



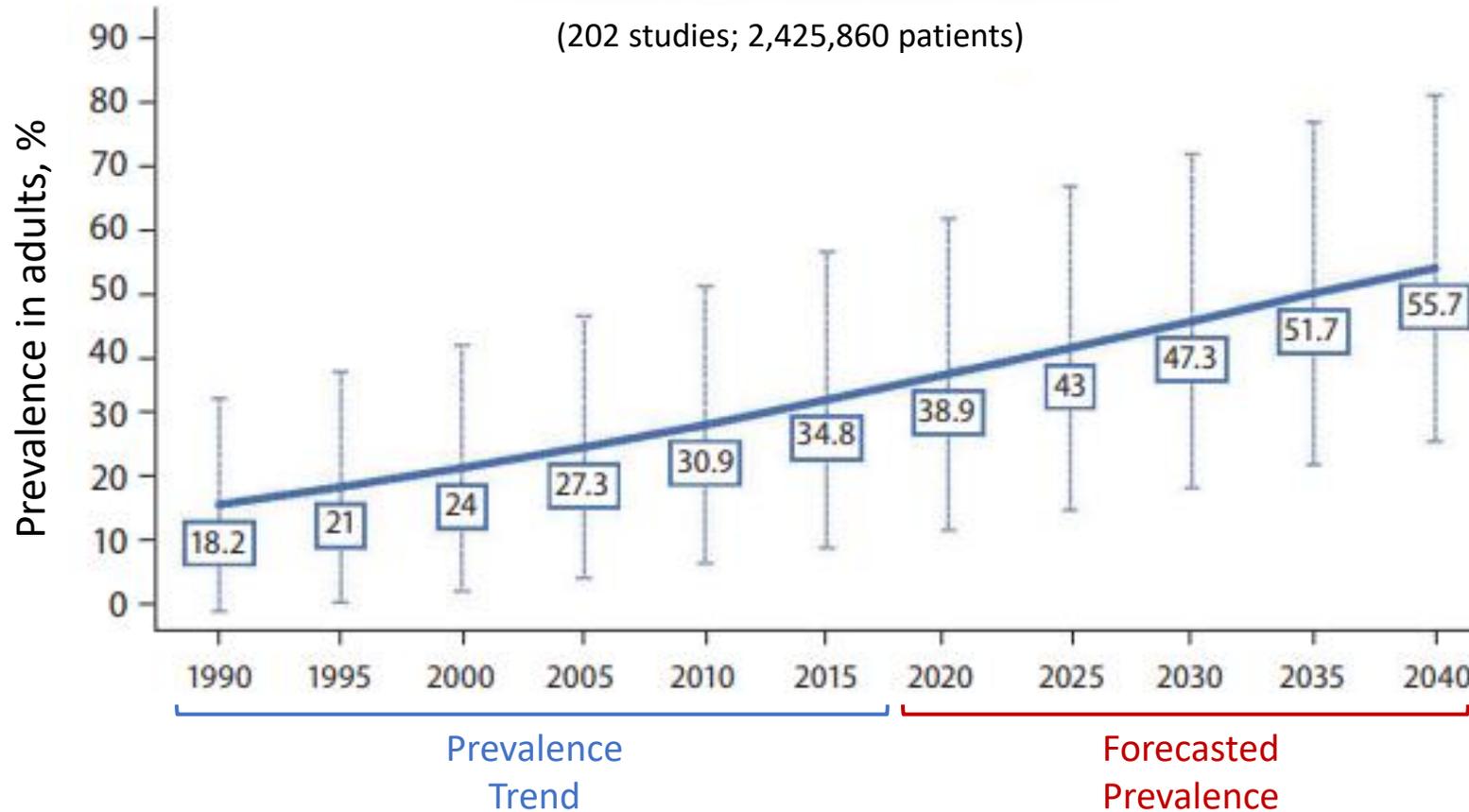
MASLD and Diet: Revolutionizing Care with Tailored Nutritional Strategies

Octavia Pickett-Blakely, MD, MHS

MASLD Prevalence is Increasing Globally

Global MASLD Prevalence in Adults¹

(202 studies; 2,425,860 patients)



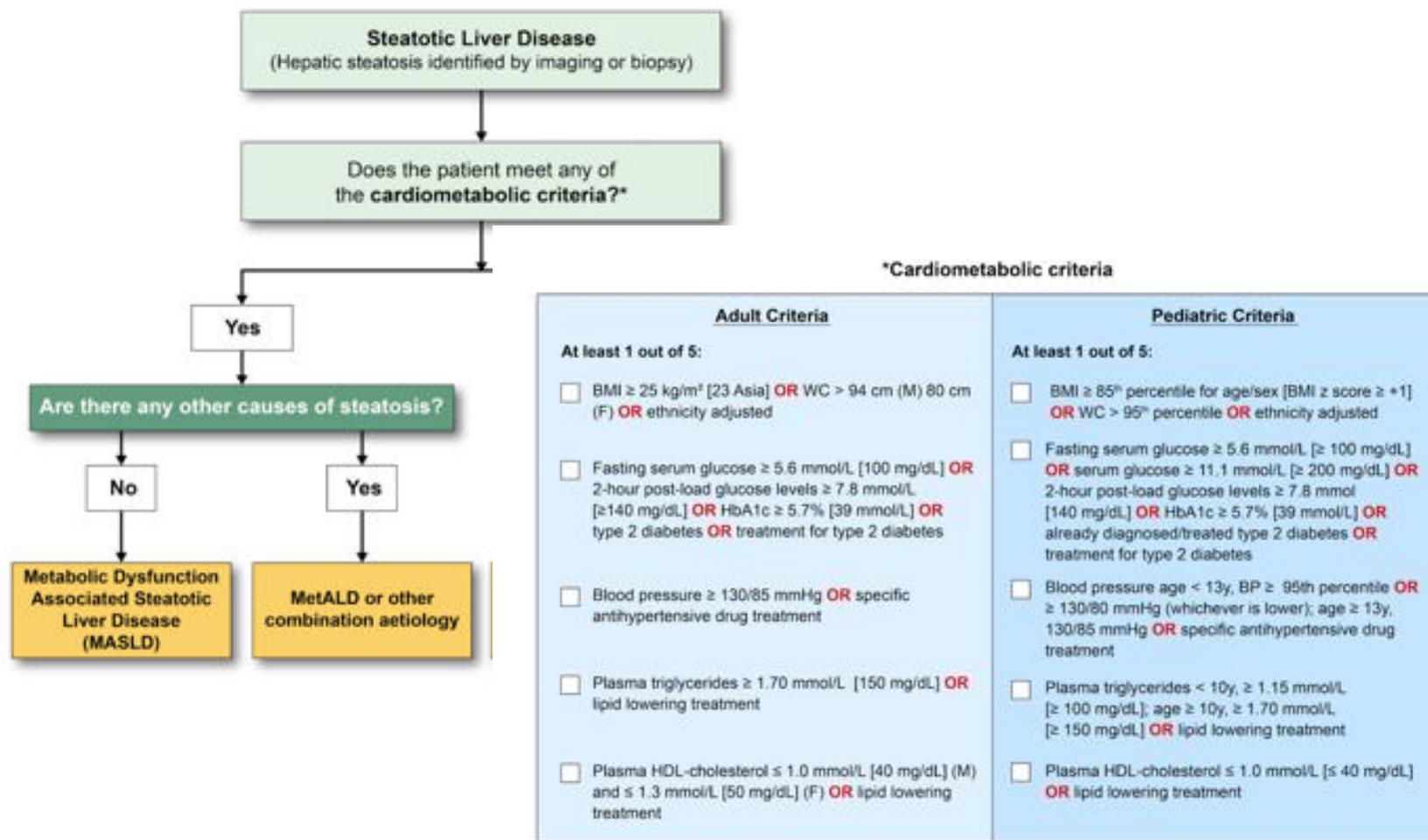
Increased MASLD and MASH prevalence is associated with^{2,3}

- rising prevalence of obesity and T2D
- population aging

❖ **>60%** in people with T2D⁴

❖ **≈70%** in people with overweight/obesity⁵

MASLD Diagnostic Criteria



Dietary patterns associated with MASLD



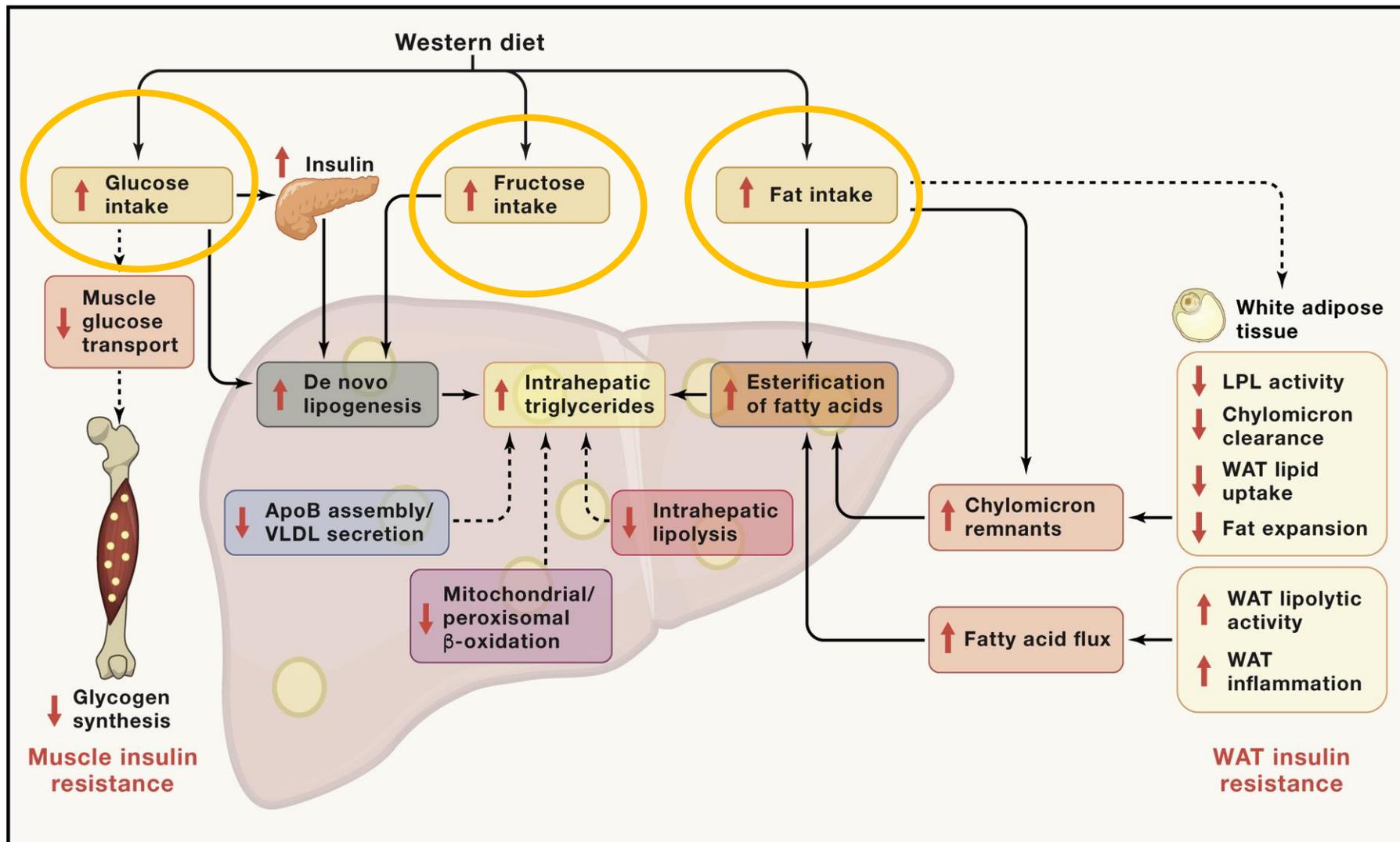
HIGH CALORIC INTAKE



HIGH FRUCTOSE
CORN SYRUP



HIGH SATURATED FAT



What's the guidance on diet in MASLD management?

AASLD

“Patients with NAFLD who are overweight or obese should be prescribed a diet that leads to a caloric deficit. When possible, diets with limited carbohydrates and saturated fat and enriched with high fiber and unsaturated fats (e.g., Mediterranean diet) should be encouraged due to their additional cardiovascular benefits.”¹

EASL

“Dietary recommendations should consider energy restriction and exclusion of NAFLD-promoting components (processed food, and food and beverages high in added fructose). The macronutrient composition should be adjusted according to the Mediterranean diet.”

1. Hepatology 77(5):p 1797-1835, May 2023.

2. *Journal of Hepatology* 2016 64:1388-1402 DOI: (10.1016/j.jhep.2015.11.004) 0

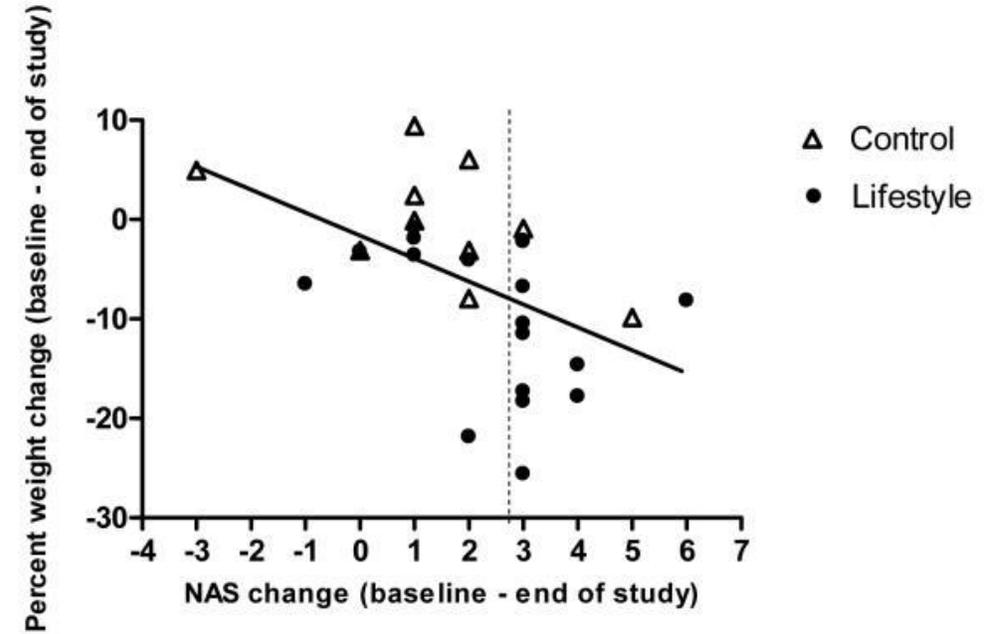
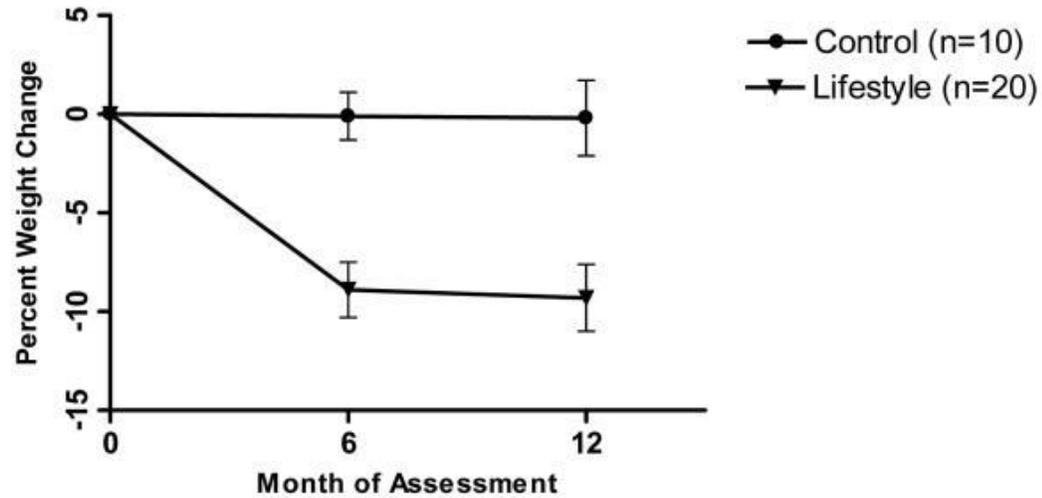
Goals of diet therapy in MASLD

- Weight loss*
- Improve metabolic parameters
 - insulin resistance
 - lipid metabolism
 - reduce liver fat
- Reduce inflammation/oxidative stress



Weight loss improves MASH

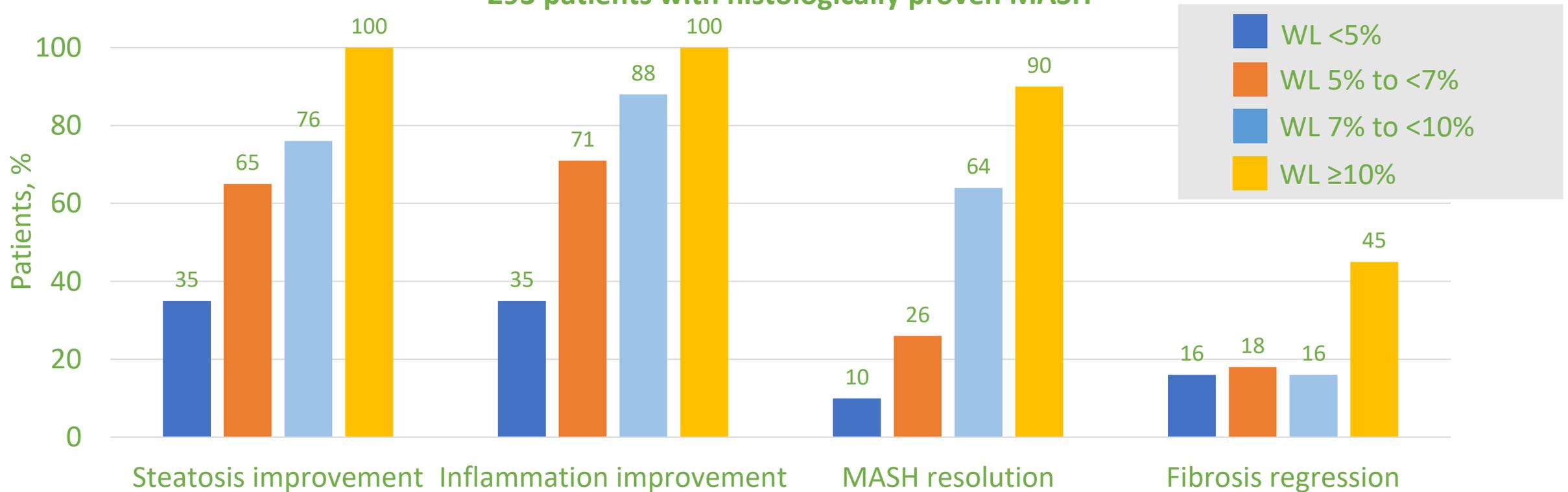
Percent Weight Change by Group at 6 and 12 Months



- Reduced fat mass
- Reduced fat free mass
- Improved NAS activity score

How much weight loss is enough?

1 year outcomes according to degree of lifestyle-induced weight loss
* 293 patients with histologically proven MASH



How do we get there?

- Predictors of diet-induced weight loss ¹
 - Energy deficit
 - High quality
 - Adherence
- Analogous dietary patterns²
 - Mediterranean diet
 - DASH diet



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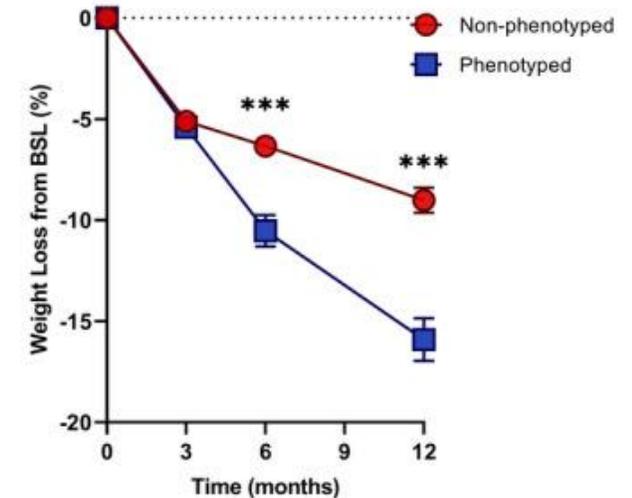
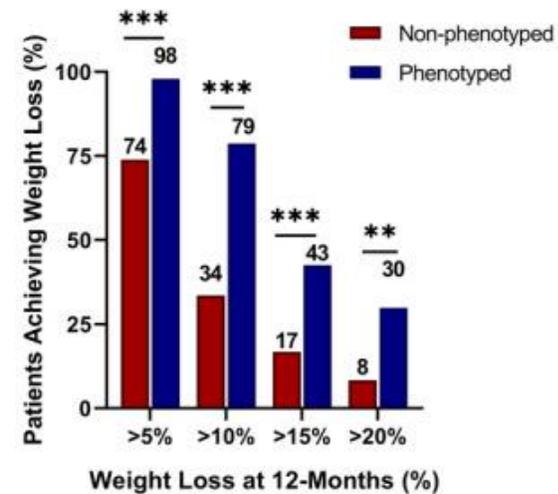
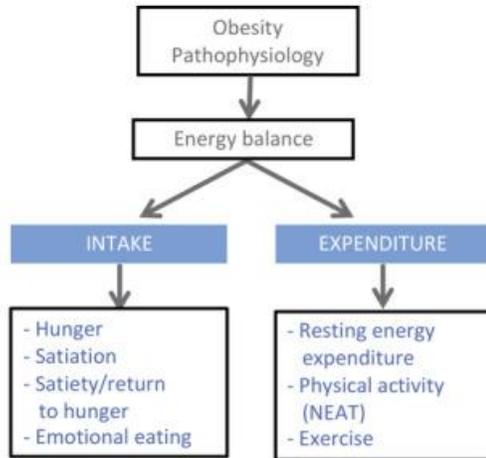
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1. Freire, R Nutrition.2019 Jul 4;69:110549.

2. Parra-Vargas M et al. Nutrients. 2020 Dec 17;12(12):3860.

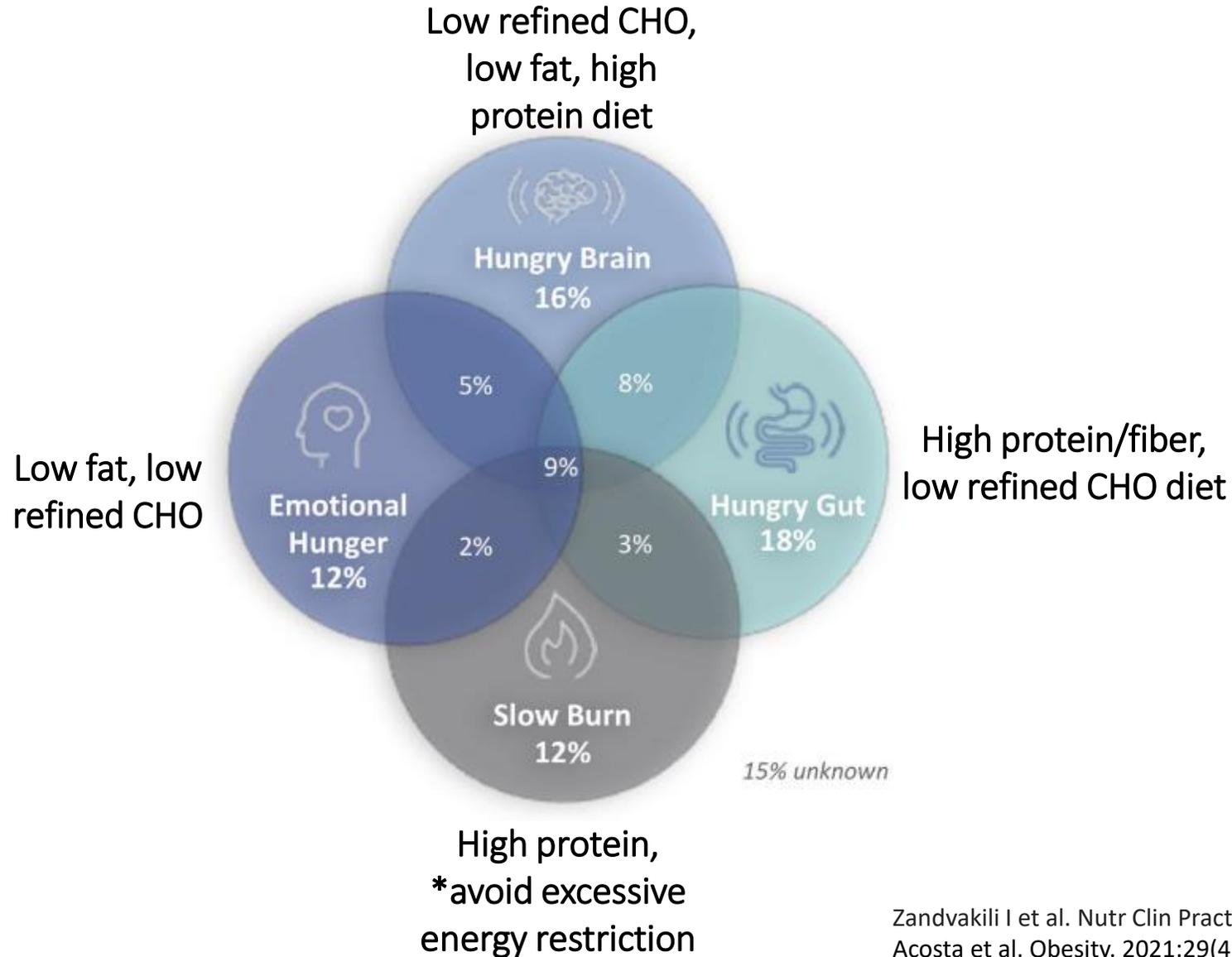
Selection of Antiobesity Medications Based on Phenotypes Enhances Weight Loss: A Pragmatic Trial in an Obesity Clinic

Andres Acosta ¹, Michael Camilleri ¹, Barham Abu Dayyeh ¹, Gerardo Calderon ¹, Daniel Gonzalez ¹, Alison McRae ¹, William Rossini ¹, Sneha Singh ¹, Duane Burton ¹, and Matthew M. Clark ²



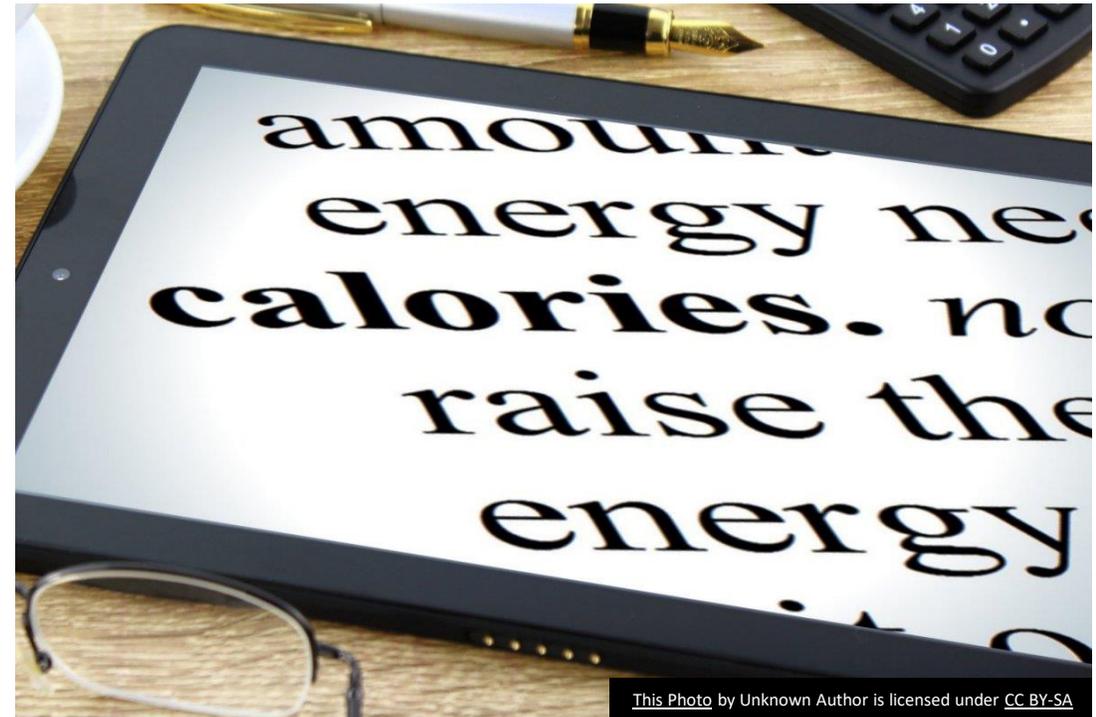
A phenotypic approach to obesity treatment

Inuk Zandvakili MD, PhD, Marya Pulaski MD, Octavia Pickett-Blakely MD, MHS



Benefits of the calorie deficient diet

- Weight loss (early phase)
 - Reduction in fat mass > fat free mass
 - Reduced fat mass → reduce adipose tissue activity
- Reduction in energy expenditure
 - Resting energy expenditure is proportional to body mass
 - Hypothesized to reduce oxidative damage to cells and tissues
- Metabolic adaptation
 - energy expenditure reduction in excess of body mass loss
 - loss of fat free mass differs by organ (**liver** > kidney > skeletal muscle)
 - mediated by
 - reduced leptin, thyroid hormones, and insulin
 - neuroendocrine function shift from sympathetic → parasympathetic tone



Goals of diet therapy in MASLD

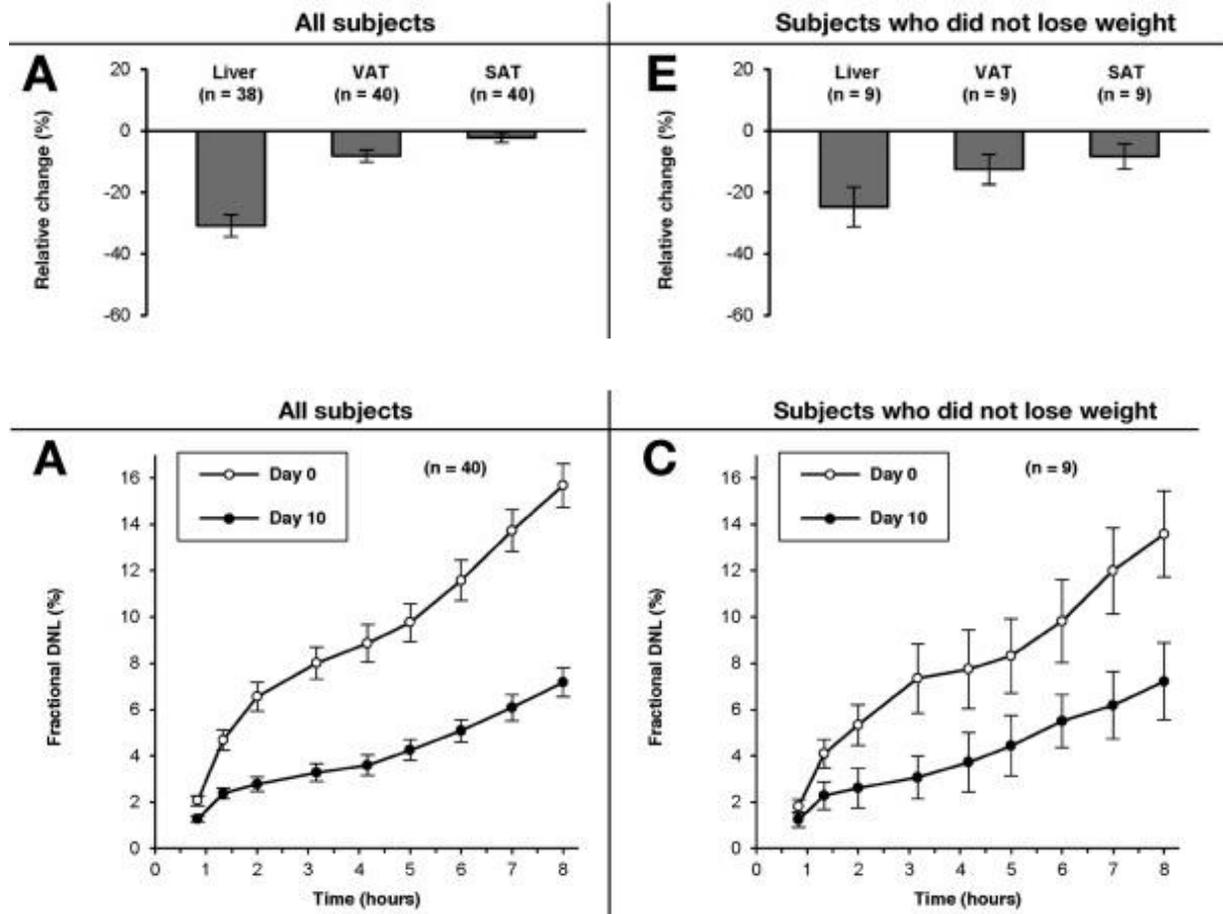
- Weight loss*
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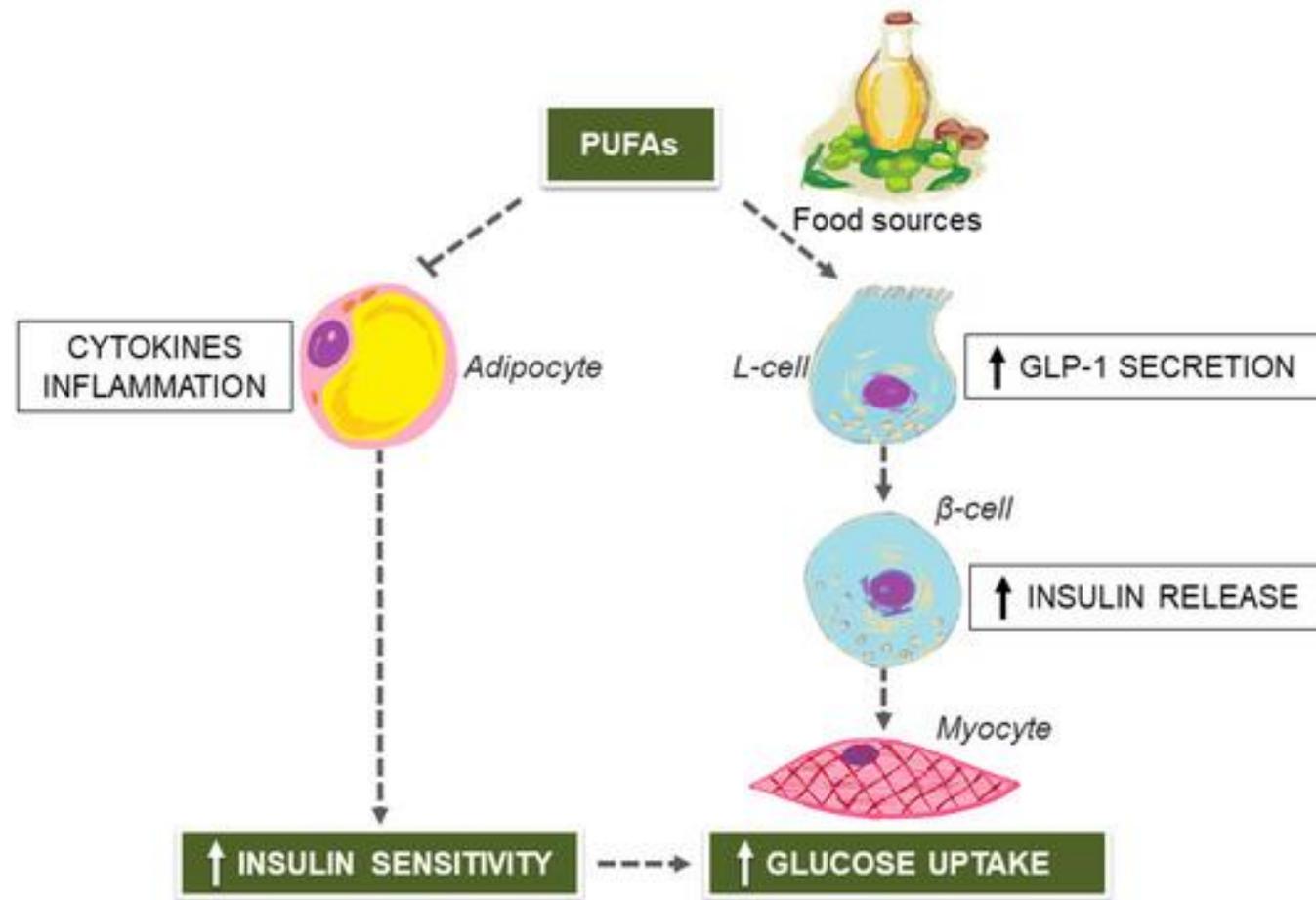
Dietary fructose restriction



- Short-term isocaloric fructose restriction
- Decreased liver fat and VAT
- Decreased de novo lipogenesis
- Improved insulin kinetics
*in children with obesity

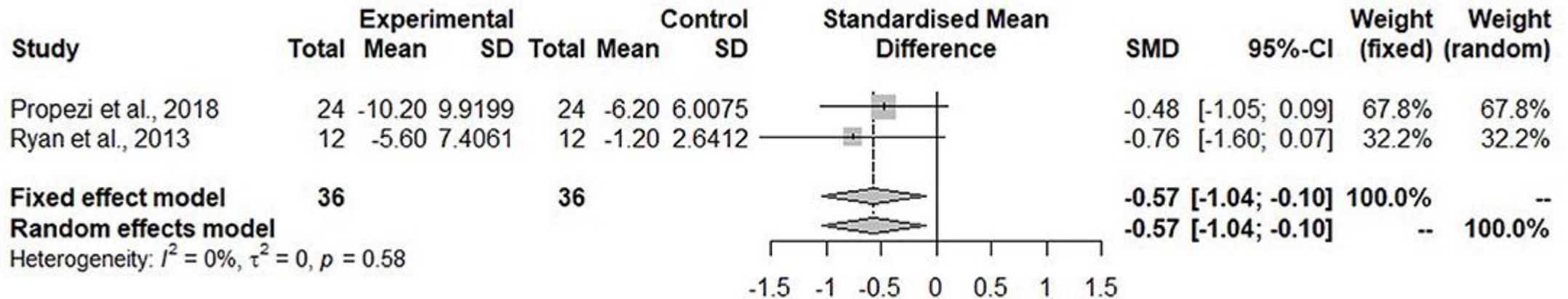


Mediterranean diet and insulin resistance



Mediterranean diet in MASLD

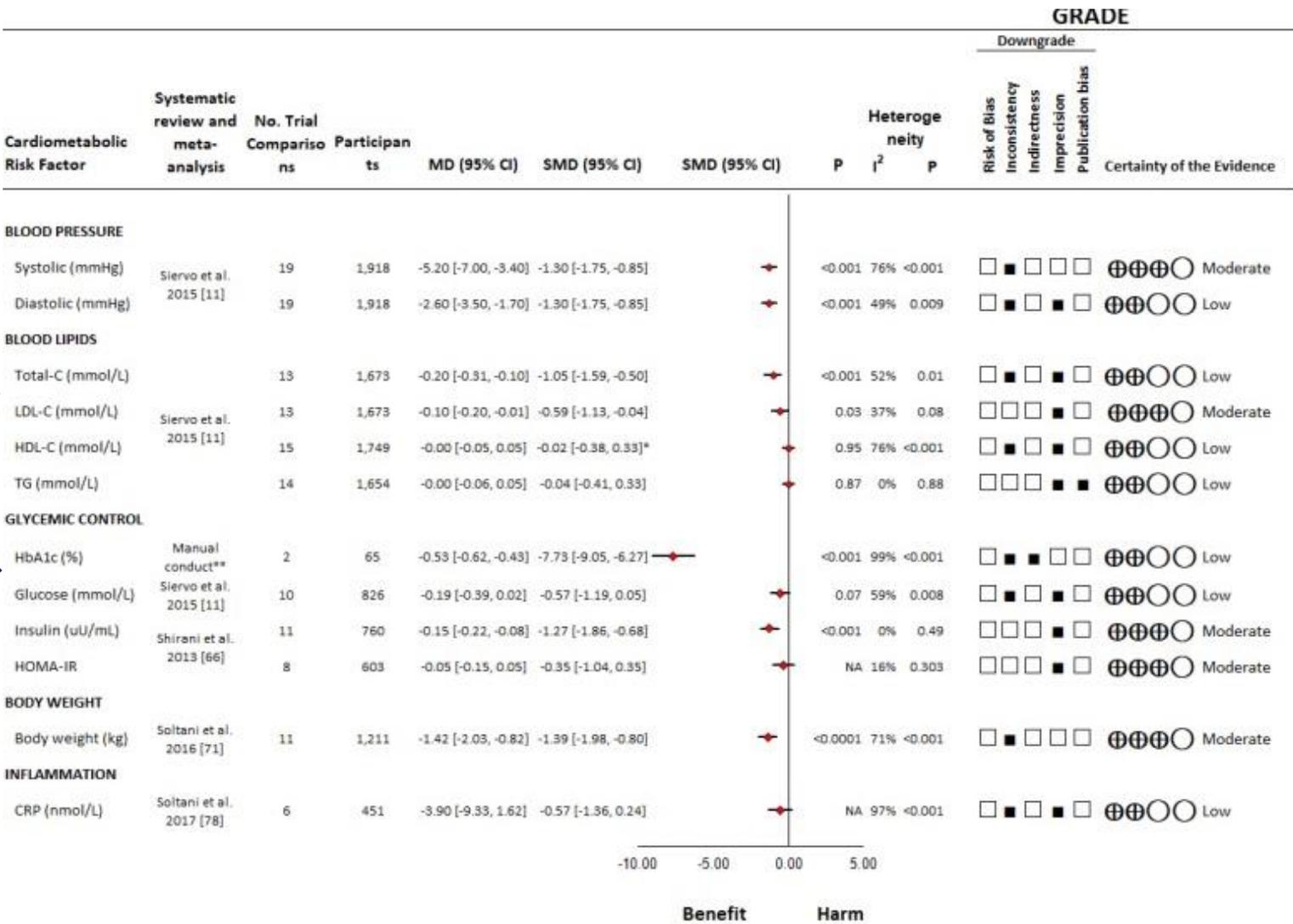
- Meta-analysis of diet interventions in MASLD (8 RCTs, 499 subjects)
 - no change in fasting glucose, insulin and HOMA-IR
 - no changes in total cholesterol, HDL, LDL
 - reduction in liver fat



Forest plot of intrahepatic liver fat (IHL)

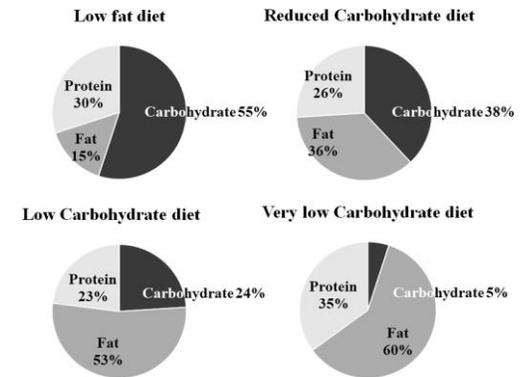
FLIPAN Study: Mediterranean Diet

		CD (<i>n</i> = 43)	MD-HMF (<i>n</i> = 43)	MD-PA (<i>n</i> = 42)	<i>p</i> ‡
BMI (kg/m ²)	Basal	33.6 ± 3.7	34.3 ± 4.0	33.4 ± 3.1	0.006
	12 months	31.9 ± 4.1	31.7 ± 4.3	31.8 ± 3.5	
	Δ	-1.7 ± 1.8 *a	-2.6 ± 2.2 *a,b	-1.6 ± 1.8 *b	
Body weight (kg)	Basal	92.7 ± 14.4	96.3 ± 13.8	95.3 ± 12.3	0.031
	12 months	88.4 ± 14.4	89.5 ± 14.4	91.6 ± 13.0	
	Δ	-4.3 ± 5.5 *	-6.8 ± 6.4 *b	-3.7 ± 5.0 *b	
Body fat (%)	Basal	35.2 ± 6.3	35.4 ± 7.2	35.7 ± 7.3	0.737
	12 months	33.3 ± 6.1	34.2 ± 9.8	34.9 ± 8.2	
	Δ	-1.9 ± 2.6 *	-1.2 ± 8.4	-1.2 ± 7.2	
Mass muscle (kg)	Basal	57.6 ± 12.2	59.5 ± 8.4	58.7 ± 10.2	0.099
	12 months	56.1 ± 11.1	56.1 ± 10.4	57.6 ± 11.0	
	Δ	-1.6 ± 2.5 *	-3.3 ± 6.6 *	-1.1 ± 2.0 *	
Waist circumference (cm)	Basal	110.7 ± 9.4	112.1 ± 9.1	112.7 ± 8.5	0.044
	12 months	105.0 ± 10.25	104.8 ± 12.0	107.3 ± 9.9	
	Δ	-5.2 ± 6.3 *	-7.3 ± 6.2 *	-4.1 ± 6.0 *	
HDL-chol (mg/dL)	Basal	45.5 ± 14.6	46.1 ± 9.0	43.0 ± 9.3	0.560
	12 months	47.3 ± 14.2	49.5 ± 11.4	45.4 ± 11.9	
	Δ	1.8 ± 7.1	3.3 ± 7.4 *	2.4 ± 6.2 *	
Intraliver fat contents (%)	Basal	14.5 ± 10.1	12.0 ± 12.1	13.5 ± 11.8	0.372
	12 months	12.6 ± 9.1	7.1 ± 5.8	10.6 ± 7.7	
	Δ	-1.8 ± 7.6	-4.9 ± 10.6 *	-2.9 ± 11.3	
Liver stiffness K-pa	Basal	5.3 ± 1.7	5.3 ± 1.9	5.3 ± 2.2	0.300
	12 months	5.0 ± 1.7	4.8 ± 1.5	5.7 ± 2.4	
	Δ	-0.3 ± 2.1	-0.4 ± 2.2	-0.4 ± 2.8	

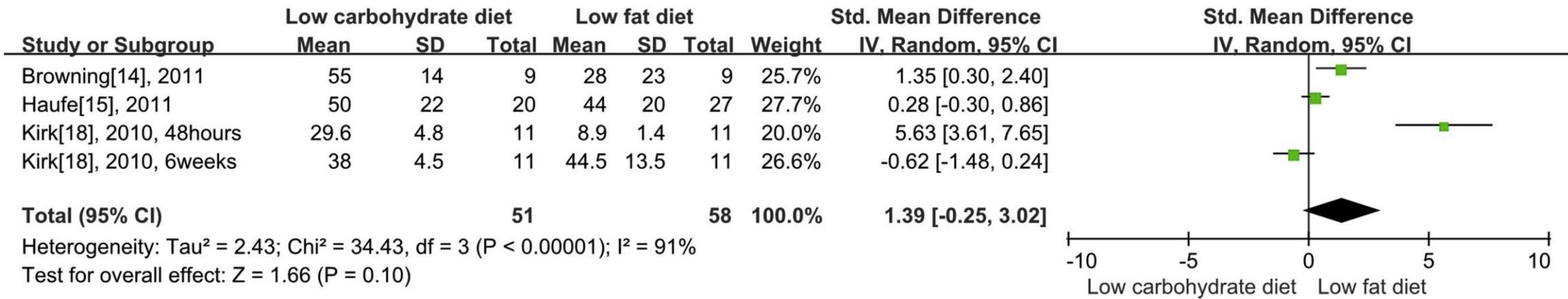


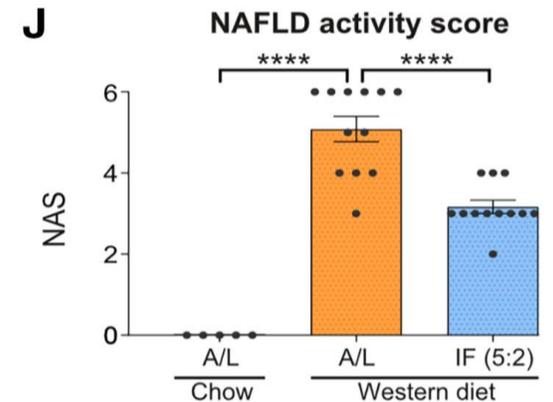
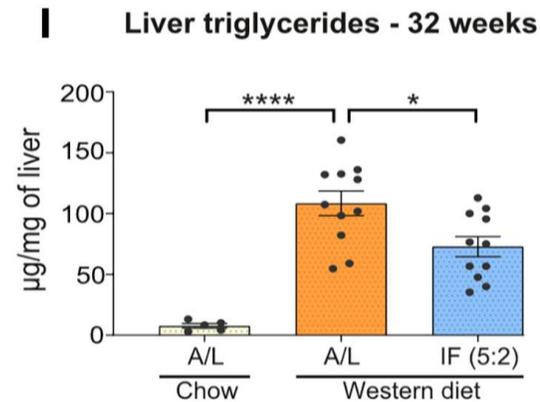
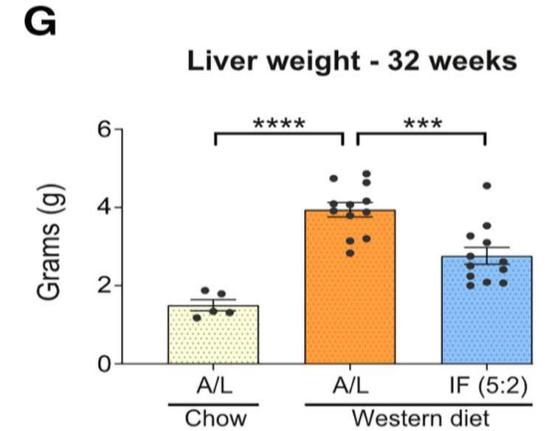
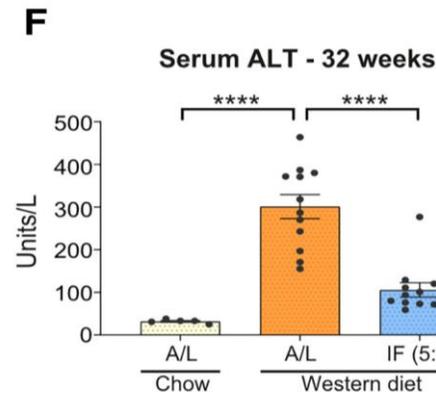
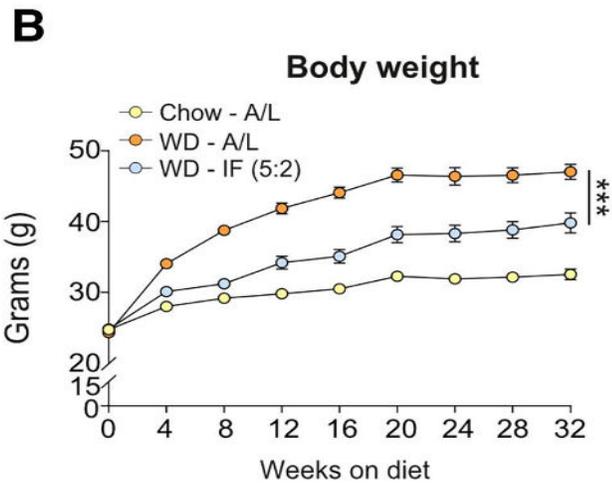
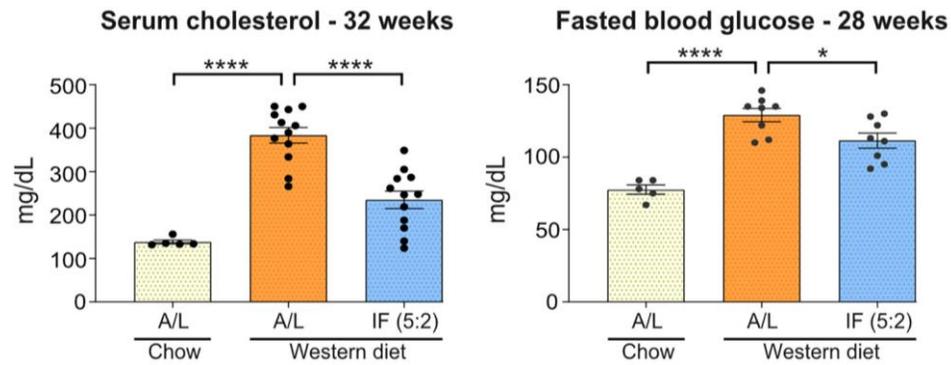
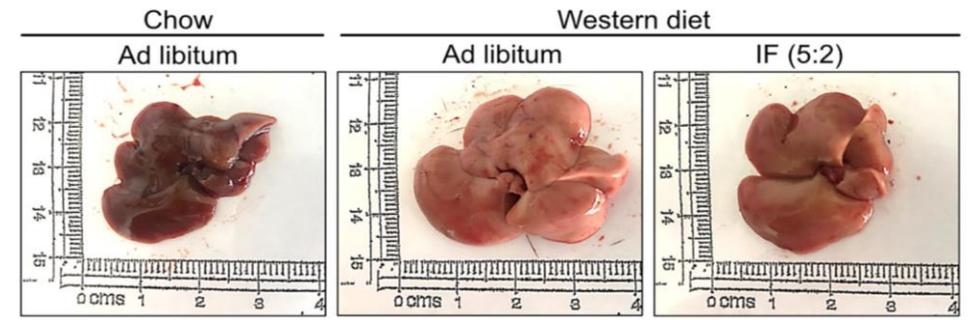
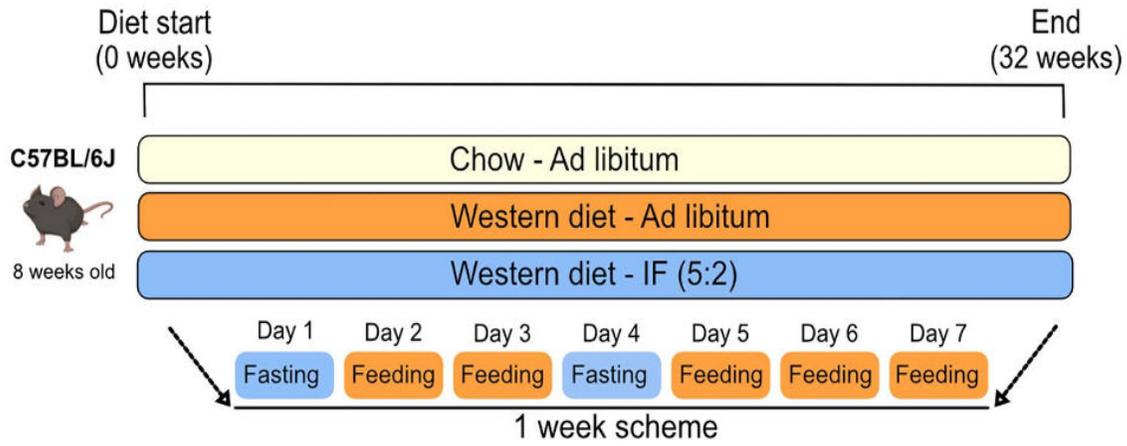
DASH diet and metabolic parameters

Macronutrient alteration



Hepatic fat (imaging)





Goals of diet therapy in MASLD

- Weight loss*
- Improve metabolic parameters
 - insulin resistance
 - lipid metabolism
 - reduce liver fat
- Reduce inflammation/oxidative stress



Anti-inflammatory nutrients

- Observational studies suggest protective effects of¹
 - Vit C
 - Vit E
 - Phenolic acids (fruits, nuts, coffee, red wine)
 - Mono/polyunsaturated fatty acids (MUFA/PUFAs)
- Vitamin E
 - PIVENS study²
 - A meta-analysis confirmed that vitamin E treatment significantly reduces ALT, AST and body mass index (BMI) in patients with MASLD, but it did not decrease the fibrosis score and total cholesterol³

1. Younossi, Z.M. et al. *Nat Rev Gastroenterol Hepatol* **20**, 708–722 (2023).

2. Sanyal AJ, et al. *N Engl J Med*. 2010;362(18):1675-1685

3. Abdel-Maboud M et al. *Therap Adv Gastroenterol*. 2020 Dec 7;13:1756284820974917.

Food quality/preparation

- Advanced glycation end products (AGEs)
 - associated with oxidative stress and inflammation
 - can accumulate from smoking and preparation of high-sugar, high-fat, ultra-processed foods at high heat
 - can accumulate from very well-done red and processed meat

Decreasing AGEs

- cook using moist heat, shorter cooking times, lower temperatures
- use acidic ingredients (lemon juice or vinegar) to decrease the formation of new AGEs during cooking

Putting it into practice...

- Goals of diet therapy in MASLD
 - Weight loss*
 - Improve metabolic parameters
 - insulin resistance
 - lipid metabolism
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Achieving Goals



- Weight loss
- When appropriate
- Understand obesity phenotype(s)
- Reduced calorie, high quality, sustainable
 - ✓ Mediterranean diet
 - ✓ Dash diet
 - ✓ Low fat
 - ✓ Low carbohydrate

Achieving Goals

- Improve metabolic parameters/liver fat
- Calorie restricted diet with
 - ✓ Reduce dietary fructose
 - ✓ Mediterranean diet
 - ✓ DASH diet
 - ✓ Low fat
 - ✓ Low carbohydrate
 - ✓ Time restricted eating

Achieving Goals

- Reduce oxidative stress

- ✓ Reduce AGEs

- ✓ Mediterranean

- ✓ DASH diet

- ✓ Vitamin E containing foods

- ✓ Mediterranean diet

- ✓ DASH diet

- ✓ Reduce alcohol

- ✓ Coffee

Thank you!



@blakely_md

