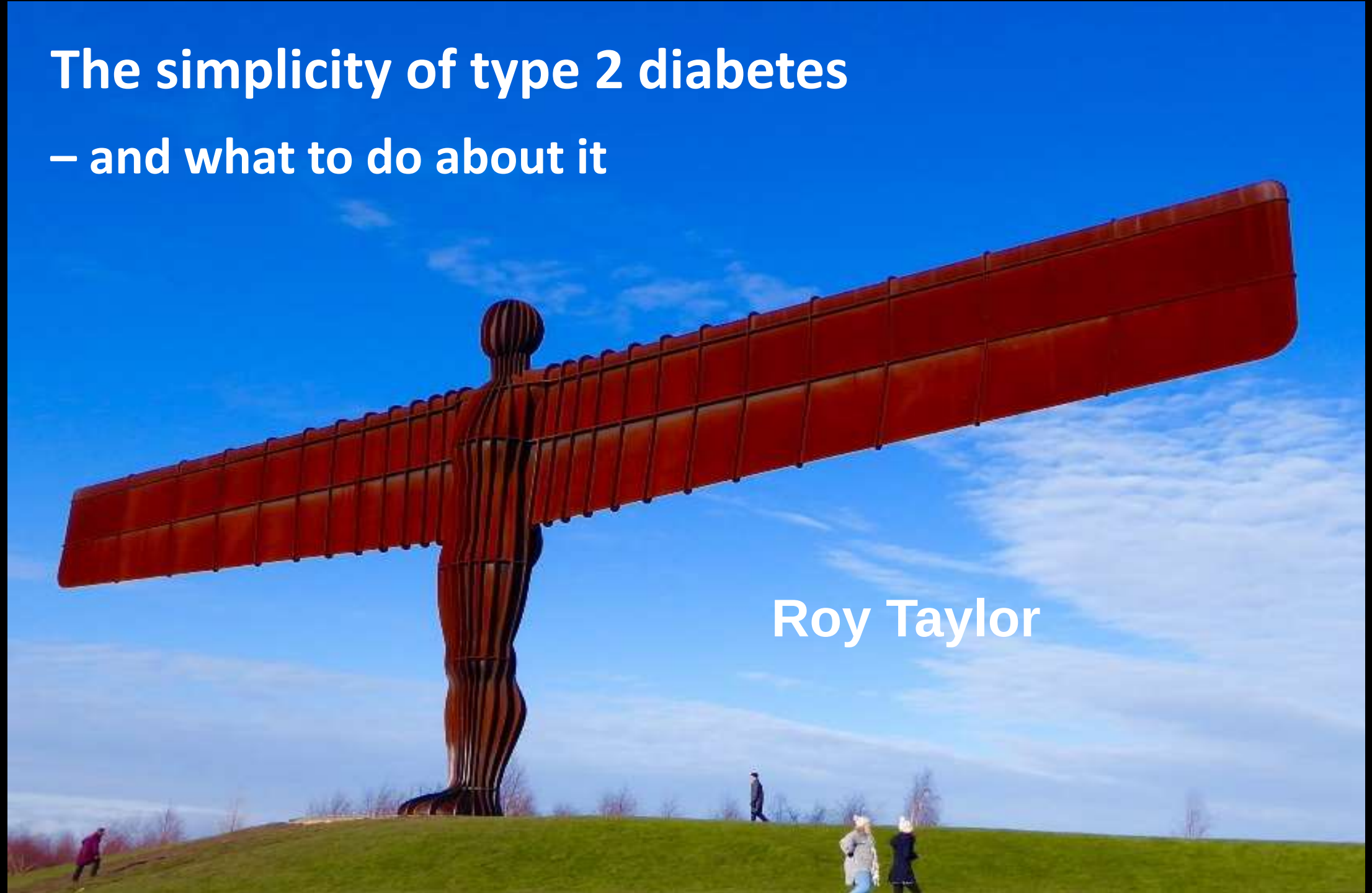
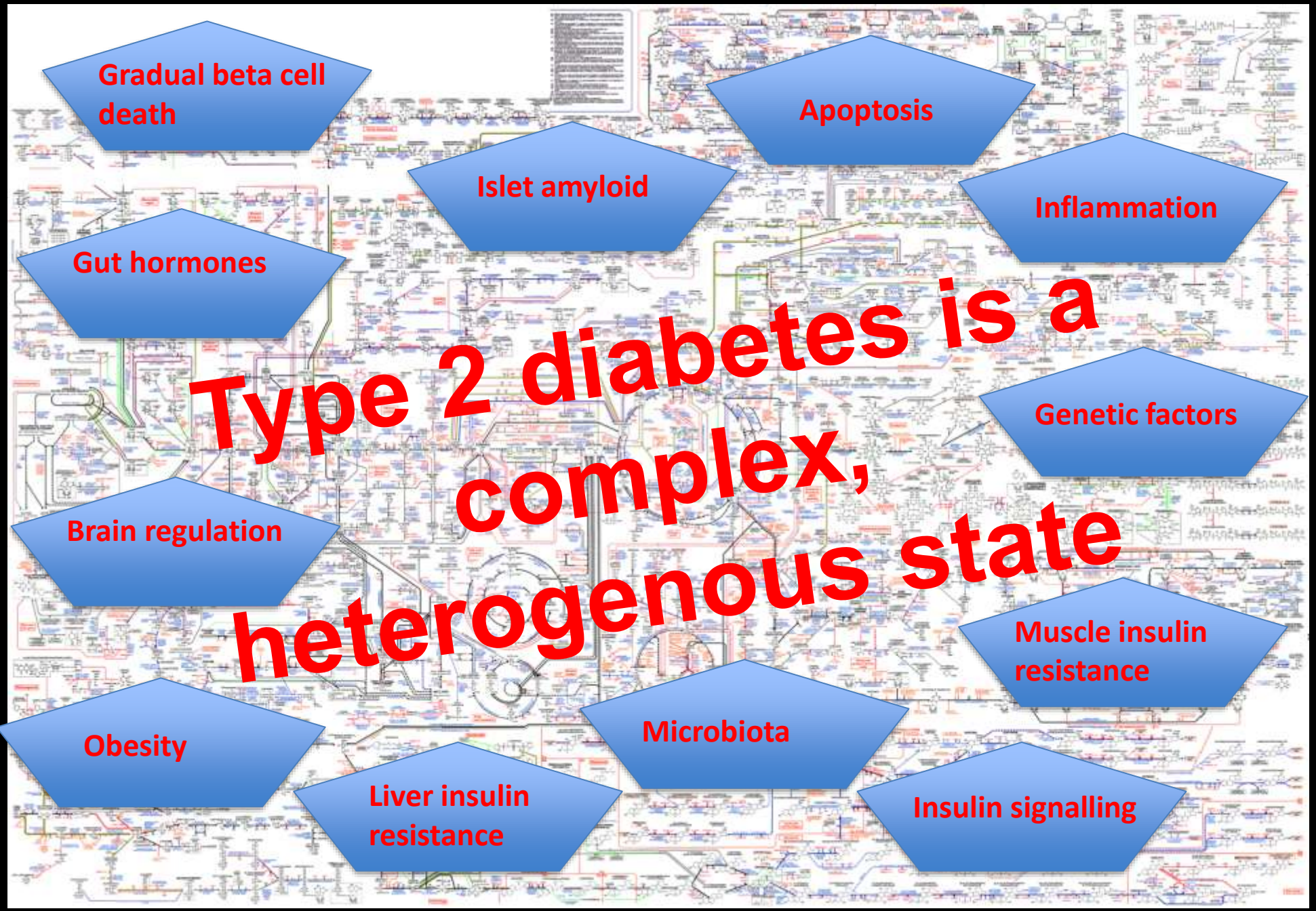
The simplicity of type 2 diabetes

– and what to do about it



Roy Taylor


Gradual beta cell death
Apoptosis
Islet amyloid
Inflammation
Gut hormones
Type 2 diabetes is a complex, heterogenous state
Genetic factors
Brain regulation
Muscle insulin resistance
Obesity
Microbiota
Liver insulin resistance
Insulin signalling

The twin cycle hypothesis

Type 2 diabetes is a simple condition

caused by too much fat

in liver and pancreas

Taylor R, Diabetologia 2008; 51: 1781

The twin cycle hypothesis

Negative calorie balance in people with type 2 diabetes will:

Liver

Decrease fat – improve insulin action and normalise overnight blood sugar

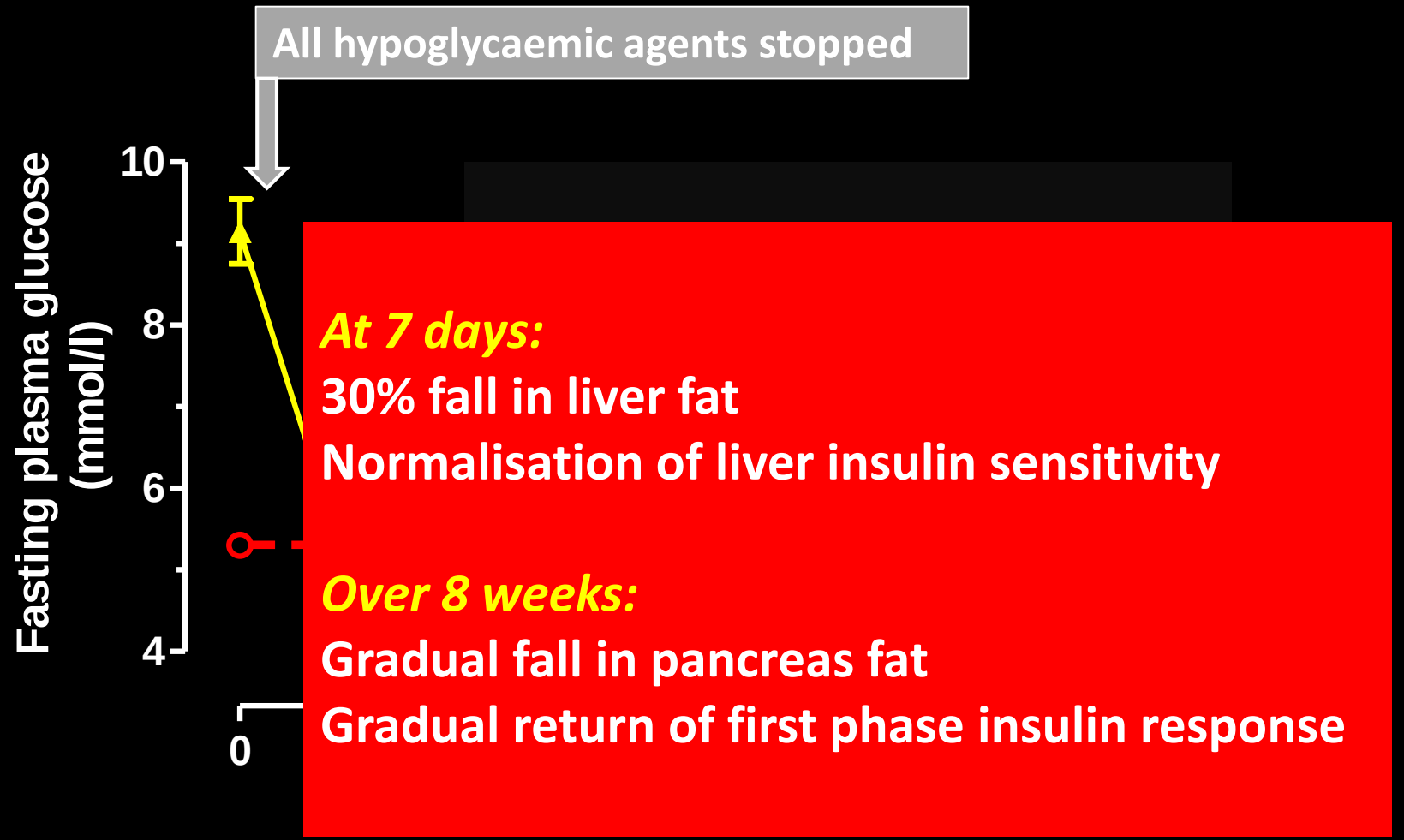
and

Pancreas

Decrease fat – normalise the insulin response to eating

Taylor R, Diabetologia 2008; 51: 1781

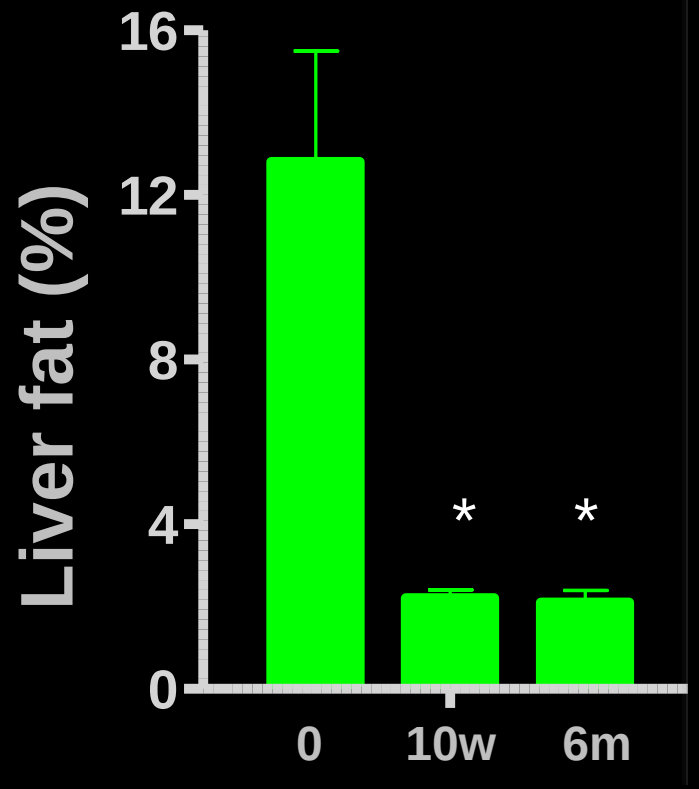
Effect of very low calorie diet on fasting glucose
The COUNTERPOINT study



Lim E-L et al, Diabetologia 2011; 54: 2506

The 2nd study - Counterbalance: VLCD then 6 months normal eating

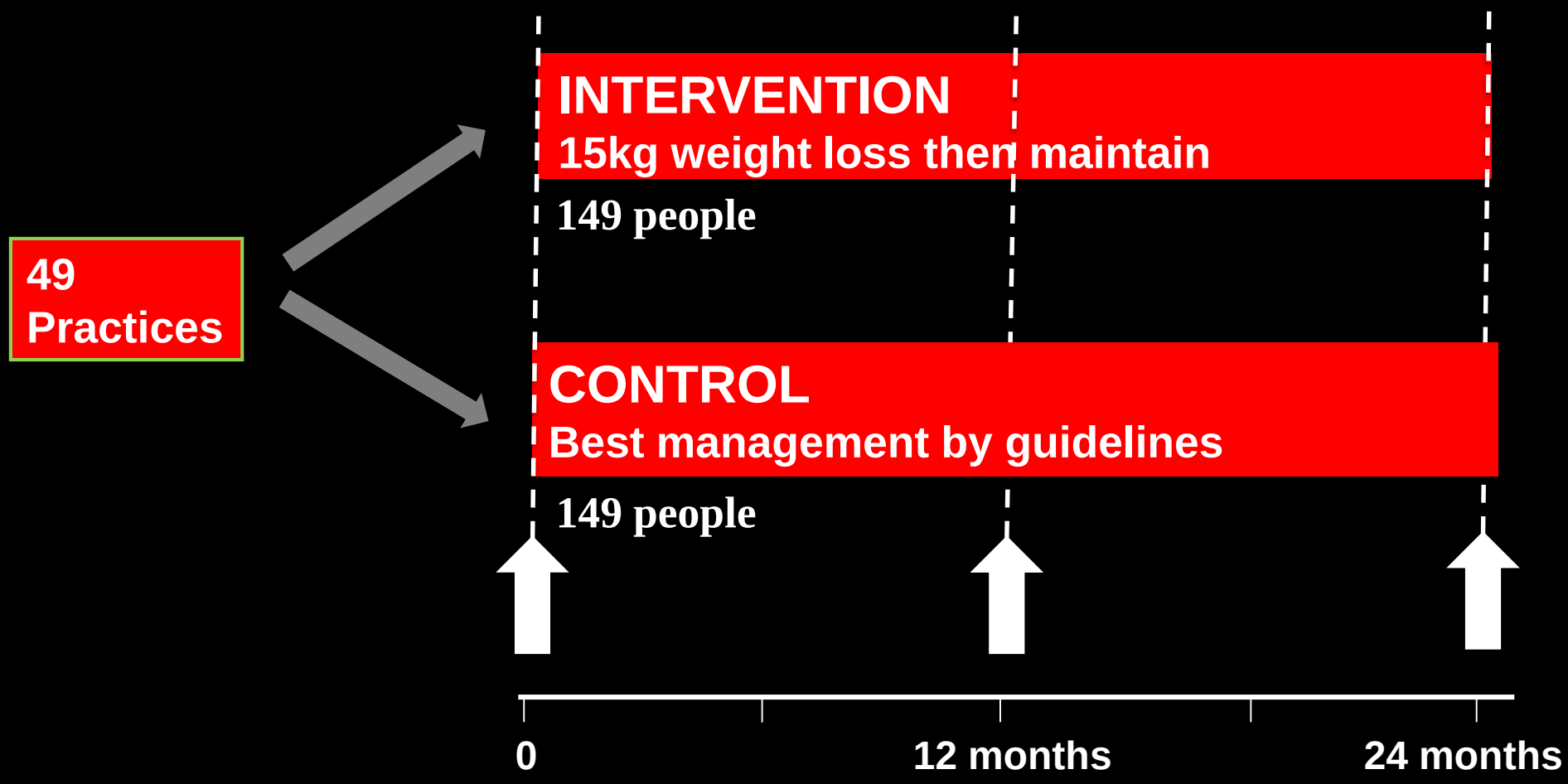
Responders:



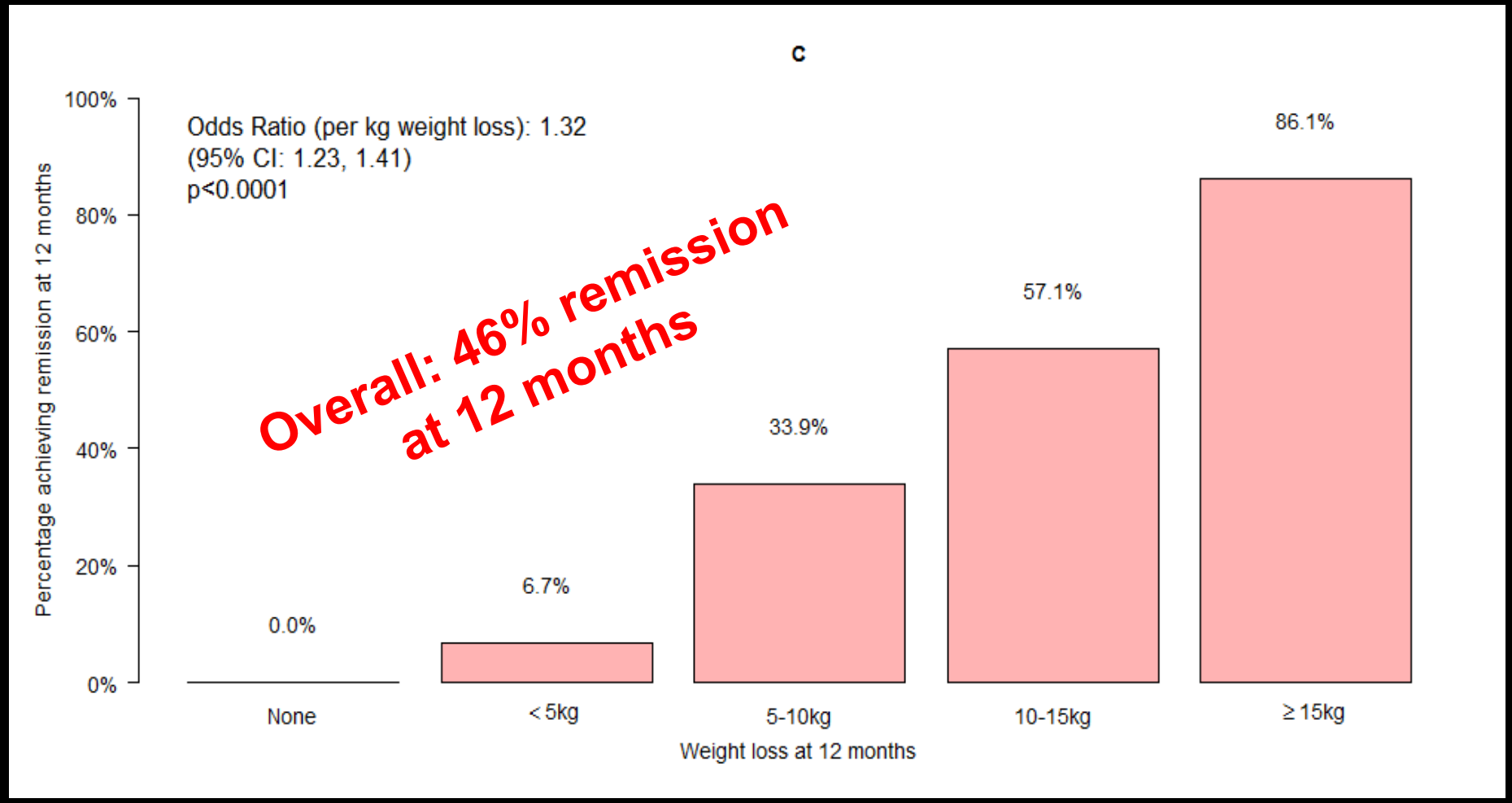
Steven et al, Diabetes Care 2016; 39:808

DiRECT – a study in routine NHS General Practice

Duration of T2DM less than 6 years; on oral agents and/or diet



Remissions by weight-loss category at 12 months



Lean et al, Lancet 2017 391:541-51

Facilitators

Behaviour-regulation strategies (examples)

- Avoidance,
- Distraction
- Drinking water
- Reminding oneself of the goals
- Removing food from environment
- Social disclosure

Barriers

Int
(ba

Emotional and cognitive barriers

- Life events and stress
- Lack of social support

Environmental barriers

- Presence of shops with food
- Traveling
- Going out and socializing

Destabilisation
Re-designing of the "Foodrobe"

Non-obese cf. obese type 2 diabetes – Is the assumed difference in pathophysiology real?

?

Non-obese T2DM have a greater beta cell defect and less insulin resistance

?

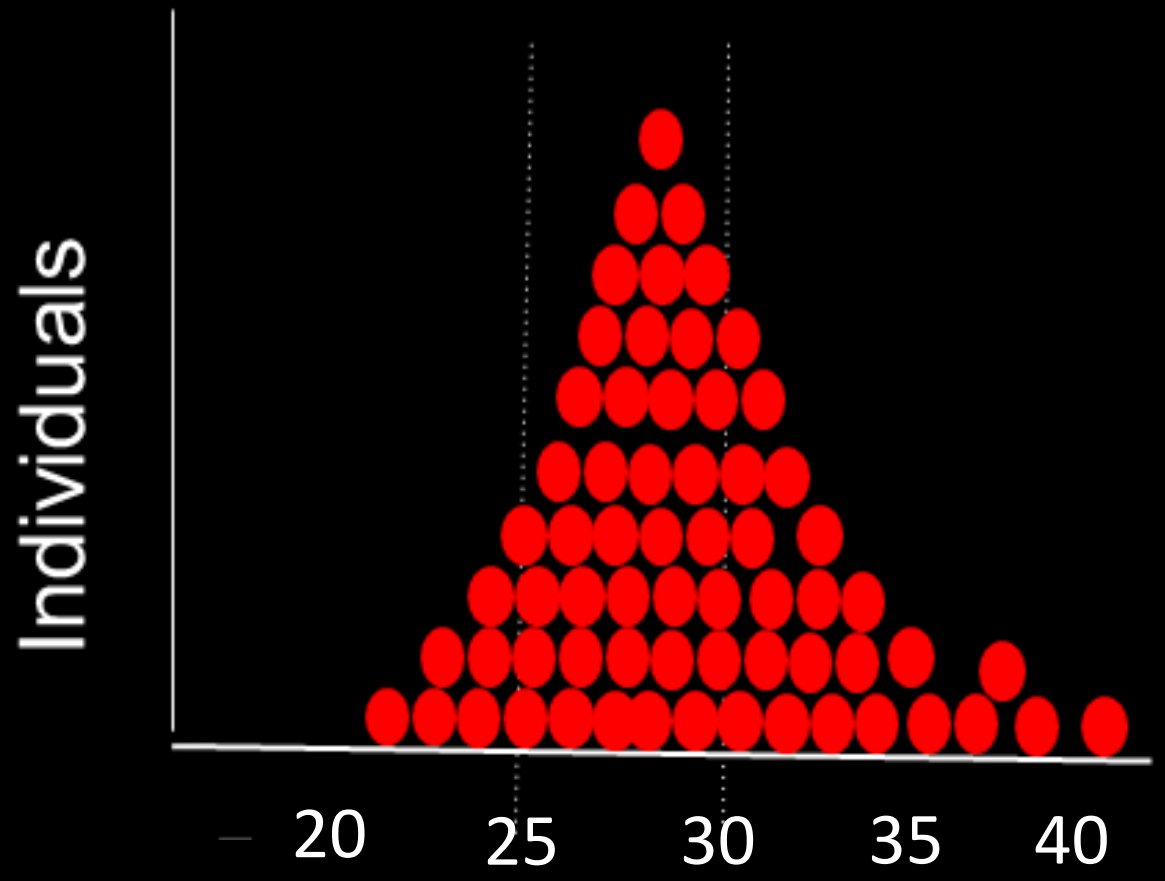
Meal tests elicit similar insulin secretion
(C-peptide rise of 2.5 fold in non-obese and 1.8 fold in obese)

Reaven et al JCEM 1993; 76: 44

No greater insulin resistance in obese than non-obese T2DM relative to weight-matched control groups

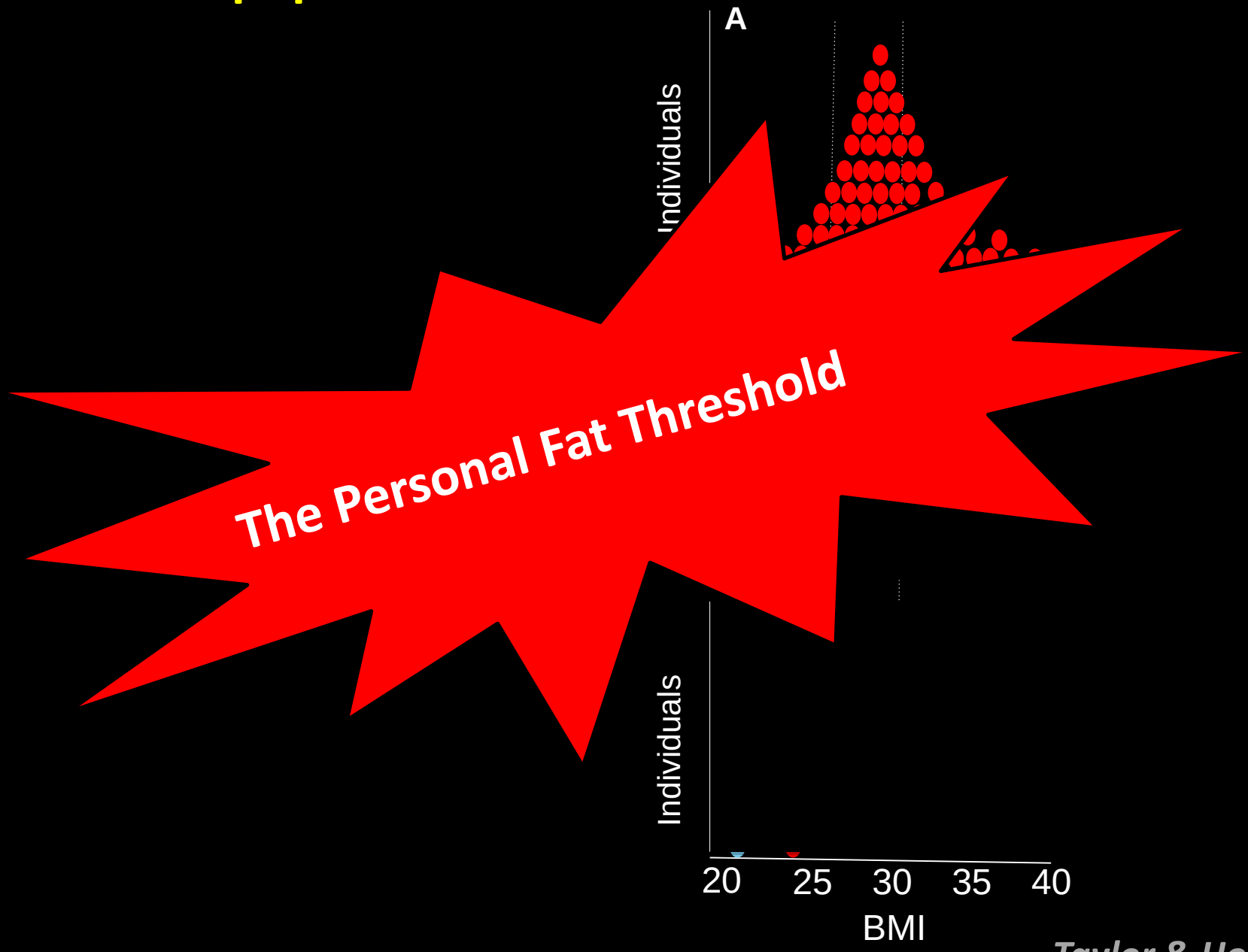
Hollenbeck et al Diabetes 1984; 33: 622

BMI distribution of individuals with type 2 diabetes



Taylor & Holman Clin Sci 2014

Personal vs population



Taylor & Holman Clin Sci 2014

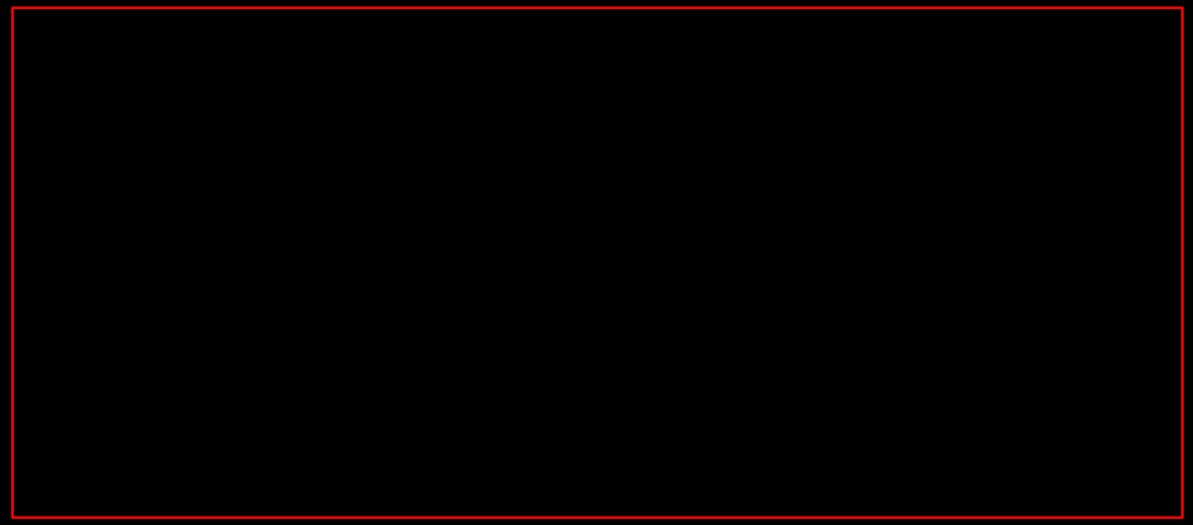
An index patient

54y old diagnosed with type 2 diabetes:

BMI 26.5; HbA1c 6.5%; Fasting glucose 7.2

“I do not want this. How can I get rid of it?”

Advice.



2013

Weight 126kg

HbA1c 9.2%

2014:

Weight 94kg

HbA1c 6.2%

2017

Weight 83kg

HbA1c 5.7%

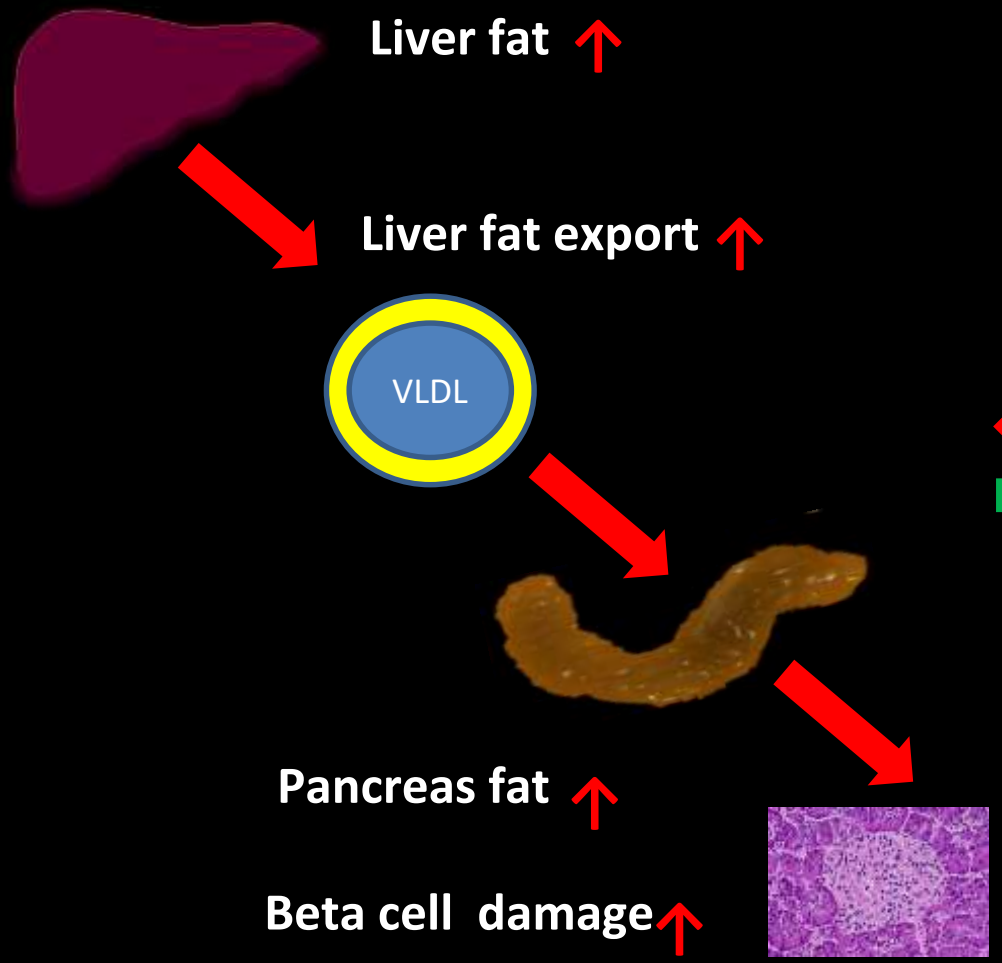
Benefits to individuals

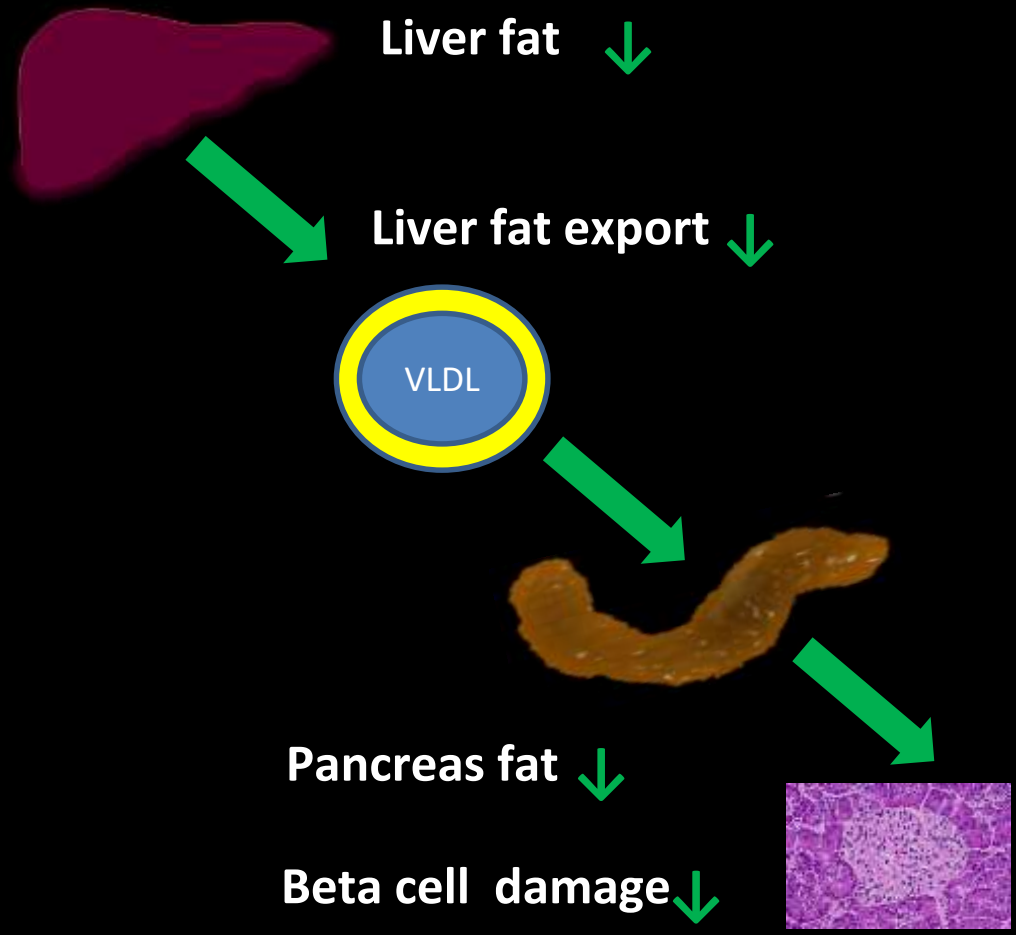
- Feeling 10 years younger
- Losing the ‘diabetic’ label
- No diabetes tablets/injections

- Outlook for long term health
- Less time at the doc’s
- No excess insurance costs

Rehovaka et al Diabetic Medicine 2018

Summary


Liver fat
Liver fat export
VLDL
Pancreas fat
Beta cell damage


Liver fat
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Type 2 diabetes is a simple state of having more fat than the individual can tolerate