Total Nutrition Therapy for Diabetes

Medical nutrition therapy and the science and innovation in diabetes nutrition

TNT

TOTAL NUTRITION THERAPY™
for Diabetes

Abbott

WHAT IS MEDICAL NUTRITION THERAPY (MNT)?

TNT
AN INTEGRATED APPROACH TO PATIENT CARE
TOTAL NUTRITION THERAPY™
for Diabetes

Abbott

What is Medical Nutrition Therapy (MNT)?

- **MNT** is an **evidence-based** application of the nutrition care process.
- Nutrition therapy is defined as **"the treatment of a disease or condition"** through the modification of nutrient or whole-food intake.

NUTRITION TREATMENT — helps to control → **DISEASE / CONDITION**

MNT, medical nutrition therapy.
Evert AB, et al. Diabetes Care. 2014;37(Suppl. 1):S120-S143.

Goals of MNT for adults with diabetes[1]

The ADA states:

> **For many individuals with diabetes, the most challenging part of the treatment plan is determining what to eat. There is not a one-size-fits-all eating pattern.**

1. **To promote and support healthful eating patterns,** emphasizing a variety of nutrient-dense foods in appropriate portion sizes in order to improve overall health

2. **To address individual nutrition needs** based on personal and cultural preferences, health literacy and numeracy, access to healthful foods, willingness and ability to make behavioral changes, and barriers to change

3. **To maintain the pleasure of eating** by providing nonjudgmental messages about food choices while limiting food choices only when indicated by scientific evidence

4. **To provide and individual with diabetes the practical tools** for developing healthy eating patterns rather than focusing on individual macronutrients, micronutrients or single foods

1. American Diabetes Association Professional Practice Committee. *Diabetes Care*. 2022;45(Suppl. 1):S60–S82.

Role of medical nutrition therapy (MNT)[1]

"MNT can **reduce A1C by up to 2%,** making it an essential component of initial and ongoing diabetes care."

"**MNT is integral to quality diabetes care** and should be incorporated into the overall care plan, medication plan, and Diabetes Self- Management Education and Support (DSMES) plan on an ongoing basis"

- 1. Powers M, et al. *Diabetes Care*. 2020; dci200023

Guideline recommendations

American Diabetes Association

5. Facilitating behaviour change and well-being to improve health outcomes Standards of medical care in diabetes (2022)

EASD European Association for the Study of Diabetes

"Studies have demonstrated that a variety of eating plans, varying in macronutrient composition, can be used effectively and safely in the short term (1-2 years) to achieve weight loss in people with diabetes. These plans include **structured low-calorie meal plans with meal replacements**…"

"**Diabetes medical nutrition therapy** can result in cost savings and improved outcomes (e.g., A1c reduction, reduced weight, decrease in cholesterol."

AACE / ACE

Consensus statement on the comprehensive type 2 diabetes management algorithm (2020)

"Structured counselling and **meal replacement** programs have been shown to be more effective than standard in-office counselling."

DIABETES UK KNOW DIABETES. FIGHT DIABETES.

Evidence-based nutrition guidelines for the prevention and management of diabetes (2018)

"There is good evidence that approaches where **food is replaced by nutritionally complete liquid formula, providing 800-1200 kcal/day** are effective for weight loss in Type 2 Diabetes."

"Studies using total diet replacement have reported mean weight losses of about 15 kg and **remission of Type 2 diabetes**."

ESPEN The European Society for Clinical Nutrition and Metabolism

Carbohydrates and insulin resistance in clinical nutrition: Recommendations from the ESPEN expert group (2017)

"[T]he ESPEN expert group endorses the utilization of **diabetes-specific formulas** for nutritional support of people with obesity and diabetes."

MNT IN DM PATIENTS

TOTAL NUTRITION THERAPY™
for Diabetes

What should I eat?

Dilemma between nutritional adequacy and glycemic control

Eat enough to get sufficient energy and nutrients to feel strong and energetic

Eat less to control blood glucose

Nutrition Refresh

- No one-size-fits all diet for PWD
- Many eating patterns ↓ HbA1c 1-2% (someday we will say ↑ TIR)

PWD- People With Diabetes

- Whole food over highly processed food

- Emphasize non-starchy vegetables (1/2 plate)

- Limit added sugars and refined grains

- Eliminate sugar-sweetened beverages

Evert AB, et al. *Diabetes Care*. 2019;42(5):731-754.

Retrospective Review: Carbs are not Equal

- CGM shows equal carbohydrate amounts produce different glucose responses

- iAUC glucose lower with WG
- GV lower with whole grains
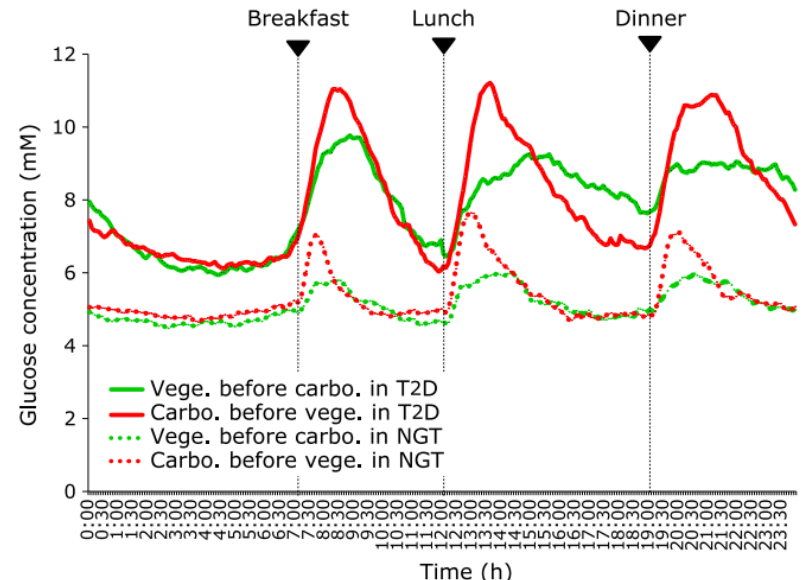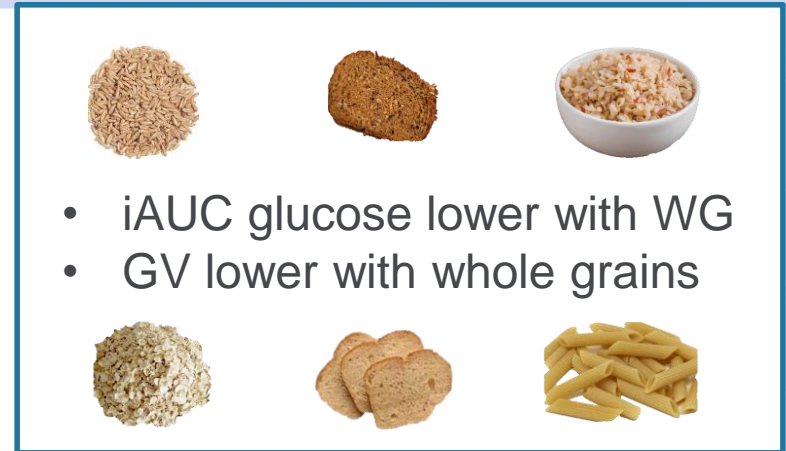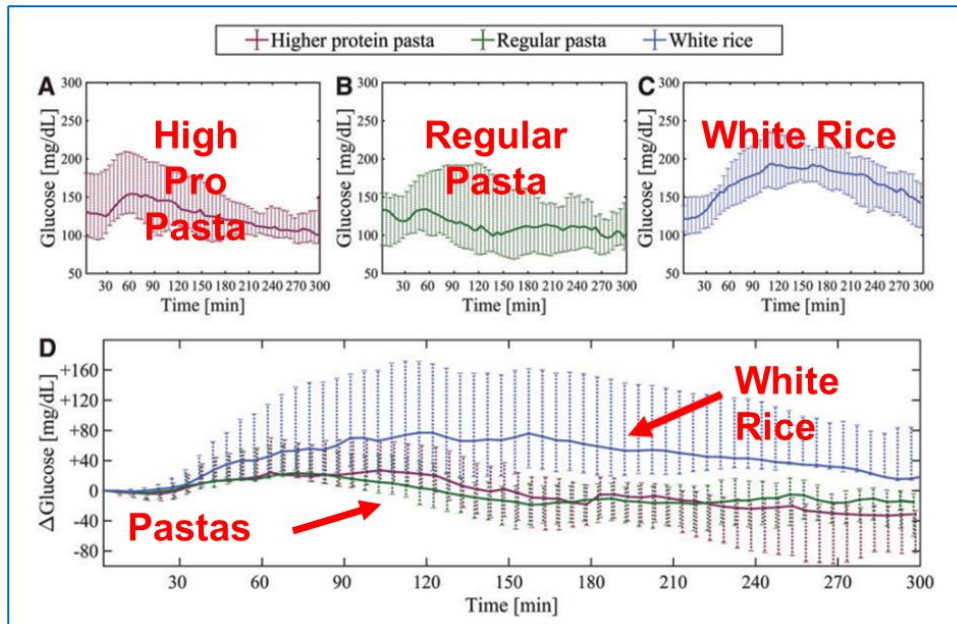
Åberg S, et al. *Diabetes Care*. 2020;43(8):1717-1723; Zavitsanou S, et al. *Diabetes Technol Ther*. 2019;21(9):485-492; Imai S, et al. *J Clin Biochem Nutr*. 2014;54(1):7-11.

iAUC - Mean Incremental Area Under the Glucose Curve; GV- Glycemic Variability ; WG- Whole Grains; VEGE- Vegetable; CARBO- Carbohydrate; NGT- Normal Glucose Tolerance

Micronutrient Deficiencies in T2D

Micronutrient	Deficiency Prevalence	
	Obesity	**T2D**
B1 Thiamine	15% – 29%	17% – 79%
B6 Pyridoxine	0% – 11%	58% – 63%
B9 Folic acid	3% – 4%	22%
B12 Cobalamin	3% – 8%	22%
B7 Biotin	No data	No data
Chromium	No data	20-40%
Selenium	58%	No data
Vitamin A	17%	No data
Vitamin C	35% – 45%	13% – 55%
Vitamin D (< 30 mg/dL)	80% – 90%	85% – 91%
Vitamin E	0%	0%
Zinc	14% – 30%	19%

Via M. *ISRN Endocrinol.* 2012;2012:103472.

MNT Should Be Applied in All DM Patients

Standards of Medical Care in Diabetes – 2020

An **individualized MNT program** as needed to achieve treatment goals, preferably provided by a RDN, is recommended **for all people** with type 1 or type 2 DM, prediabetes, and gestational DM[1]

American Diabetes Association

2022糖尿病臨床照護指引

每一位糖尿病人在衛教過程中，都應該接受**個人化的醫療營養治療**，包括醣類份數計算，並由合格的營養師給予相關飲食的知識與技能。

醫療營養治療降低糖化血色素的效果，第 1 型糖尿病人可降低 1.0-1.9%，第 2 型糖尿病人可降低 0.3-2.0%

DM, diabetes mellitus; MNT, medical nutrition therapy; RDN, registered dietitian nutritionist.

1. American Diabetes Association. Diabetes Care. 2020;43(Suppl. 1):S48-S65; **2.** 中華民國糖尿病學會 / 2022 糖尿病臨床照護指引 /

The Effect of MNT in T1DM Patients

T1DM

- 256 T1DM subjects to a nutritional education program (group A) or not (group B).

Comparison between group A and group B

Group A vs Group B	Group A vs Group B	Group A vs Group B
Reduction in **HbA1C** (%)	Less **hypoglycaemic events** (%)	Reduction in dose of **rapid insulin analogues** (IU/24 hr)
-0.4%	**-3**%	**-4.2** IU/24hr
P < 0.01	*P* < 0.05	*P* = 0.03

A structured and multi-professional educational team, focusing on **MNT** can help patients to **improve glycaemic control.**

HbA1c, glycated hemoglobin; hr, hour; MNT, medical nutrition therapy; T1DM, type 1 diabetes mellitus.

Scavone G, et al. Diabet Med. 2010;27(4):477-479.

The Effect of MNT in T2DM Patients

T2DM

- Retrospective analysis: 100 T2DM patients completing **diabetes self-management education (DSME)** and **individualized MNT** from June 2013 to 2014 were analyzed.

Compared to baseline

Reduction in **HbA1C** (%)

-1.92%

$P < 0.001$

Compared to baseline

Weight loss (kg)

-1.6 kg

$P < 0.001$

72%

patients
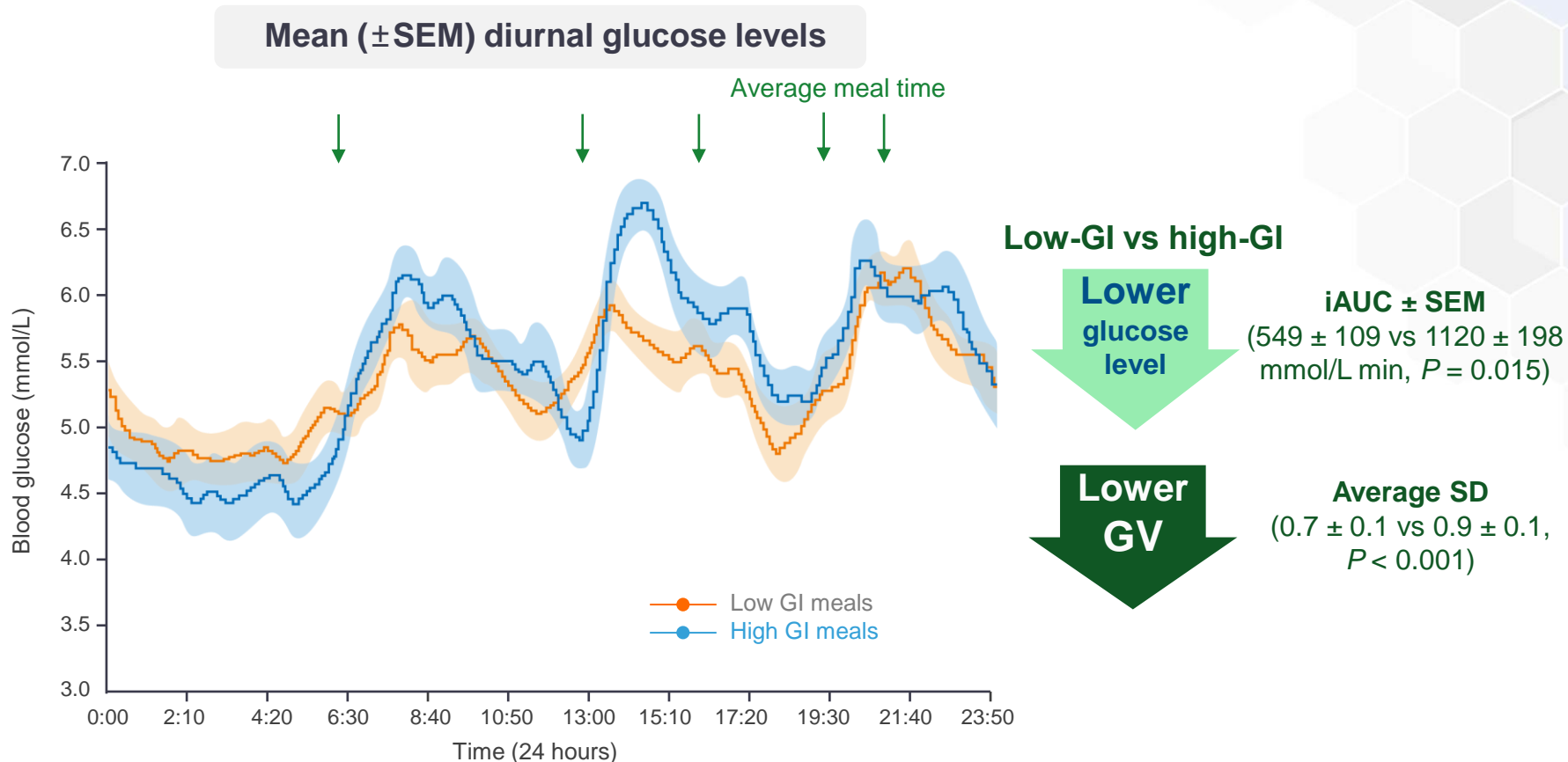
Achieve HbA1c target (≤ 7%)

(compare to 27% at baseline, $P = 0.008$)

This retrospective chart review of 88 patients who received ADA-recognized education program reports positive outcomes for all end points (**weight, BMI, HbA1c**, and lipids*).

*Follow-up lipids were available from a small subset of the sample (n = 9).

Lower GI Meals Reduce Diurnal Glycemic Oscillations in Pregnant Woman

- A crossover study of 17 pregnant women between 26 and 32 weeks of gestation at higher risk of GDM who consumed a low-GI or a high-GI diet in random order.

Mean (±SEM) diurnal glucose levels

Average meal time

Low-GI vs high-GI

Lower glucose level

iAUC ± SEM
(549 ± 109 vs 1120 ± 198 mmol/L min, $P = 0.015$)

Lower GV

Average SD
(0.7 ± 0.1 vs 0.9 ± 0.1, $P < 0.001$)

GDM, gestational diabetes mellitus; GI, glycemic index; GV, glycemic variability; iAUC, incremental area under the curve; SD, standard deviation; SEM, standard error of the mean.

Kizirian NV, et al. BMJ Open Diabetes Res Care. 2017;5:e000351.

Goals of Nutrition Therapy for Adults with Diabetes

1 To promote and support **healthful eating patterns**, emphasizing a variety of nutrient-dense foods in appropriate portion sizes.

2 To address **individual nutrition** needs based on personal and cultural preferences, willingness and ability to make behavioral changes, and barriers to change.

3 To maintain the **pleasure of eating** by providing nonjudgmental messages about food choices.

4 To provide an individual with diabetes the practical tools for **developing healthy eating patterns** rather than focusing on individual macronutrients, micronutrients, or single foods.

For healthcare professional education only.
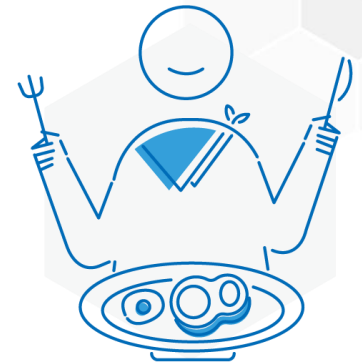
QUIZ TIME

- What is the purpose of medical nutrition therapy in individuals with diabetes?

    A. To achieve and maintain body weight goals

    B. To attain individualized glycemic, blood pressure, and lipid goals

    C. To delay or prevent complications of diabetes

    D. To reduce rapid and extensive loss of muscle mass

    E. A, B & C

Answer: E   (To reduce body weight, blood glucose, blood pressure, blood lipids, and complications)

INNOVATION IN DIABETES NUTRITION

Meta-analysis: Diabetes-specific formulas[1]

Meta-analyses

Diabetes-specific formulas high in monounsaturated fatty acids and metabolic outcomes in patients with diabetes or hyperglycaemia. A systematic review and meta-analysis
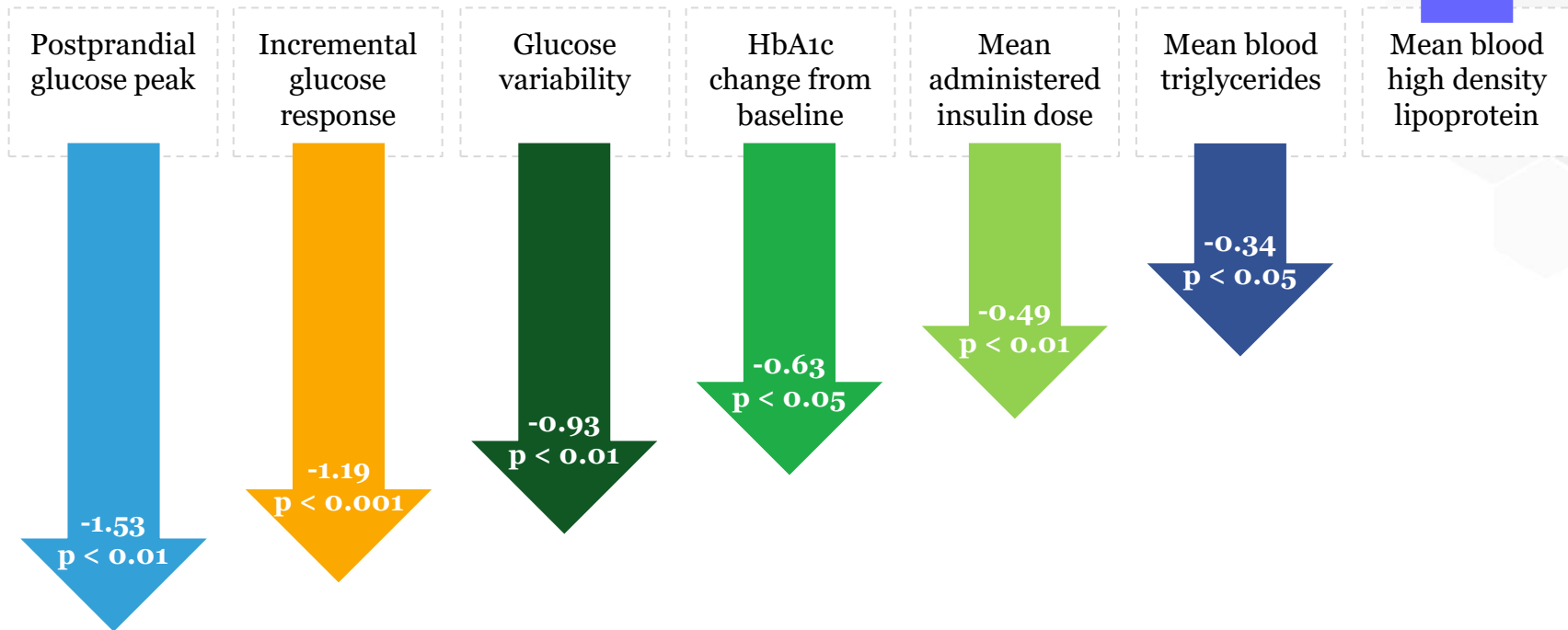
Alejandro Sanz-París [a, b, *], Pilar Matía-Martín [c, d, e], Ángela Martín-Palmero [f], Carmen Gómez-Candela [g], Maria Camprubi Robles [h]

- To compare the metabolic benefits of diabetes-specific formulas (DSF) high in monounsaturated fatty acids (MUFA), with standard formulas (STDF) in adult patients with type 1, type 2 diabetes or stress-induced hyperglycemia

1. Sanz-París A, et al. *Clin Nutr*. 2020;39:3273-3282

DSFs showed better glucose management and improved lipid metabolism[1]

DSFs vs. non-DSFs in seven key endpoints

Postprandial glucose peak	Incremental glucose response	Glucose variability	HbA1c change from baseline	Mean administered insulin dose	Mean blood triglycerides	Mean blood high density lipoprotein

Mean blood high density lipoprotein:
$p < 0.05$
+0.42

Postprandial glucose peak:
-1.53
$p < 0.01$

Incremental glucose response:
-1.19
$p < 0.001$

Glucose variability:
-0.93
$p < 0.01$

HbA1c change from baseline:
-0.63
$p < 0.05$

Mean administered insulin dose:
-0.49
$p < 0.01$

Mean blood triglycerides:
-0.34
$p < 0.05$

1. Sanz-París A, et al. *Clin Nutr*. 2020;39:3273-3282

Diabetic-specific Formulas (DSF) and Standard Nutrition Formulas

- **DSF** contains a lesser proportion of **carbohydrate** than standard nutrition formulas.

Standard nutrition formulas vs DSF

Composition	Standard nutrition formulas	DSF
Amount of carbohydrate	Higher (> 50% TE)	**Lower** (< 50% TE)
Type of carbohydrate	Simple	**Complex slowly digestible blend**
Glycemic load/index	Higher	**Lower**
Amount of fat	Lower (~30% TE)	Higher (> 30% TE)
Type of fat	LCT	**MUFAs, n-3**
Amount of fiber	Low or no	**Higher**
Type of fiber	-	Soluble, prebiotic
Amount of protein	15-20%	15-25%

For healthcare professional education only.

Fact check!

MYTH — **People with diabetes should avoid carbohydrates at all costs.**

FACT — Carbohydrates are a main source of energy essential for metabolism and well-being. Instead of actively avoiding carbohydrates to control blood sugar levels, people living with diabetes should be more careful about the type and amount of carbohydrates they consume, as well as the time of consumption.

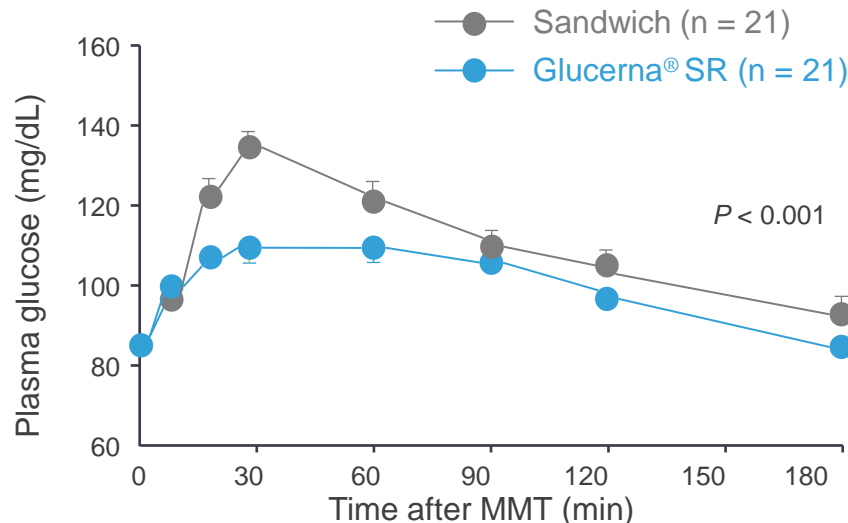# EVIDENCE OF MEAL REPLACEMENT

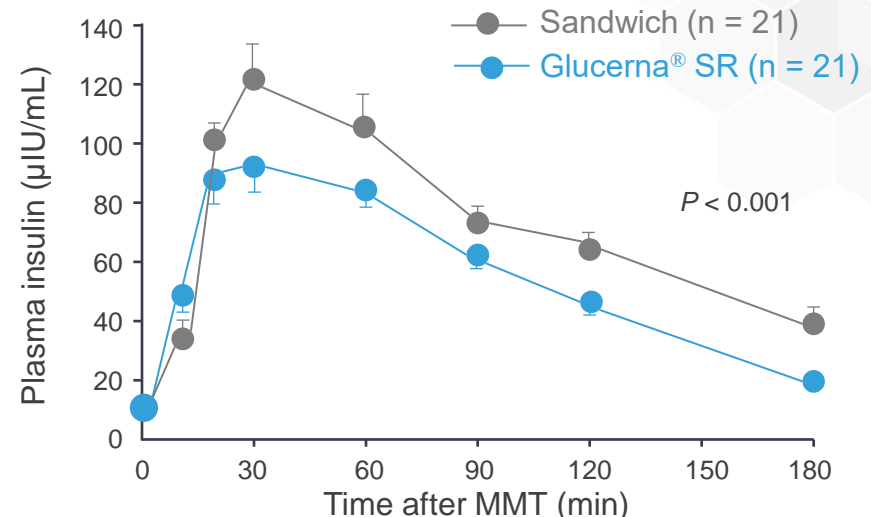# The Effect of DSF in Healthy Humans

- Non-obese people were recruited to examine the postprandial changes of plasma glucose, insulin in a mixed meal test (MMT) of Glucerna® SR* and an ordinary meal (sandwich).

  * Nutritional supplement designed for DM patients.

Plasma glucose

Plasma insulin

Glucerna® SR ingestion resulted in lower glucose and insulin responses.

DM, diabetes mellitus; DSF, diabetic-specific formulas.

Chang YJ, et al. American Diabetes Associationptive Medicine. 2016;8(1):24-31.

The Effect of DSF in T2DM Patients

T2DM

◆ A randomized, controlled, cross-over trial to investigate the effect of isoenergetic breakfast replacement by a low-GI liquid formula in T2DM patients.
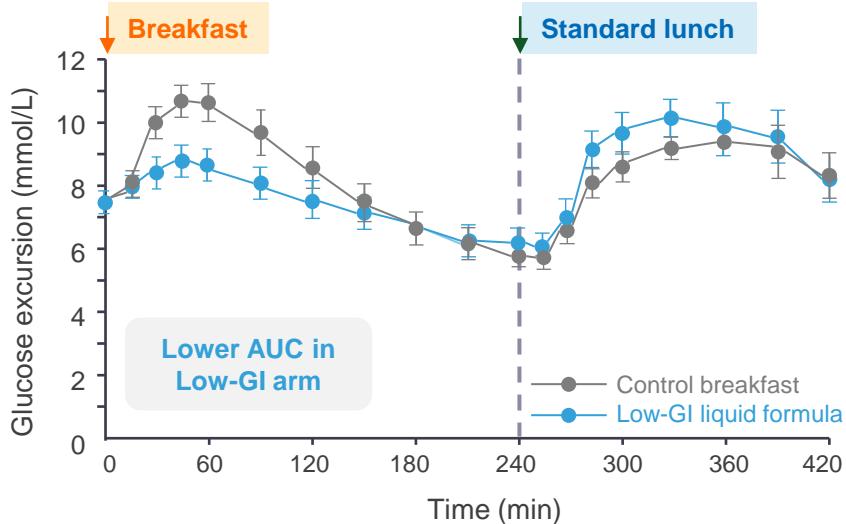
Glucose AUC (mmol x min/L)		
	Control	Low GI
Median	253	97
25th-75th percentile	162-386	60-188

$P < 0.001$

Insulin AUC (pmol x min/L)		
	Control	Low GI
Median	19939	14670
25th-75th percentile	10709 -33396	7328-19611

$P = 0.048$

Postprandial glucose

Insulin excursions

AUC, area under the curve; GI, glycemic index.

Stenvers DJ, et al. Br J Nutr. 2014;112(4): 504-512.
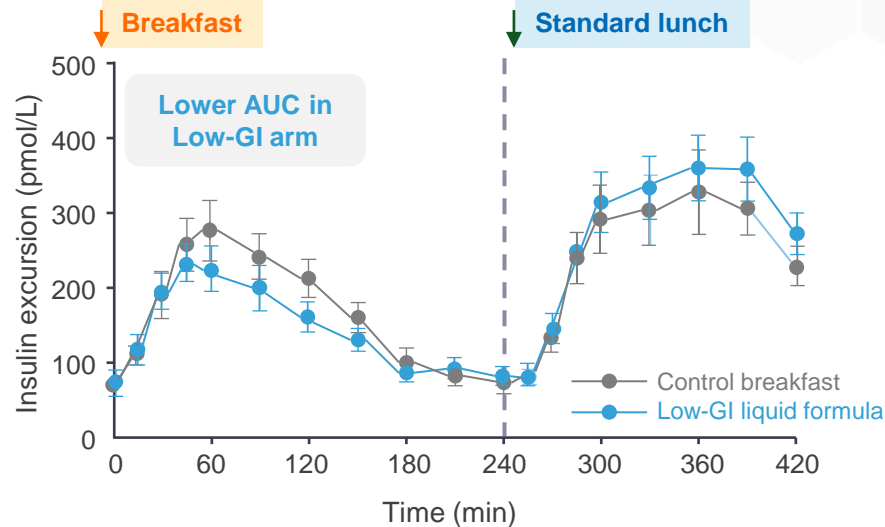
Physiological Effect of GLP-1 in Peripheral Tissues

🔷 Absorbed nutrients in the small intestine induce GLP-1 secretion from L cells in the intestinal ileum. Interaction between GLP-1 and GLP-1 receptor cause majority of the effect of GLP-1.

GLP-1

Intestine

Stomach
- Gastric emptying ↓
- Gastric motility ↓

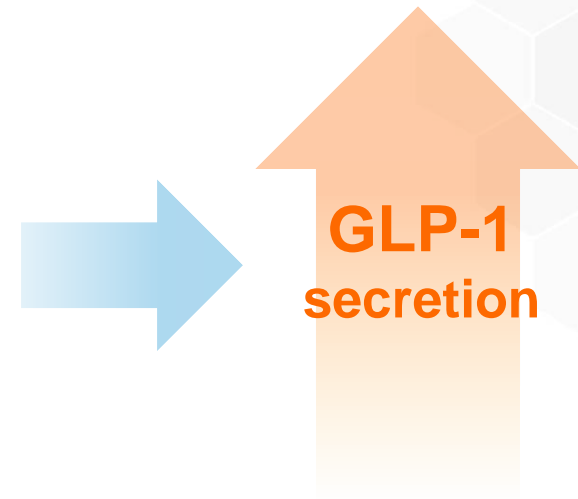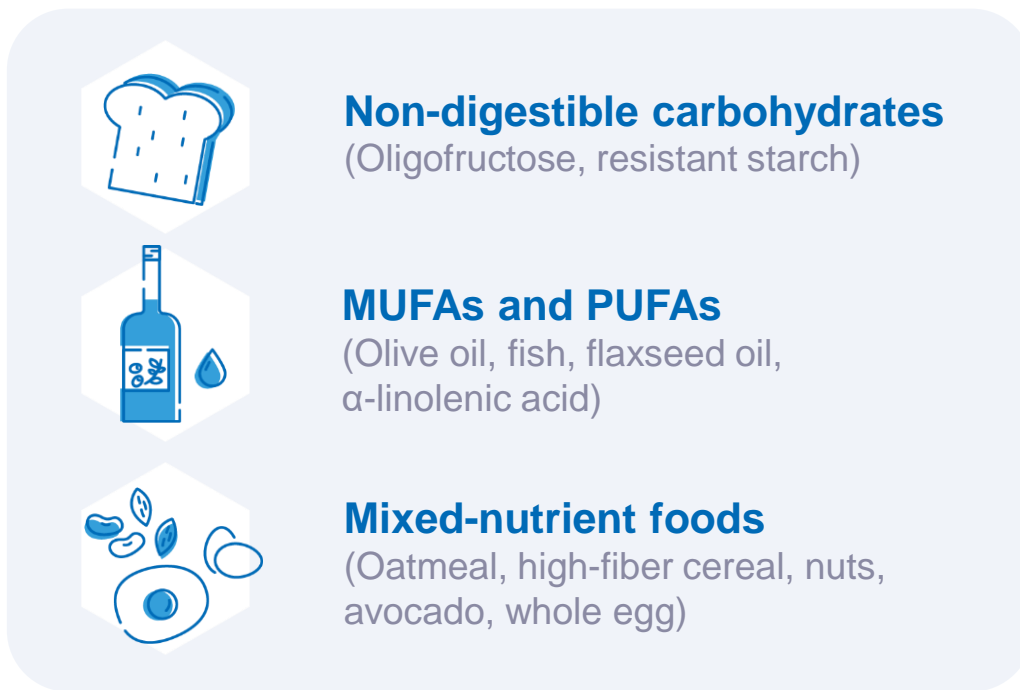**Brain**
- Food uptake ↓
- Body weight ↓

Colon
- Food transit time ↓

Pancreas
- Insulin biosynthesis ↑
- Glucagon secretion ↓
- β-cell apoptosis ↓
- β-cell survival ↑
- Glucose transporter gene ↑

Adipose tissue
- Thermogenesis of BAT ↑
- Browning of white adipose tissue ↑
- Energy expenditure ↑

The postprandial **GLP-1 response is decreased in T2DM**.
This impairment alone could contribute to the pathogenesis of diabetes.

Food May Influence GLP-1 Secretion

◆ GLP-1 secretion is partially mediated by receptors bind to **monosaccharides**, **peptides and amino-acids**, **MUFAs** and **PUFAs** as well as to **short chain fatty acids**.

Non-digestible carbohydrates
(Oligofructose, resistant starch)

MUFAs and PUFAs
(Olive oil, fish, flaxseed oil, α-linolenic acid)

Mixed-nutrient foods
(Oatmeal, high-fiber cereal, nuts, avocado, whole egg)
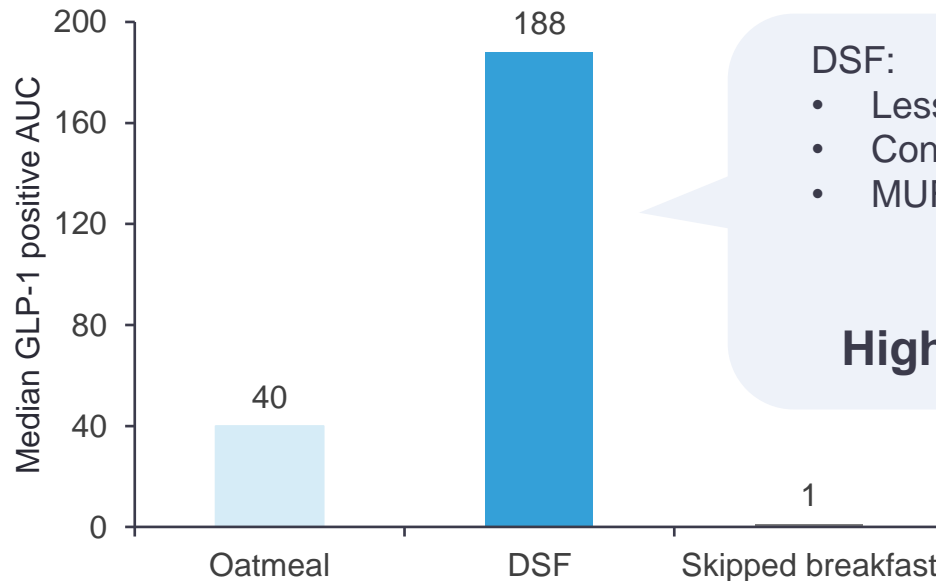
GLP-1 secretion

The stimulation of endogenous GLP-1 secretion by **manipulating the composition of the diet** may be a relevant strategy for obesity and T2DM management.

GLP-1; glucagon-like peptide-1; MUFAs, monounsaturated fatty acids; PUFAs, polyunsaturated fatty acids; T2DM, type2 diabetes mellitus.

Bodnaruc AM, et al. Nutr Metab (Lond). 2016;13:92.

DSF Improves GLP-1 Expression in Patients Having T2DM

- 32 T2DM patients were randomized into 3 groups to evaluate the impact of breakfast choices on metabolic benefits.

Median adjusted plasma GLP-1 values

DSF:
- Less CHO
- Containing slowly digesting CHO
- MUFAs

Higher GLP-1 response

AUC, area under the cure; CHO, carbohydrate; DSF, diabetic-specific formulas; GLP-1; glucagon-like peptide-1; MUFAs, monounsaturated fatty acids; T2DM, type2 diabetes mellitus.
Devitt AA, et al. J Diabetes Res Clin Metab. 2012;1:20.

DSF Improves Postprandial Glucose in Comparison to Oatmeal (1/2)

T2DM

- 22 overweight/obese patients with T2DM were given 200 kcal of each of the 3 meals as breakfast on 3 separate days in random order.

Postprandial glucose and GLP-1 levels
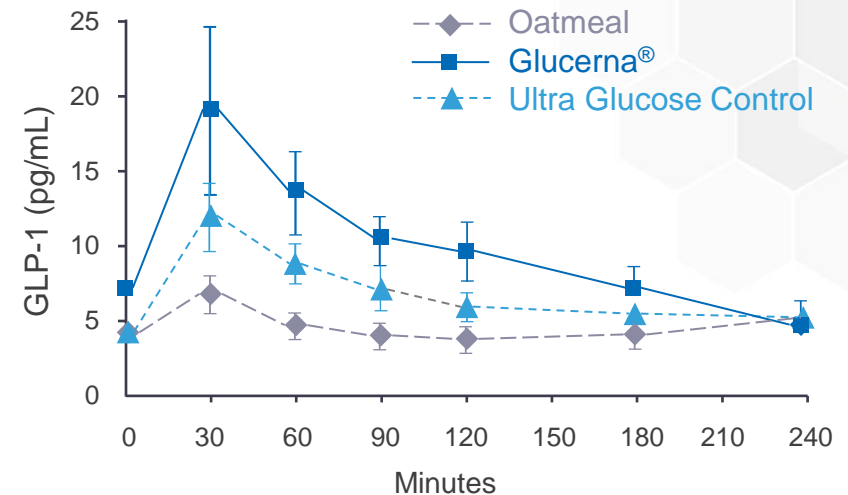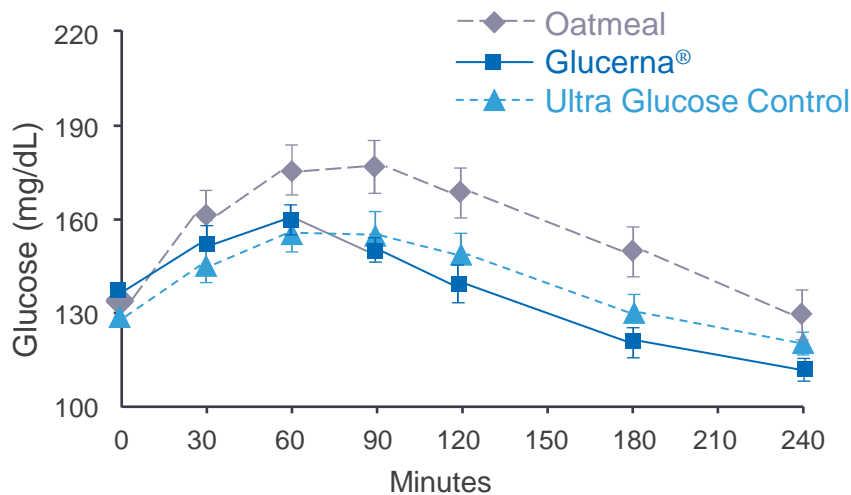
AUC $_{0-240\ mins}$

*$P < 0.001$ compared to oatmeal.

	Oatmeal	Glucerna®		Ultra glucose control
Glucose (mg • min/dL)	37828.6 ± 1678.7	**32747.0 ± 1287.7***	Lowest	33538.6 ± 1266.5*
Active GLP-1 (pg • min/mL)	1055.5 ± 187.3	**2347.7 ± 464.2***	Highest	1631.5 ± 246.8*

AUC, area under the curve; DSF, diabetic-specific formulas; GLP-1, glucagon-like peptide-1; T2DM, type 2 diabetes mellitus.

Mottalib A, et al. Nutrients. 2016;8(7):443.

DSF Improves Postprandial Glucose in Comparison to Oatmeal (2/2)

Nutrition information of the 3 breakfast meals

	Oatmeal		Glucerna®		Ultra Glucose Control	
	Amount	% DV	Amount	% DV	Amount	% DV
Serving size	53.3 (g)	NA	8 (fl oz)	NA	56 (g)	NA
Energy (kcal)	200	10	200	10	200	10
Total fat (g)	4	6.7	7	11	7	11
% energy	18	-	32	-	32	-
Saturated fat (g)	0	0	0.5	3	1	5
Monounsaturated fat (g)	1.3	-	5.2	-	4.5	-
Total Carbohydrates (g)	36	12	26	9	27	9
% energy	72	-	52	-	54	-
Dietary fiber (g)	5.3	20	3	12	3	12
Protein (g)	6.7	NA	10	20	15	30
% energy	13	-	20	-	30	-

% DV: percentage daily values were calculated based on a 2000 kcal diet.

The difference between effects of DFS are probably related to their unique blends of **amino acids, carbohydrates and fat.**

DV, daily values; DSF, diabetes-specific formulas; NA, not applicable; T2DM, type2 diabetes mellitus.

Mottalib A, et al. Nutrients. 2016;8(7):443.

The Effect of Structured Lifestyle Intervention with DSF in T2DM Patients (1/2)

230
T2DM patients
- Overweight and obese
- HbA1c 7-11%

R

6 months

Usual care group*
n = 115

Standard dietary and exercise advice

6 months

tDNA group
n =115

Structured meal plan, MR and physical activity

tDNA-MI
n = 58

Motivational interviewing

tDNA-CC
n = 57

Conventional counseling
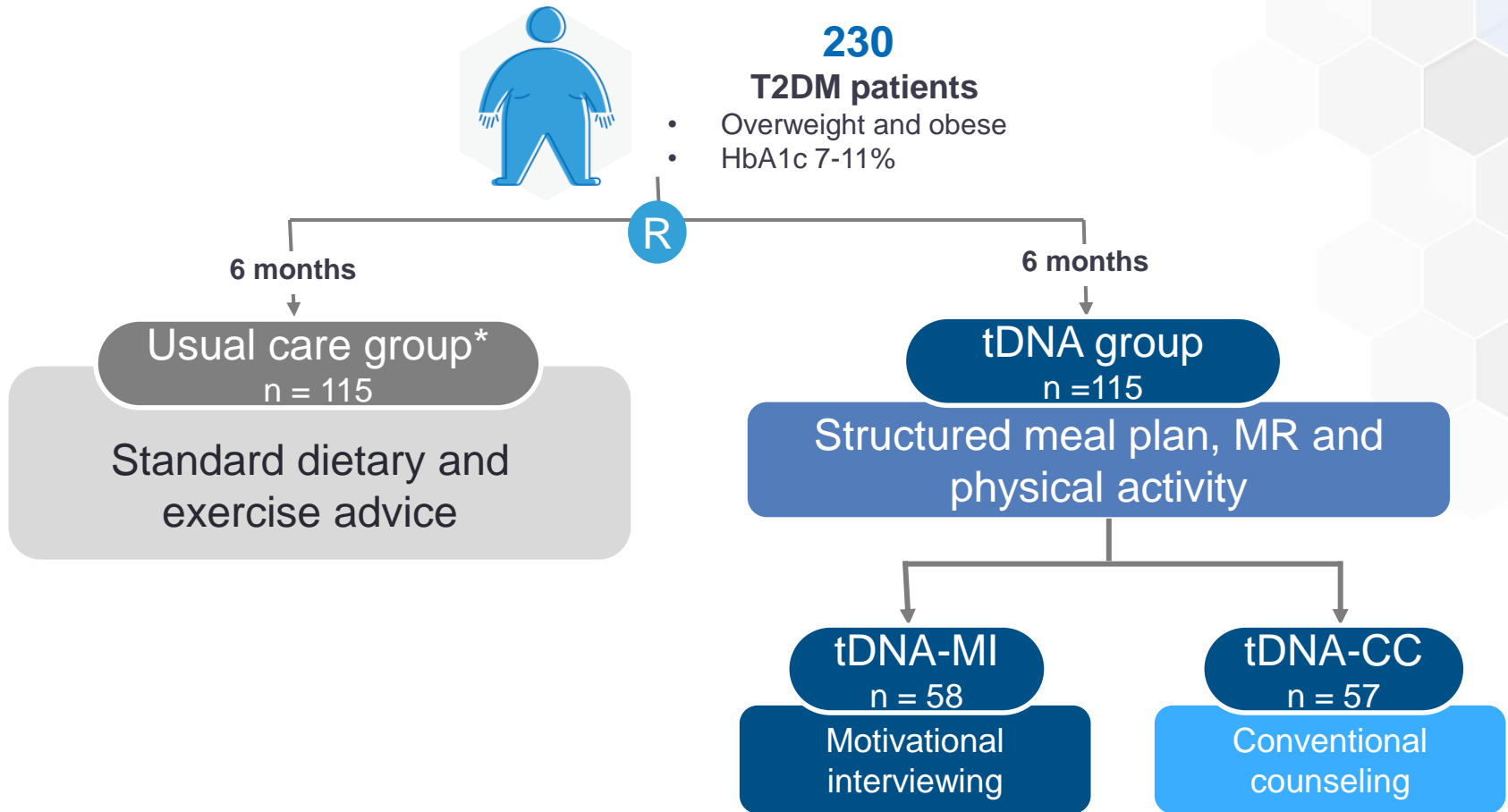
All patients were followed up at 3 and 6 months after termination of the intervention.
Primary endpoint: Changes in HbA1c.

HbA1c, glycated hemoglobin; MR, meal replacement; R, randomized; T2DM, type 2 diabetes mellitus; tDNA, trans-cultural diabetes specific nutrition algorithm; tDNA-MI, tDNA-counseling with motivational Interviewing; tDNA-CC, tDNA-conventional counseling; R, randomized.
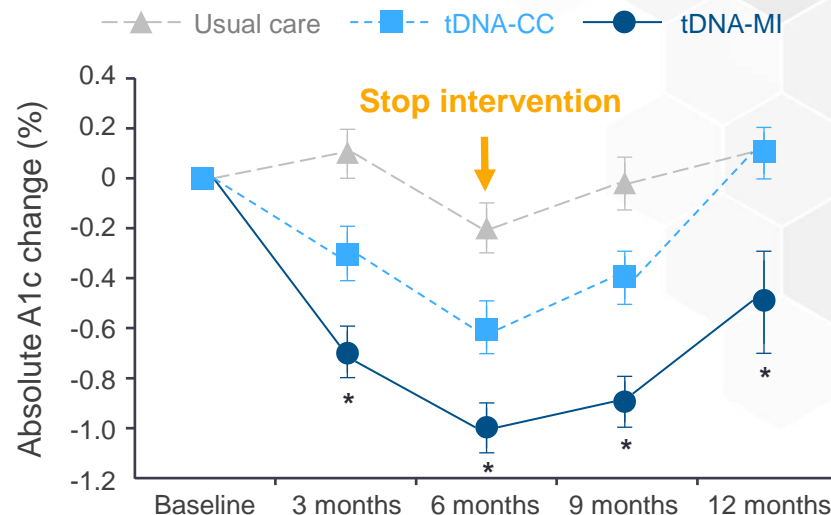Chee WSS, et al. BMJ Open Diabetes Res Care. 2017;5(1):e000384.

The Effect of Structured Lifestyle Intervention with DSF in T2DM Patients (2/2)

Weight change

Usual care · · ▲ · · tDNA-CC · ·■· · tDNA-MI ●

Stop intervention

Weight change (%)
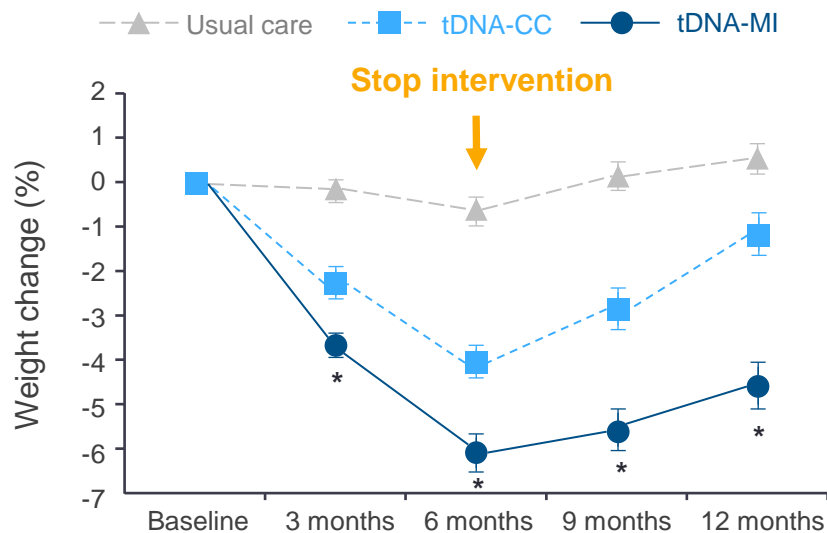
*P < 0.001 for comparisons between groups at all time points.

HbA1c change

Usual care · · ▲ · · tDNA-CC · ·■· · tDNA-MI ●

Stop intervention

Absolute A1c change (%)

*P < 0.001 for comparisons between groups at 3, 6, 9 months.
P = 0.007 at 12 months.

Structured lifestyle intervention and **motivational interviewing** significantly improved diabetes control and body weight in primary care setting.

T2DM, type 2 diabetes mellitus; tDNA, trans-cultural diabetes specific nutrition algorithm; tDNA-MI, tDNA-counseling with motivational Interviewing; tDNA-CC, tDNA-conventional counseling.

Chee WSS, et al. BMJ Open Diabetes Res Care. 2017;5(1):e000384.

For healthcare professional education only.

DSFs Maintained Glucose Control while Increased Energy Intake

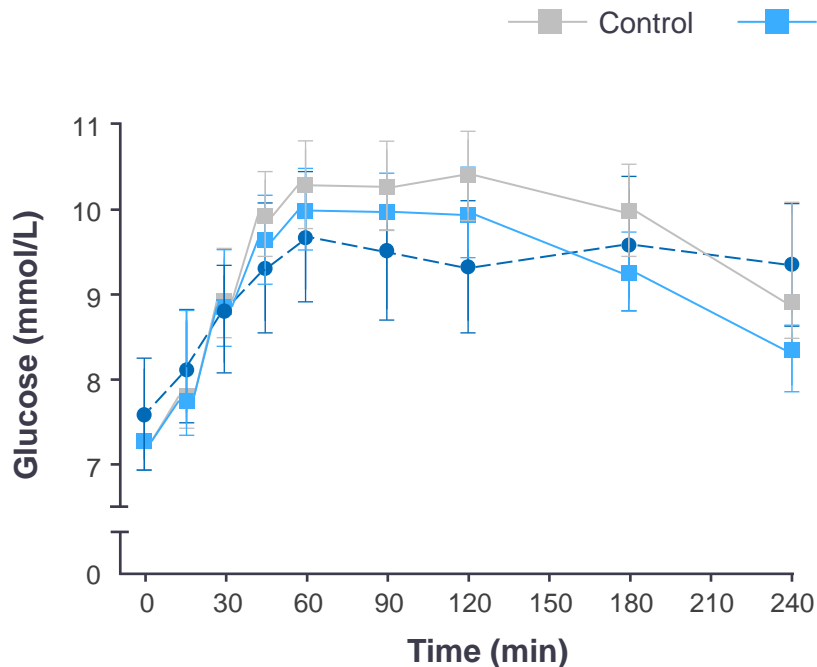- The average **intake of energy increased** up to 660 kcal/day

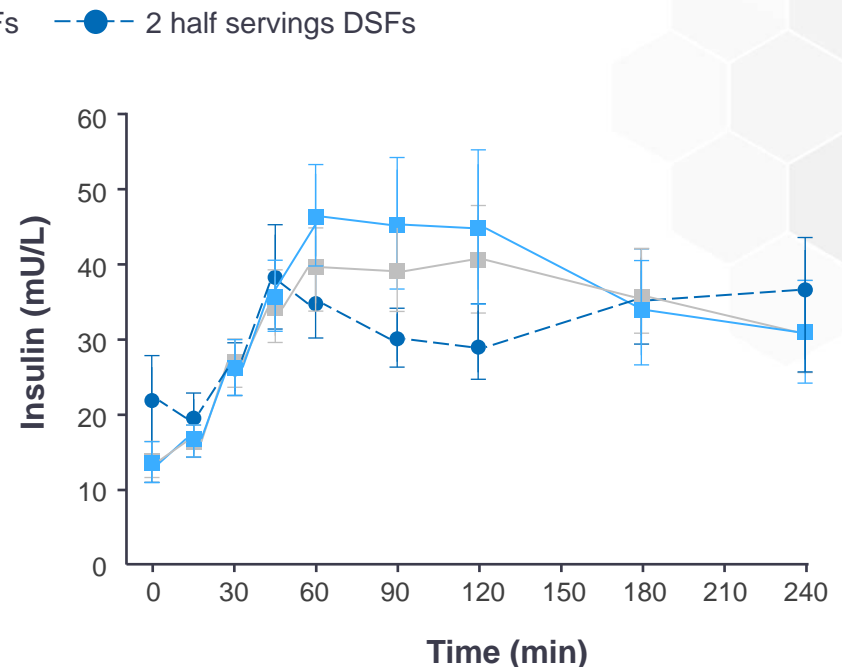**Glucose control status before and after intervention of DSFs**

■ Before DSFs intervention　■ After DSFs intervention
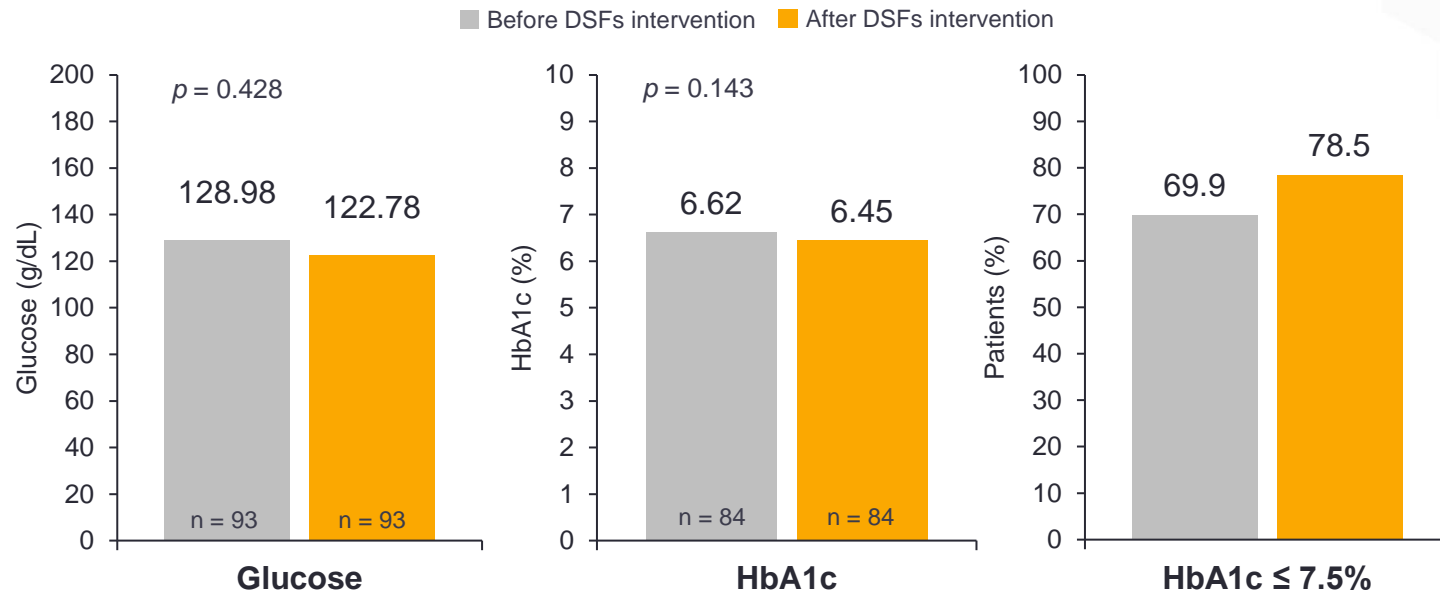
DSFs, diabetes-specific formulas; HbA1c, glycated hemoglobin.

Sanz-Paris A, et al. Nutrients. 2016;8(3):153.

For healthcare professional education only.

Consumption of a High Energy, High Protein DSF Resulted in a Lower PPG Response in Elderly Patient

DSF, diabetes-specific formula; PPG, postprandial glucose.

Laksir H, et al. Clin Nutr. 2018;37(6 Pt A):2084-2090.

HOW TO REDUCE GV?

Glycemic Variability (GV) Increases DM-related Complications

- Frequent or large glucose fluctuations may independently contribute to diabetes-related complications.

Glycemic variability

Hyperglycemia
- Induce excessive protein glycation end products.
- Activation of oxidative stress.

Hypoglycemia
- Inducing the release of inflammatory cytokines.
- Increased platelet and neutrophil activation.

Time

CV events increased in DM patients
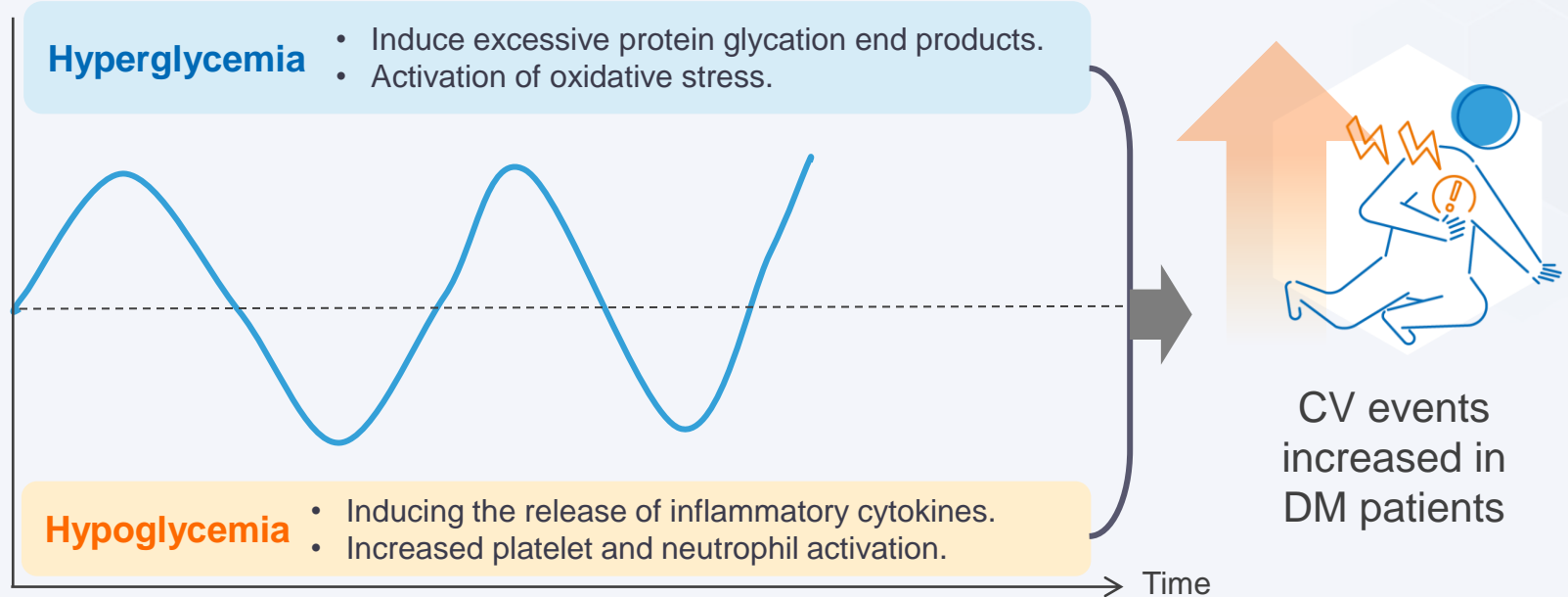
Postprandial spikes in blood glucose, as well as hypoglycemic events, are blamed for increased CV events in DM. **Minimizing GV** can prevent future **CV events.**

For healthcare professional education only.

How to Reduce GV?

First therapeutic instrument
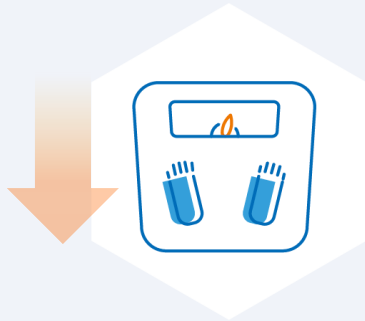
Weight reduction

Diet change

Pharmacological therapy

Fast-acting and long-acting insulin

GLP-1 analogs, DPP-4 inhibitors

GLP-1, glucagon-like peptide-1; DPP-4, dipeptidyl-peptidase 4; GV, glycemic variability.
Suh S, Kim JH, Diabetes Metab J. 2015;39(4):273-282.

DSF Minimized GV in T2DM patients (1/2)

T2DM

- A randomized clinical trial evaluated the effects of lifestyle intervention with or without breakfast replacement on the indices of GV.
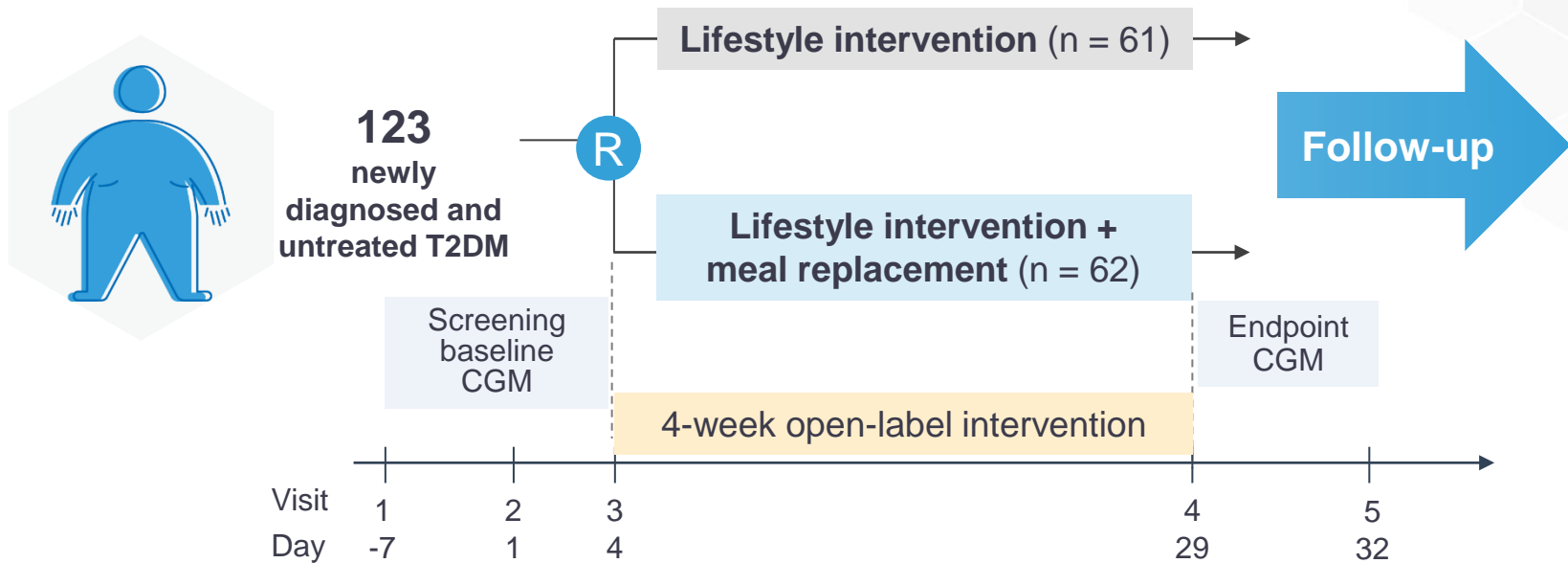
CGM, continuous glucose monitoring; DSF, diabetes-specific formulas; GV, glycemic variability ; T2DM, type 2 diabetes mellitus.

Peng J, et al. Br J Nutr. 2019:121:560-566.

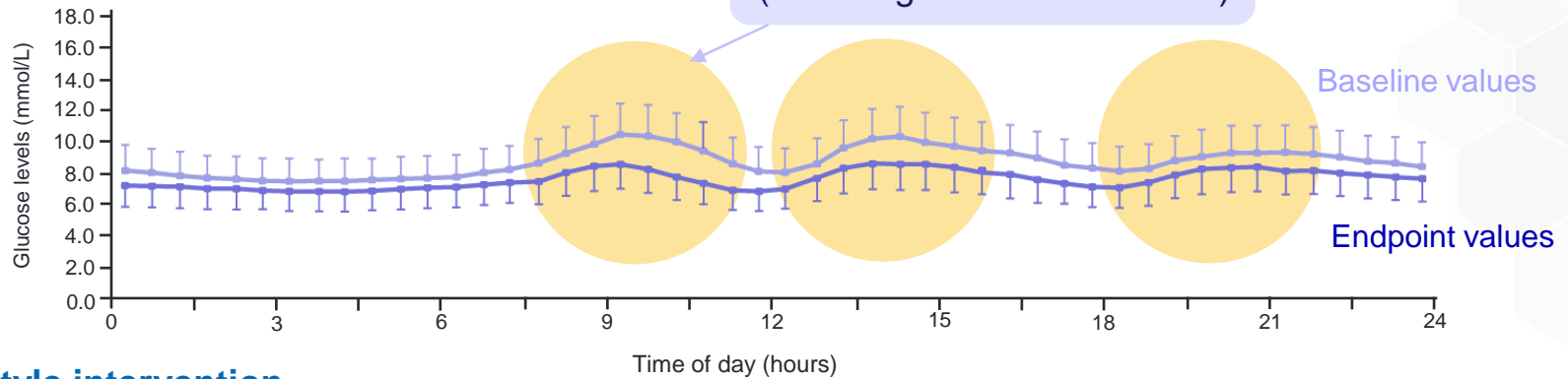**For healthcare professional education only.**
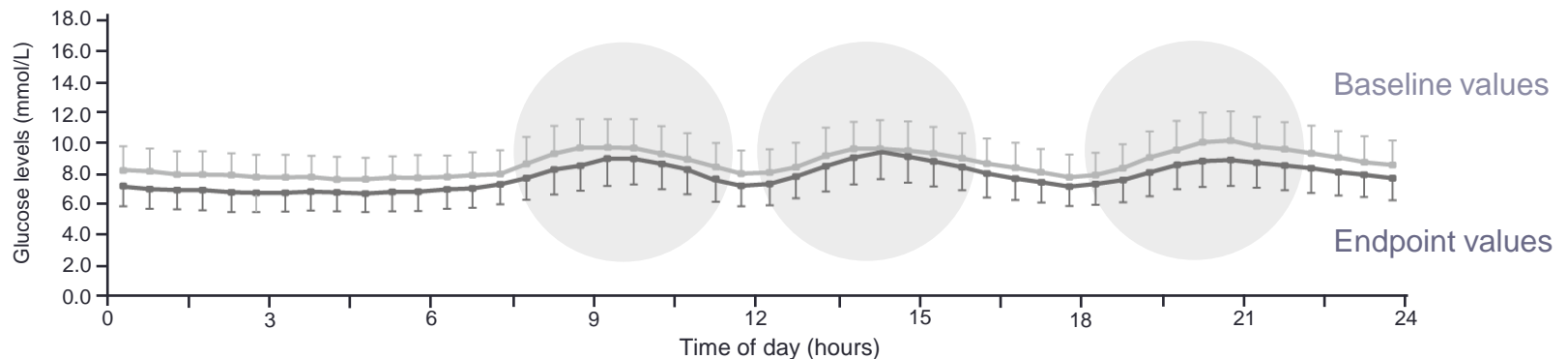
DSF Improves GV in T2DM Patients (2/2)

T2DM

Comparison of average CGM tracings between groups

Lifestyle intervention + Meal replacement

Better GV metrics
(including SDBG and MAGE)

Baseline values

Endpoint values

Lifestyle intervention

Baseline values

Endpoint values

CGM, continuous glucose monitoring; DSF, diabetes-specific formulas; GV, glycemic variability; MAGE, mean amplitude of glycaemic excursions; SDBG, standard deviation of blood glucose.

Peng J, et al. Br J Nutr. 2019:121:560-566.

DSF Improves Glycemic Responses in T2DM patients (1/3)

T2DM

- A randomized clinical piolet study revealed that a diabetes-specific nutritional shake to replace a daily breakfast and afternoon snack improves glycemic responses, traced by CGM.

Days 0 – 6

Days 7 – 14

81
T2DM on oral medication
HbA1C: 7% - 10%
≥ 30 yrs

Excluded:
- Active disease (cardiovascular, renal, hepatic, cancer)
- During pregnancy
- Night shift workers or following atypical eating pattern other than three main meals and snacks

Self-selected diets

Maintaining usual diabetes management behaviors (eg, medications, exercise) and typical diet with 3 main meals + 2 daily snacks (mid-morning and mid-afternoon).

Maintaining typical diet and eating patterns

DSF as breakfast meal + mid-afternoon snack replacement

DSF as breakfast meal + bedtime snack replacement

CGM, continuous glucose monitoring; DSF, diabetes-specific formulas ; T2DM, type 2 diabetes mellitus.
Mustad VA, et al. BMJ Open Diab Res Care 2020;8:e001258. doi:10.1136/bmjdrc-2020-001258

DSF Improves Glycemic Responses in T2DM patients (2/3)

T2DM

Using DSF for **breakfast meal** & **afternoon snack** decreases late-morning evaluation in glucose levels.
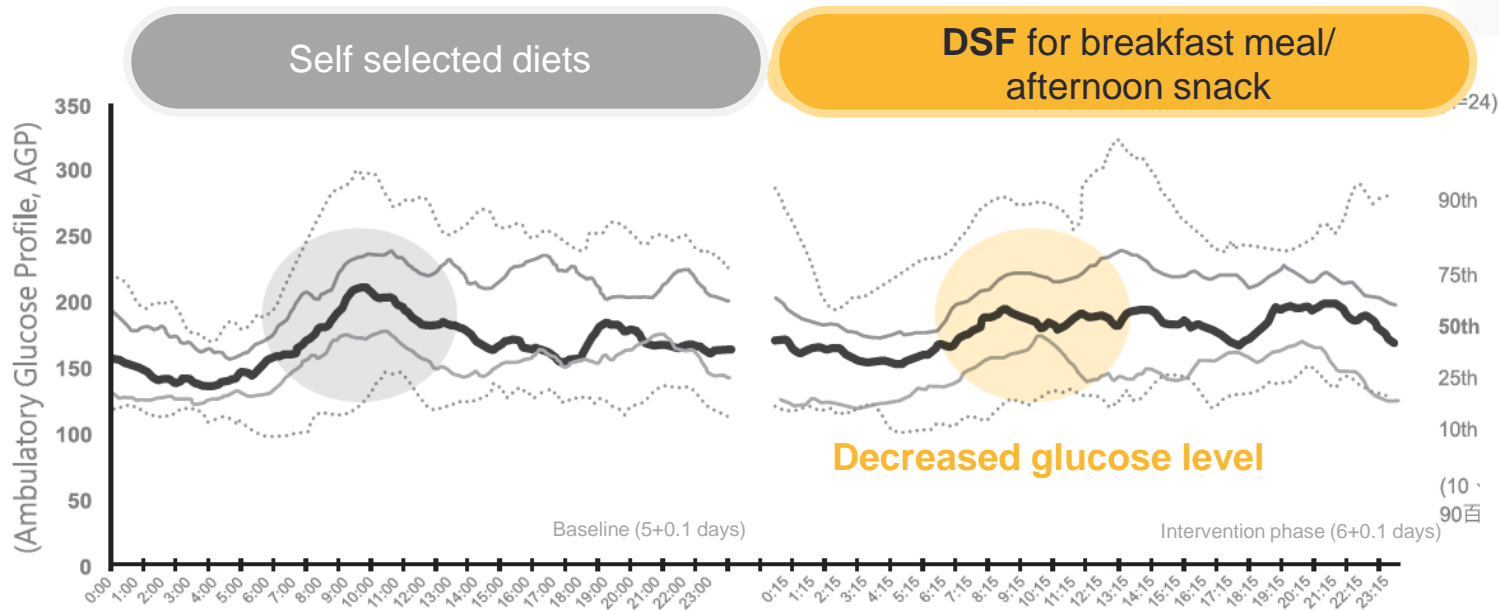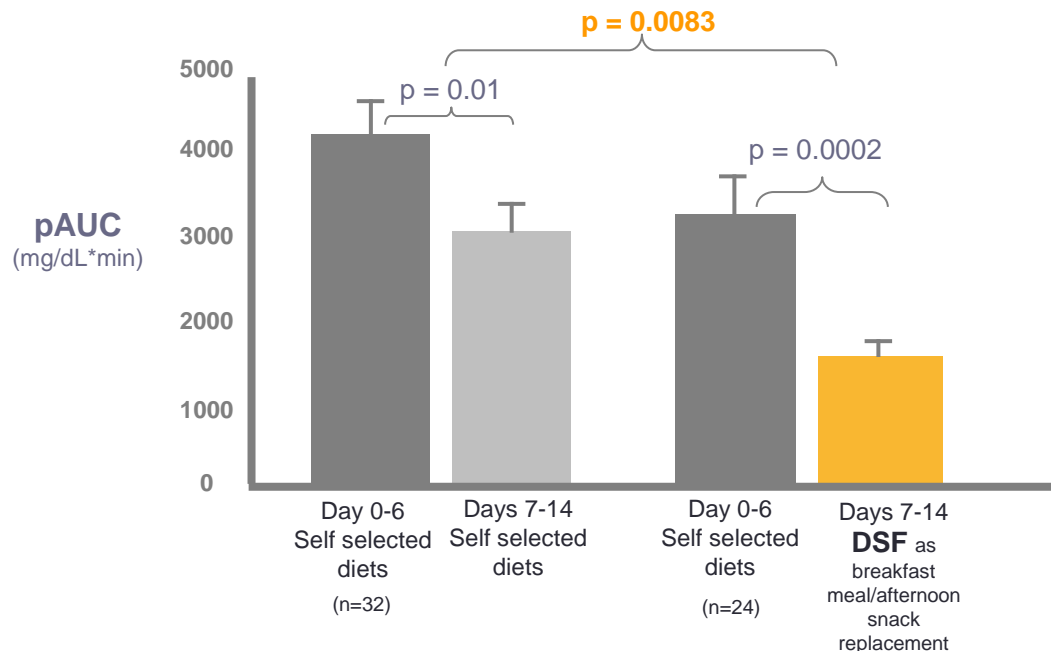

DSF, diabetes-specific formulas; T2DM, type 2 diabetes mellitus

Mustad VA, et al. BMJ Open Diab Res Care 2020;8:e001258. doi:10.1136/bmjdrc-2020-001258

DSF Improves Glycemic Responses in T2DM patients (3/3)

T2DM

Using DSF for **breakfast meal & afternoon snack**, significantly decreases 120 min postprandial glycemic response (positive AUC)**

pAUC (mg/dL*min)

p = 0.0083

p = 0.01

p = 0.0002

Day 0-6 Self selected diets (n=32)

Days 7-14 Self selected diets

Day 0-6 Self selected diets (n=24)

Days 7-14 **DSF** as breakfast meal/afternoon snack replacement

**Begins with the first time point collected after meal and continues until 120 min after meal.

DSF, diabetes-specific formulas; T2DM, type 2 diabetes mellitus; pAUC, positive area under the curve

Mustad VA, et al. BMJ Open Diab Res Care 2020;8:e001258. doi:10.1136/bmjdrc-2020-001258

For healthcare professional education only.

PRESCRIBE DSF BASED ON CLINICAL EVIDENCE

Diabetes-specific formulas: an important tool in medical nutrition therapy

Advantages

Portion control

Convenience

Predefined calories

Takes the guesswork out of meal choice

Prescribe based on weight status and degree of diabetes control

Overweight/ obese

Use 2–3 diabetes-specific formulas per day as part of a reduced-calorie meal plan, as a calorie replacement for a meal, partial meal or snack

| Women | 1500 calories |
| Men1 | 1800 calories |

Calories from diabetes-specific formulas and other healthy dietary sources

Normal weight

Uncontrolled diabetes HbA1c >7%

1–2 diabetes-specific formulas per day incorporated into a meal plan as a calorie replacement for a meal, partial meal or snack

Controlled diabetes

Use based on clinical judgment and individual assessment

Underweight

Use 1–3 diabetes-specific formulas per day per clinical judgement, based on desired rate of weight gain and clinical tolerance

Working within each patient's schedule and lifestyle

Diabetes-specific formulas

A low-calorie meal replacement…   …or a healthy snack alternative

for breakfast   or lunch   afternoon or evening

Scientifically formulated for the nutritional challenges of diabetes

Low-glycemic carbohydrates
- Slow digestion and absorption
- Reduce glycemic response

Monounsaturated fatty acids
- Replace saturated fats
- Support lipid management

Prebiotics/Fibersol-2
- Bowel health
- Reduce glycemic response

| Blood glucose | Heart health | GI health |

Postprandial glycemic response

For healthcare professional education only.

THANK YOU

For healthcare professional education only.