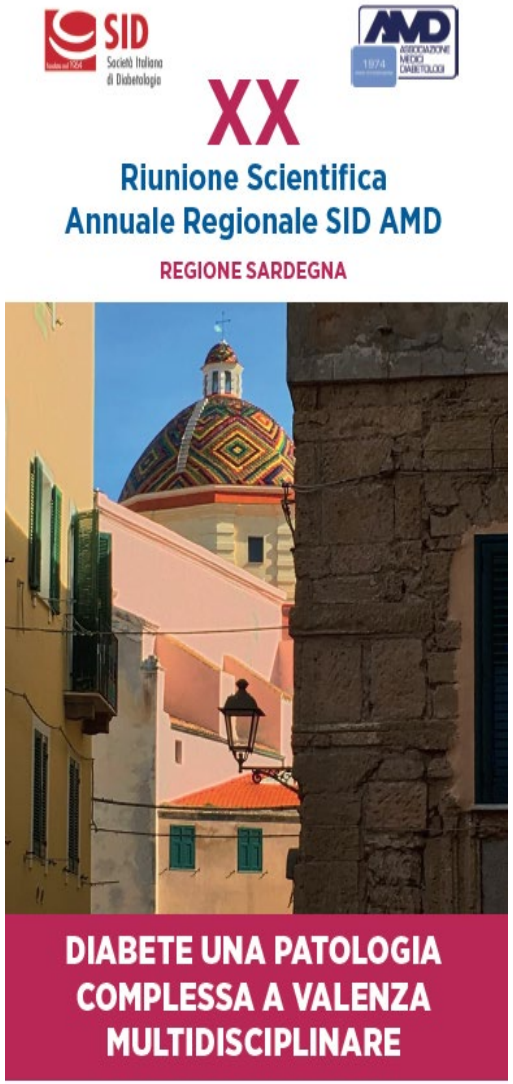


Nuove e Vecchie Diete per il Paziente con Diabete

Prof. Angela A. Rivellese

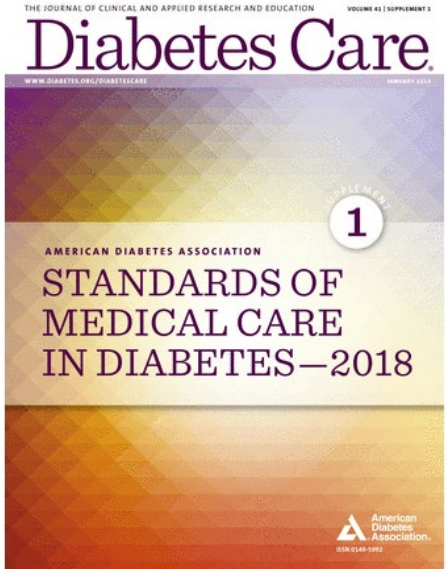
Dipartimento di Medicina Clinica e Chirurgia

Università degli Studi di Napoli Federico II

Dichiaro di aver ricevuto negli ultimi due anni compensi o finanziamenti dalle seguenti Aziende Farmaceutiche e/o Diagnostiche:

- *Sanofi*

4. Lifestyle Management: *Standards of Medical Care in Diabetes—2018*



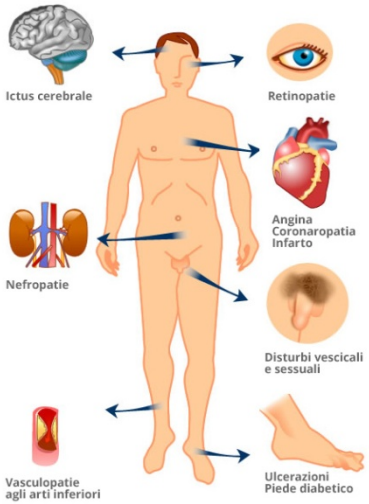
Goals of Nutrition Therapy for Adults With Diabetes

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



- Achieve and maintain body weight goals
- Attain individualized glycemic, blood pressure, and lipid goals
- Delay or prevent the complications of diabetes





American Diabetes Association.

EFSD European Foundation for the Study of Diabetes

American Diabetes Association.

Diabetes Care

Management of Hyperglycemia in Type 2 Diabetes, 2018. A Consensus Report by the American Diabetes Association (ADA) and the European Association for the Study of Diabetes (EASD)

Melanie J. Davies,[1,2] David A. D'Alessio,[3] Judith Fradkin,[4] Walter N. Kernan,[5] Chantal Mathieu,[6] Geltrude Mingrone,[7,8] Peter Rossing,[9,10] Apostolos Tsapas,[11] Deborah J. Wexler,[12,13] and John B. Buse[14]

Lifestyle Management

Consensus recommendation

- An individualized program of MNT should be offered to all patients.

Medical Nutrition Therapy

MNT comprises education and support to help patients adopt healthy eating patterns. The goal of MNT is to manage blood glucose and cardiovascular risk factors to reduce risk for diabetes-related complications while preserving the pleasure of eating (21). Two basic dimensions of MNT include dietary quality and energy restriction. Strategies directed at each dimension can improve glycemic control.

Dietary Quality and Eating Patterns. There is no single ratio of carbohydrate, proteins, and fat intake that is optimal for every person with type 2 diabetes. Instead, there are many good options and pro- ional guidelines usually recom d individua atterns that

Consensus recommendation

- All overweight and obese patients with diabetes should be advised of the health benefits of weight loss and encouraged to engage in a program of intensive lifestyle management, which may include food substitution.

Diabete…
Quale dieta



Fad Diets: Hype or Hope?

Aravind R. Kuchkuntla[1] · Berkeley Limketkai[2] · Sanjeev Nanda[3] · Ryan T. Hurt[1,3] · Manpreet S. Mundi[1]

Curr. Nutr. Report,2018

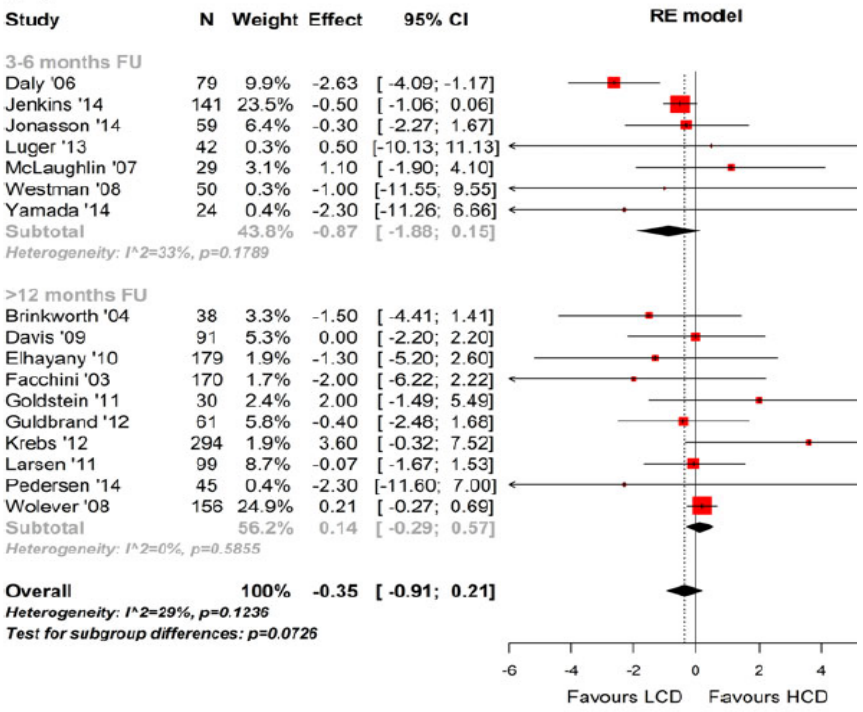
Table 1 Overview of dietary interventions

Diet	Diet description	Diet program	Metabolic changes	Limitations
Atkins diet	No calorie restriction, low carbohydrate with unrestricted protein and fat intake	Induction phase = 2 weeks < 20 g/day carb (weight loss = 10 lbs/2 weeks) Ongoing weight loss phase: gradual carb increase 5 g/day (weight loss 1–2 lb/week) Pre-maintenance phase: carb intake 40–100 g/day Maintenance phase: maintain ideal carb balance	Reduction in weight, TG, LDL, TC, DBP, SBP, CRP, TC/LDL ratio, LDL/HDL ratio, leptin, and insulin Improved HDL, insulin sensitivity, and adiponectin	Fluctuating LDL Weight regain Poor compliance
Mediterranean diet	50–55% low GL carb, 30% fats, 15–20% protein	Dietary pattern followed in Southern European countries rich in MUFA, PUFA, and predominantly plant-based foods	Reduction in weight, oxidized LDL, insulin, CRP, HbA1c, TG, and leptin Increase in HDL and adiponectin Improved overall and CAD survival	None
Zone diet	40% low GL carb, 30% fat, 30% protein	Diet provided in Zone food blocks	Reduction in weight, waist circumference, BMI, total cholesterol/HDL ratio, LDL/HDL ratio, TG, and LDL	Possible effects on renal function
South Beach diet	Low carb and high fat	Phase 1: no carbs for 2 weeks (weight loss = 10–14 lbs/2 weeks) Phase 2: gradual introduction of low GI carbs (weight loss = 1–2 lbs/week) Phase 3: maintenance high-intensity interval training (30 min/day)	Reduction in weight, waist-to-hip ratio, weight, %dense LDL, TG, and TC	Poor compliance
Intermittent fasting	Abstinence from food	Time-restricted IF Complete IF Modified IF	Reduction in weight, TG, insulin, adiponectin, SBP, TCLower risk of CAD	Noncompliance Weight regain

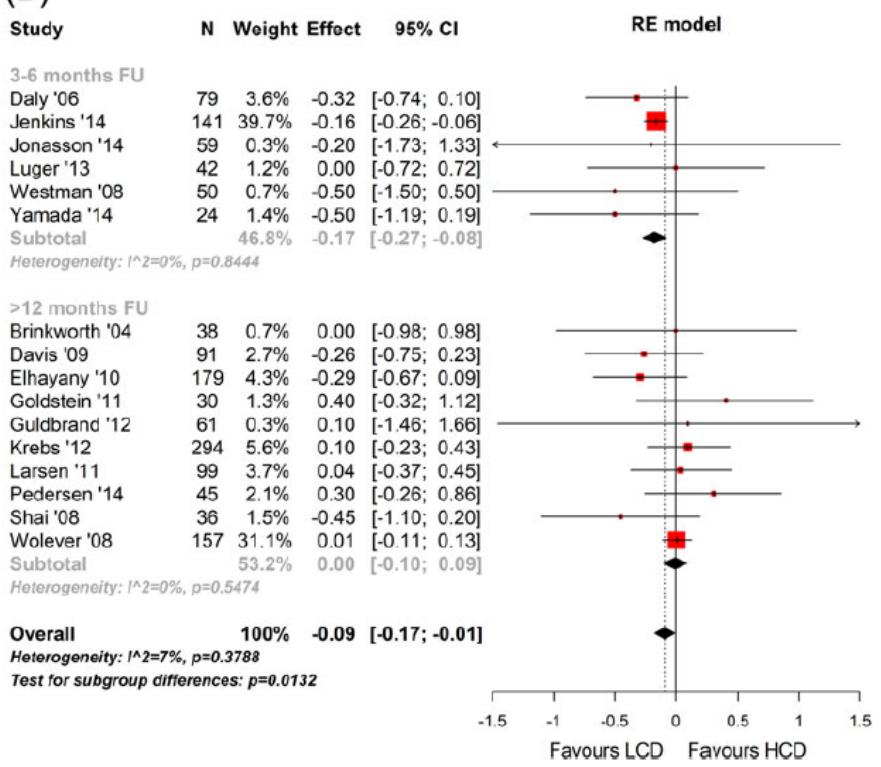
TG triglyceride, *LDL* low-density lipoprotein, *HDL* high-density lipoprotein, *TC* total cholesterol, *SBP* systolic blood pressure, *DBP* diastolic blood

Low-Carb vs High-Carb diets for T2DM? Meta-analyses for Body Weight (A) and HbA1c (B)

(A)



(B)



AM Aas, Diabetes Obes Metab 2018

Assessing the evidence for weight loss strategies in people with and without type 2 diabetes

Peter Clifton

World J Diabetes 2017 October 15; 8(10): 440-454

Table 2 Weight loss diets in people with type 2 diabetes

Type of diet	Type of summary document	Effect size	Long term data	Recommendation	Risk markers
VLCD	Meta-analysis of 5 studies of VLCD in volunteers with diabetes or no diabetes[80]	Weekly weight loss was similar in the two groups at 0.5 to 0.6 kg/wk. Weight losses of > 15%-20% were observed in these studies			
VLCD	Retrospective analysis of 355 patients with diabetes matched with nondiabetics	After 12 wk, there was significant weight loss within each group when compared with baseline (T2DM: 115.0 ± 24.4 kg *vs* 96.7 ± 21.4 kg, $P < 0.0001$; non-T2DM: 117.2 ± 25.8 kg *vs* 97.3 ± 22.2 kg, $P < 0.0001$)	No long term data available		
	Total cohort comprised 204 males: 506 females, age 54.0 ± 9.1; BMI 41.6 ± 8.1; weight 116.1 ± 25.1 kg[81]	At 12 wk, weight change (-18.3 ± 7.3 kg *vs* -19.9 ± 7.0 kg, $P = 0.012$) were significantly less in the T2DM group when compared with the non-T2DM group			
Conclusion				Although expensive VLCD has long term benefits	

Leslie *et al. BMC Family Practice* (2016) 17:20
DOI 10.1186/s12875-016-0406-2

BMC Family Practice

STUDY PROTOCOL Open Access

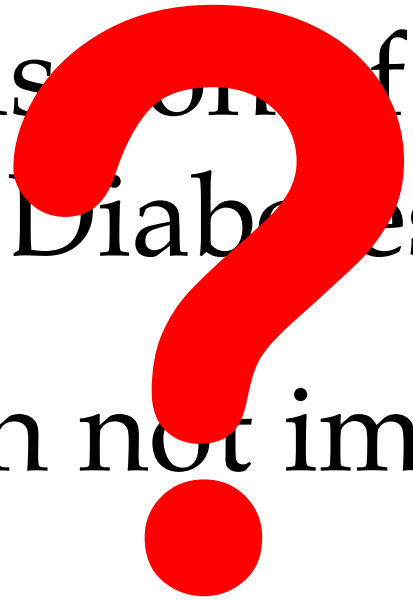
The Diabetes Remission Clinical Trial (DiRECT): protocol for a cluster randomised trial

Wilma S. Leslie[1*], Ian Ford[1], Naveed Sattar[1], Kieren G. Hollingsworth[2], Ashley Adamson[2], Falko F. Sniehotta[2], Louise McCombie[3], Naomi Brosnahan[1], Hazel Ross[3], John C. Mathers[2], Carl Peters[2], George Thom[1], Alison Barnes[2], Sharon Kean[1], Yvonne McIlvenna[1], Angela Rodrigues[2], Lucia Rehackova[2], Sviatlana Zhyzhneuskaya[2], Roy Taylor[2] and Mike E. J. Lean[1]

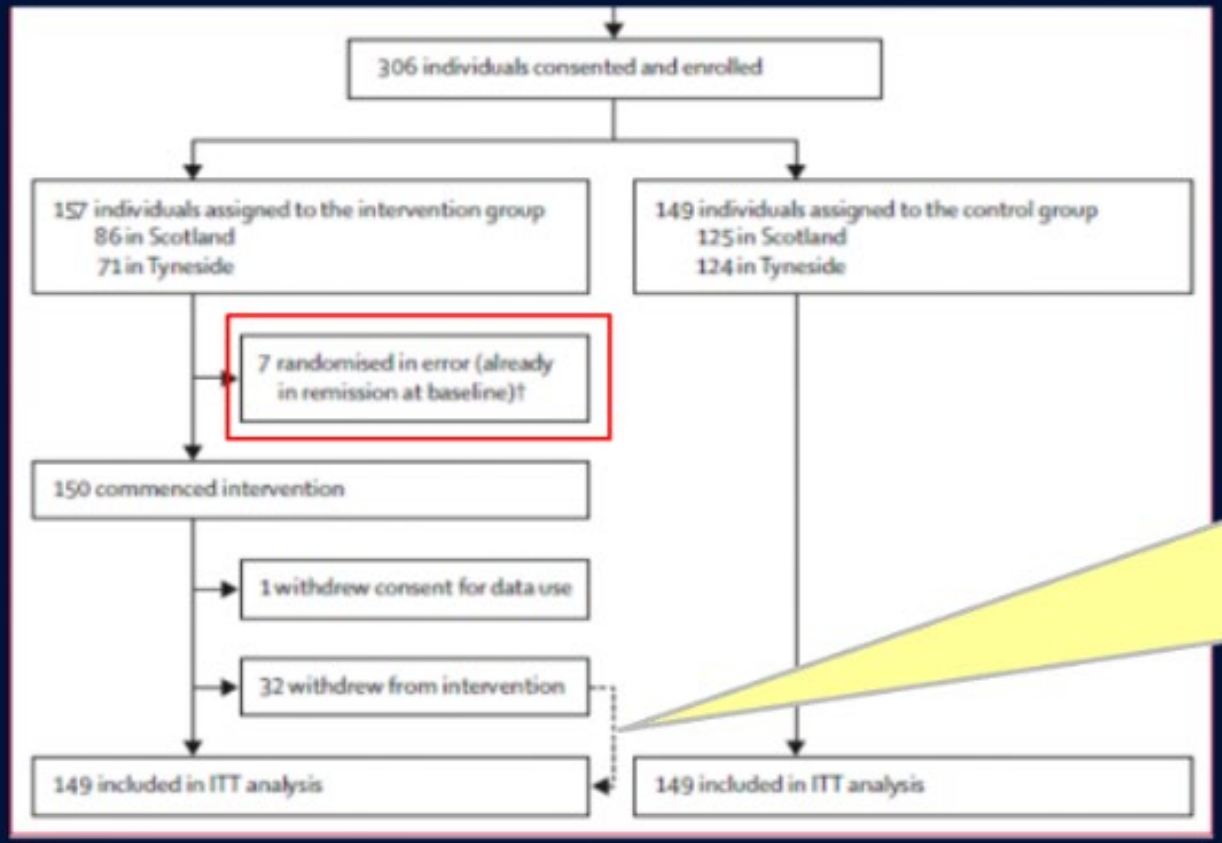
Ed ecco che la vecchia dieta ipocalorica "rivisitata" potrebbe diventare la nuova dieta….

Remission of type 2 Diabetes:

mission not impossible



Results: participant retention



Drop-outs:
12 month outcome data collected within a 100 day window from routine GP clinic records

DiRECT

University of Glasgow

Newcastle University

DIABETES UK
CARE. CONNECT. CAMPAIGN.

DiRECT Intervention: Counterweight-Plus Protocol

Total Diet Replacement - Counterweight Pro800

- Nutritionally complete (vitamins & minerals)
- 830 kcal: 61%E carbohydrate, 13% fat, 26% protein
- >2.25 litres fluid per day
- Fibre supplement

- **Maintain PA** ~30mins/ day

- **STOP** all anti-diabetes medications
- **STOP** all antihypertensive medications



Lean et al, Br J General Practice (2013),
Leslie et al, BMC Family Practice (2016)

DiRECT
University of Glasgow
Newcastle University
DIABETES UK CARE. CONNECT. CAMPAIGN.

DiRECT Intervention: Counterweight-Plus Protocol

Stepped Food Reintroduction
- Add a ~400kcal meal every 2-3 weeks

  Step-counters: gradually increase PA

Weight Loss Maintenance
- Food-based diet +/- meal replacements
- 50%E carbohydrate, 35% fat, 15% protein

Relapse Management (regain >2kg)
- Tool-kit: offer orlistat, brief TDR & FR

Visits 2-4 weekly at own primary care centre
- Total c. 8h with usual NHS nurse/dietitian
- (8 hour initial training & mentoring)





Lean et al, Br J General Practice (2013),

Leslie et al, BMC Family Practice (2016)

ITT Primary Outcome Results

1st Co-Primary Outcome: ≥15 kg weight loss

Intervention	36/149	(24%)	p <0.0001
Control	0/149		

2nd Co-Primary Outcome: Remission of diabetes*

Intervention	68/149	(46%)	p <0.0001
Control	6/149	(4%)	

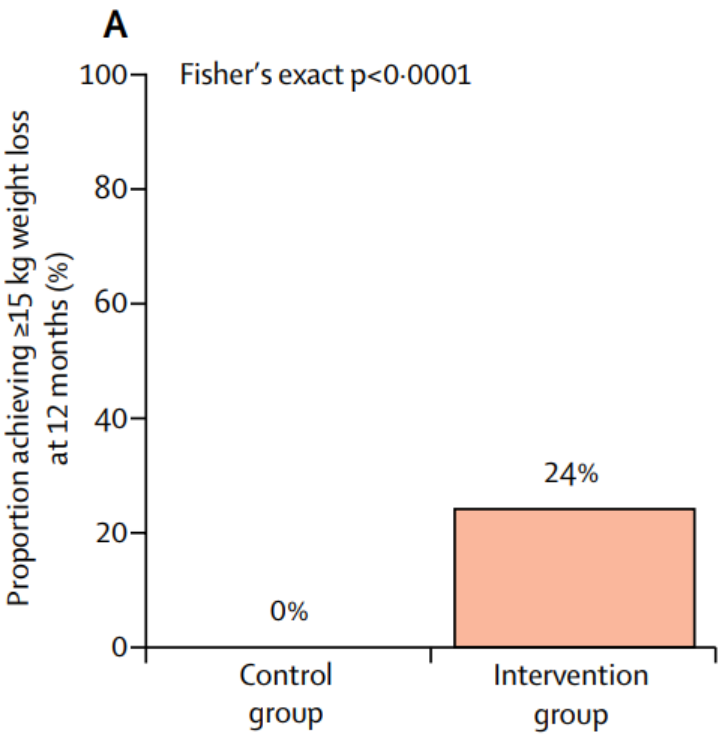
* HbA1c <48 mmol/mol,
off all anti-diabetes medication for at least 2 months

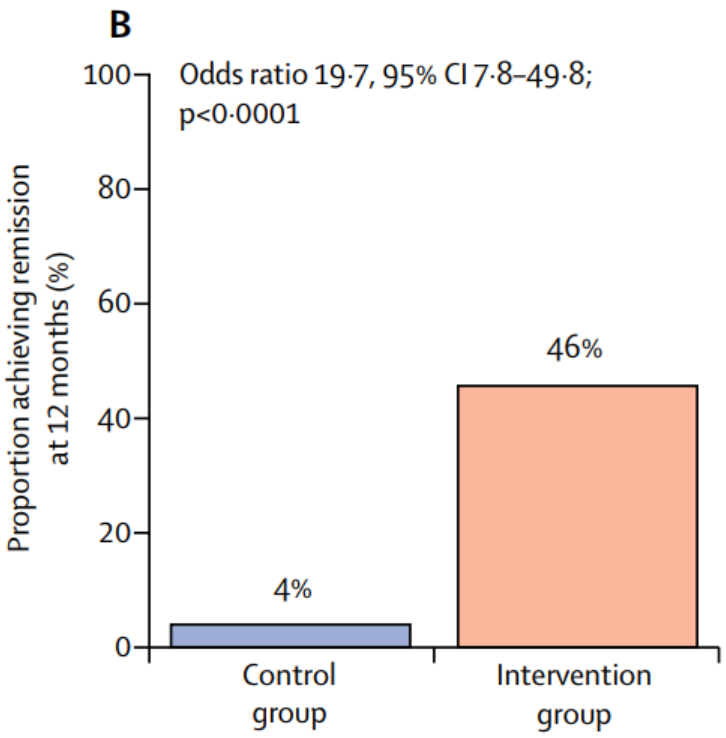
DiRECT
University of Glasgow
Newcastle University
DIABETES UK
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First co-primary outcome:

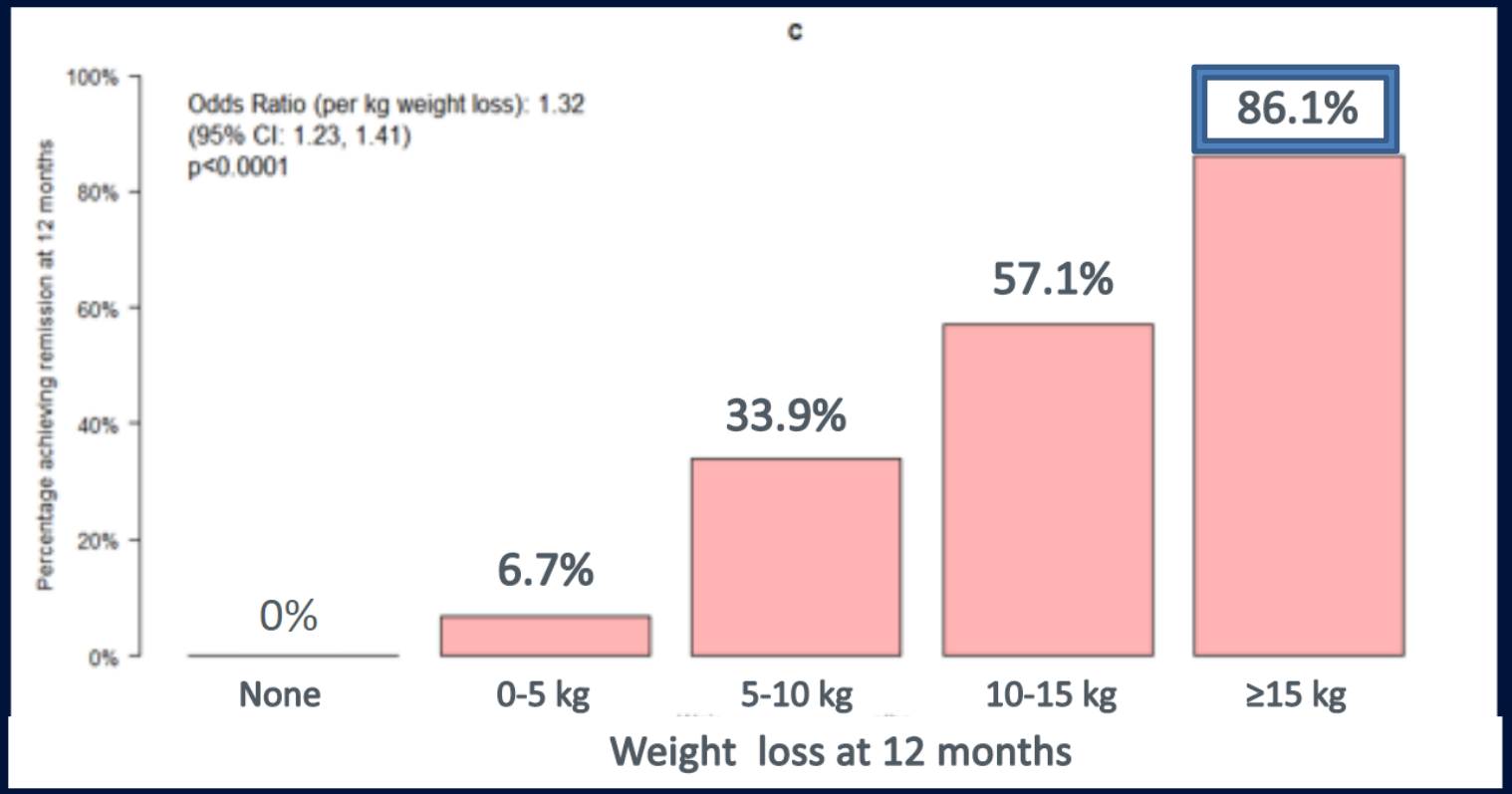
A) Achievement of at least 15 kg weight loss at 12 months

B) Second co-primary outcome: remission of diabetes (glycated haemoglobin < 6,5%, off anti-diabetics medication for 2 months)





Remissions by 12m weight loss: entire study population



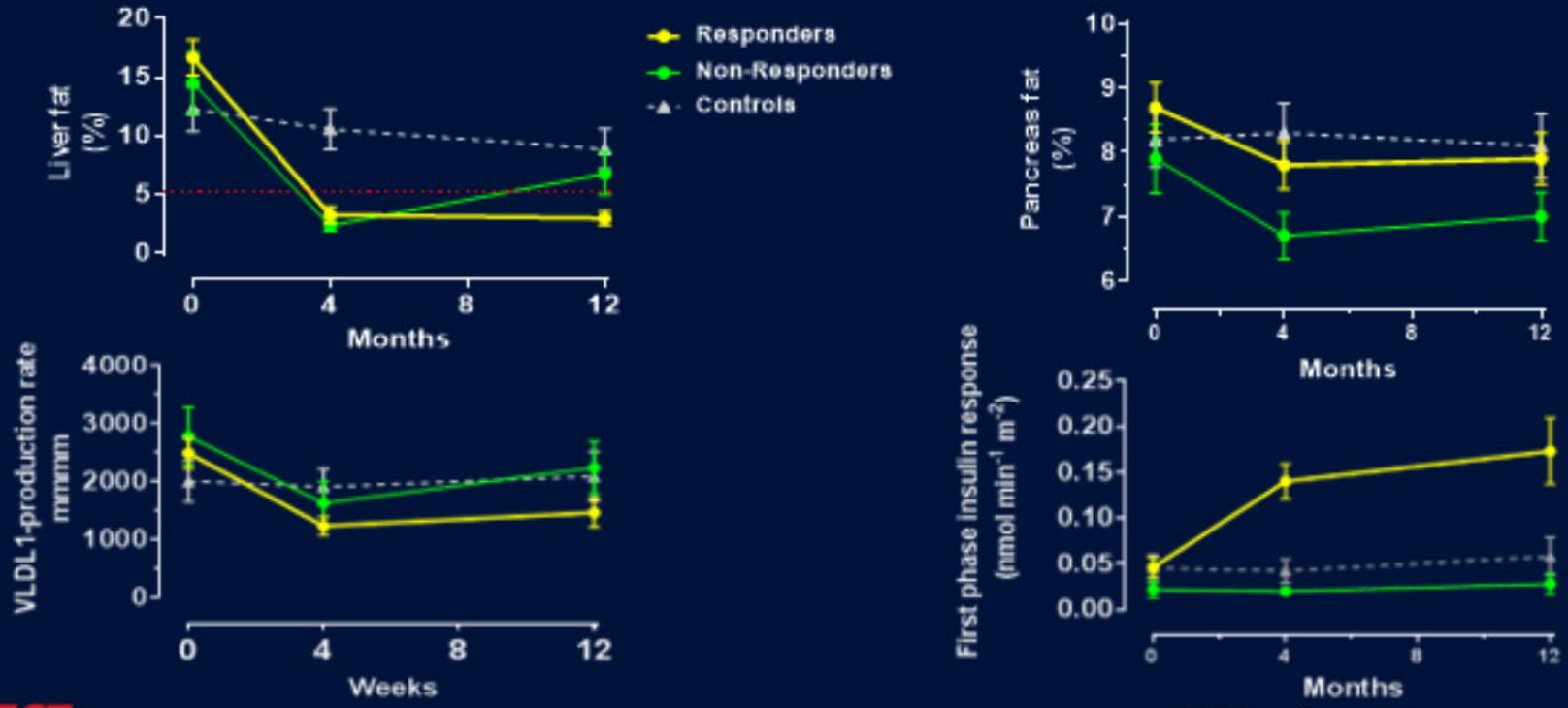
DiRECT

University of Glasgow

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DiABETES UK
CARE. CONNECT. CAMPAIGN.

Liver and pancreas in Responders (Remissions), Non-responders and Controls



Taylor R, Lean M et al. unpublished (IDF 2017)

DiRECT: Conclusions and Actions

- T2DM is a complication of weight gain and excess body fat, and it is not necessarily a permanent condition
- Structured 1° care weight management welcomed by patients, & safe
- Almost half with early T2DM achieve remission (73% with >10kg loss)

- Remission should become a primary aim of diabetes care
- Ethics: Offer optimal non-surgical weight management first, before prescribing (or trialling) additional treatments for T2DM
- Record, recode and reward (patients and clinics) for remissions

DiRECT

University of Glasgow

Newcastle University

DiABETES UK
CARE. CONNECT. CAMPAIGN.







Alimenti ricchi in carboidrati





THE LANCET, AUGUST 30, 1980

EFFECT OF DIETARY FIBRE ON GLUCOSE CONTROL AND SERUM LIPOPROTEINS IN DIABETIC PATIENTS

A. RIVELLESE
A. GIACCO
S. GENOVESE
G. RICCARDI
D. PACIONI
P. L. MATTIOLI
M. MANCINI

University of Naples, 2nd Faculty of Medicine, Institute of Semeiotica Medica, Napoli, Italy

Clinical Care/Education/Nutrition
ORIGINAL ARTICLE

Long-term Dietary Treatment With Increased Amounts of Fiber-Rich Low-Glycemic Index Natural Foods Improves Blood Glucose Control and Reduces the Number of Hypoglycemic Events in Type 1 Diabetic Patients

Giacco R. *et al.* - Diabetes Care, 2000

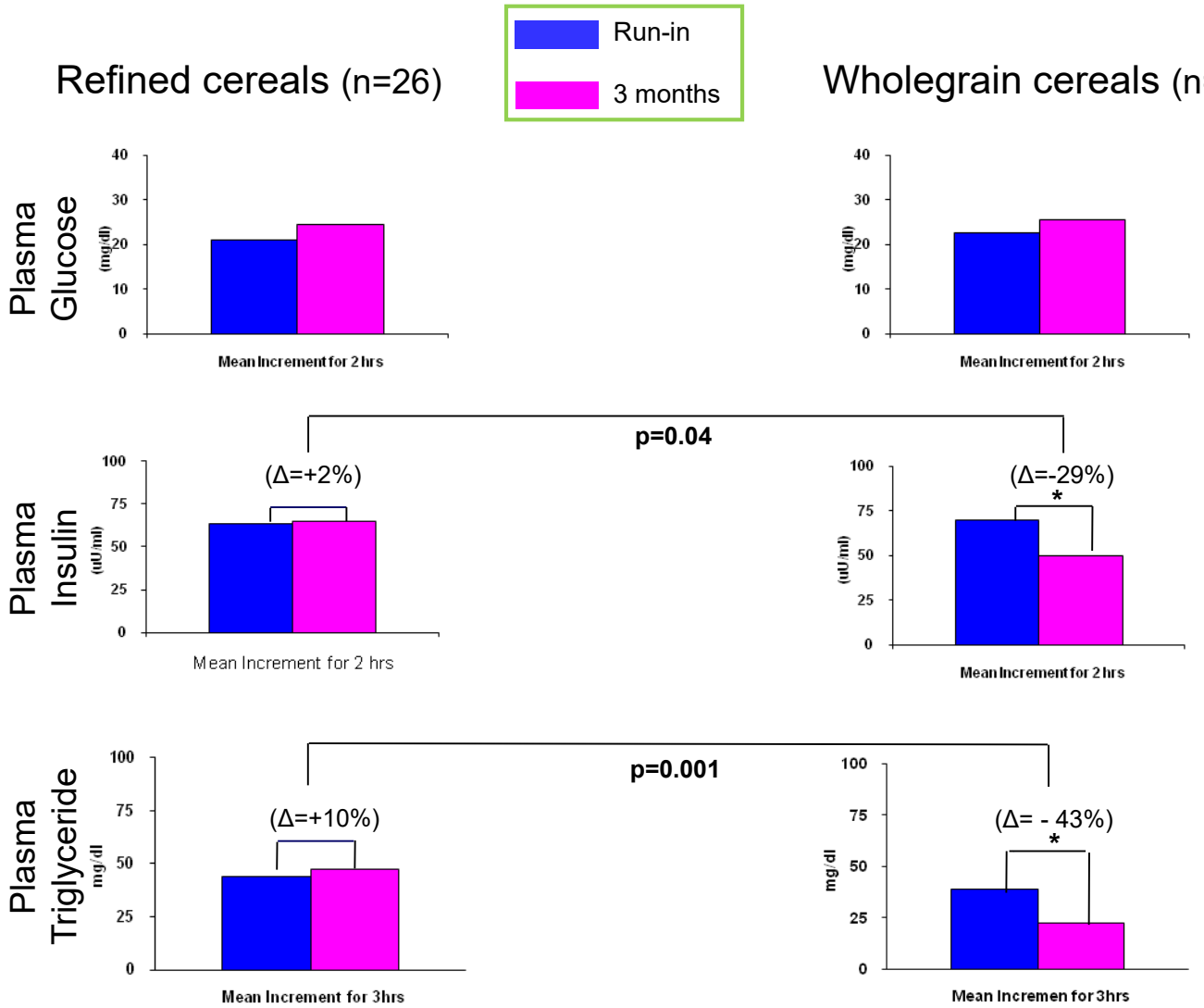
Clinical Care/Education/Nutrition/Psychosocial Research
ORIGINAL ARTICLE

Effects of a Plant-Based High-Carbohydrate/High-Fiber Diet Versus High-Monounsaturated Fat/Low-Carbohydrate Diet on Postprandial Lipids in Type 2 Diabetic Patients

De Natale C *et al.,* Diabetes Care 2009

HEALTHGRAIN

A diet rich in whole grains improves the action of insulin and reduces triglycerides levels in the postprandial period



*p<0.05 vs 12 week (Paired Smaple t-test)

(Giacco R *et al.* – NMCD, 2014)

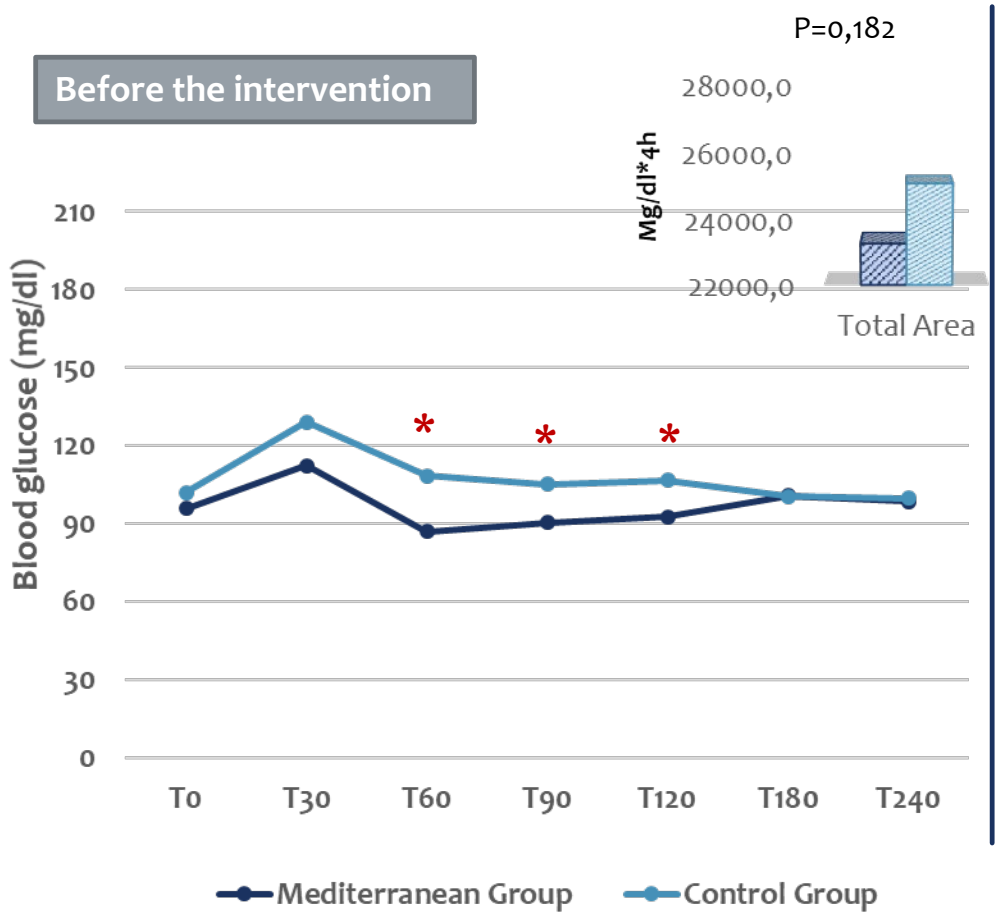
ENERGY AND NUTRIENT COMPOSITION OF THE DIETS FOLLOWED BY THE PARTICIPANTS

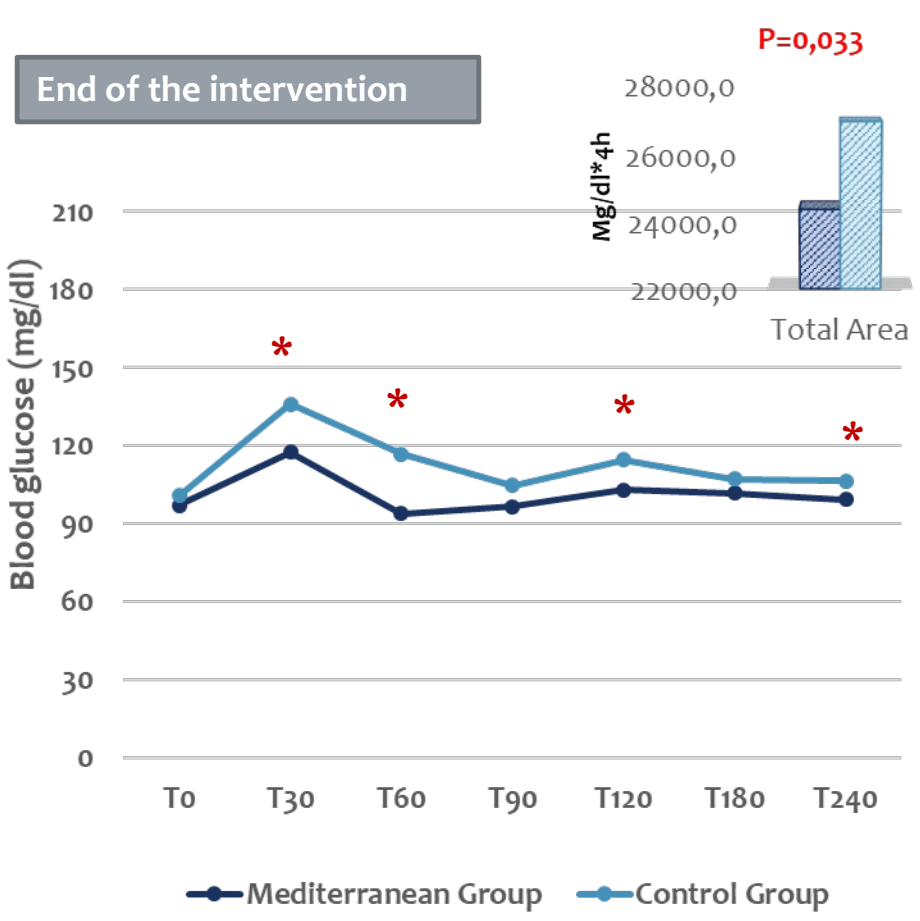
	MED Group	Control Group	MED Group	Control Group
	Baseline		After 8-wk of intervention	
	n=16	n=13	n=16	n=13
Total Energy (Kcal/day)	1857±404	1879±582	1842±454	1816±574
Carbohydrates (% of TE)	46,8±4,4	47,1±5,9	48,1±5,6	49,0±5,8
Fiber (g/1000 Kcal)	11,7±2,4	10,0±2,3	19,3±3,1	8,1±2,3*
Total Proteins (% of TE)	16,7±2,9	16,2±3,5	15,6±2,1	15,2±3,4
Animal sources (% of TE)	10,1±3,4	9,2±3,6	5,8±2,3	8,6±4,0*
Vegetable sources (% of TE)	5,7±1,2	5,1±1,1	9,0±1,6	4,6±0,8*
Vegetable / Animal proteins ratio	0,6±0,3	0,6±0,2	1,8±0,9	0,6±0,3*
Total Fat (% of TE)	34,1±3,9	34,5±4,9	34,6±6,1	34,7±5,4
SFA (% of TE)	9,7±2,5	8,8±2,0	6,7±1,4	9,2±1,9*
MUFA (% of TE)	15,1±2,1	14,9±4,2	17,9±3,8	13,6±2,6*
PUFA (% of TE)	4,3±1,0	3,9±0,9	6,2±1,6	3,8±0,9*

* p<0.05 vs Mediterranean Group, Indipendent sample T-Test

ACUTE AND CHRONIC POSTPRANDIAL METABOLIC RESPONSE

BLOOD GLUCOSE





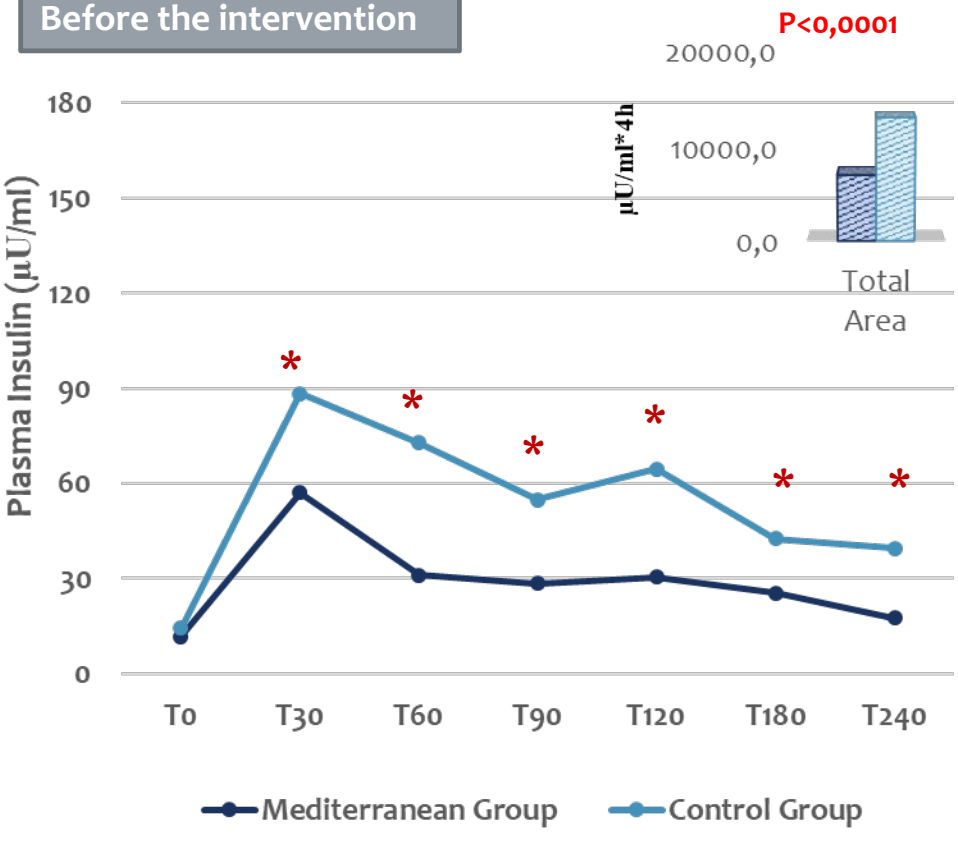
* p<0.05 vs Mediterranean Group, Indipendent sample T-Test

Unpublished Data

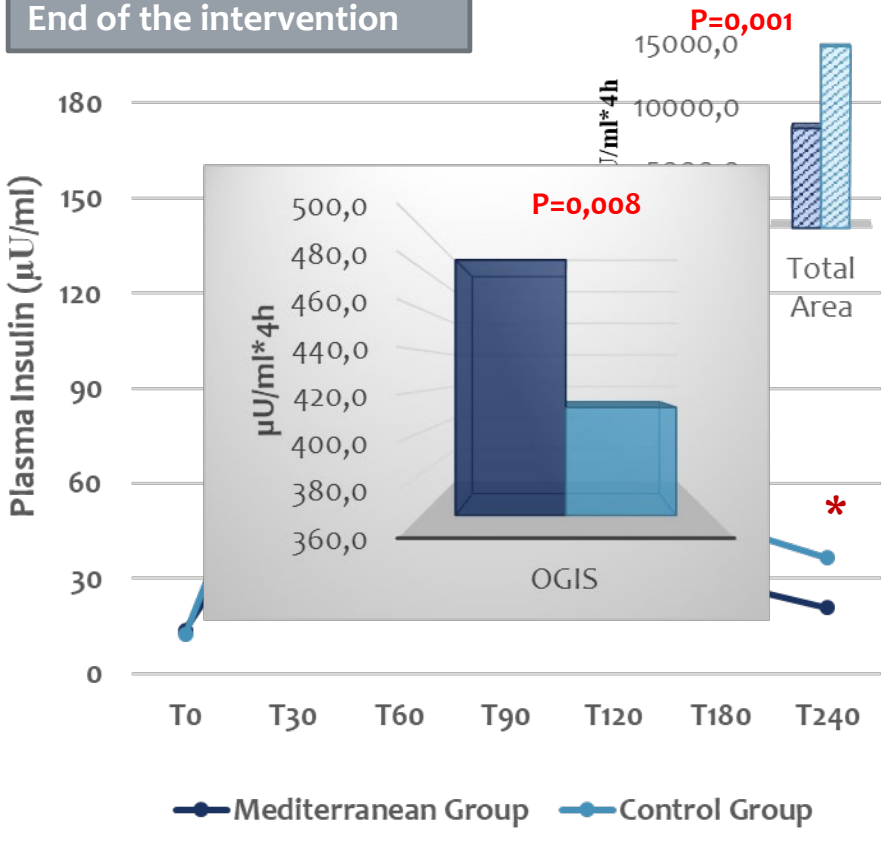
ACUTE AND CHRONIC POSTPRANDIAL METABOLIC RESPONSE

PLASMA INSULIN

Before the intervention



End of the intervention



* p<0.05 vs Mediterranean Group, Indipendent sample T-Test

(Unpublished Data)

Unhealthy CHO





Healthy CHO



Amount less relevant

Quality/type makes difference





Healthy CHO within the context of healthy dietary patterns





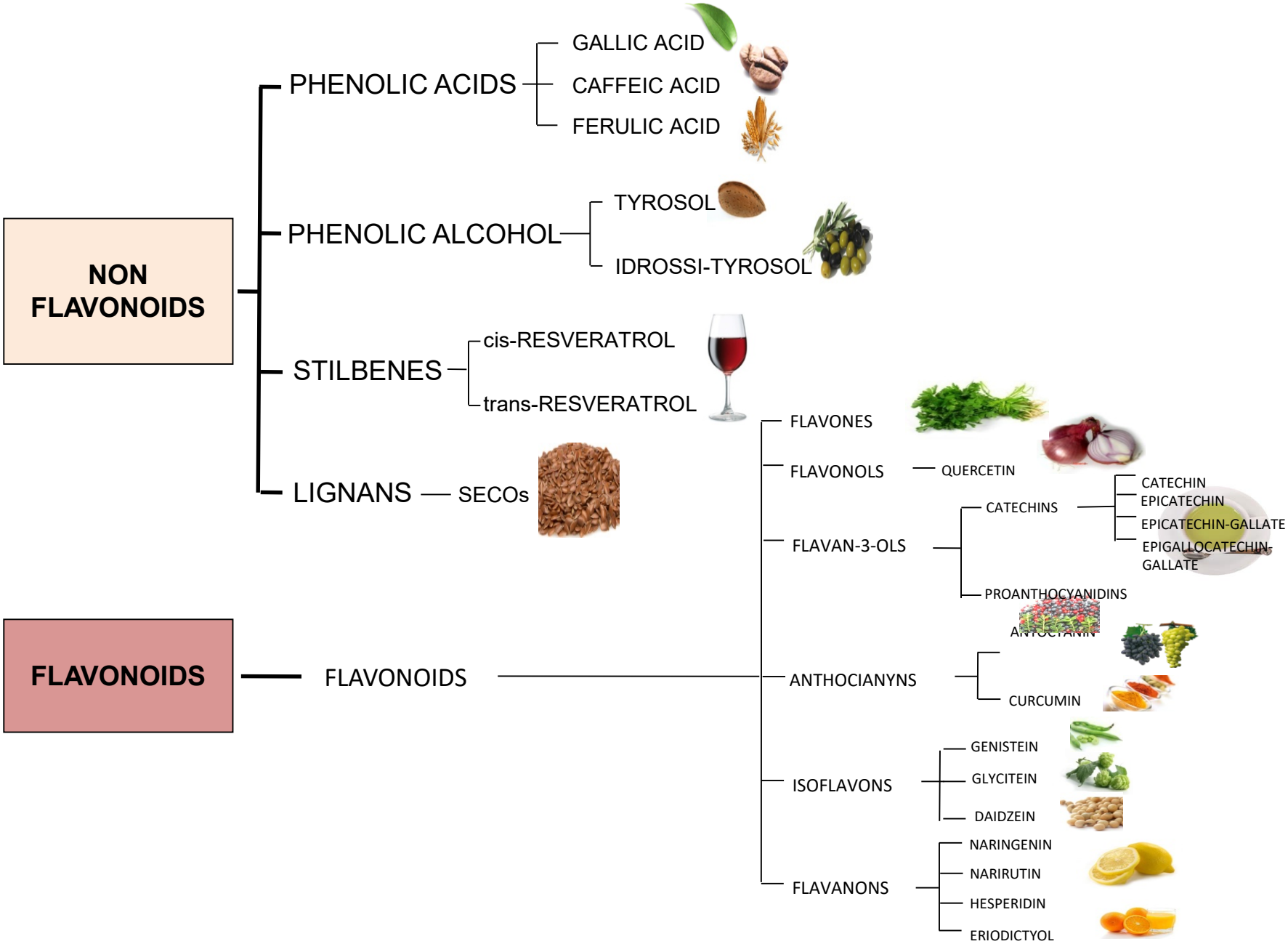




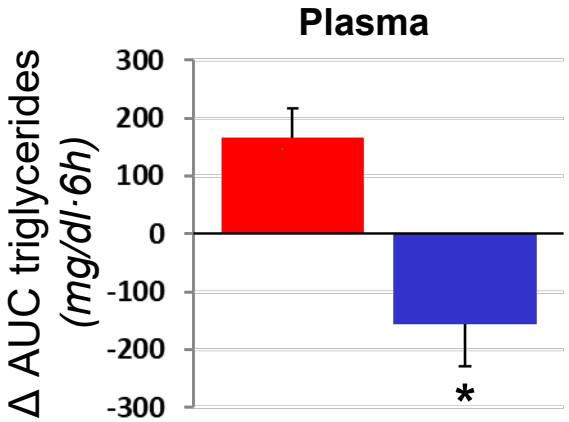




Poyphenols: Classification and Major sources



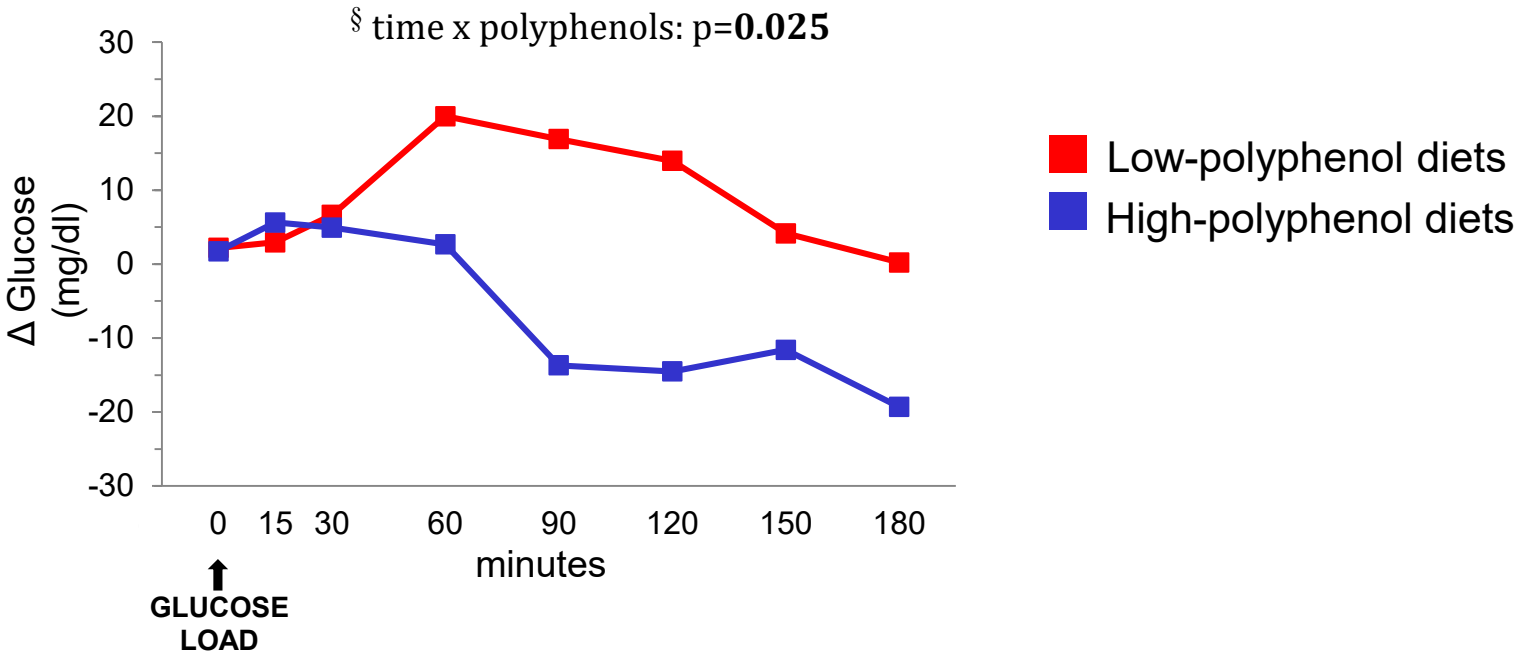
Absolute change (8 week - baseline) of lipid response to the test meal



* p<0.05 for polyphenol effect (2-factor ANOVA)

Annuzzi G *et al.* – Am J Clin Nutr, 2014

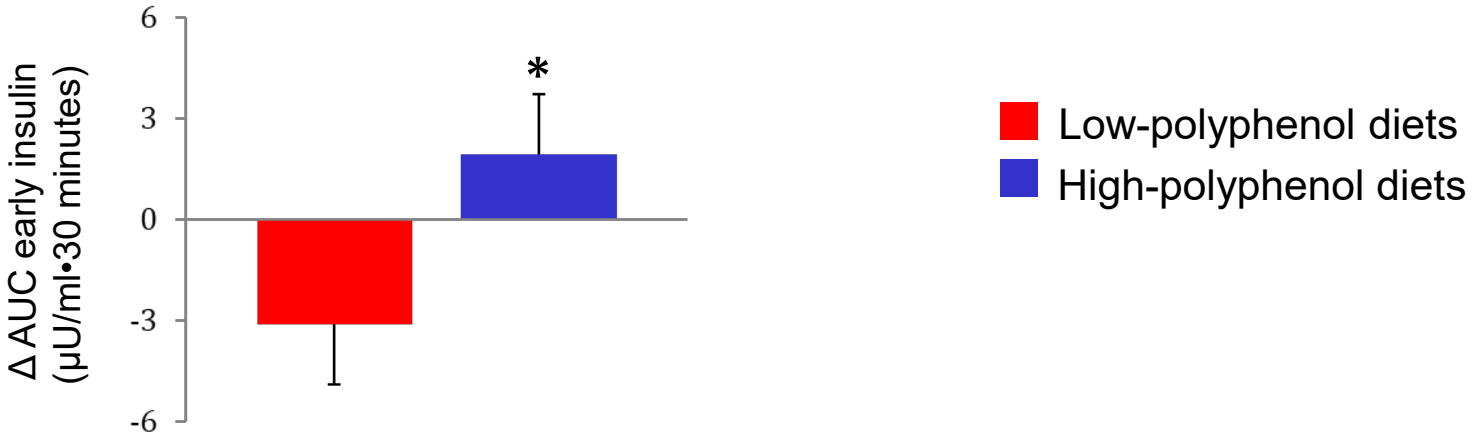
Absolute change (8 week - baseline) of glucose response during the OGTT



§ GLM repeated measures
* p<0.05 for polyphenol effect (2-factor ANOVA)

Bozzetto L *et al*. -Diabetologia, 2015

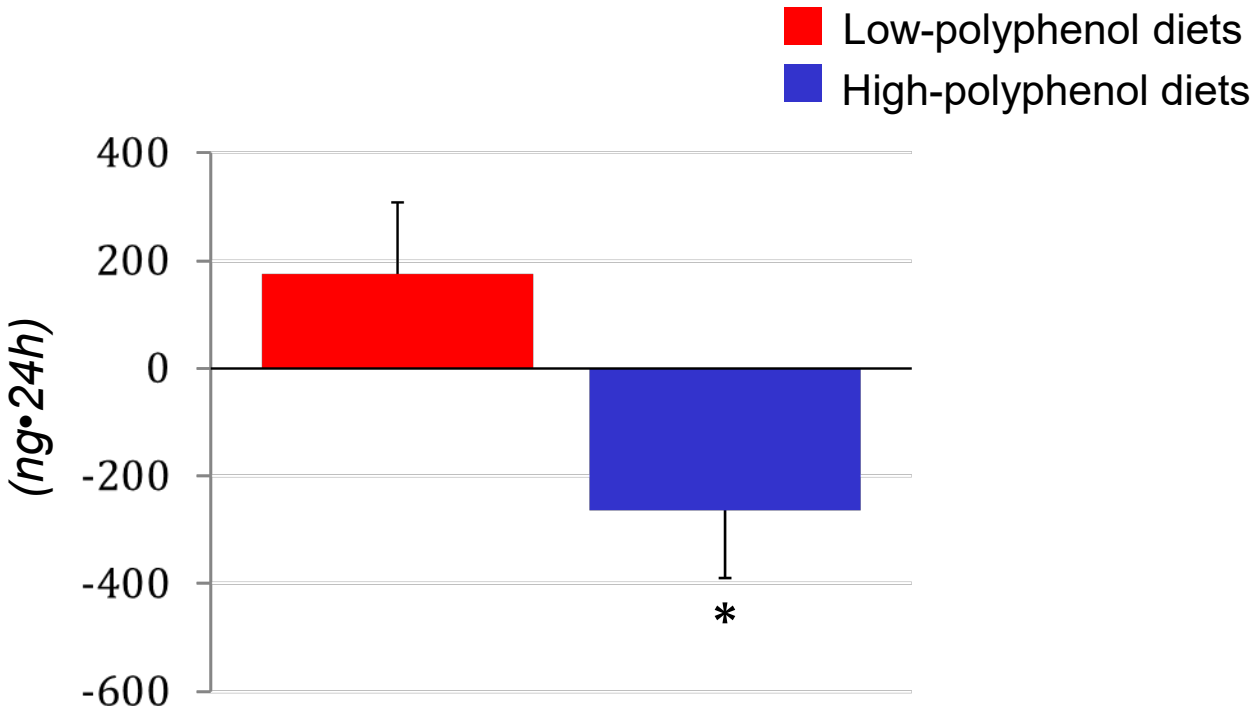
Absolute change (8 week - baseline) of early insulin secretion, β-cell function and insulin sensitivity during the OGTT



* p<0.05 for polyphenol effect (2-factor ANOVA)

Bozzetto L *et al*. -Diabetologia, 2015

Absolute change (8 week - baseline) of urinary isoprostanes



* p<0.05 for polyphenol effect (2-factor ANOVA)

Annuzzi G *et al.* – Am J Clin Nutr, 2014

A diet naturally-rich in polyphenols:

- decreases lipid levels in the postprandial period
- reduces oxidative stress (urinary isoprostanes)
- improves glucose tolerance likely by increasing
  - early insulin secretion (30 minutes)
  - insulin-sensitivity (OGIS)

In our trial, the effect of polyphenols on clinical outcomes seem to be related mainly to:



FLAVANONES



POSTPRANDIAL LIPID RESPONSE



FLAVONES

GLUCOSE RESPONSE



FLAVAN-3-OLS



OXIDATIVE STRESS and EARLY INSULIN SECRETION

Take Home Messages

- Una riduzione del peso di 10-15 Kg determina una remissione del diabete del 57-86% in pazienti con breve durata della malattia.
- Strategie per ottenere e mantenere tale riduzione ponderale dovrebbero essere implementate tenendo conto delle diverse realtà.
- Nuovi e vecchi componenti della dieta sono importanti nell'ottimizzazione del controllo glicemico e degli altri fattori di rischio cardiovascolare.

A.A. Rivellese
G. Riccardi
G. Annuzzi
R. Giacco
L. Bozzetto
C. De Natale
B. Capaldo
O. Vaccaro
G. Della Pepa
M. Masulli

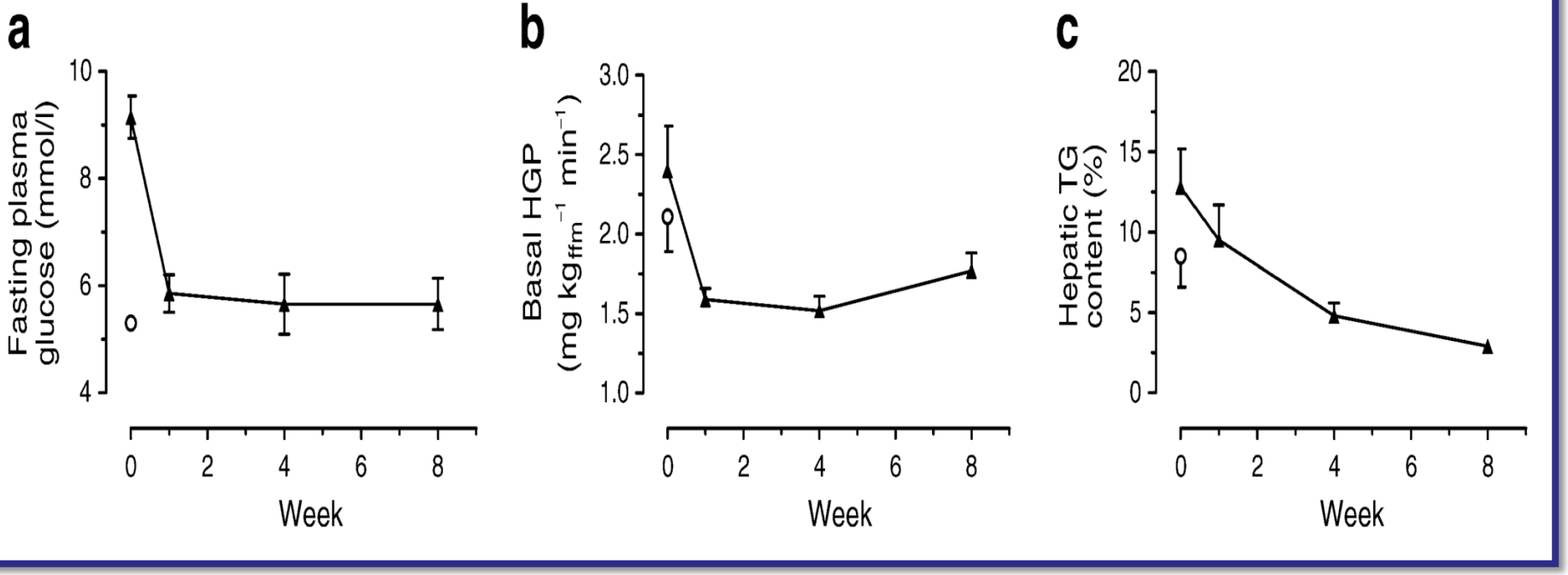


L. Di Marino
L. Patti
P. Cipriano
G. Costabile
E. Griffo
A. Mangione

A. Giacco
A. Rivieccio
G. Anniballi
O. Ciano
C. Vetrani
M. Vitale

… AT WORK !

Effect of 8 weeks of dietary intervention on (a) plasma glucose, (b) hepatic glucose production (HGP) and (c) hepatic triacylglycerol content (TG) for diabetic participants (black triangles).



White circles indicate the mean for the weight-matched non-diabetic control group.
Data are shown as mean ± SE

Lim EL, Diabetologia 2011

4. Lifestyle Management: *Standards of Medical Care in Diabetes—2018*

• Weight loss (>5%) achievable by the combination of reduction of calorie intake and lifestyle modification benefits overweight or obese adults with type 2 diabetes and also those with prediabetes. Intervention programs to facilitate weight loss are recommended.	**A**
• There is no single ideal dietary distribution of calories among carbohydrates, fats, and proteins for people with diabetes; therefore, macronutrient distribution should be individualized while keeping total calorie and metabolic goals in mind.	**E**
• A variety of eating patterns are acceptable for the management of type 2 diabetes and prediabetes.	**B**

Tabella 4.F1. Indicazioni generali per la composizione ottimale della dieta nel diabete di tipo 2.

Componenti della dieta	Quantità complessiva consigliata	Quantità consigliata dei singoli nutrienti	Consigli pratici
Carboidrati	45-60% kcal tot (III, B)	• Saccarosio e altri zuccheri aggiunti <10% (I, A)	• Vegetali, legumi, frutta, cereali preferibilmente integrali, alimenti della dieta mediterranea (III, B)
Fibre	>40 g/die (o 20 g/1000 kcal die), soprattutto solubili (I, A)		• 5 porzioni a settimana di vegetali o frutta e 4 porzioni a settimana di legumi (I, A)
Proteine	10-20% kcal tot (VI, B)		
Grassi	35% kcal tot (III, B)	Saturi <10, <8% se LDL elevato (I, A) MUFA 10-20% (III, B) PUFA 5-10% (III, B) Evitare ac. grassi trans (VI, B) Colesterolo <300 mg/die, <200 mg/die se colesterolo elevato (III, B)	• Tra i grassi da condimento preferire quelli vegetali (tranne olio di palma e di cocco)
Sale	<6 g/die (I, A)		• Limitare il consumo di sale e di alimenti conservati sotto sale (insaccati, formaggi, scatolame)

James Lind Alliance research priorities: what role do carbohydrates, fats and proteins have in the management of Type 2 diabetes, and are there risks and benefits associated with particular approaches?

P. Dyson[1], P. McArdle[2], D. Mellor[3] and N. Guess[4]

Diabet Med. 2018 Sep 27.

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[11]. However, for many people with diabetes, there remains a degree of confusion about the most appropriate diet for optimizing glycaemic control, for weight management and for cardiovascular disease (CVD) risk reduction. The majority of authorities recommend a balanced or healthy diet for diabetes, yet the media is full of advice about low-carbohydrate, high-fat and high-protein diets. This confusion appeared to be reflected in the top 10 research priorities from the James Lind Alliance, and at number 10 was the question 'What role do carbohydrates, fats and proteins have in the management of Type 2 diabetes, and are there risks and benefits associated with particular approaches?' This review aims to explore and answer this question.

Table 1 Definition of high or low macronutrient intake as defined in the research literature or as consensus definitions

Macronutrient	g/day	% total energy intake
Carbohydrate		
Very-low carbohydrate	20–50	6–10
Low carbohydrate	<130	<26
Moderate carbohydrate	130–225	26–45
High carbohydrate	>225	>45
Fat		
Mean UK fat intake	67–89	30–40
Low fat	67	≤30
Recommended lower limit	44	20
Protein		
High intake (90^{th}–97^{th} centile in Europe)	85–135	17–27
High protein	125	25
Proposed upper limit	175	35

Dyson P, McArdle P, Mellor D, Guess N. James Lind Alliance research priorities: what role do carbohydrates, fatsand proteins have in the management of Type 2 diabetes, and are there risks and benefits associated with particular approaches? Diabet Med. 2018 Sep 27

About Us

- The Counterweight Programmes
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→ Counterweight Familes



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About Us

Counterweight Ltd. enables a wide spectrum of organisations access to evidence based weight management programmes.



Counterweight Ltd. spun out from the Robert Gordon University in September 2011, selling programmes for the management of overweight and obesity.

- Counterweight research began in 2000 involving collaboration between seven UK Universities.
- Research involved assessing the burden of overweight and obesity in the NHS, and development and evaluation of three novel weight management programmes

The First developement is The Counterweight Programme:

- Aimed at a moderate weight loss of 5-10% and has demonstrated evidence of both clinical and cost effectiveness.
- It is a structured weight management intervention delivered over a 12-month period, using behavioural strategies to assist people change their lifestyle

The second development is Counterweight Plus:

- A programme aimed at 15% weight loss or more for individuals with a higher BMI.
- This programme involves a total diet replacement phase over 12 weeks, followed by stepped, structured food re-introduction and then a weight maintenance phase over 18-months.

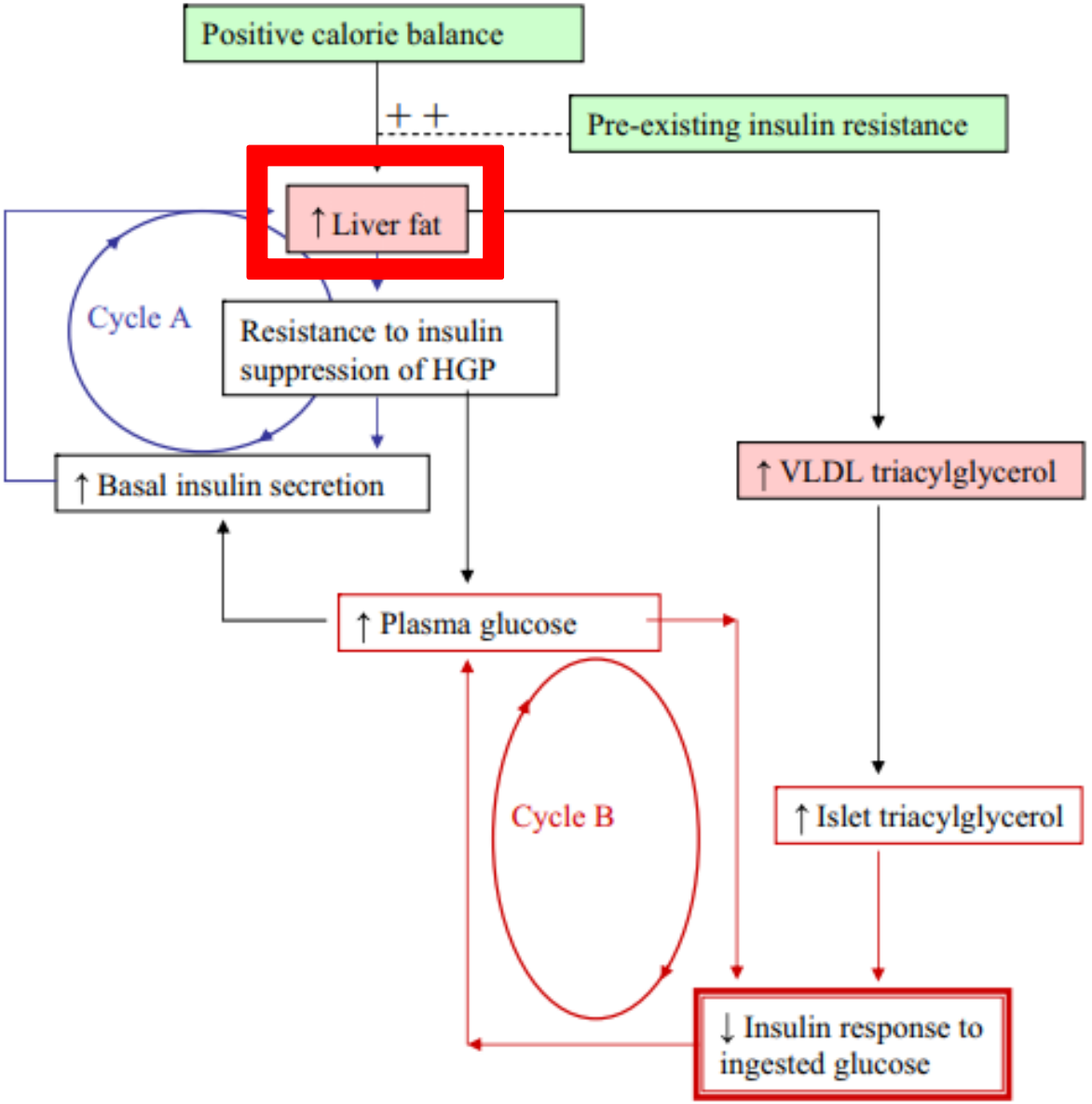
The third development is Counterweight Families:

- A novel intervention for adults and children delivered over 12-months

Metodi

Studio open-label randomizzato a cluster (DiRECT) in 49 centri di assistenza di base in Scozia e nella regione di Tyneside in Inghilterra.
I centri sono stati assegnati casualmente (1:1), tramite un elenco generato dal computer, a fornire un programma di gestione del peso (gruppo di intervento) o un'assistenza standard secondo le linee guida (controllo).

The twin vicious cycles of type 2 diabetes



Diabetologia. 2008 Oct;51(10):1781-9. doi: 10.1007/s00125-008-1116-7. Epub 2008 Aug 26.**Pathogenesis of type 2 diabetes: tracing the reverse route from cure to cause.** Taylor R[1].

DINAMIC STUDY

29 overweight subject were enrolled in the study



RUN-IN
2 wks

Randomization

Mediterranean Group (n=16)



Control Group (n=13)



0 wk

4 wks

8 wks

7-d food record

Body weight, waist and hip circumferences, body composition

Blood samples for glucose and lipid profile at fasting and in the postprandial state (over 4-h test meal resembling the assigned diet)

JPI
a healthy diet for a healthy life





Fibre
Basso indice glicemico







Different dietatary approaches

South Beach diet	Low carb and high fat	Phase 1: no carbs for 2 weeks (weight loss = 10–14 lbs/2 weeks) Phase 2: gradual introduction of low GI carbs (weight loss = 1–2 lbs/week) Phase 3: maintenance high-intensity interval training (30 min/day)
Atkins diet	No calorie restriction, low carbohydrate with unrestricted protein and fat intake	Induction phase = 2 weeks < 20 g/day carb (weight loss = 10 lbs/2 weeks) Ongoing weight loss phase: gradual carb increase 5 g/day (weight loss 1–2 lb/week) Pre-maintenance phase: carb intake 40–100 g/day Maintenance phase: maintain ideal carb balance
Mediterranean diet	50–55% low GL carb, 30% fats, 15–20% protein	Dietary pattern followed in Southern European countries rich in MUFA, PUFA, and predominantly plant-based foods
Zone diet	40% low GL carb, 30% fat, 30% protein	Diet provided in Zone food blocks
Intermittent fasting	Abstinence from food	Time-restricted IF Complete IF Modified IF

Curr. Nutr. Report,2018