

The twin cycle hypothesis

Substantial weight loss in people with type 2 diabetes will:

Liver

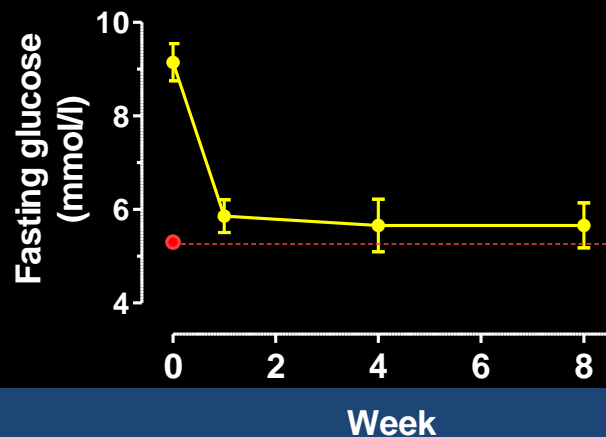
Decrease fat –
improve insulin action
and
normalise overnight
blood sugar

and

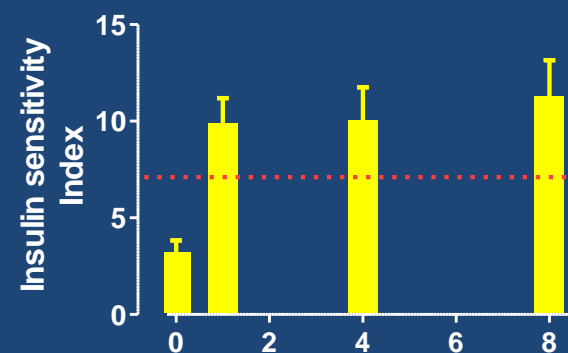
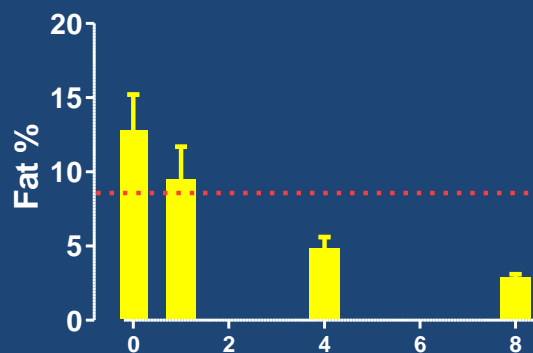
Pancreas

Decrease fat –
normalise the insulin
response to eating

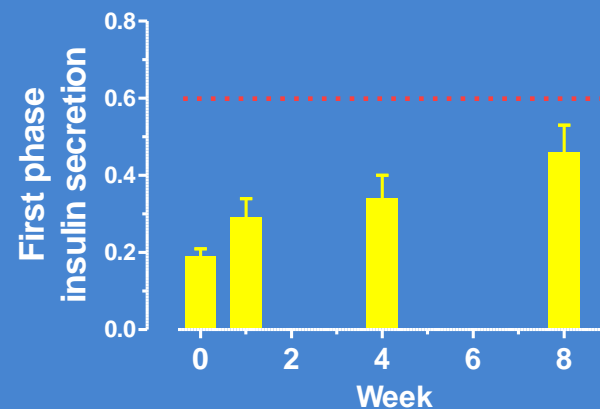
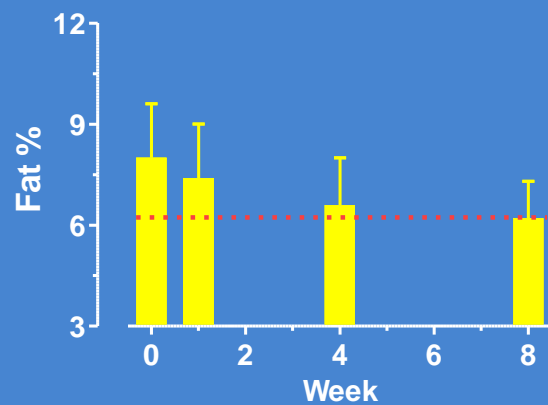
The Counterpoint study – Type 2 diabetes, 800kcal diet



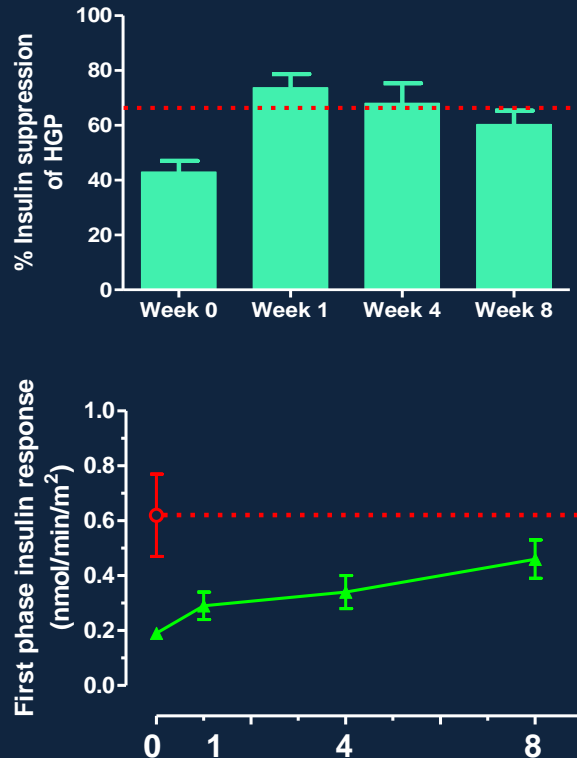
Liver



Pancreas



Reversibility of type 2 diabetes



The pathophysiological defects in the liver and pancreas are reversible – if diabetes duration <4yr

Can long duration type 2 diabetes also be reversed?

The Counterbalance Study –

Counteracting Beta cell failure by Long term
Action to Normalize Calorie intake

Questions:

Can people with longer duration type 2 diabetes reverse to normal?

Is the reversal of type 2 diabetes durable if body weight remains stable?

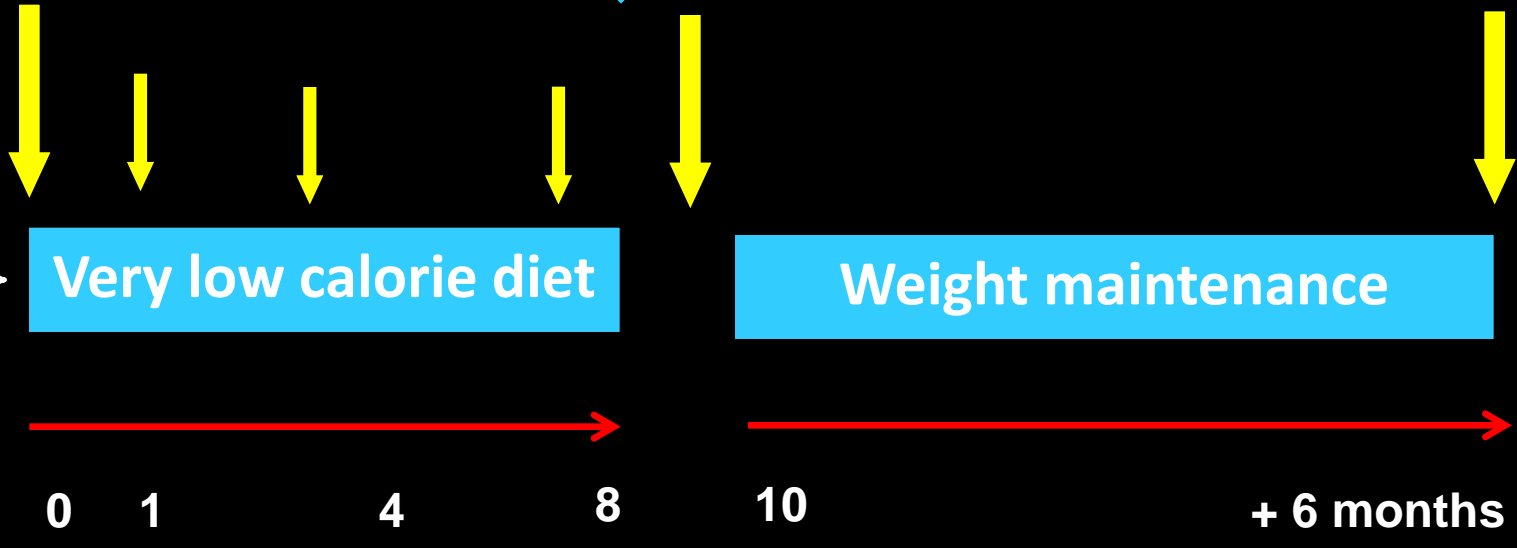
Protocol for CounterBalance study

Stepped
return to
normal eating



T2DM
< 4 yr

T2DM
> 8 yr



0 1 4 8 10 + 6 months

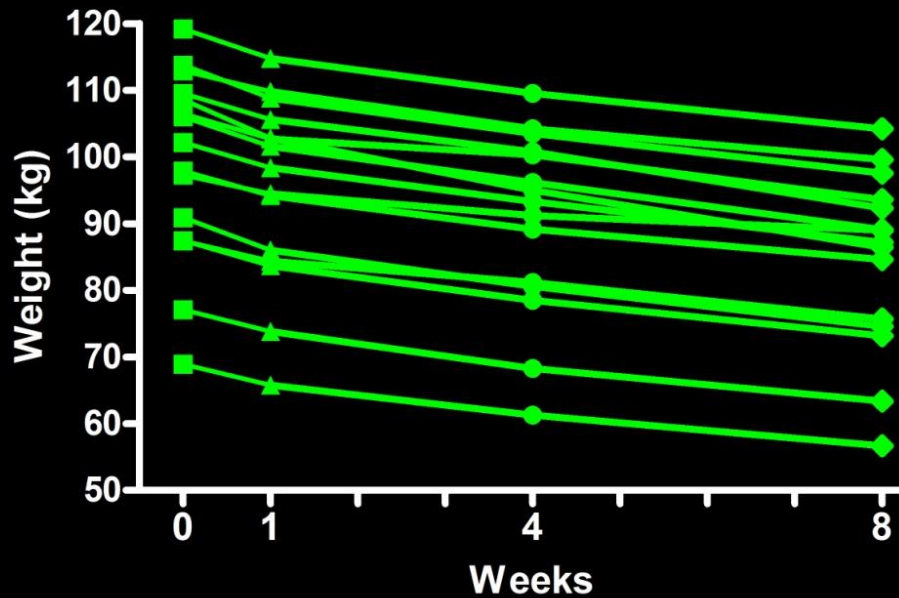
Weeks

Counterbalance Subjects

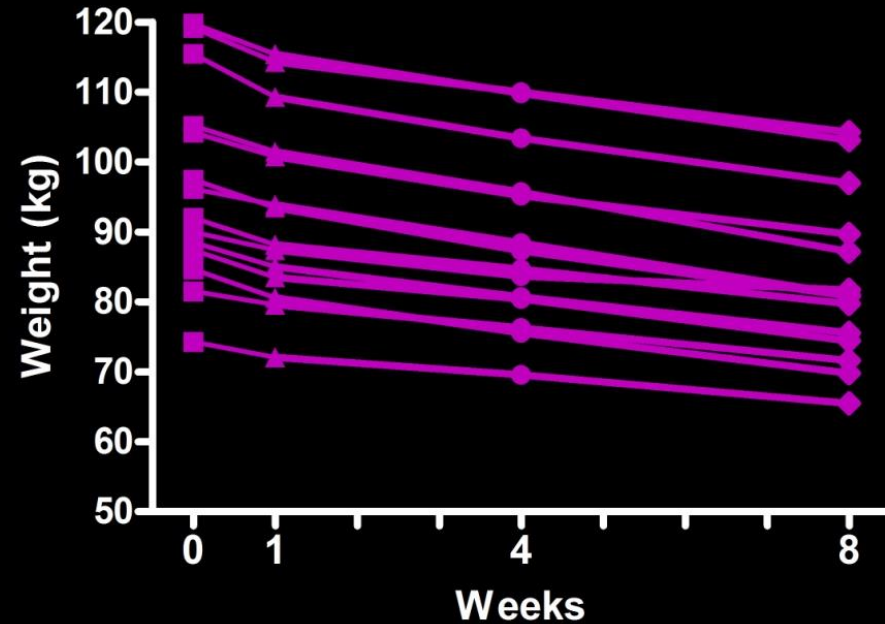
Diabetes duration	0-4y (n=15)	8-23y (n=14)
Age (yr)	52.1 ± 2.6	61.6 ± 2.0
Weight (kg)	99.0 ± 3.7	96.9 ± 3.8
BMI (kg/m²)	34.6 (27.6-38.0)	33.0 (29.4-45.7)

Results: weight loss during diet

Short duration



Long duration

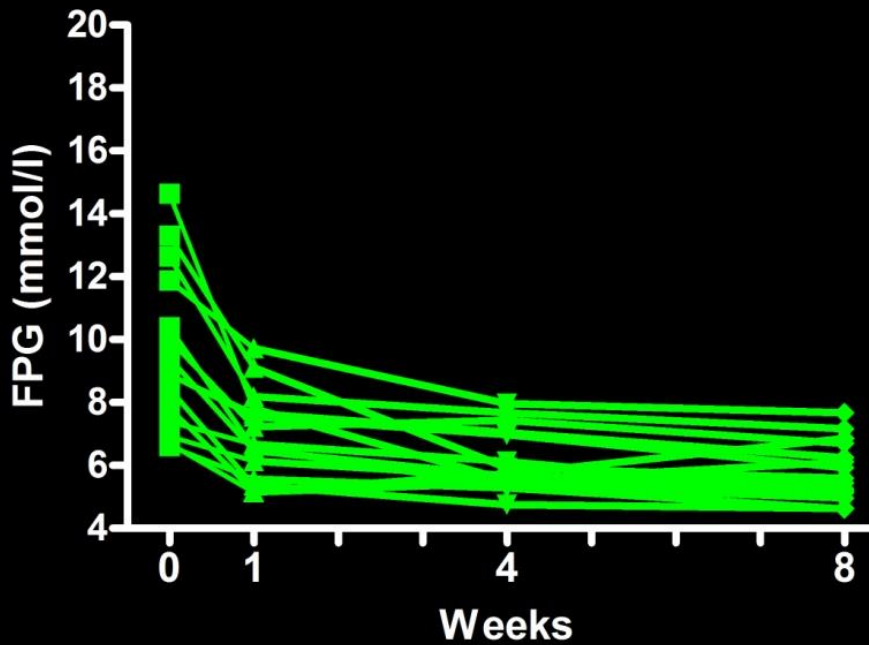


Weight loss: $14.6 \pm 0.8 \%$ vs. $14.5 \pm 0.7 \%$

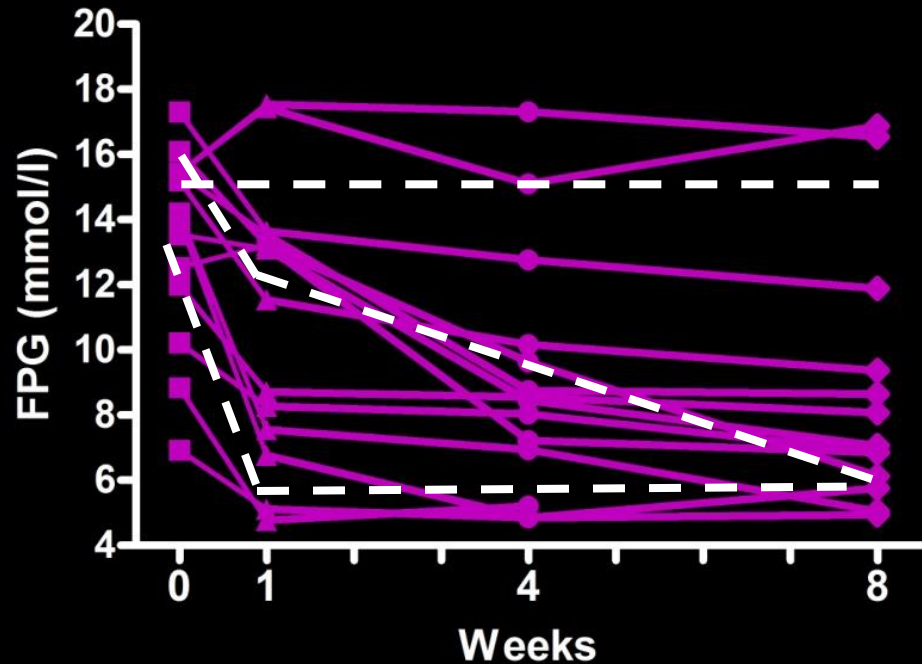
$p=0.662$

Fasting plasma glucose during diet

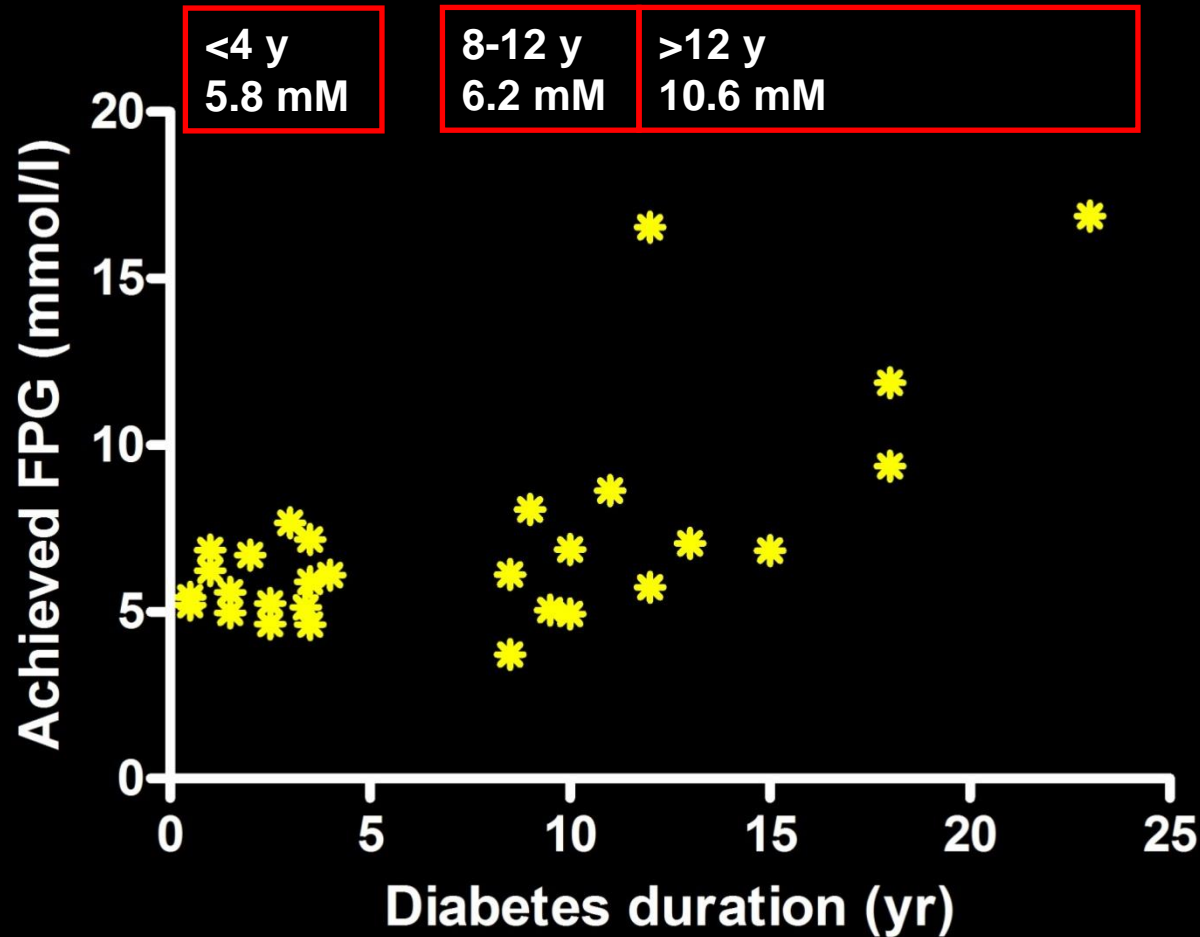
Short duration



Long duration



By diabetes duration



Spearman 0.501; p=0.006