Bariatrik Cerrahi Sonrası Metabolik Durum

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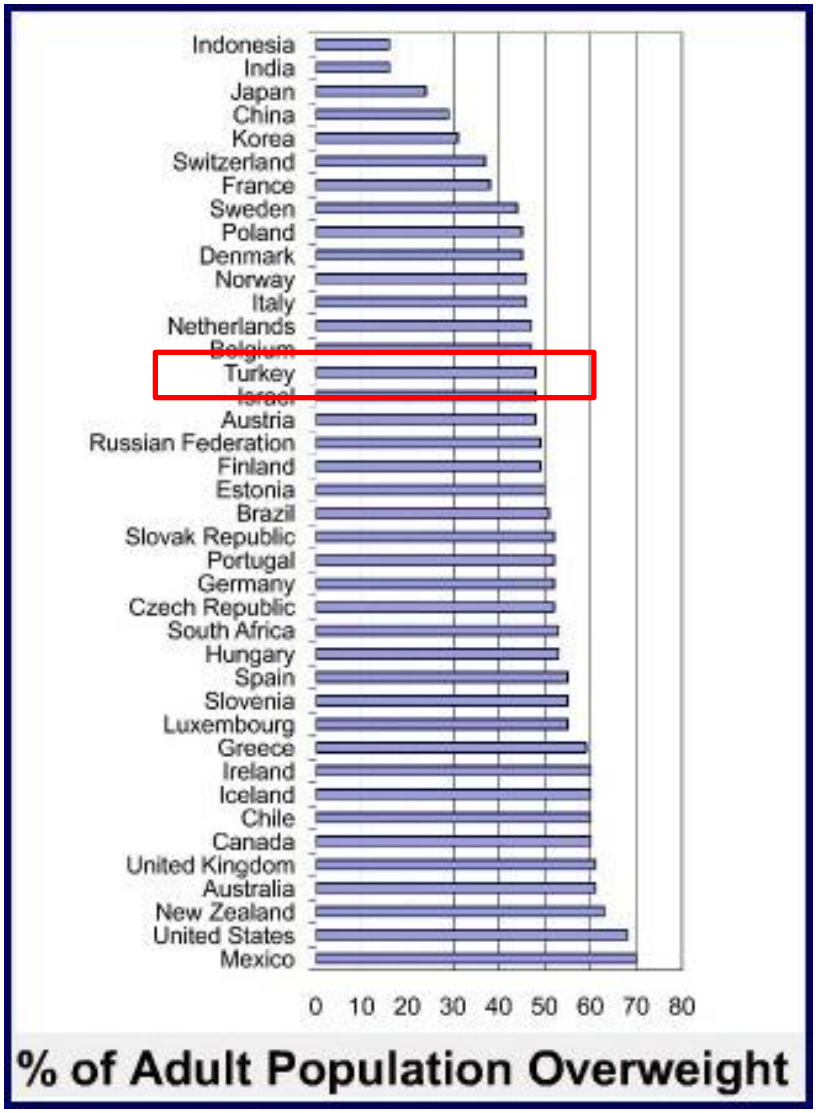
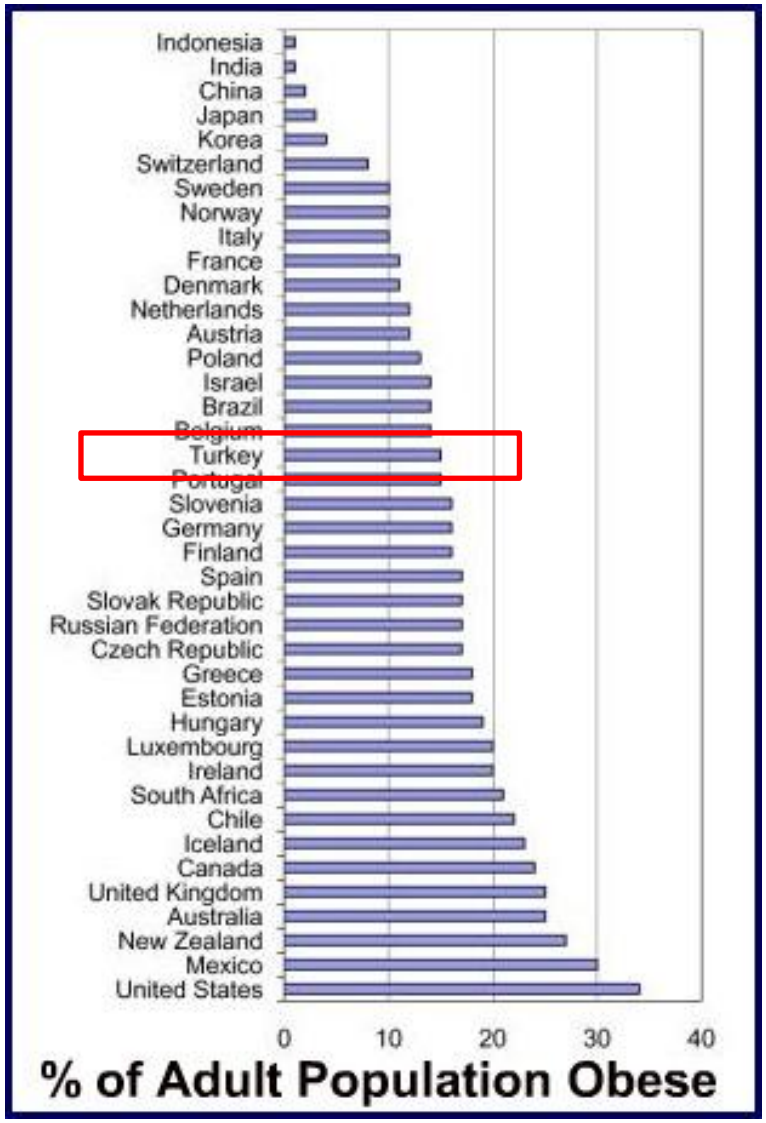
Uludağ Üniversitesi Tıp Fakültesi
Endokrinoloji ve Metabolizma Hastalıkları Bilim Dalı
Metabolik Sendrom Sempozyumu 9 Mart 2013 ANKARA

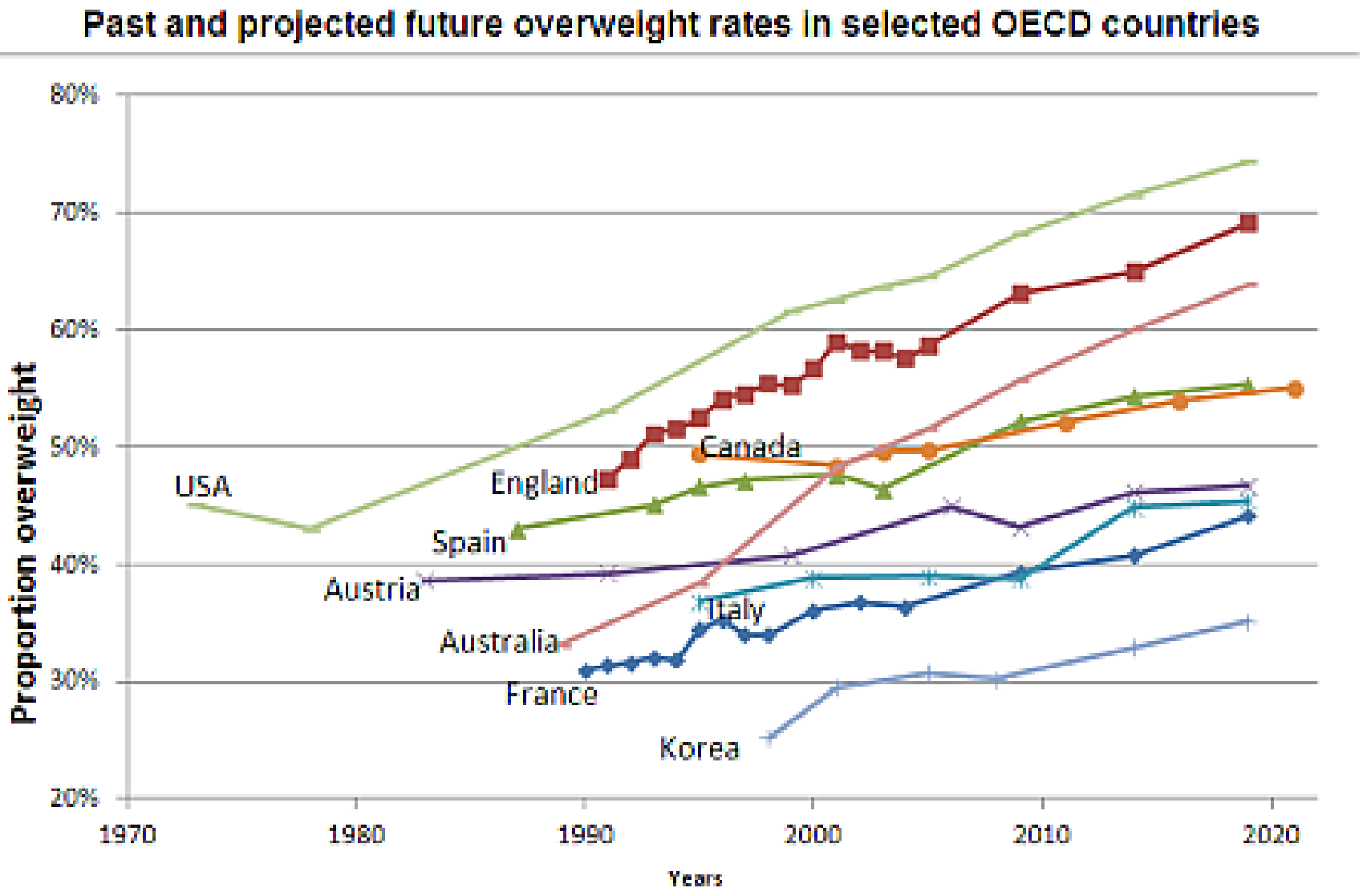
Obezite epidemisi

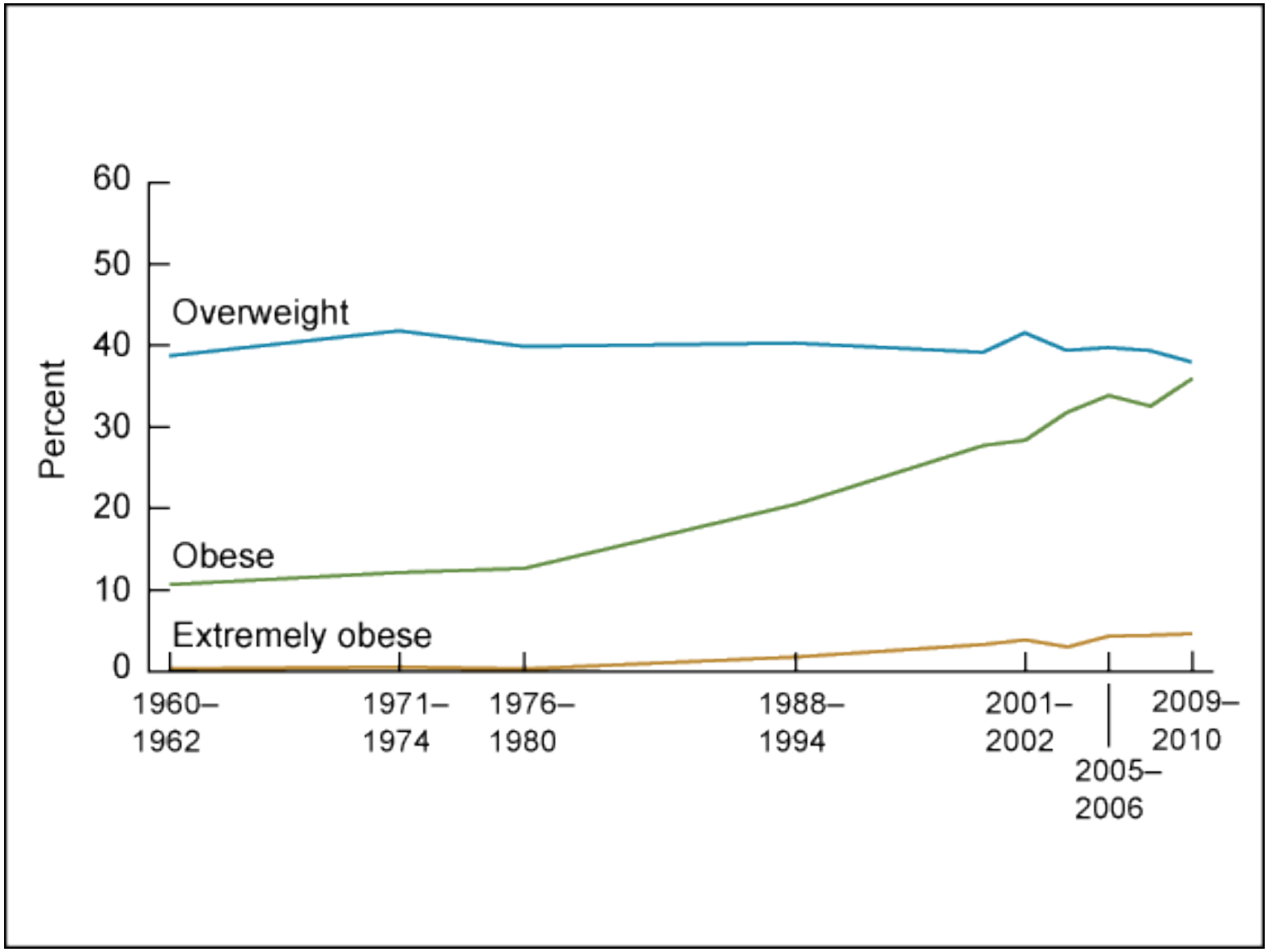


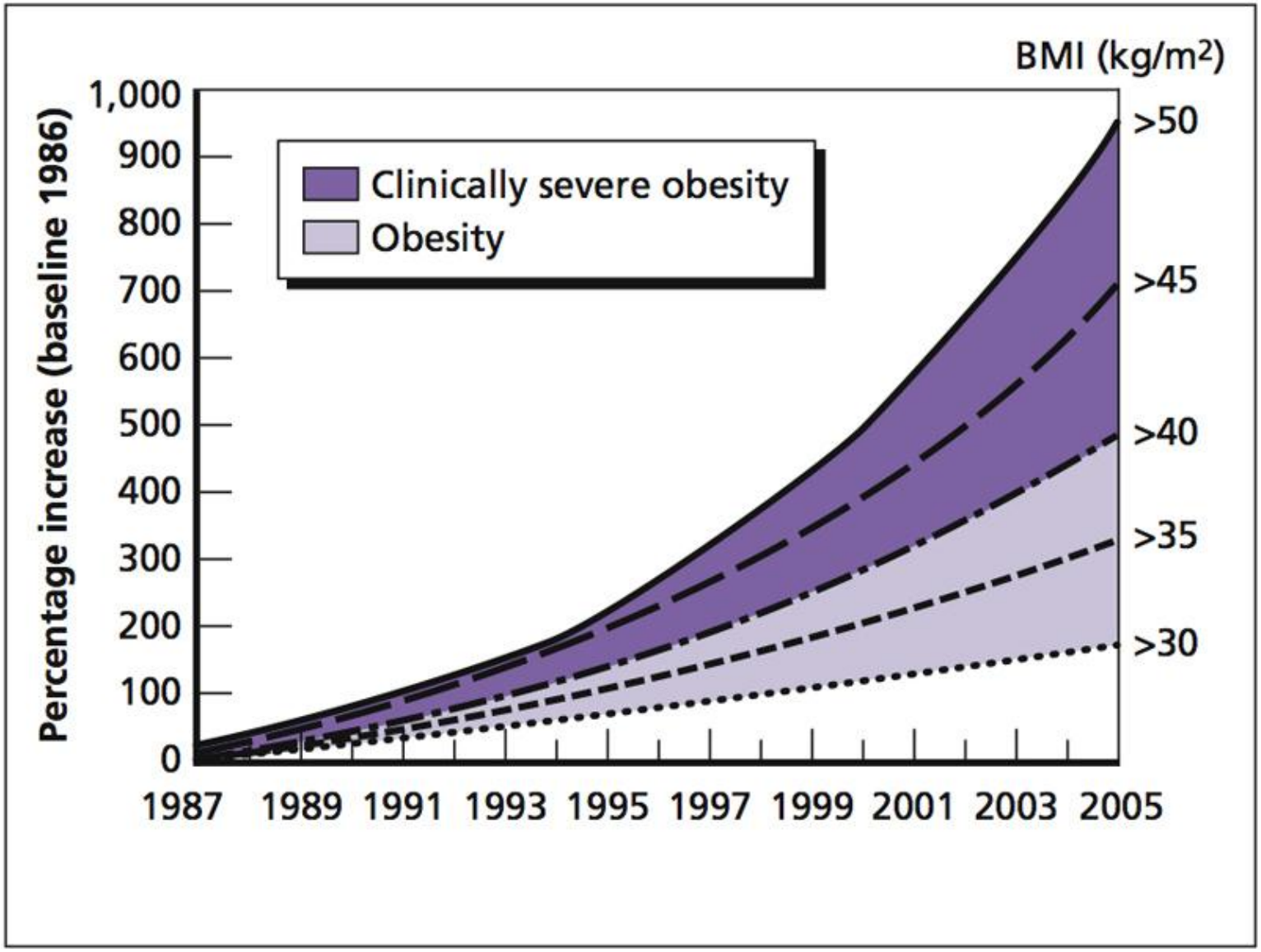


Kilolu sayısı ≈ 1,5 milyar Obez sayısı ≈ 600 bin	2015 Kilolu sayısı ≈ 2,3 milyar Obez sayısı ≈ 700 bin

WHO


Past and projected future overweight rates in selected OECD countries
Proportion overweight
80%
70%
60%
50%
40%
30%
20%
1970
1980
1990
2000
2010
2020
Years
USA
England
Canada
Spain
Austria
Italy
Australia
France
Korea


60
50
40
30
20
10
0
Percent
Overweight
Obese
Extremely obese
1960–1962
1971–1974
1976–1980
1988–1994
2001–2002
2005–2006
2009–2010


BMI (kg/m²)
Percentage increase (baseline 1986)
1,000
900
800
700
600
500
400
300
200
100
0
Clinically severe obesity
Obesity
>50
>45
>40
>35
>30
1987
1989
1991
1993
1995
1997
1999
2001
2003
2005

The Greenville Gastric Bypass

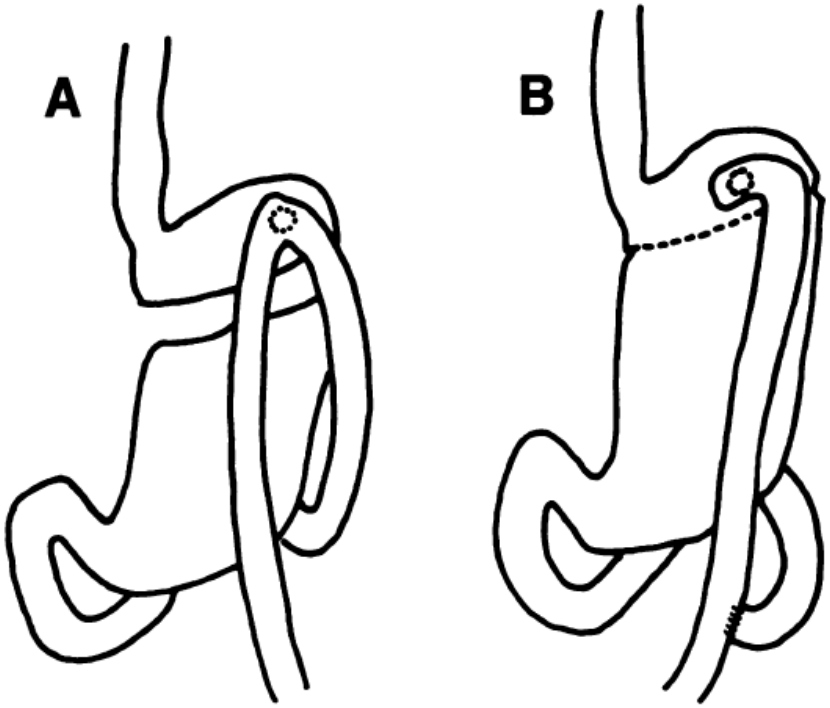
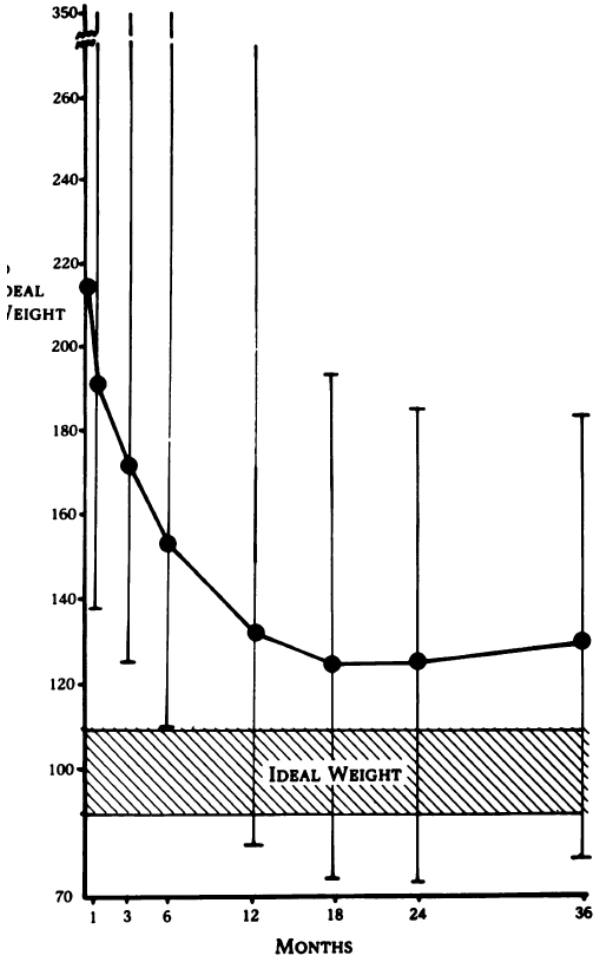
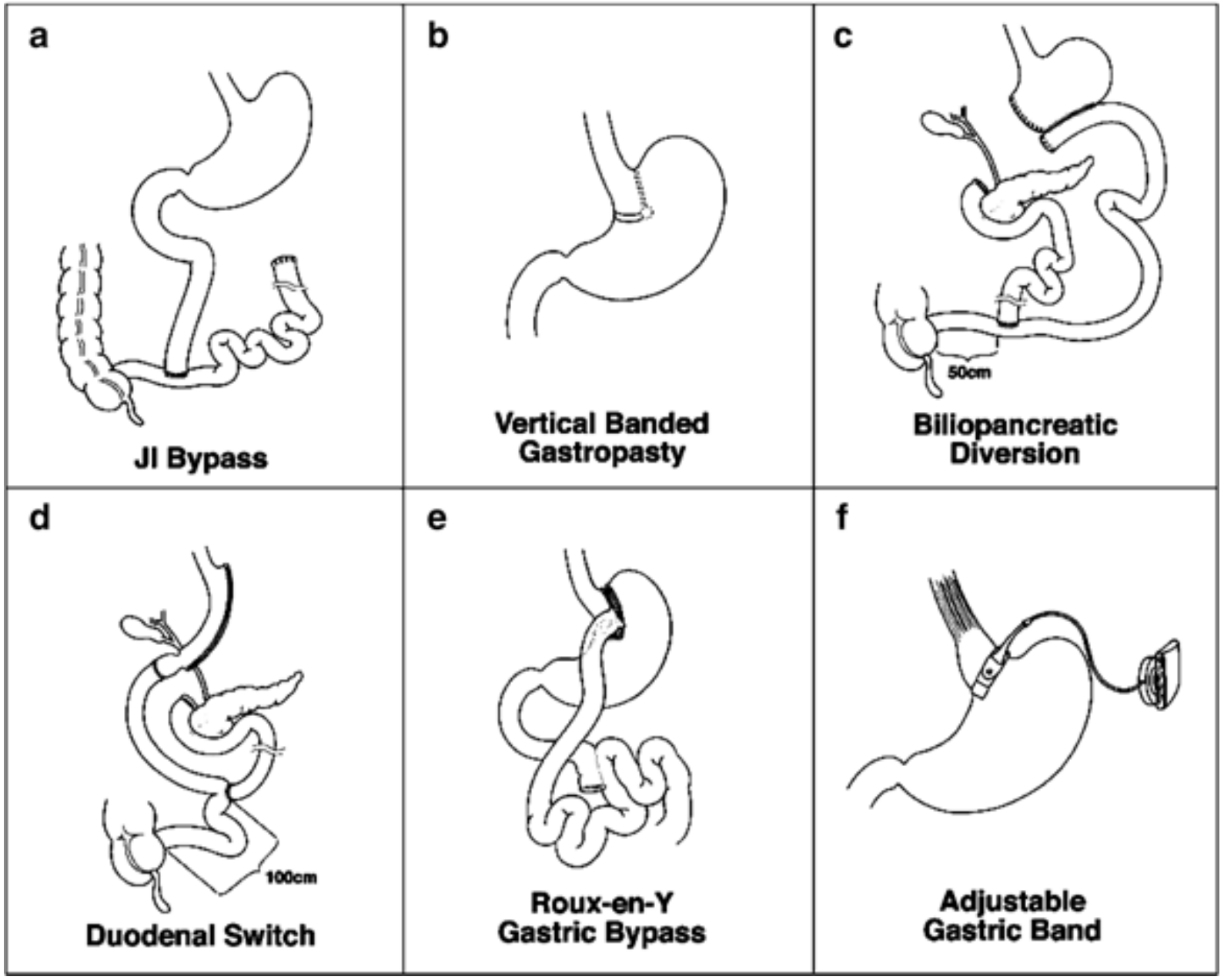
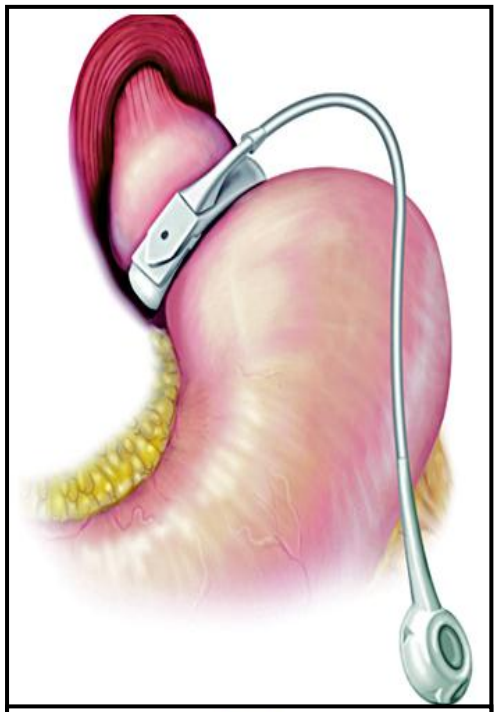


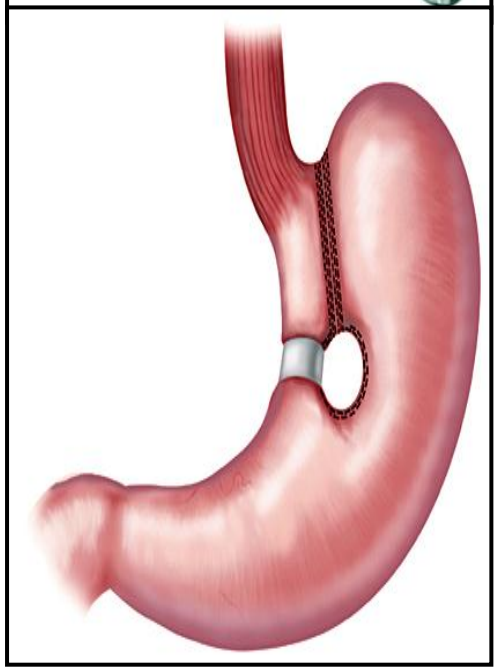
FIG. 1*A*. Mason and Ito's original gastric bypass. *B*. The Greenville modification of the gastric bypass.

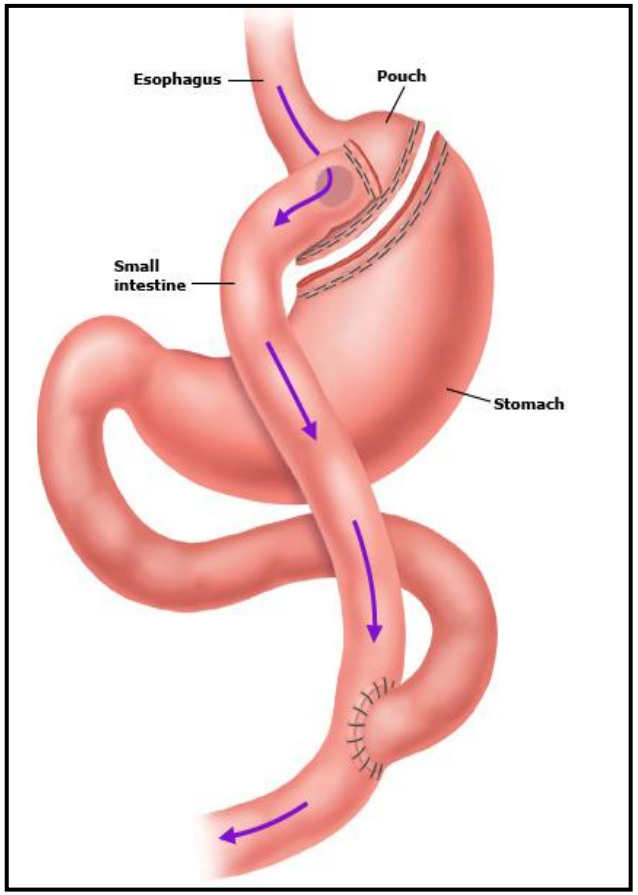


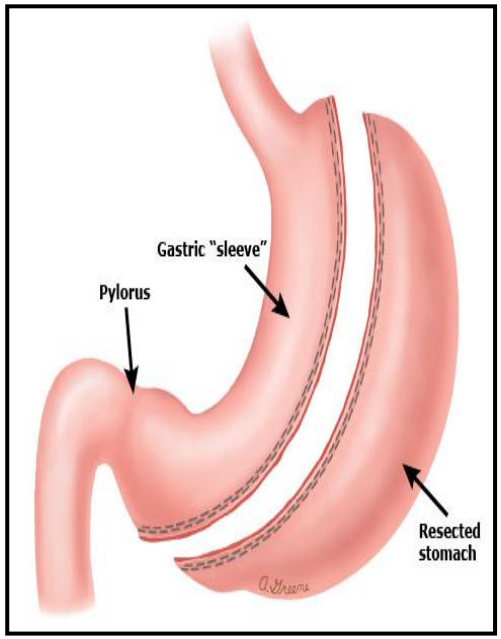
Flickinger EG. Ann Surg. 1984;199(5):555-62.


a
JI Bypass
b
Vertical Banded
Gastropasty
c
50cm
Biliopancreatic
Diversion
d
100cm
Duodenal Switch
e
Roux-en-Y
Gastric Bypass
f
Adjustable
Gastric Band

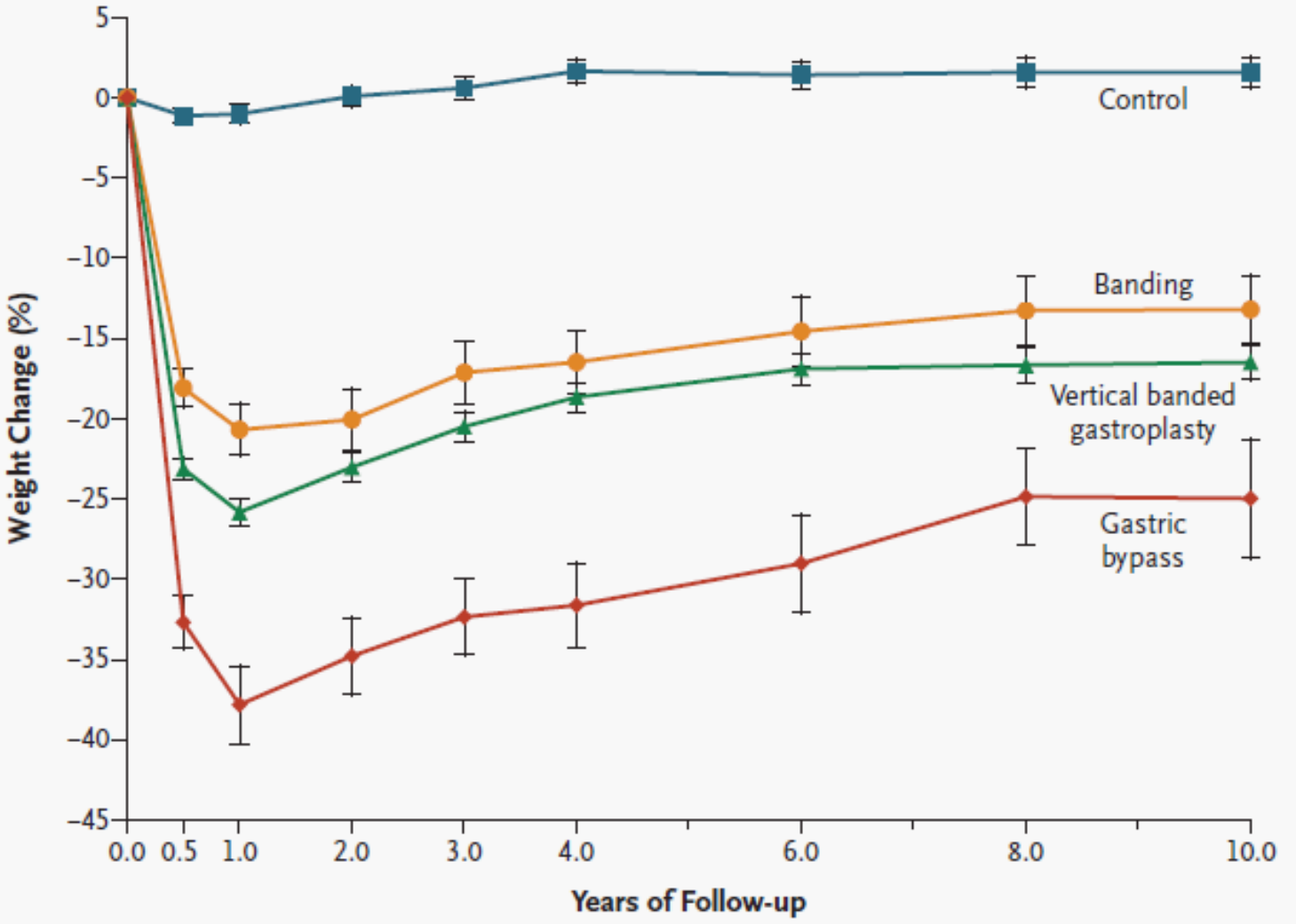





Esophagus
Pouch
Small intestine
Stomach

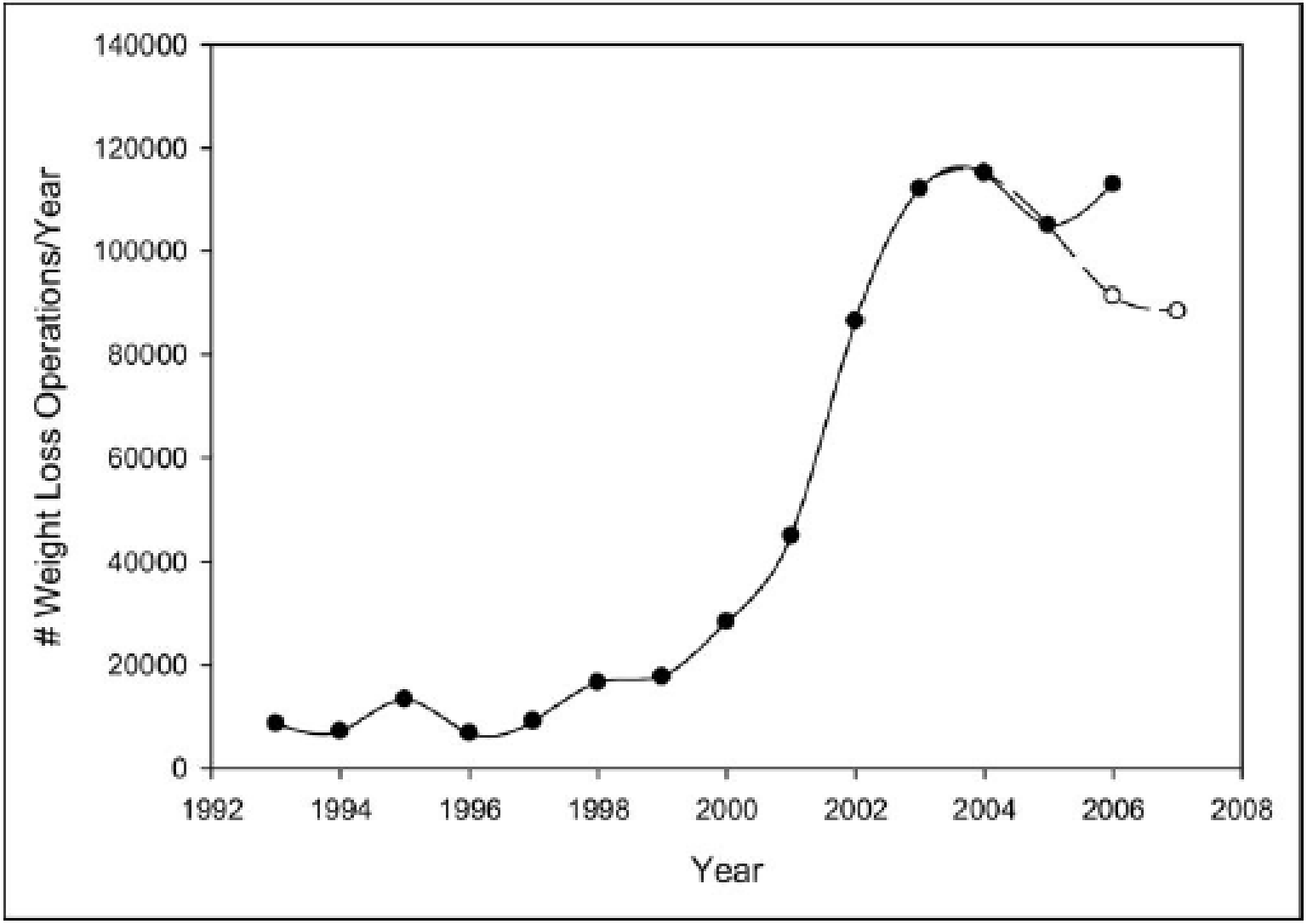

Gastric "sleeve"
Pylorus
Resected stomach

Lifestyle, Diabetes, and Cardiovascular Risk Factors 10 Years after Bariatric Surgery



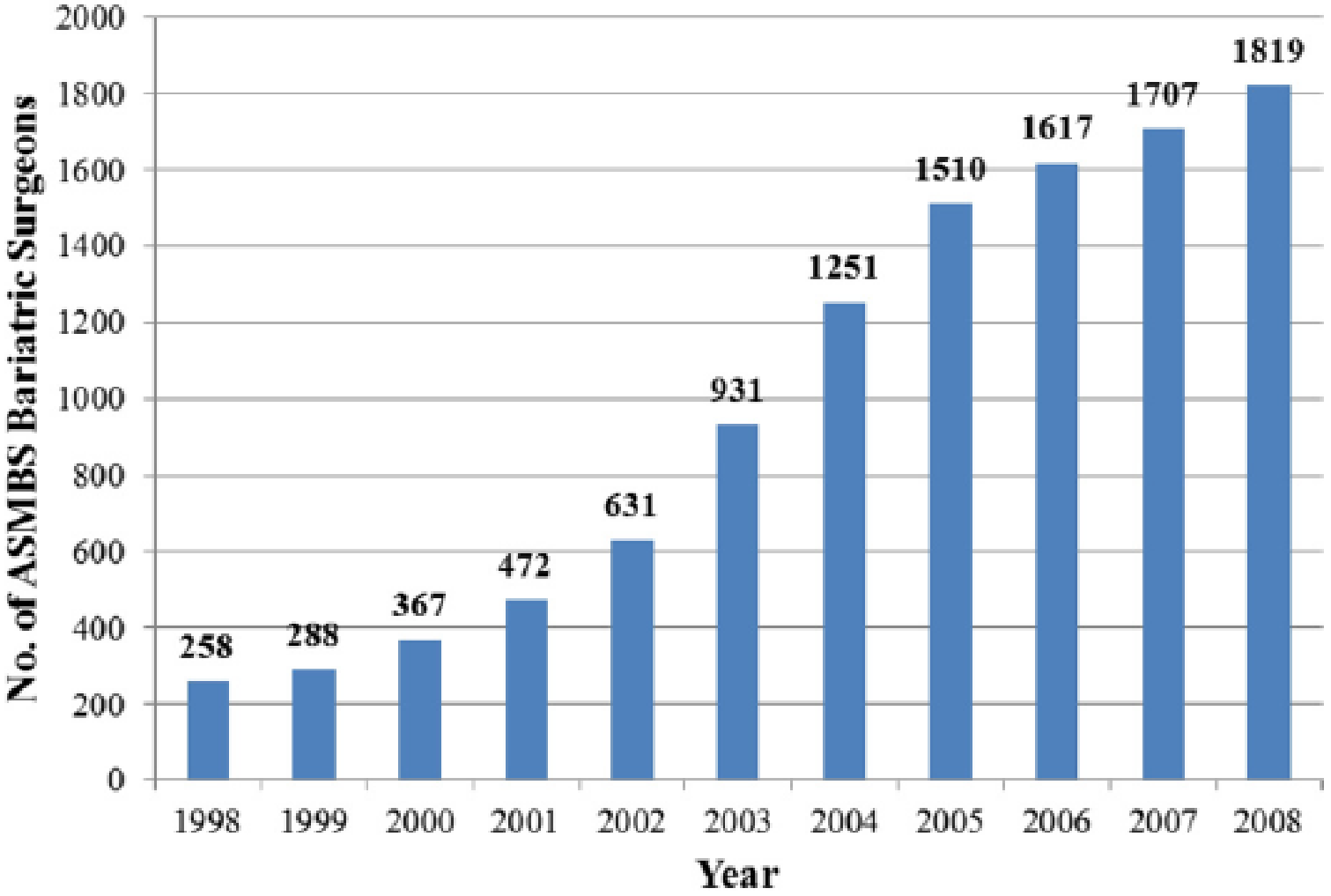
Sjöström, L. N Engl J Med 2004

The incidence of bariatric surgery has plateaued in the U.S.



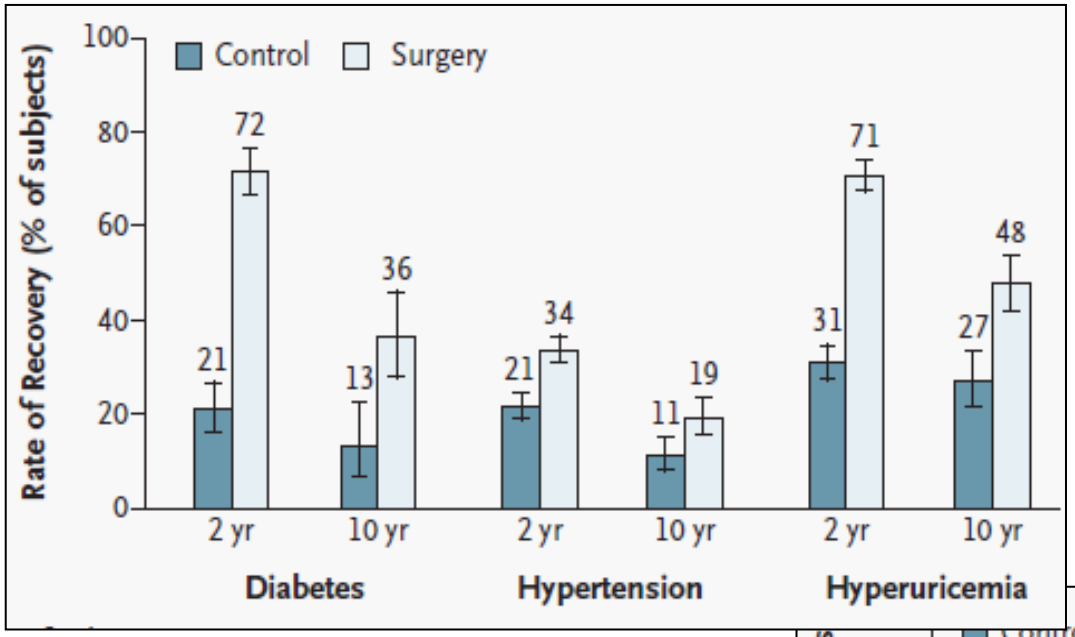
Liningsone EH. Am J Surg. 2010

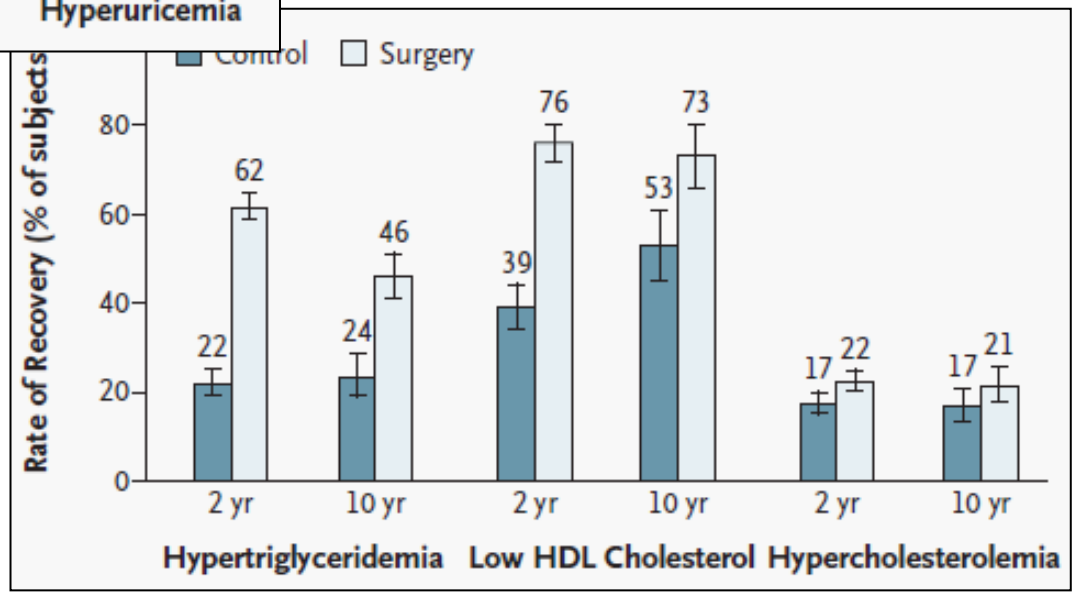
Number of bariatric surgeons with membership in the American Society for Metabolic and Bariatric Surgery (ASMBS)



Nguyen NT, J Am Coll Surg 2011;213:261–266

Lifestyle, Diabetes, and Cardiovascular Risk Factors 10 Years after Bariatric Surgery





Sjöström, L. N Engl J Med 2004;351:2683-93

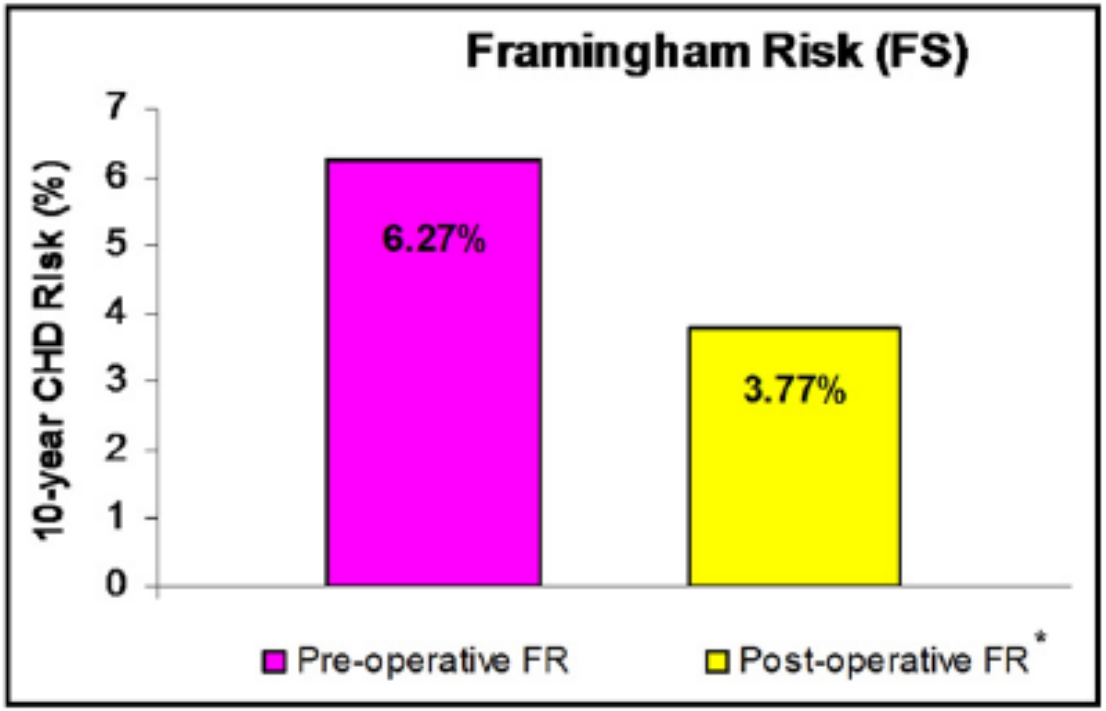
Effect of Bariatric Surgery on Cardiovascular Risk Profile

Table 1
Summary of studies included in review

First Author	Year	Country	n	Follow-Up (Months)	Mean Age (Years)	Women	Baseline BMI (kg/m^2)	Study Procedures
Traditional CV risk factor studies								
Adami[8]	2005	Italy	461	36	41.5	59%	49	BPD
Ahmed[10]	2009	United States	100	12	42	89%	49	RYGB
Ahroni[11]	2005	United States	195	12	43.8	83%	49	LGB
Alexandrides[9]	2007	Greece	137	26	41.4	77%	46	RYGB and BPD
Anderson[12]	2007	United States	50	12	43	74%	56	RYGB
Bacci[13]	2002	Italy	50	12	42	94%	55	LGB
Batsis[14]	2007	United States	197	40	44	8%	51	RYGB
Bowne[15]	2006	United States	106	40	42	80%	44	LGB and RYGB
Brancatisano[16]	2008	Australia	838	36	44	8%	50	LGB
Cottam[17]	2006	United States	362	36	43	85%	56	LGB and RYGB
Cowan[18]	1998	United States	82	12	38	74%	44	RYGB
Fernstrom[19]	2006	United States	347	18	40	77%	42	RYGB and VBG
Frigg[20]	2004	Switzerland	295	48	41	79%	47	LGB
Goergen[21]	2007	Luxemburg	110	24	41	76%	47	RYGB and VBG
Khalaileh[22]	2008	Israel	50	12	37	66%	54	RYGB
Larrad-Jimenez[23]	2007	Spain	343	120	41	80%	45	BPD
Lee[24]	2004	Taiwan	645	12	30	6%	45	RYGB and VBG
Maher[25]	2008	United States	450	12	42	80%	47	RYGB
Mattar[26]	2005	United States	70	15	47	69%	56	RYGB, LGB, and SG
Müller[27]	2008	Switzerland	50	48	38	80%	42	RYGB
Lin	2007	Taiwan	69	6	34	71%	32	VBG
Serra[55]	2006	Spain	70	12	42	59%	46	RYGB
Torquati[56]	2007	United States	500	12	45	81%	48	RYGB
Total			16,867	34	42	78%	48	

Heneghan H. Am J Cardiol 2011

Effect of Bariatric Surgery on Cardiovascular Risk Profile



Heneghan H. Am J Cardiol 2011

Who Would Have Thought It?

An Operation Proves to Be the Most Effective Therapy for Adult-Onset Diabetes Mellitus

- Kilo kaybından çok önce birkaç gün içerisinde diyabette iyileşme görülmektedir
- Hastaların çoğu obez kalmalarına rağmen diyabet iyileşmektedir
- Uzun süreli izlemde hastalar büyük oranda diyabetten korunmaktadır

Pories WJ, M.D. Ann Surg. 1995

Weight and Type 2 Diabetes after Bariatric Surgery: Systematic Review and Meta-analysis

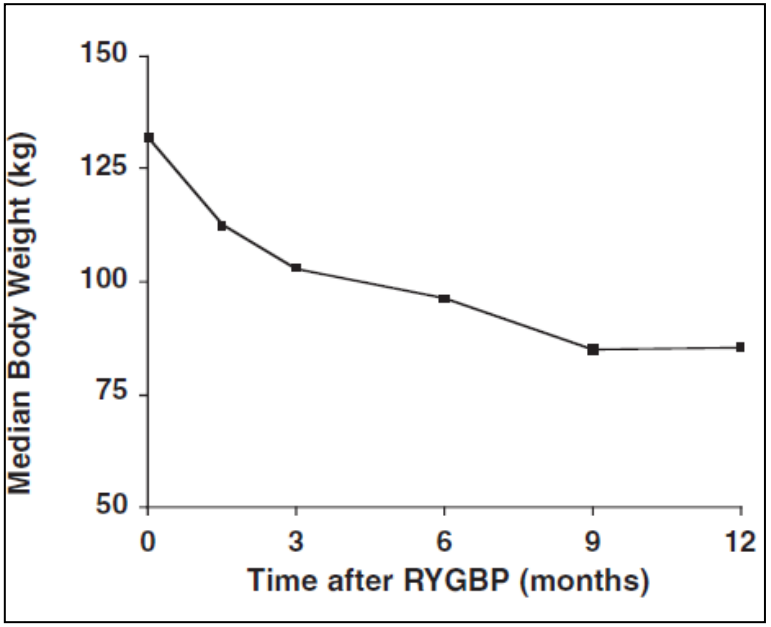
	Total[a]
Europe	45,749
North America	77,167
South America	2701
Australia/New Zealand	3838
Asia	1029
Middle East	4762
	135,246

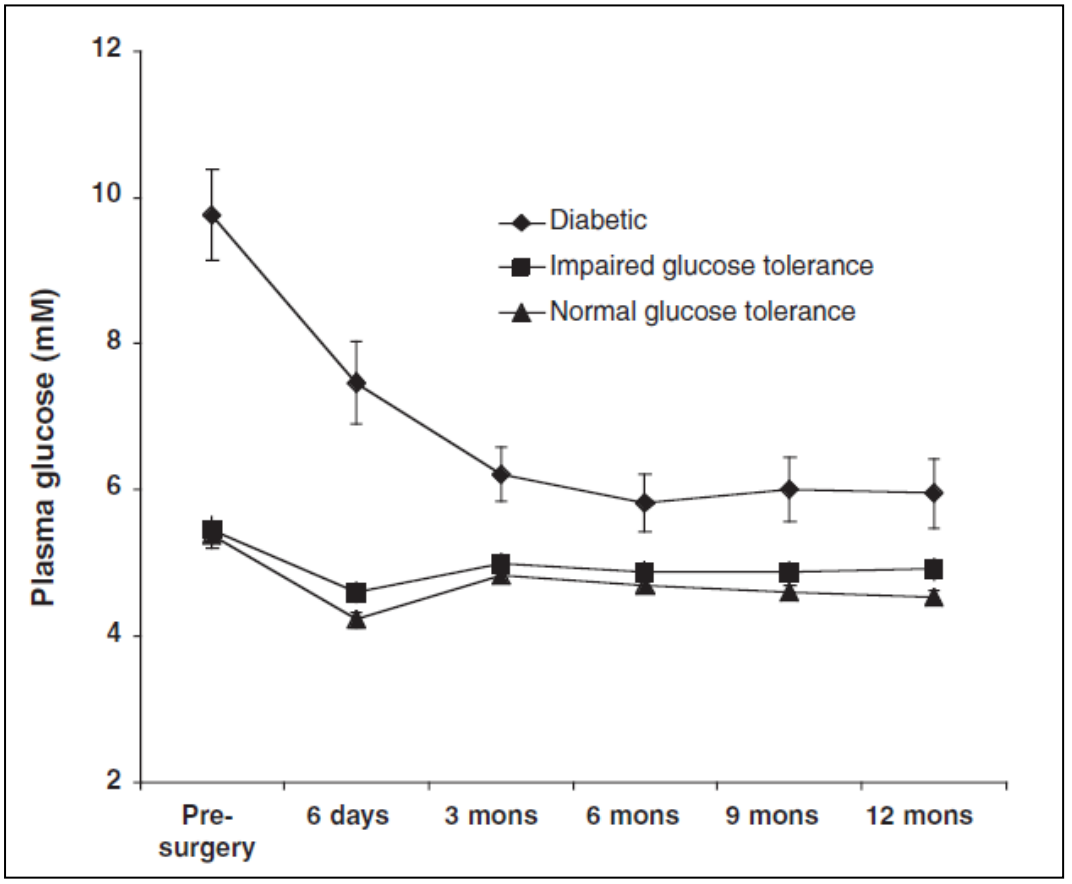
Buchwald H. AJM, 2009

CLINICAL SIGNIFICANCE

- Type 2 diabetes was resolved in 78% and resolved or improved in 87% of patients undergoing bariatric surgery.
- There was a progressive relationship of diabetes resolution and weight loss achieved as a function of the operation performed: laparoscopic adjustable gastric banding, gastroplasty, gastric bypass, and biliopancreatic diversion/duodenal switch.
- Clinical findings were substantiated by the laboratory parameters of serum insulin, HbA1c, and glucose.
- These findings were maintained for 2 years or more.

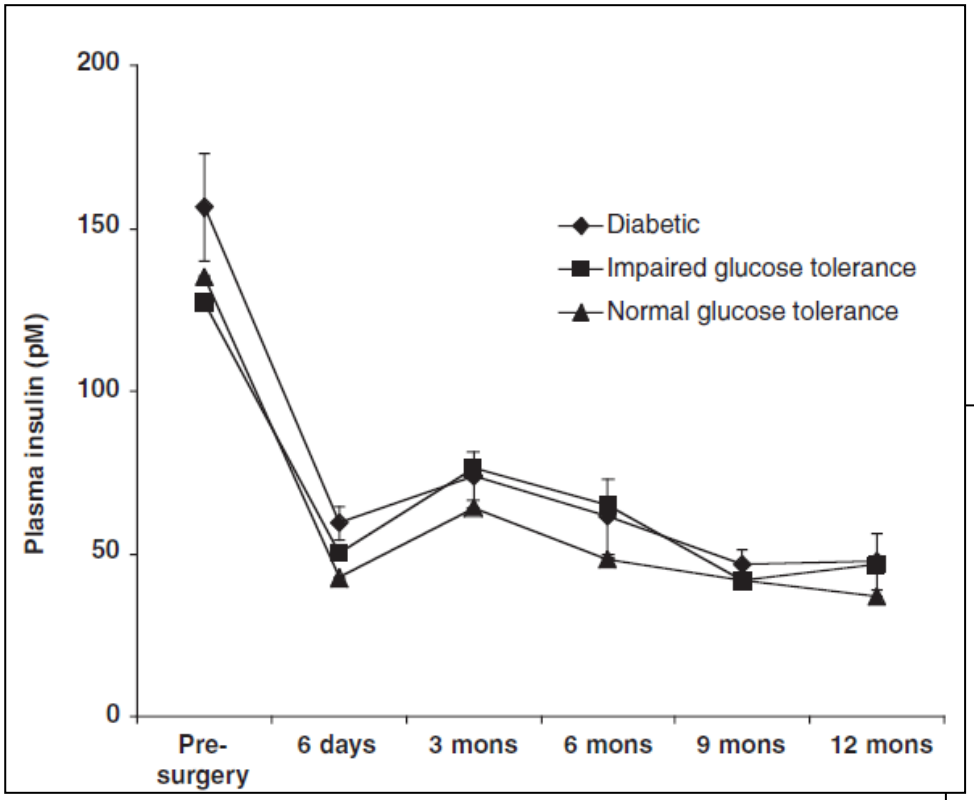
Loss of Insulin Resistance after Roux-en-Y Gastric Bypass Surgery: a Time Course Study

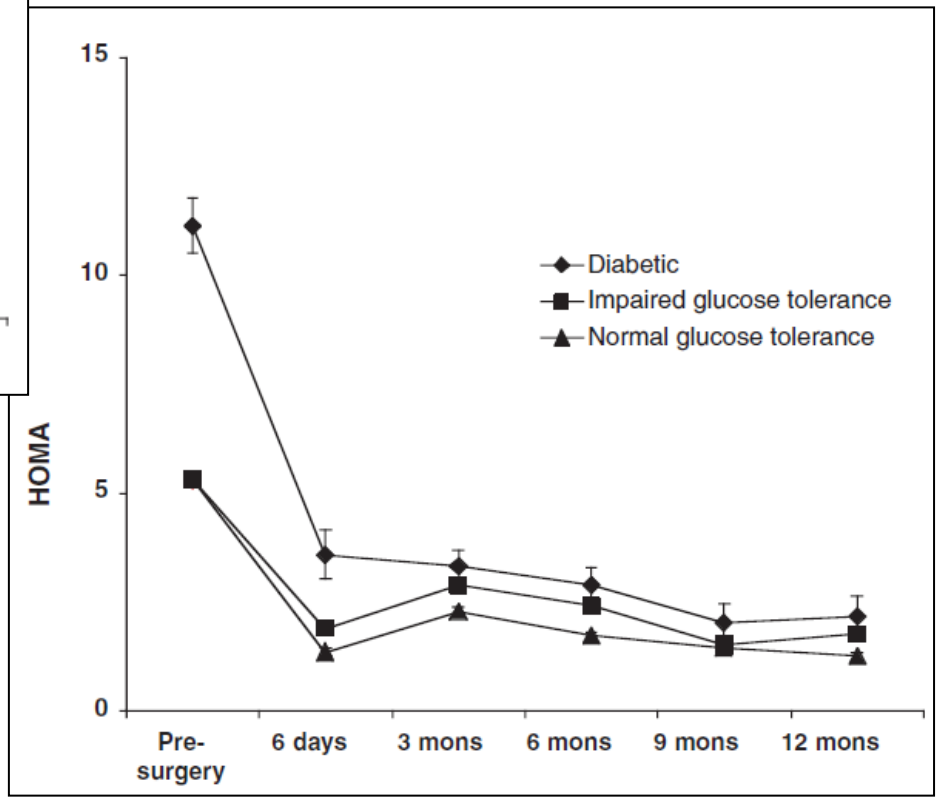




Wickremesekera K. Obes Surg. 2005

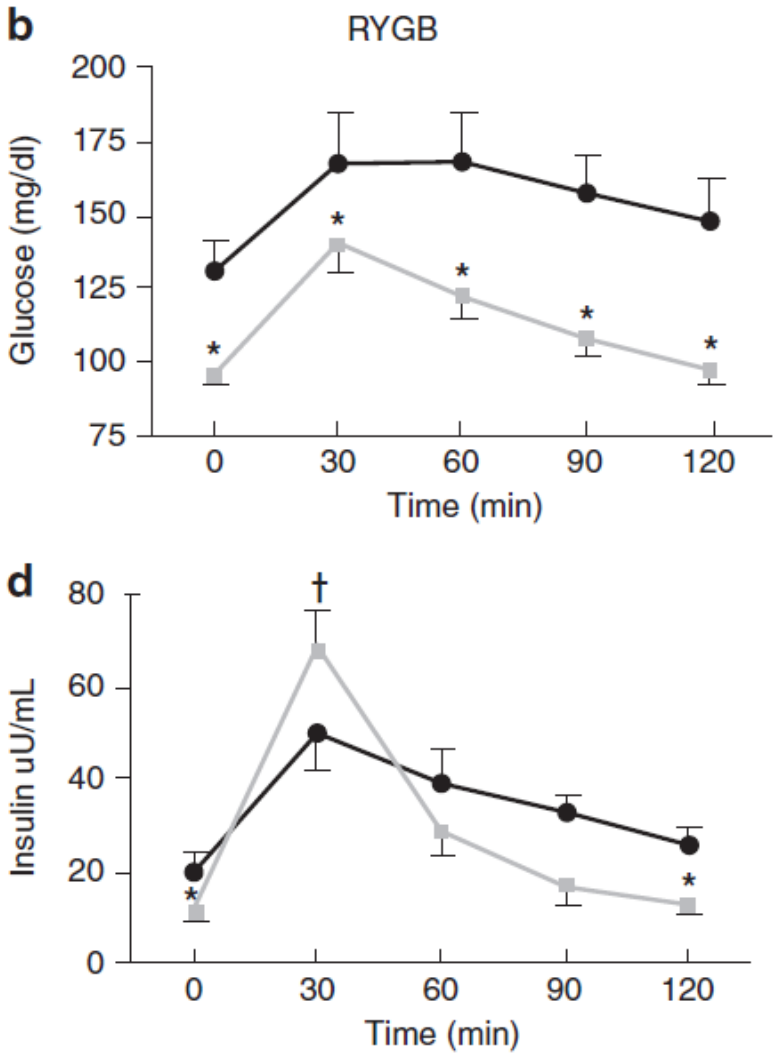
Loss of Insulin Resistance after Roux-en-Y Gastric Bypass Surgery: a Time Course Study





Wickremesekera K. Obes Surg. 2005

Glucose insulin responses during the mixed meal tolerance test (MMTT) carried out before surgery and 4 weeks after surgery.



SR Kashyap SR. Int J Ob, 2010

Changes in Body Composition and at Baseline and 14 days

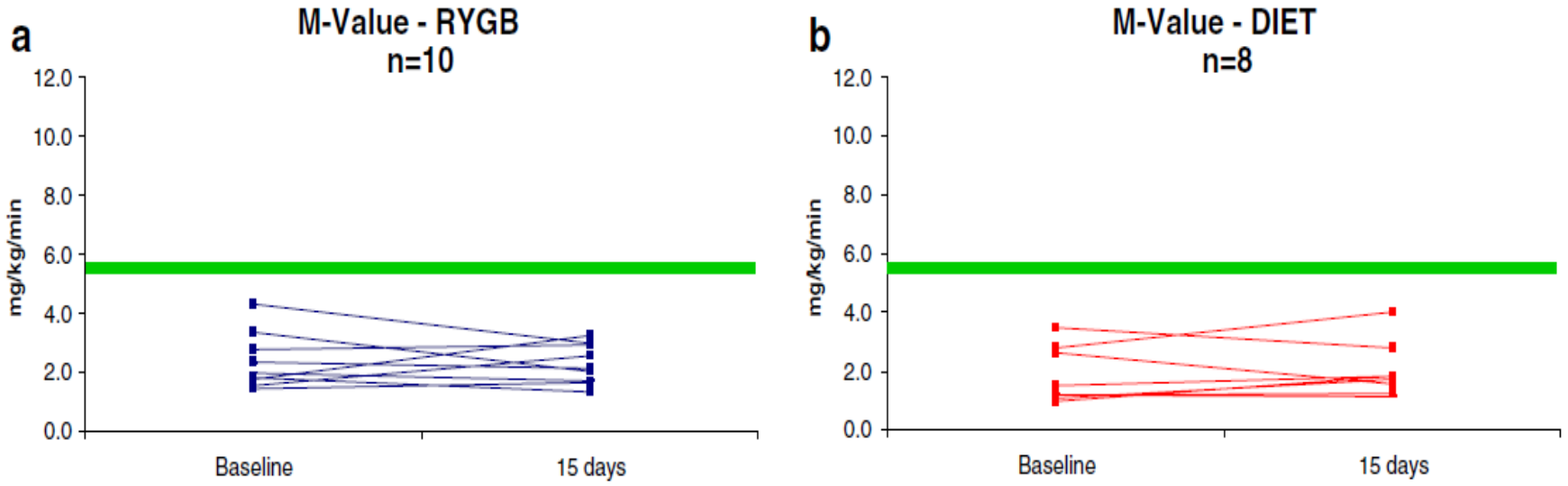
14 Gün

	RYGB (N=12)	Diet only (N=10)	p value
Weight loss (kg)	9.9±2.4	8.2±2.3	0.11
% Excess weight loss	12.7±2.4	10.9±2.8	0.12
% of weight lost as fat	40.4±16.2	29.9±16.8	0.22

Campos GM. J Gastrointest Surg. 2010

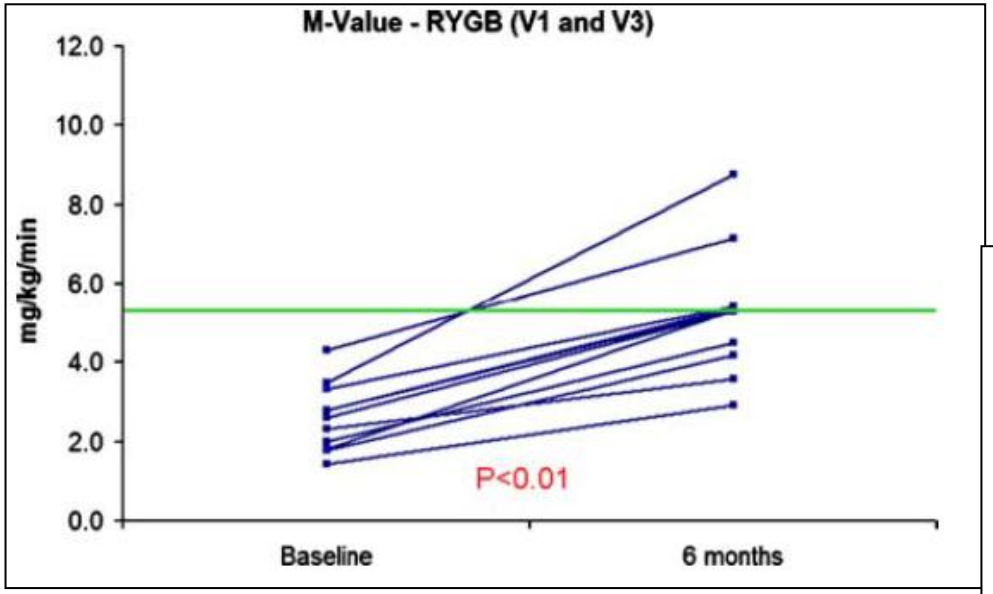
Peripheral glucose uptake (M value) by euglycemic–hyperinsulinemic clamp before (baseline) and 14 days after RYGB (a) or caloric restriction

14 Gün

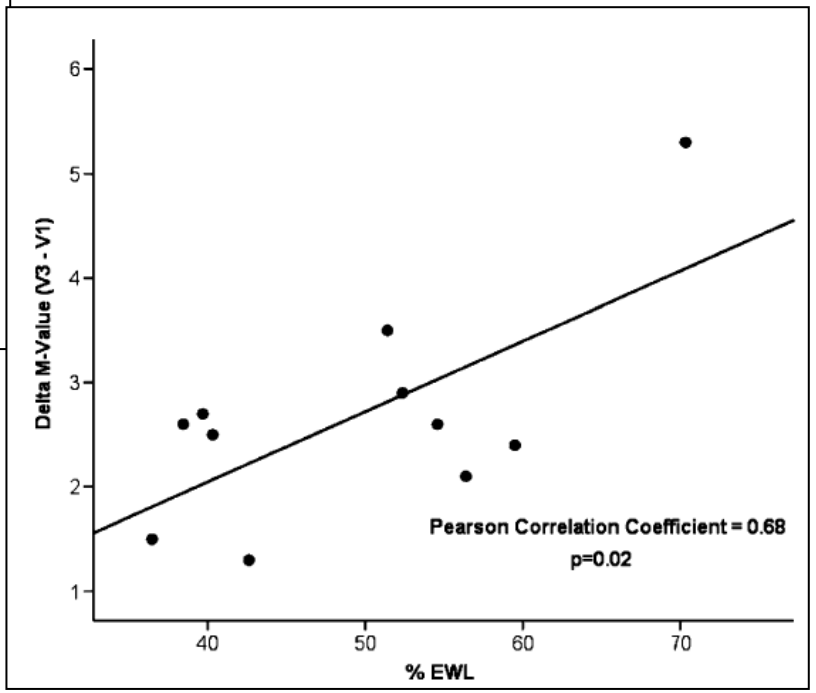


Campos GM. J Gastrointest Surg. 2010

Peripheral glucose uptake (M value) by euglycemic– hyperinsulinemic clamp before and 6 months after RYGB

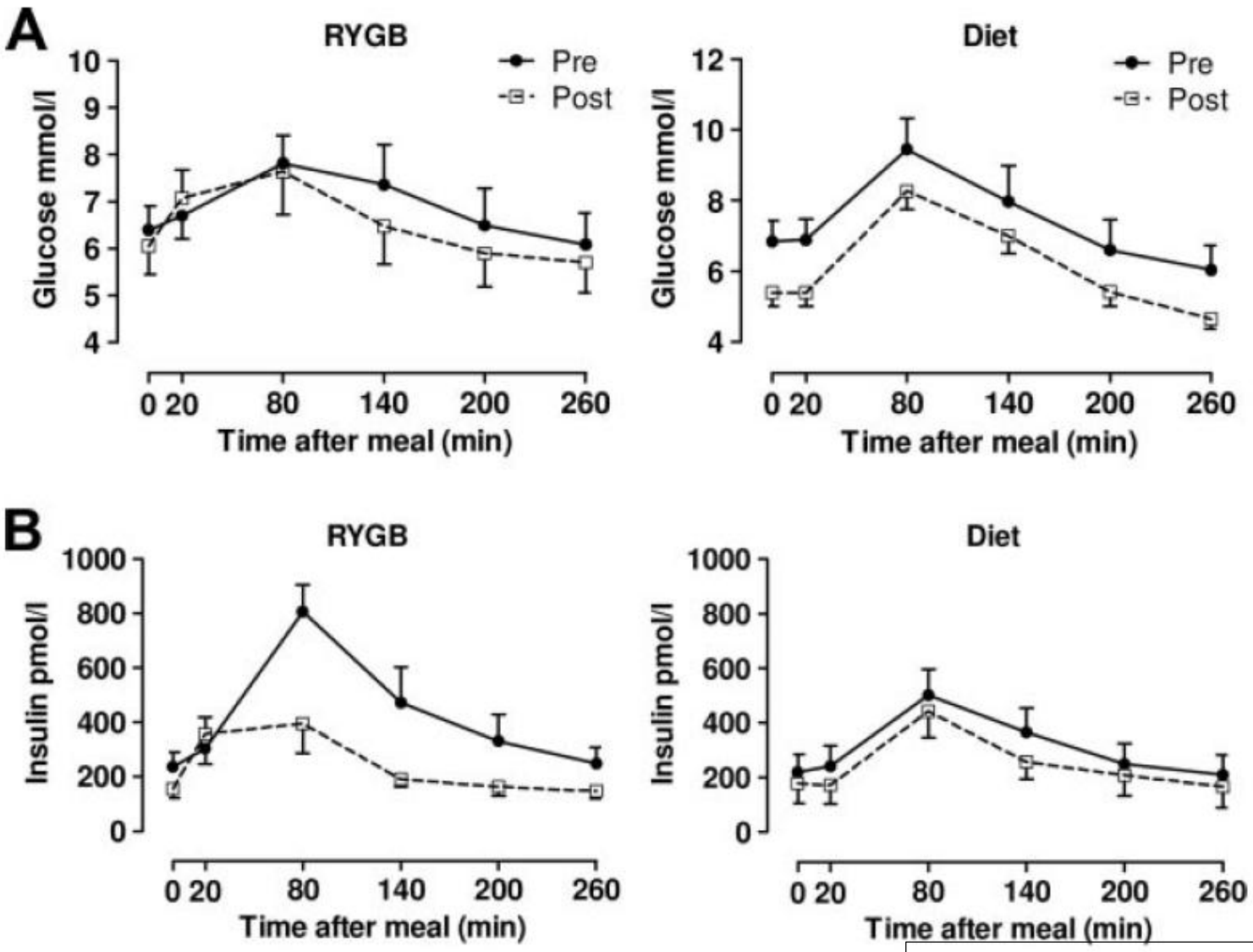


6 Ay



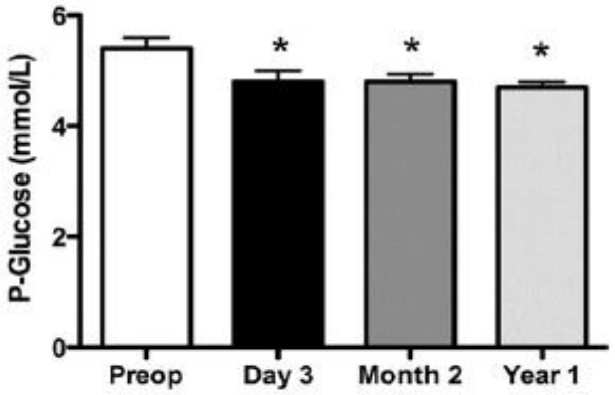
Campos GM. J Gastrointest Surg. 2010

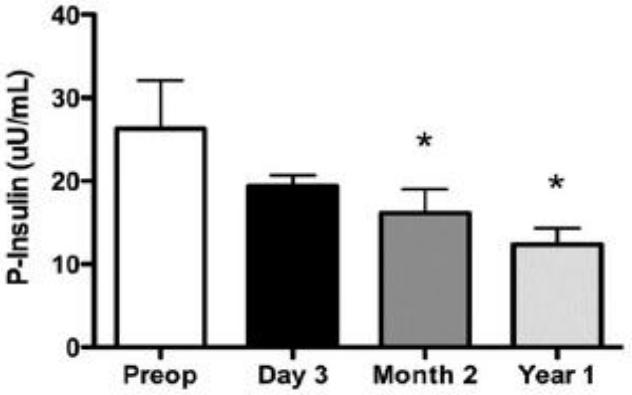
Metabolic responses during a mixed-meal before and after RYGB and diet. 4 days after RYGB or 3 days after a post– bariatric surgery diet

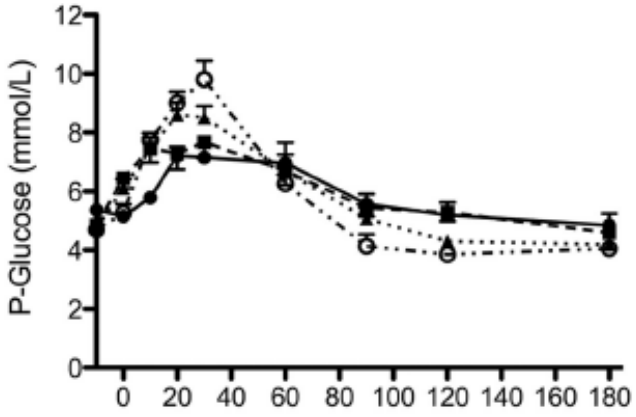


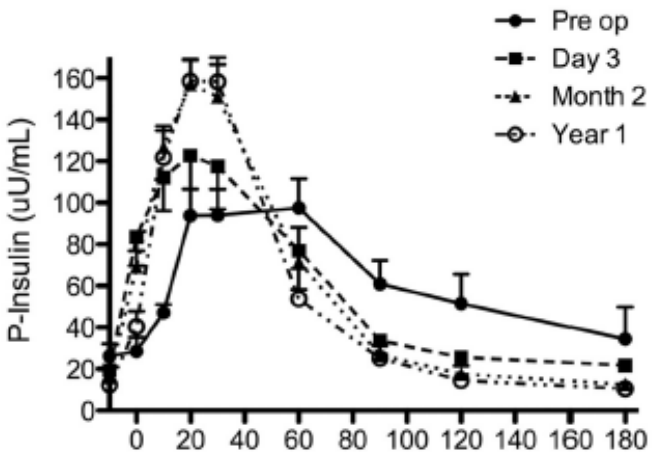
Isbell JM. Diab Care, 2010

Changes in Glucose Homeostasis after Roux-en-Y Gastric Bypass Surgery for Obesity at Day Three, Two Months, and One Year after Surgery



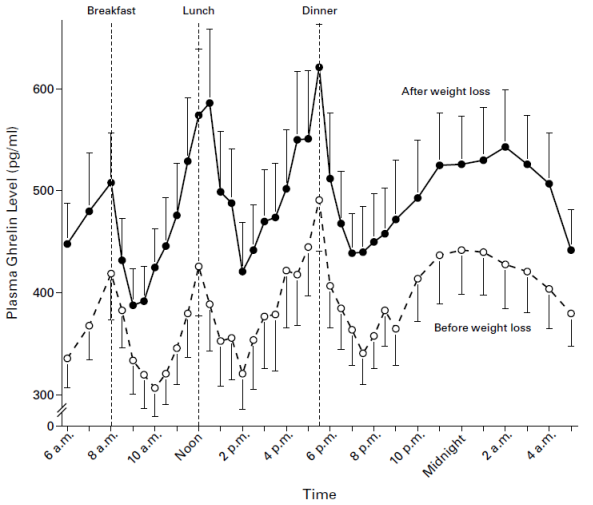




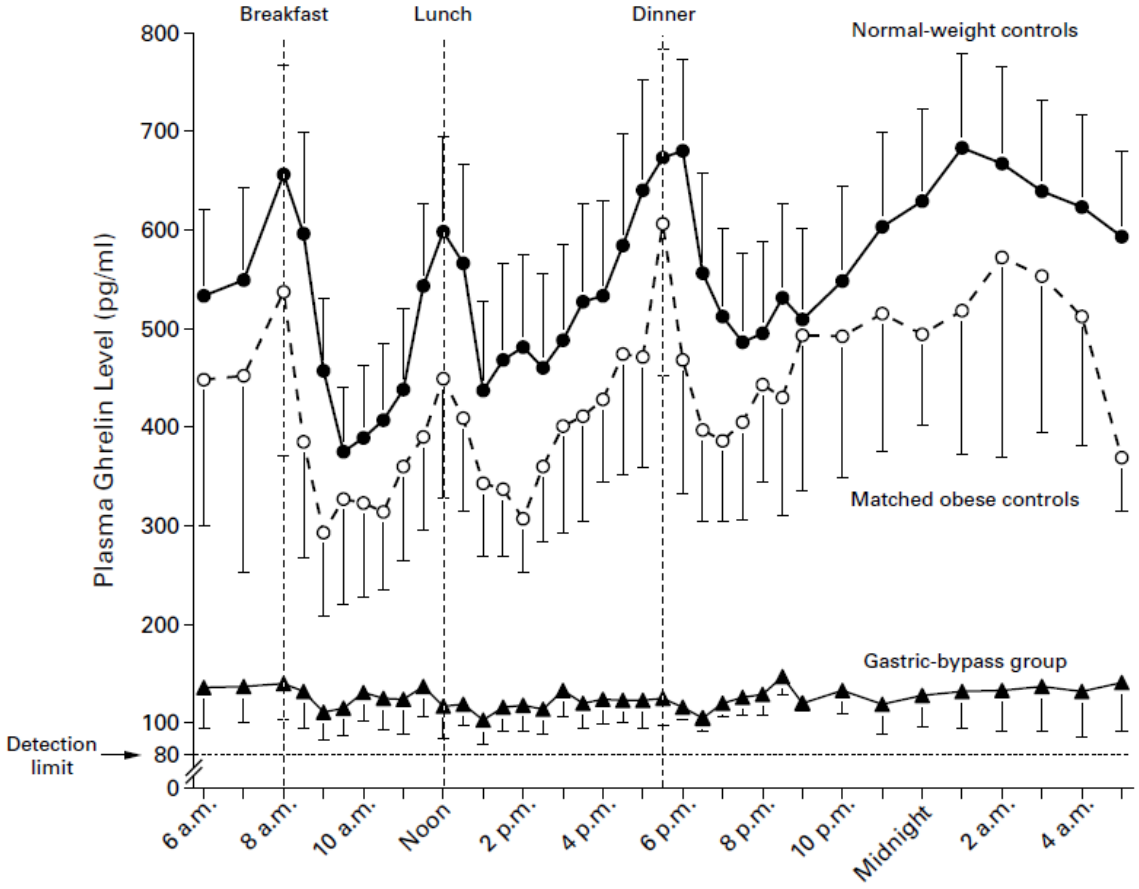


Y. Falken Y JCEM, 2011

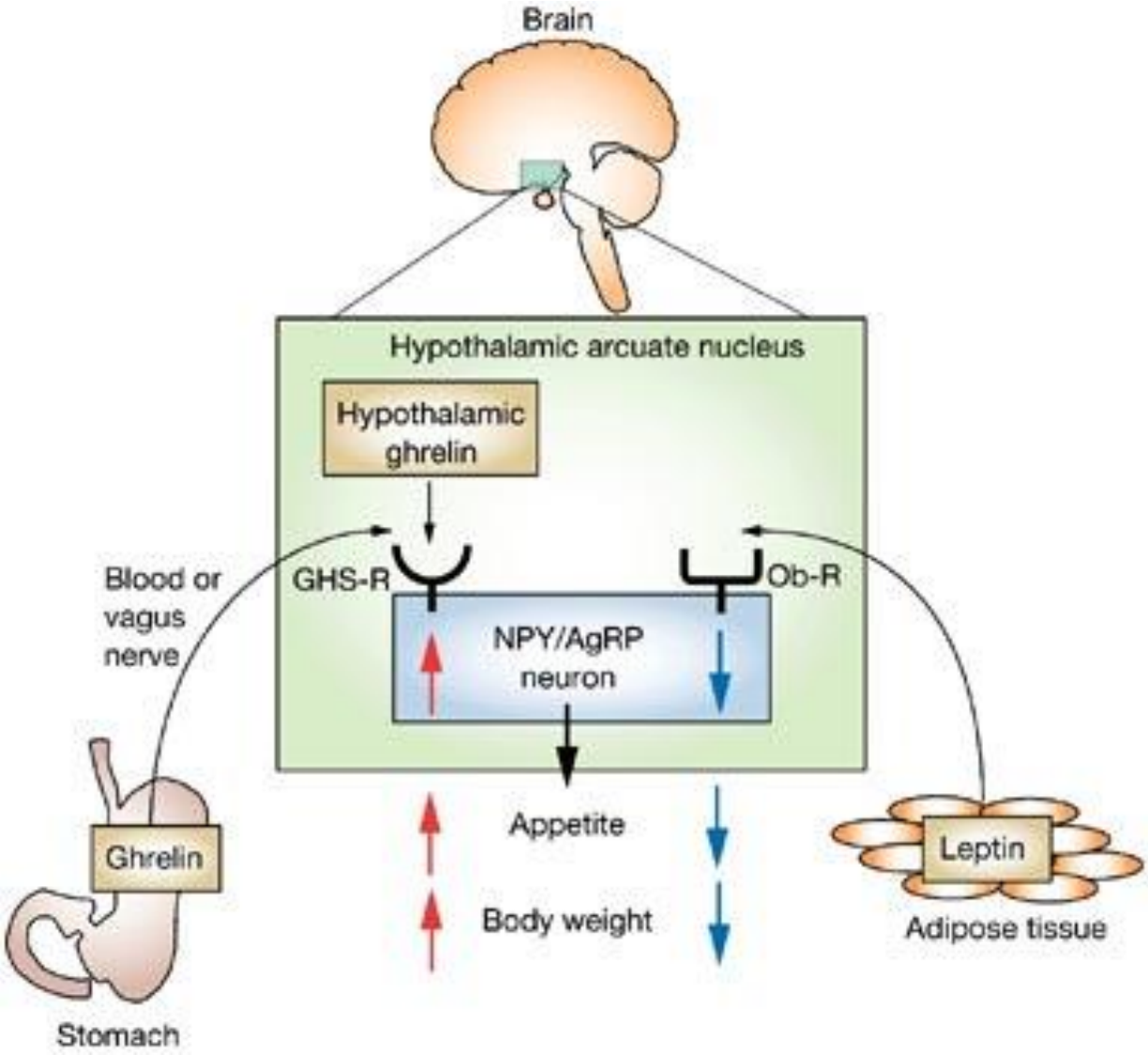
PLASMA GHRELIN LEVELS AFTER DIET-INDUCED WEIGHT LOSS OR GASTRIC BYPASS SURGERY



Subjects before and after Diet-Induced Weight Loss.



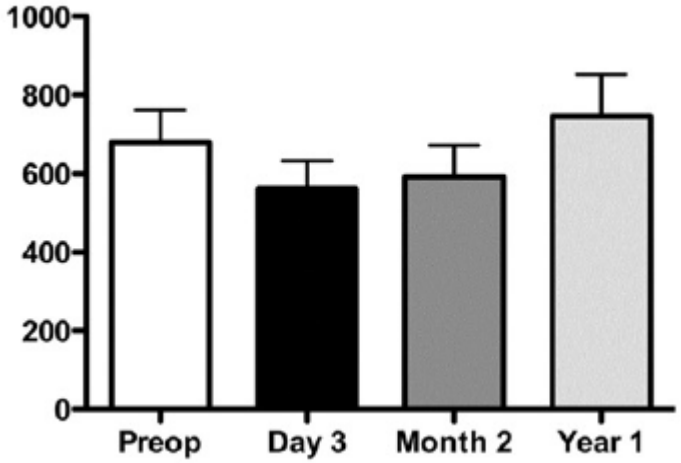
Cummings DE. N Engl J Med 2002


Brain
Hypothalamic arcuate nucleus
Hypothalamic ghrelin
GHS-R
Ob-R
Blood or vagus nerve
NPY/AgRP neuron
Appetite
Body weight
Ghrelin
Stomach
Leptin
Adipose tissue

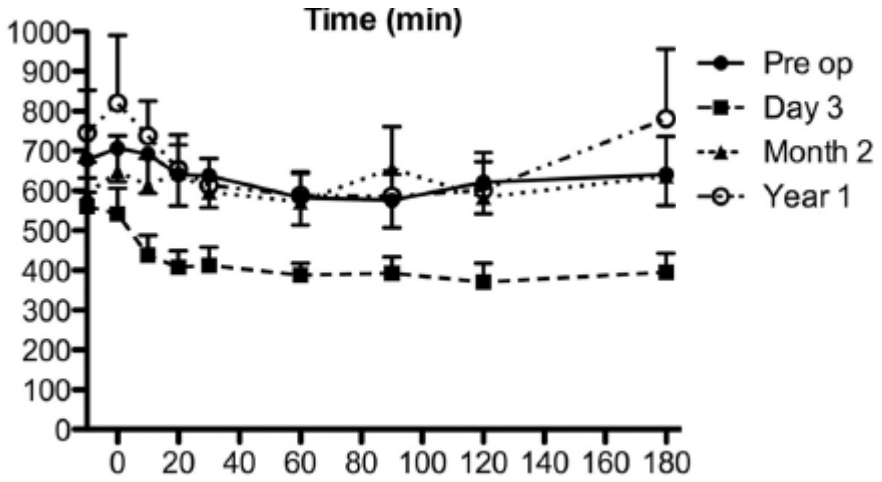
Ghrelin

Before (preop) and 3 d, 2 months and 1 yr after gastric bypass surgery for obesity.

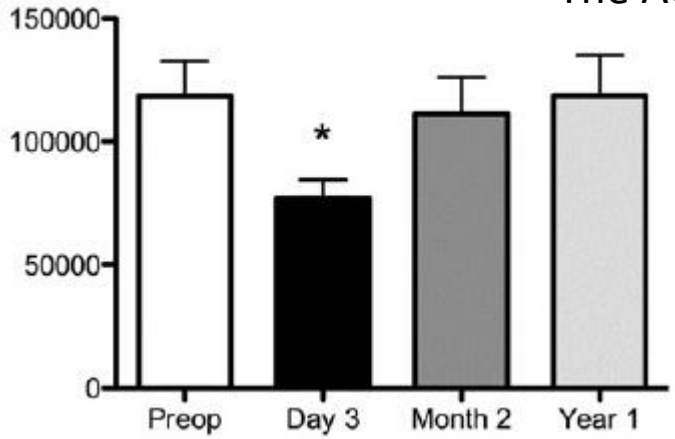
Fasting values



Plasma concentrations after food intake

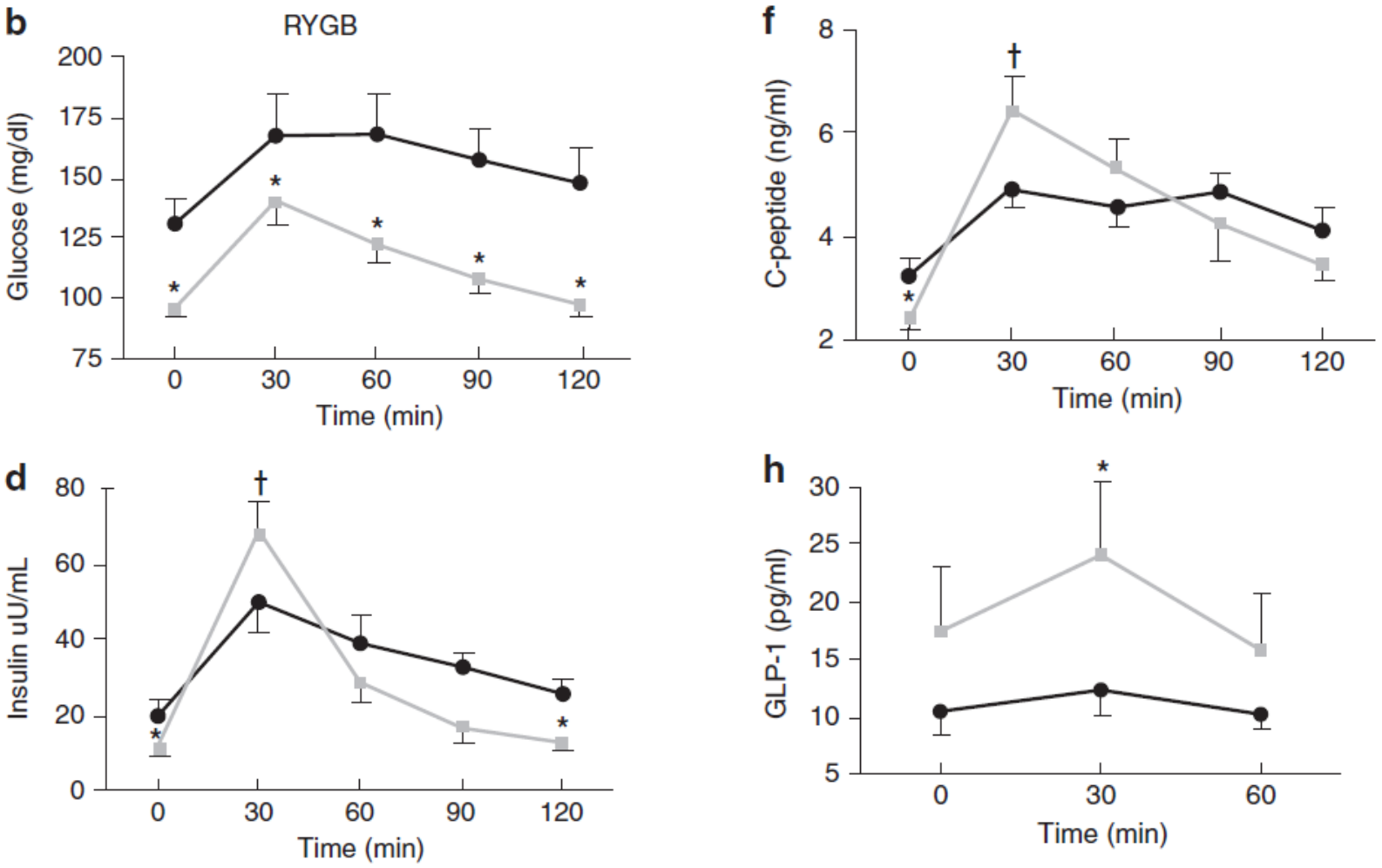


The AUC 0–180 min

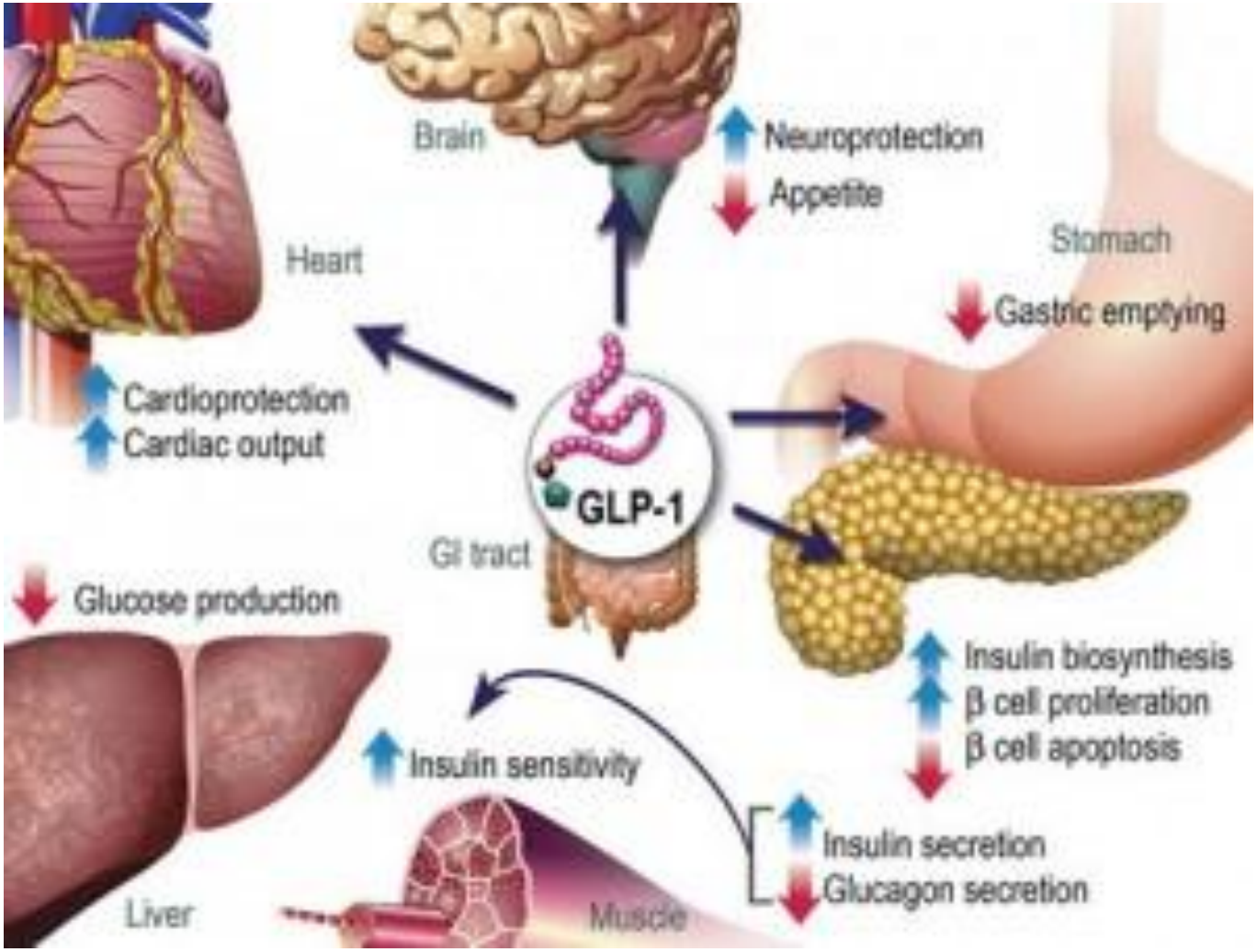


Y. Falken Y JCEM, 2011

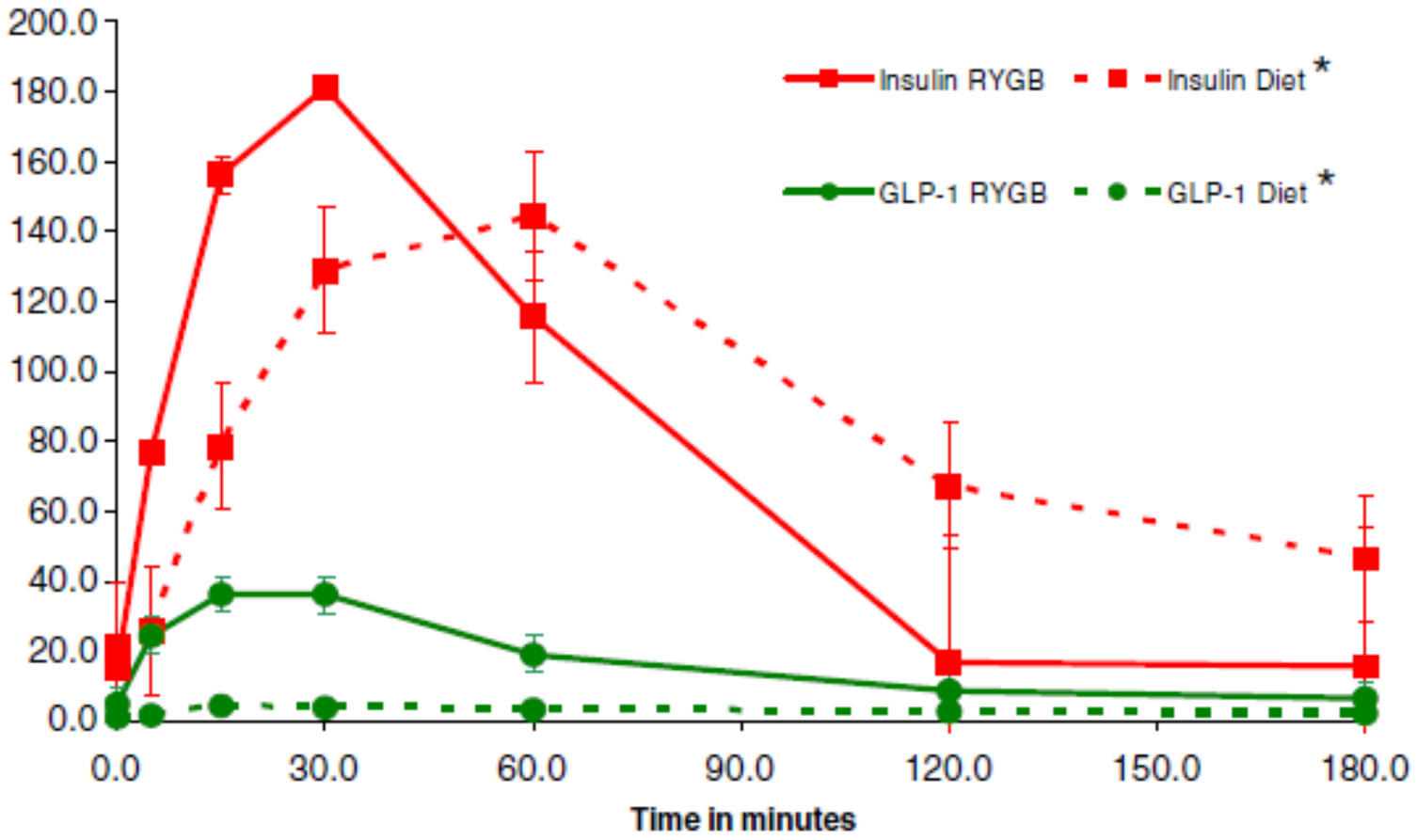
Acute effects of gastric bypass versus gastric restrictive surgery on b-cell function and insulinotropic hormones in severely obese patients with type 2 diabetes



SR Kashyap Int J Obesity, 2010


Brain
Neuroprotection
Appetite
Heart
Stomach
Gastric emptying
Cardioprotection
Cardiac output
GLP-1
GI tract
Glucose production
Insulin biosynthesis
β cell proliferation
β cell apoptosis
Insulin sensitivity
Insulin secretion
Glucagon secretion
Liver
Muscle

Insulin and GLP-1 secretion after a meal, 14 days after RYGB and calorie restriction or diet alone

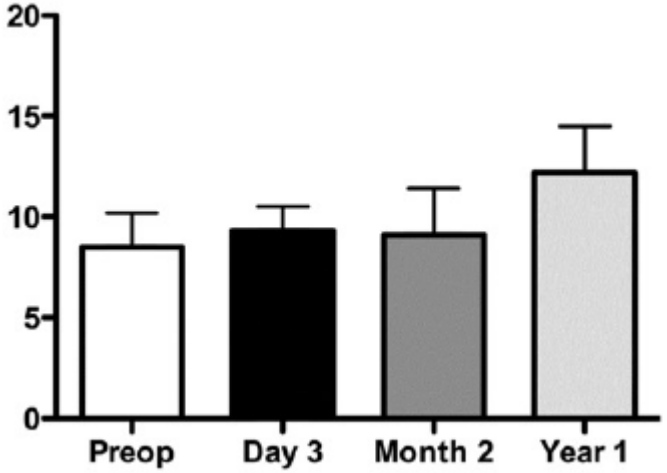


Campos GM. J Gastrointest Surg. 2010

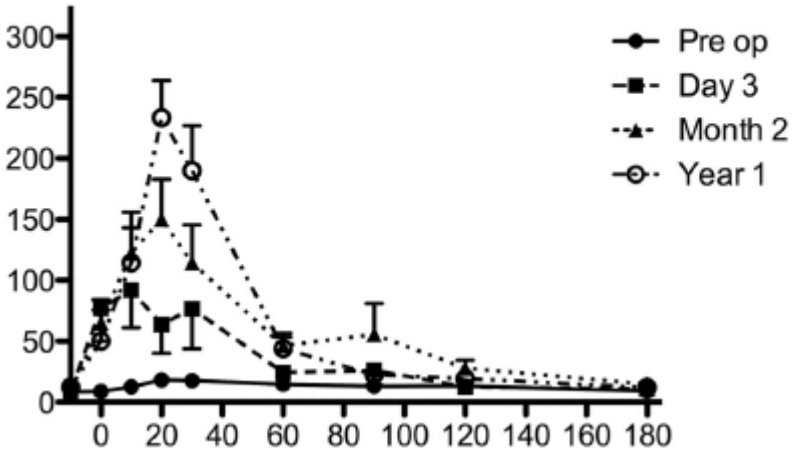
GLP-1

Before (preop) and 3 d, 2 months and 1 yr after gastric bypass surgery for obesity.

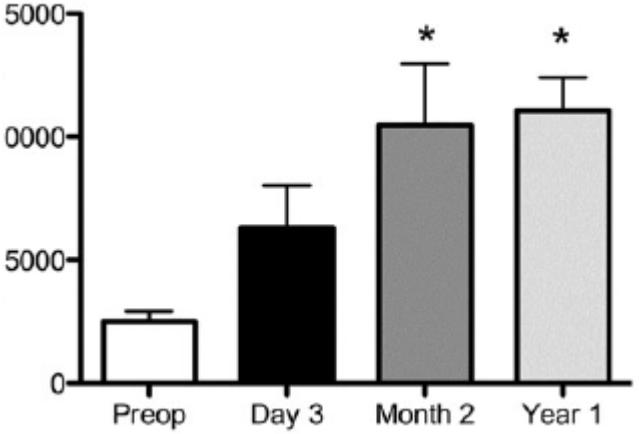
Fasting values



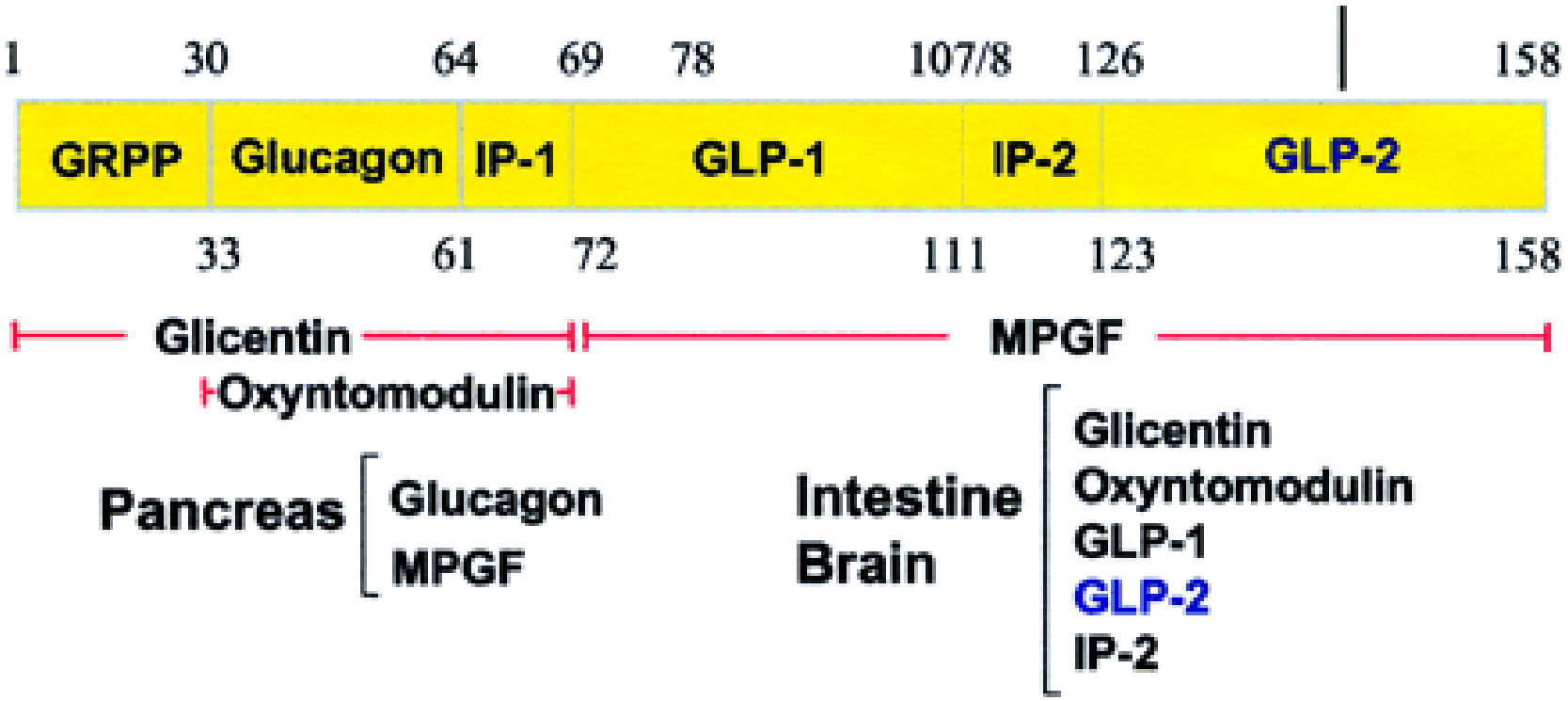
Plasma concentrations after food intake



The AUC 0–180 min



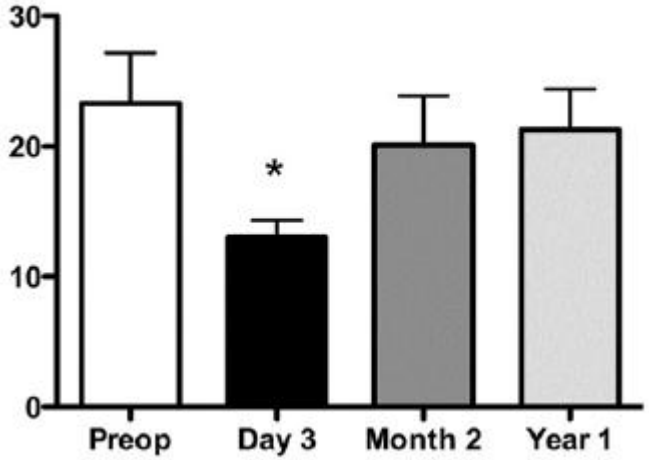
Y. Falken Y JCEM, 2011


1
30
64
69
78
107/8
126
158
GRPP
Glucagon
IP-1
GLP-1
IP-2
GLP-2
33
61
72
111
123
158
Glicentin
MPGF
Oxyntomodulin
Pancreas
Glucagon
MPGF
Intestine
Brain
Glicentin
Oxyntomodulin
GLP-1
GLP-2
IP-2

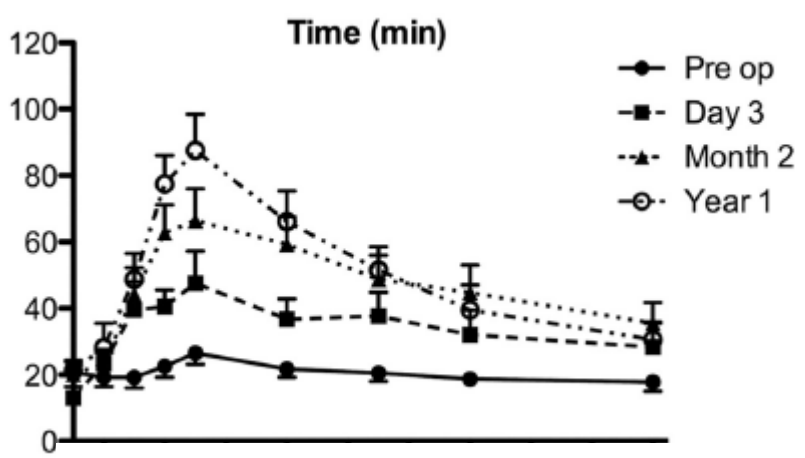
Enteroglukagon

Before (preop) and 3 d, 2 months and 1 yr after gastric bypass surgery for obesity.

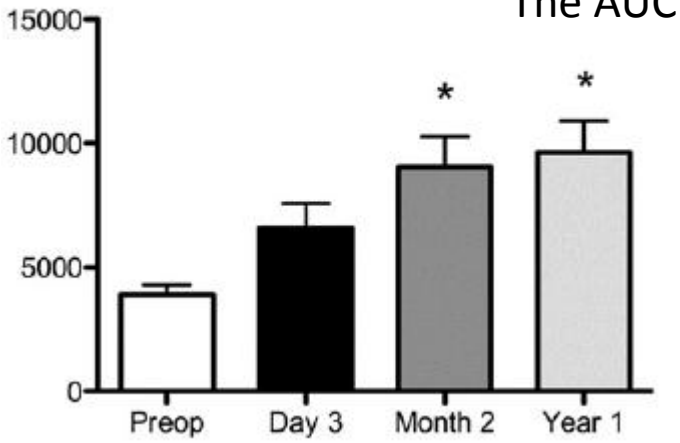
Fasting values



Plasma concentrations after food intake

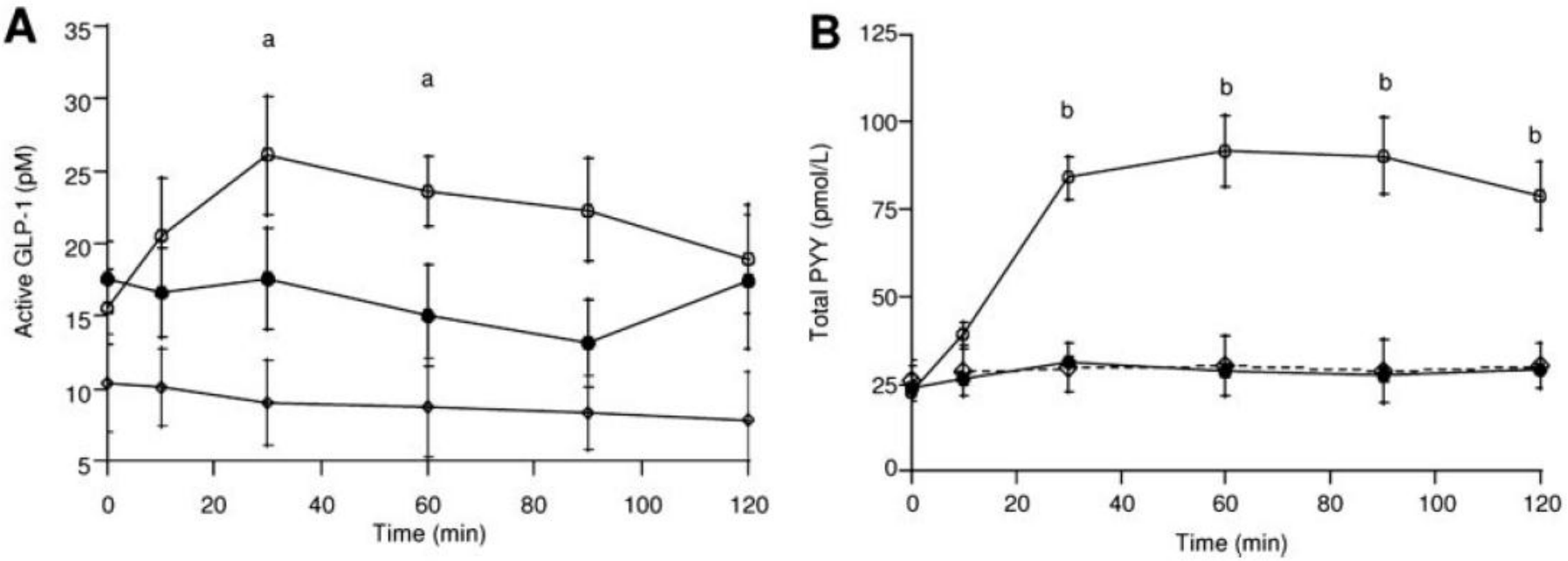


The AUC 0–180 min



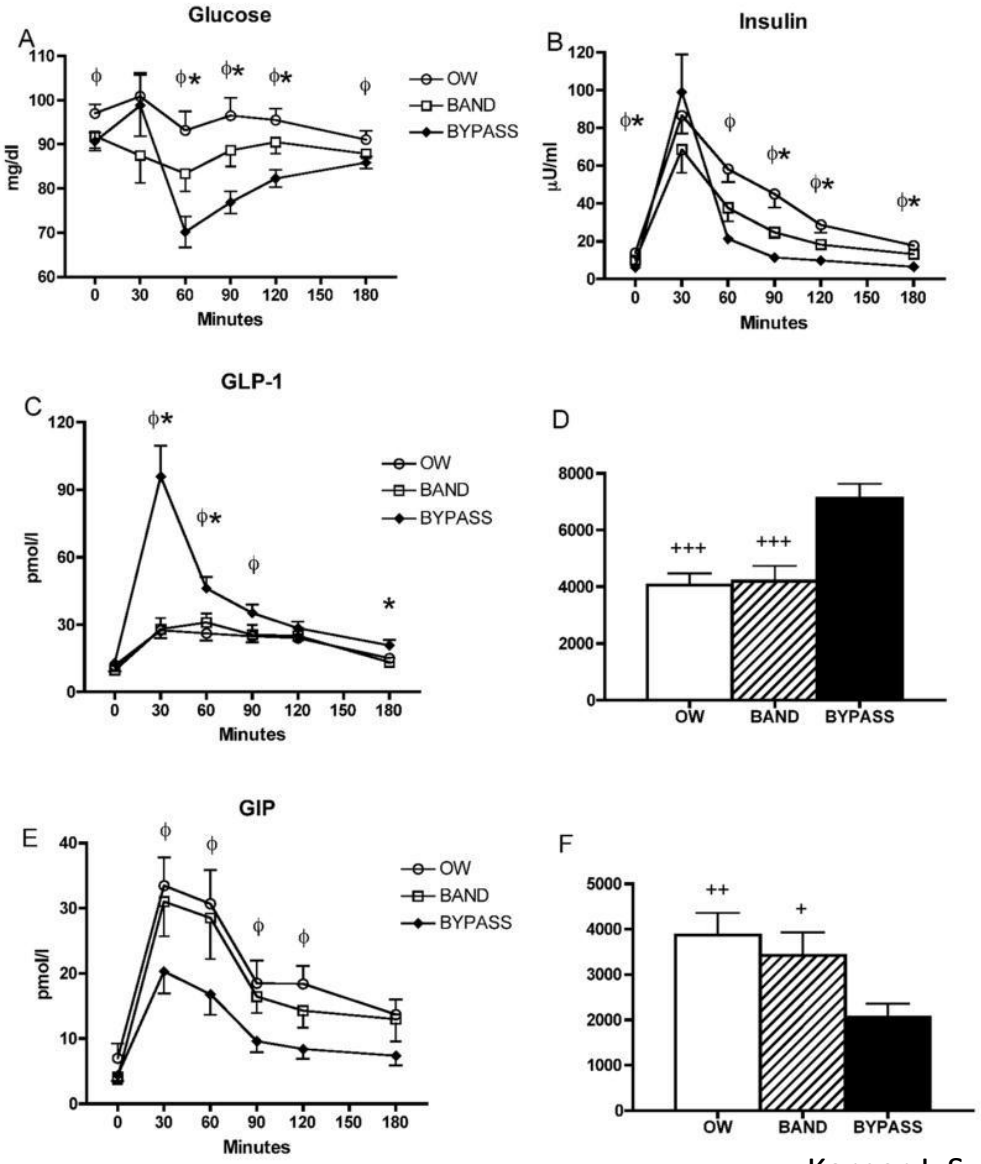
Y. Falken Y JCEM, 2011

Glucagon-Like Peptide-1, Peptide YY, after Gastric Bypass Surgery in Morbidly Obese Subjects



Morınigo R. JCEM , 2006

Exaggerated glucagon-like peptide-1 and blunted glucose-dependent insulinotropic peptide secretion are associated with Roux-en-Y gastric bypass but not adjustable gastric banding.

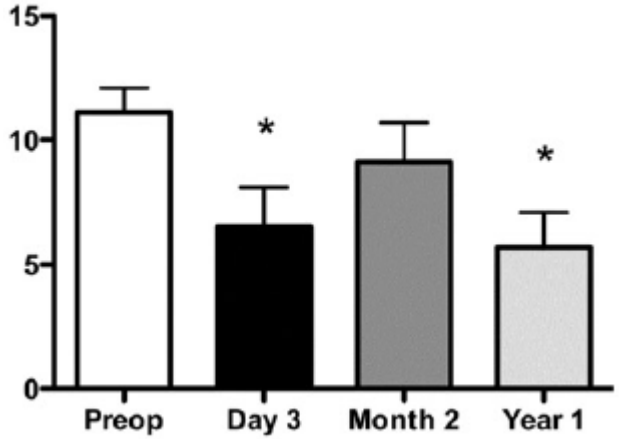


Korner J. Surg Obes Relat Dis. 2007

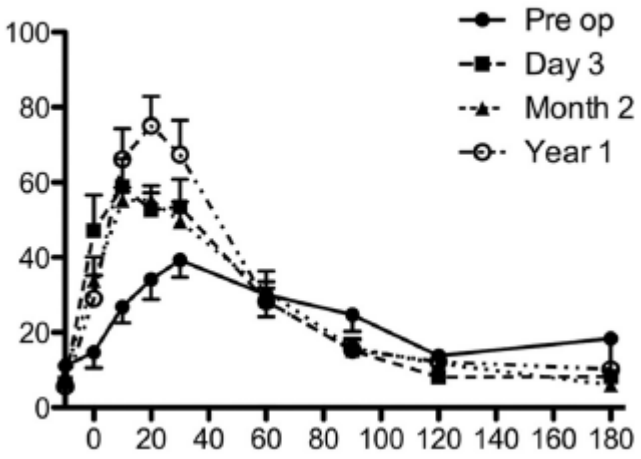
GIP

Before (preop) and 3 d, 2 months and 1 yr after gastric bypass surgery for obesity.

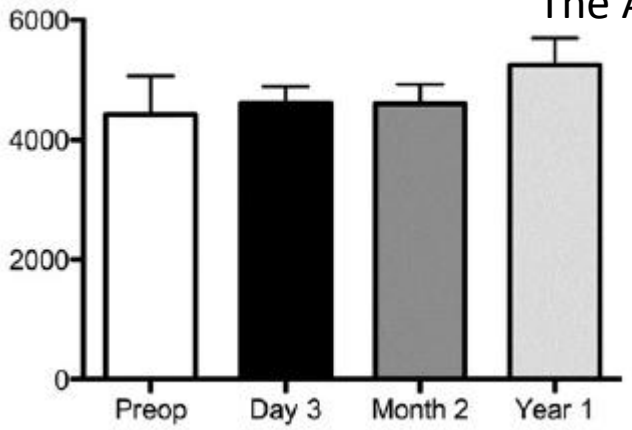
Fasting values



Plasma concentrations after food intake



The AUC 0–180 min

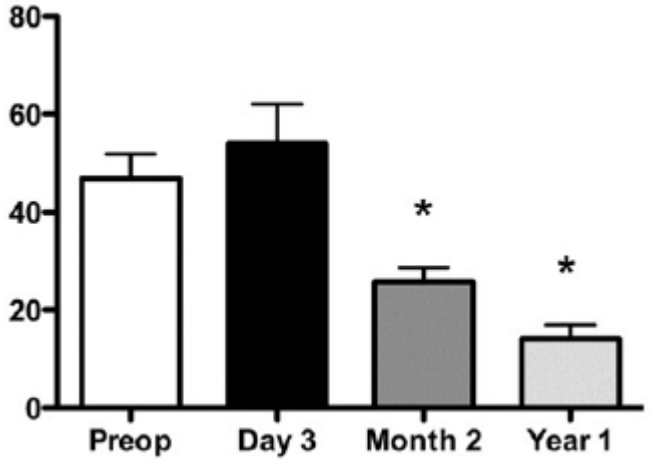


Y. Falken Y JCEM, 2011

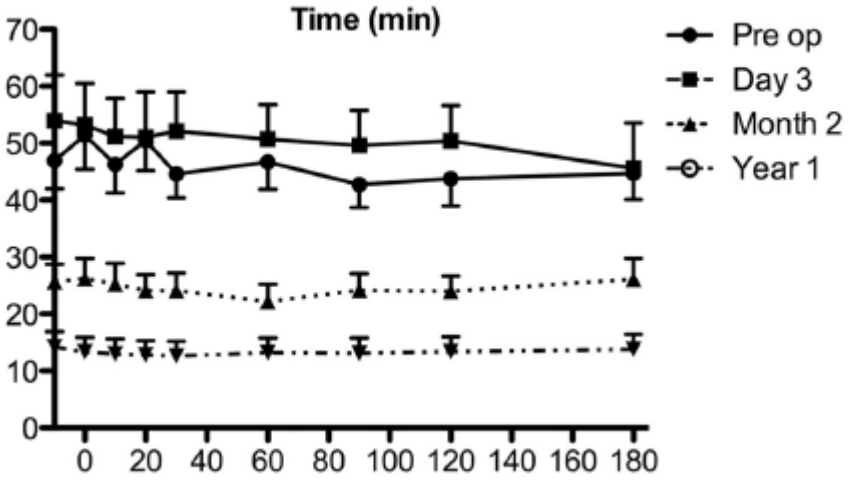
Leptin

Before (preop) and 3 d, 2 months and 1 yr after gastric bypass surgery for obesity.

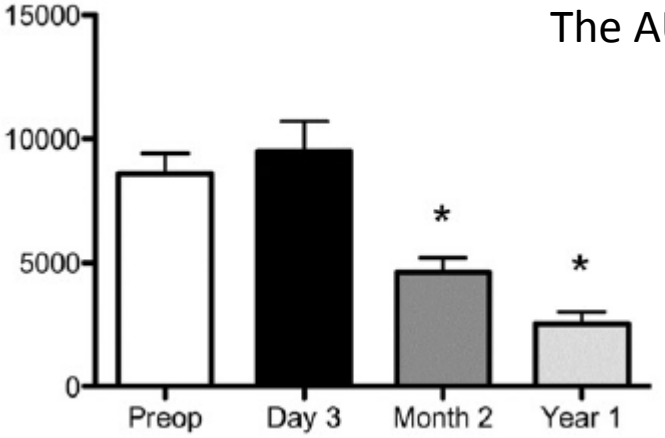
Fasting values



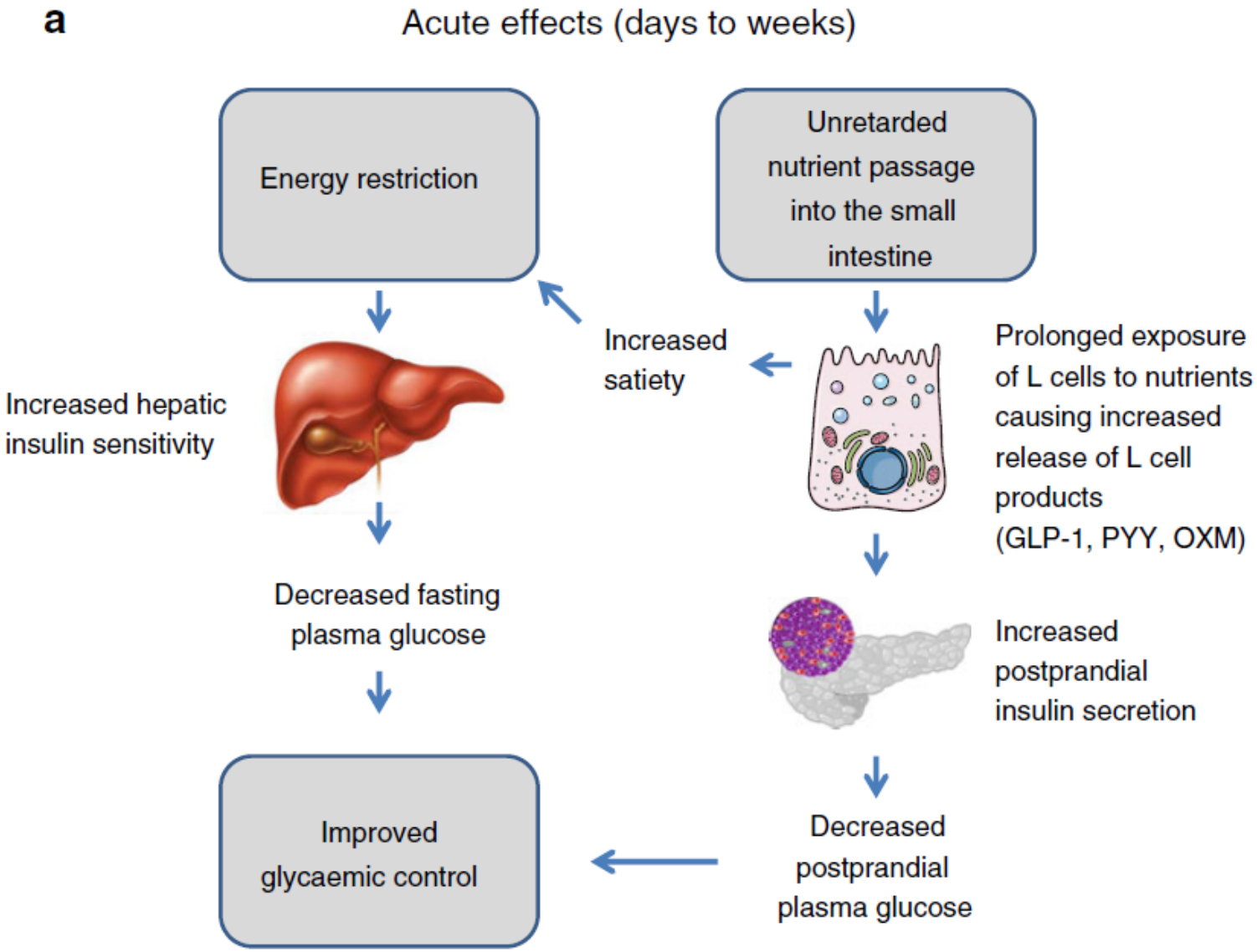
Plasma concentrations after food intake



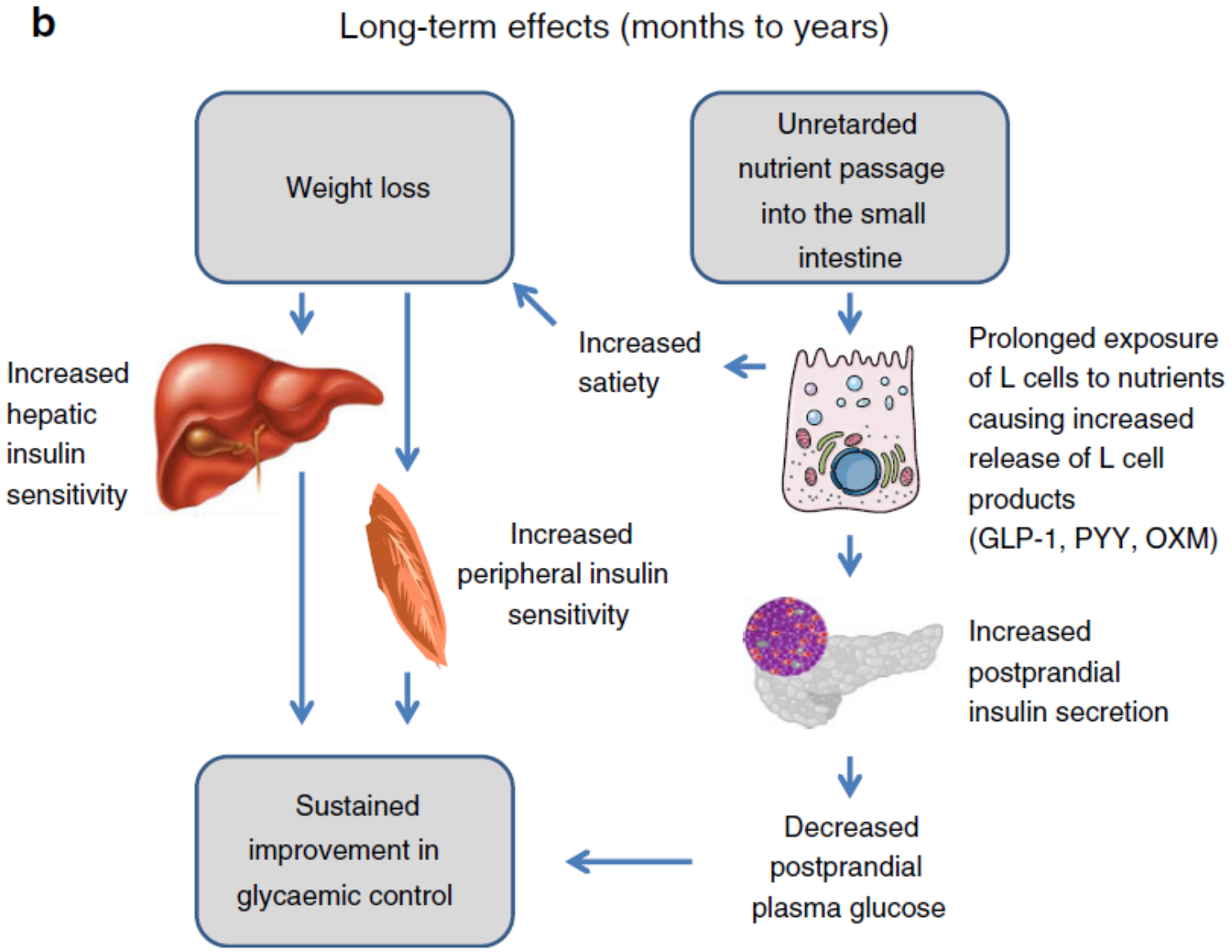
The AUC 0–180 min



Y. Falken Y JCEM, 2011



C. Dirksen Diabetologia,2012



C. Dirksen Diabetologia (2012) 55:1890–1901