine May • Jun 2022

CE Offering

Richard M. Rosenfeld, MD, MPH, MBA, John H. Kelly, MD, MPH, Monica Agarwal, MD, MEHP, FACE, Karen Aspry, MD, MS, FACC, Ted Barnett, MD, FACLM, Brenda C. Davis, RD, Denise Fields, PharmD, BC-ADM, FASHP, Trudy Gaillard, PhD, RN, CDCES, FAHA, Mahima Gulati, MD, MSc, George E. Guthrie, MD, MPH, CDE, CNS, FACLM, FAAFP, Denee J. Moore, MD, Gunadhar Panigrahi, MD, FACC, Amy Rothberg, MD, PhD, Deepa V. Sannidhi, MD, Lorraine Weatherspoon, PhD, RDN, Kaitlyn Pauly, MS, RDN, and Micaela C. Karlsen, PhD, MSPH

Dietary Interventions to Treat Type 2 Diabetes in Adults with a Goal of Remission: An Expert Consensus Statement from the American College of Lifestyle Medicine

"Other strategies that have been successful for reducing energy intake include very-low-calorie diets, **fasting-mimicking diets**, and intermittent fasting.

Am J Lifestyle Med.16(3):342-362

AMERICAN COLLEGE OF Lifestyle Medicine

eat right. Academy of Nutrition and Dietetics

AACE

ENDOCRINE SOCIETY

Limitations of the Current Healthcare Model

Pharmacy-First

- Focuses on symptom management
- Polypharmacy and side effects
- Reactive

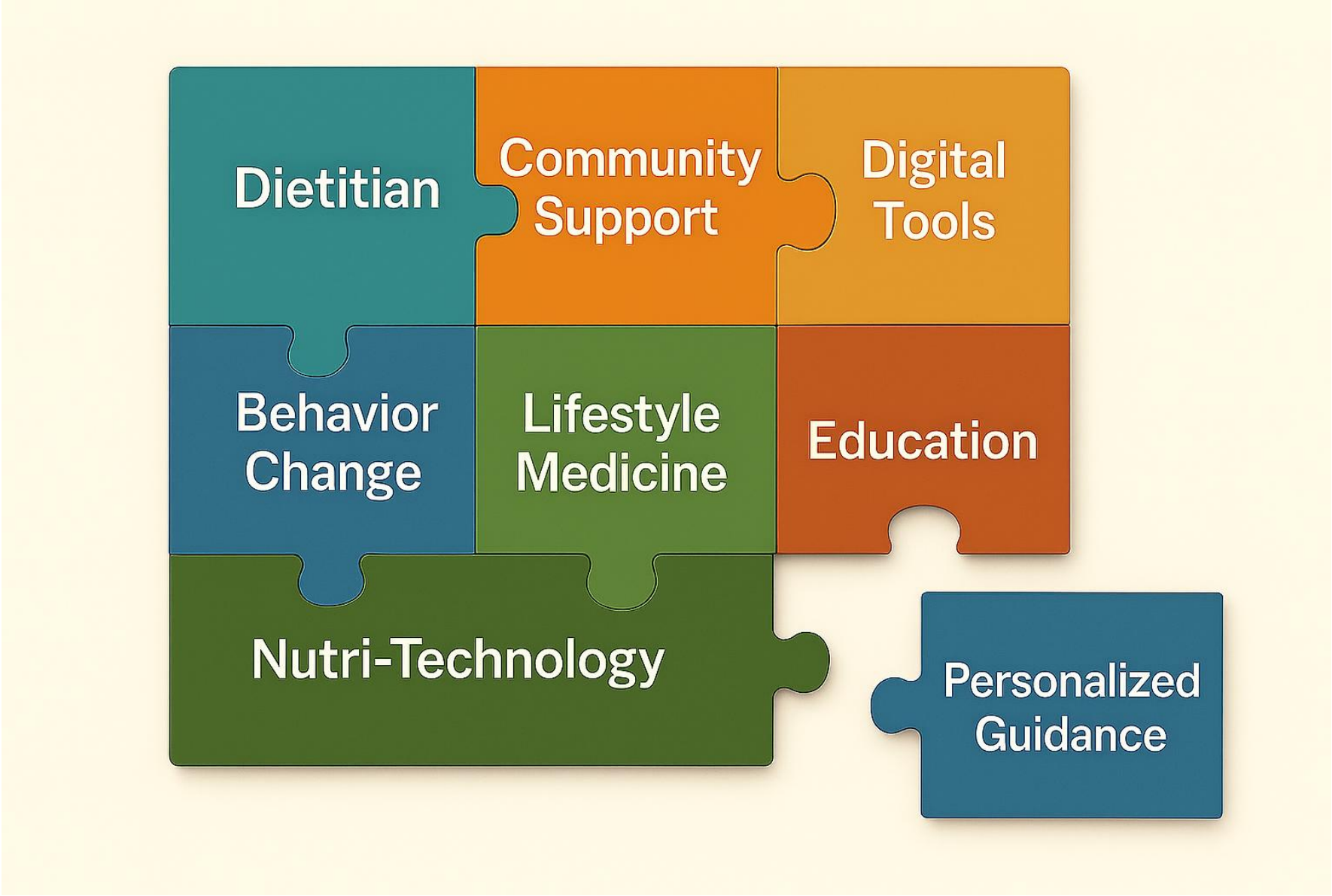
Conventional Nutrition

- Generic Advice –lacking personalization
- Lack of community and behavioral support
- Often focused on nutrition only rather than a whole-body approach

Lifestyle Medicine

- Addresses root causes but limited adoption
- Requires sustained patient engagement
- Reimbursement challenges

The Missing Links in Comprehensive Medical Care

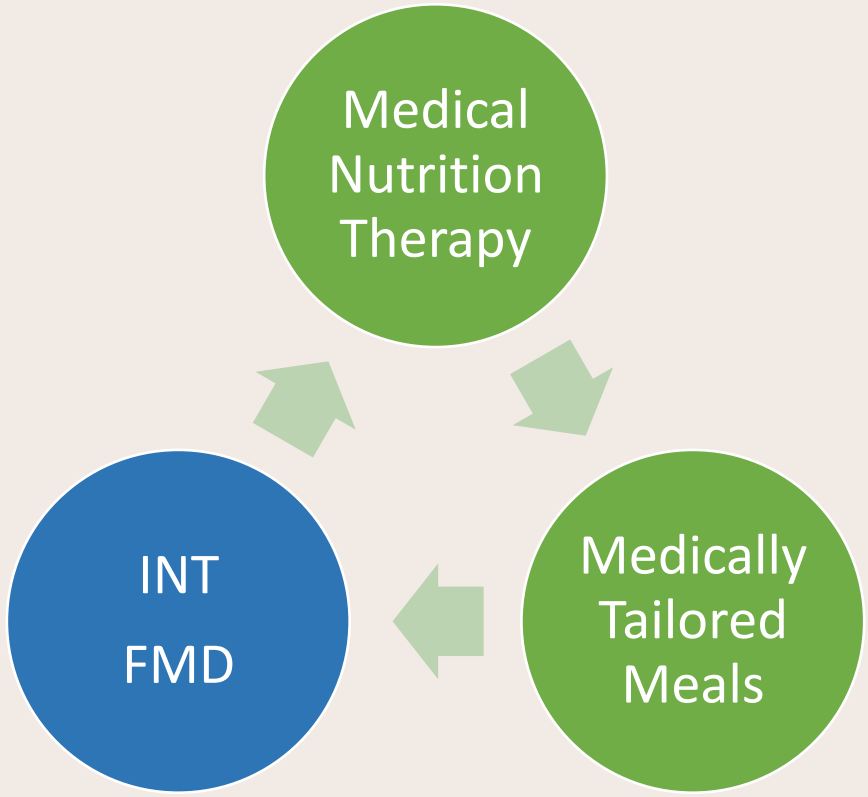


Integrating the Full Food As Medicine Toolbox

True Food As Medicine requires integration across multiple interventions:

- INT (Interventional Nutrition Therapy)- cycles of fasting mimicking diet, or other fasting mimetics
- MNT (Medical Nutrition Therapy)- dietitian guided, condition-specific plans
- MTM (Medically Tailored Meals) ongoing support for chronic disease management

Combining these creates a continuum of nutrition intervention-short, medium and long-term nutrition strategies



From Efficacy

To Effectiveness

Clinical Efficacy does not = real-world effectiveness...
Personalized Guidance and Support Determine Outcomes

To drive results, interventions like the Fasting Mimicking Diet (FMD) require:

- Professional supervision and patient education
- Behavioral and Motivational support
- Personalization for disease states, age, and body composition

Potential Programs Using MNT with FMD

Wellness & Weight Loss Program	Metabolic Health Program	GLP-1 Program	Diabetes Remission & Regression Program
For Health Optimization, Wellness and Longevity	For Prediabetes, Cholesterol, Hypertension and Inflammation	For obesity, GLP-1 off ramp or alternative	For Type 2 Diabetes to achieve target while reducing medication burden/cost

Questions

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