Central Obesity and Hypertension

Sang Hak Lee, Cardiology,
Yonsei Cardiovascular Center, Yonsei University College of Meidicine

Framingham Offspring Study. 1987

75 and 65% of hypertension in men and women are attributable to obesity.

Adiposity stands out as a major controllable contributor to hypertension.

Waist circumference is more closely linked to cardiovascular disease risk factors than is BMI.

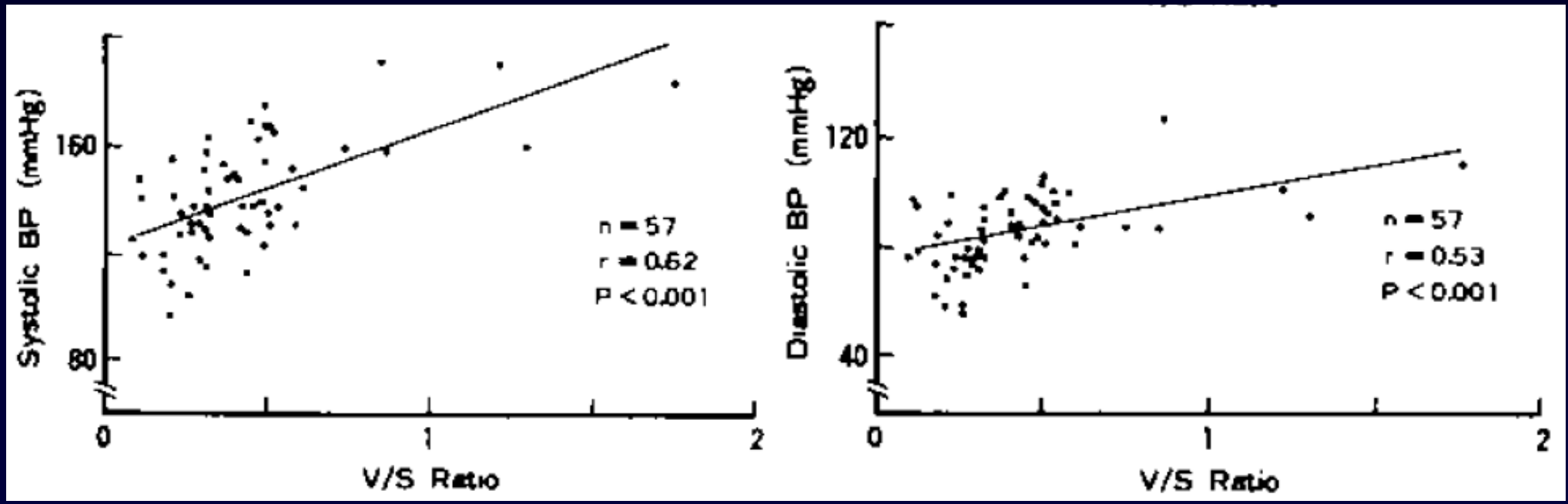
Zhu et al. Am J Clin Nutr 2002

A central distribution of body fat is associated with increased BP, independently of body mass index.

Siani et al. Am J Hypertens 2002

Close Correlation of Intra-abdominal Fat Accumulation to Hypertension in Obese Women

Hideyuki Kanai, Yuji Matsuzawa, Kazuaki Kotani, Yoshiaki Keno, Takashi Kobatake, Yoshiyuki Nagai, Shigenori Fujioka, Katsuto Tokunaga, and Seiichiro Tarui

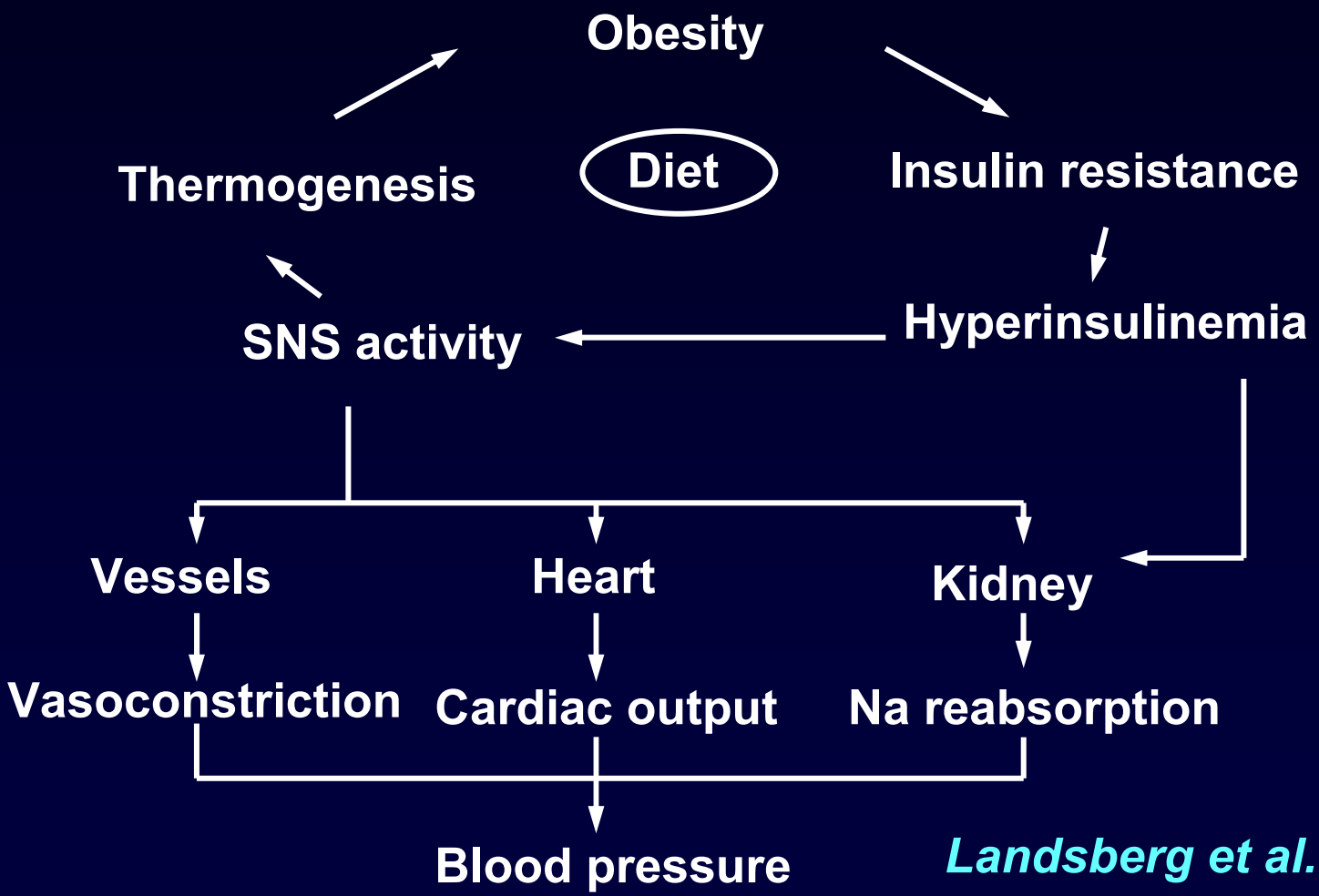


Kanai et al. Hypertension 1990

Factors Linking Obesity to Hypertension

- Insulin resistance and endothelial dysfunction
- Sympathetic nerve system (SNS) activation
- Adipocytokines
- Hemodynamic alterations

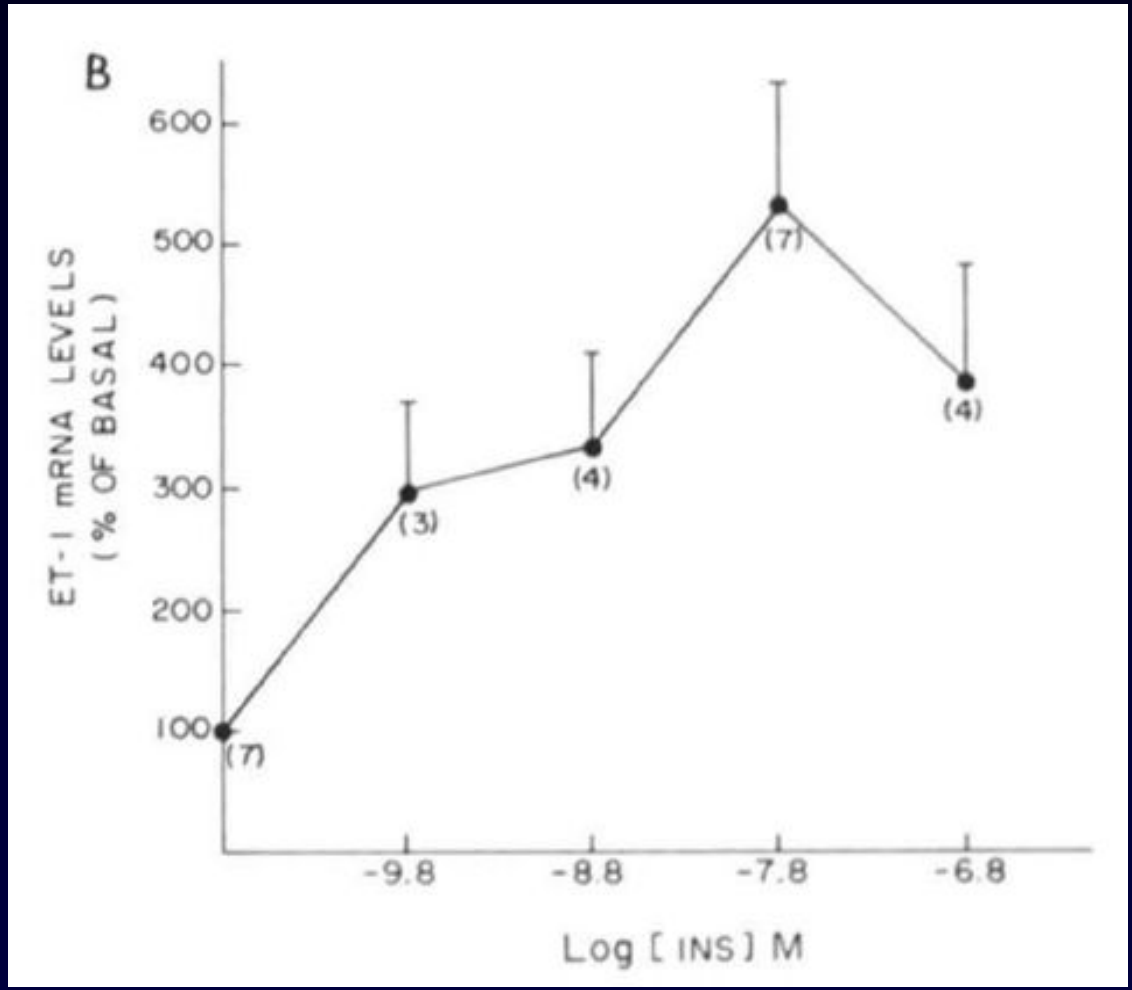
Insulin and blood pressure: by Landsberg et al



Landsberg et al. NEJM 1978

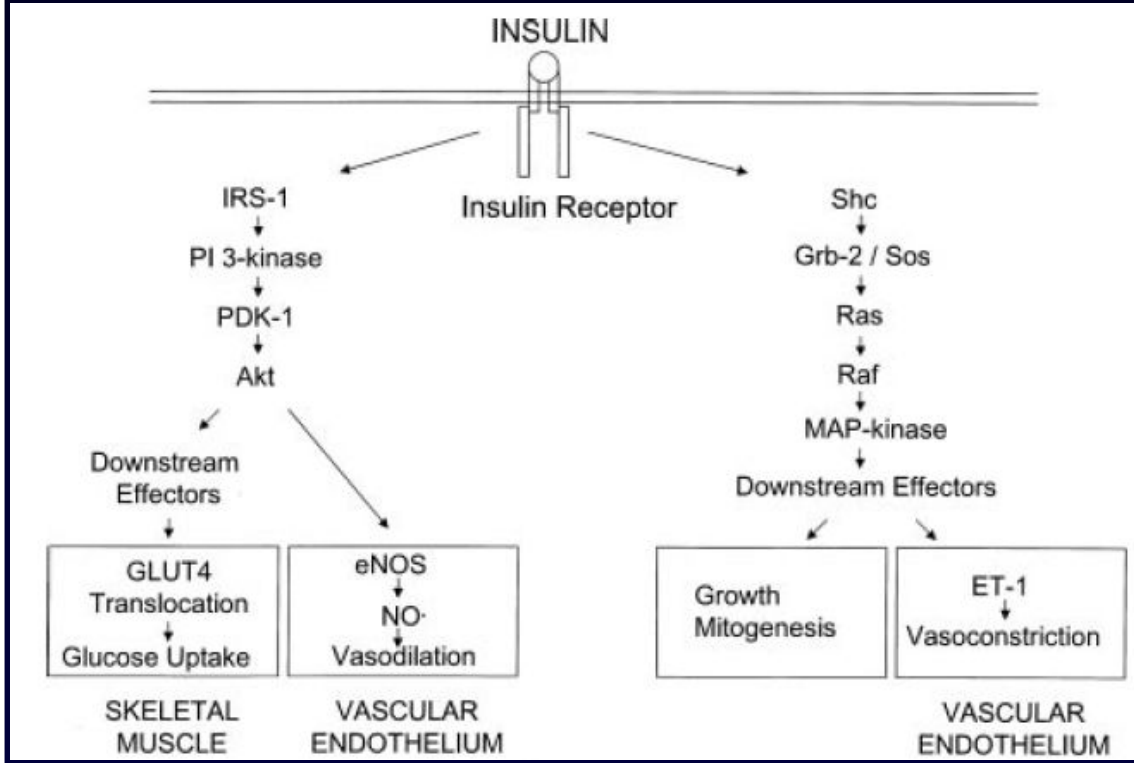
Landsberg. J Hypertens 2001

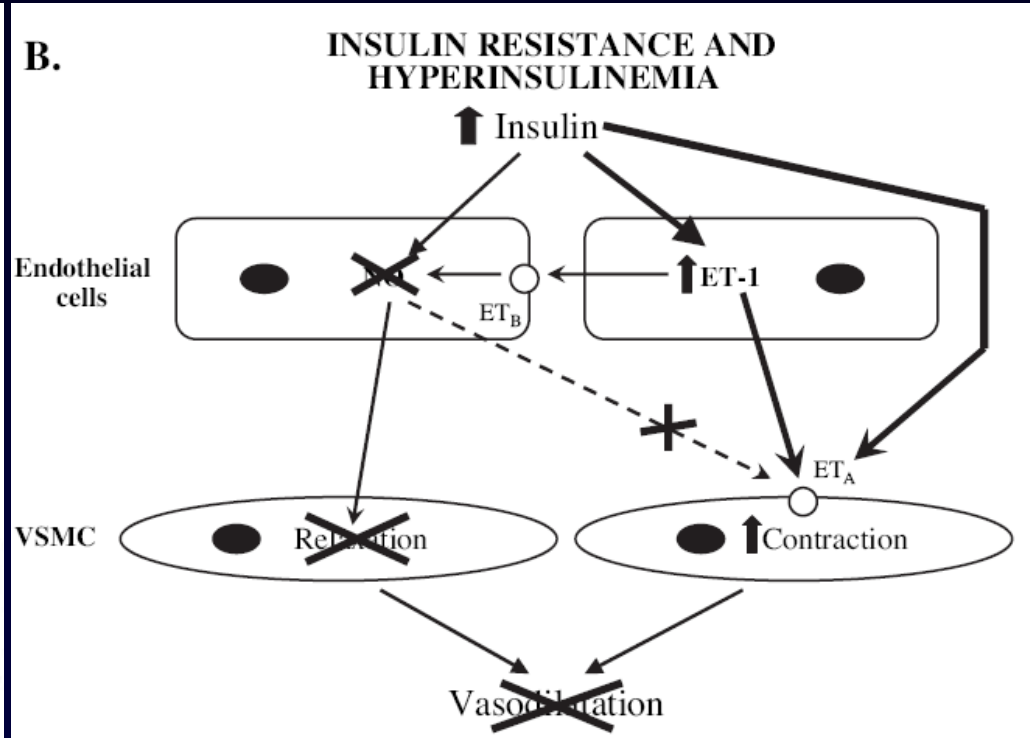
Stimulation of Endothelin-1 Gene Expression by Insulin in Endothelial Cells*



Oliver et al. J Biol Chem 1991

Effects of insulin on ET-1 and NO production

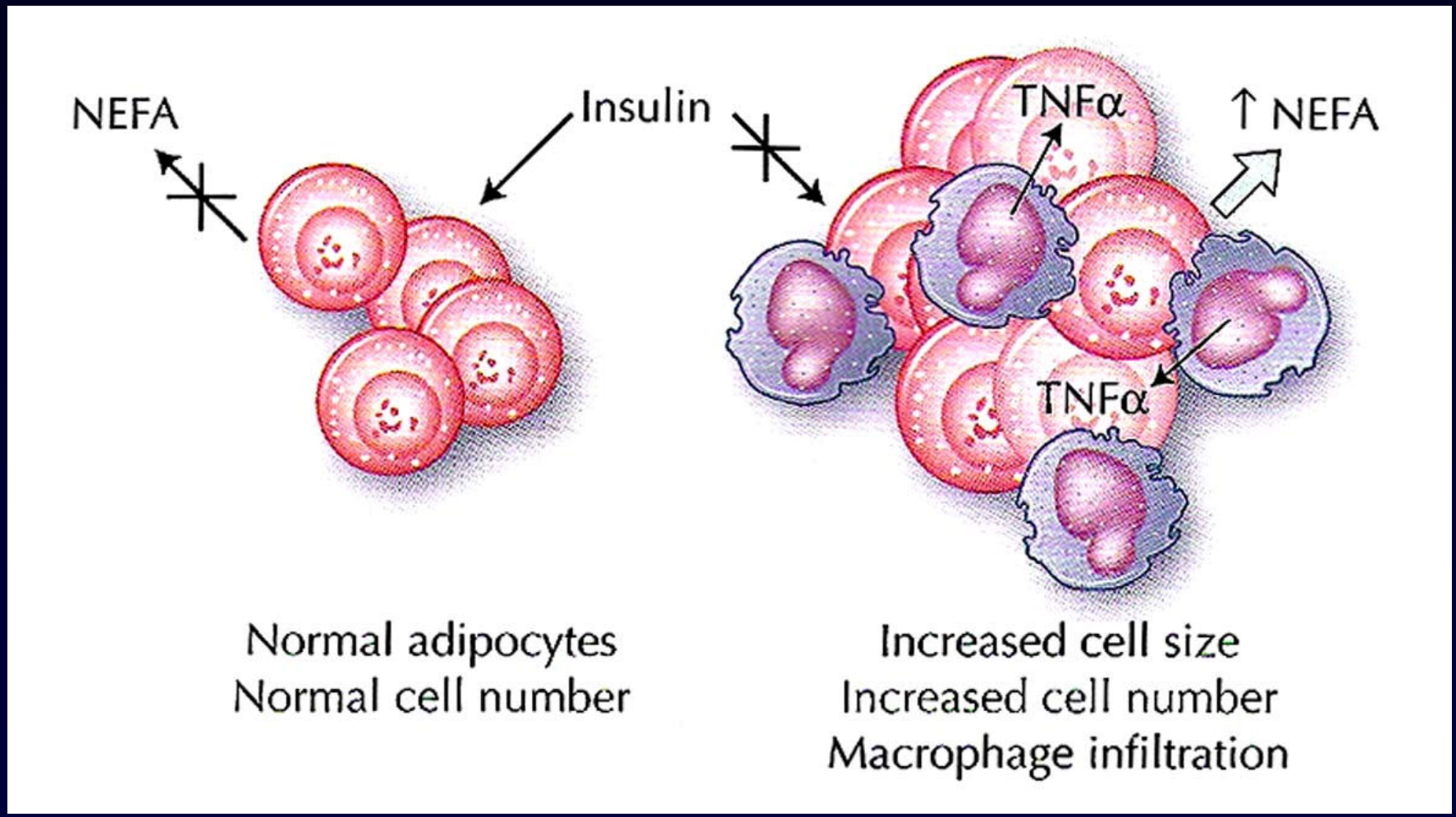




Kim et al. Circulation 2006

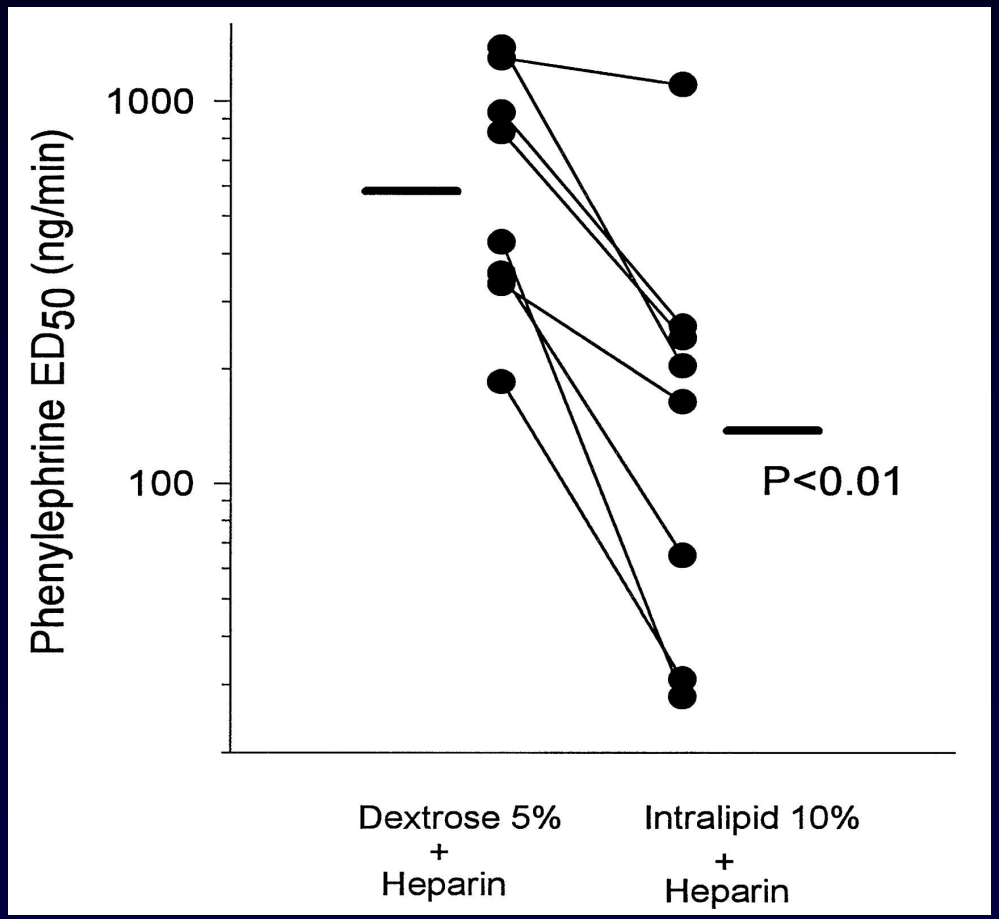
Sarafidis et al. J Clin Endocrinol Metab 2007

Obesity and insulin resistance

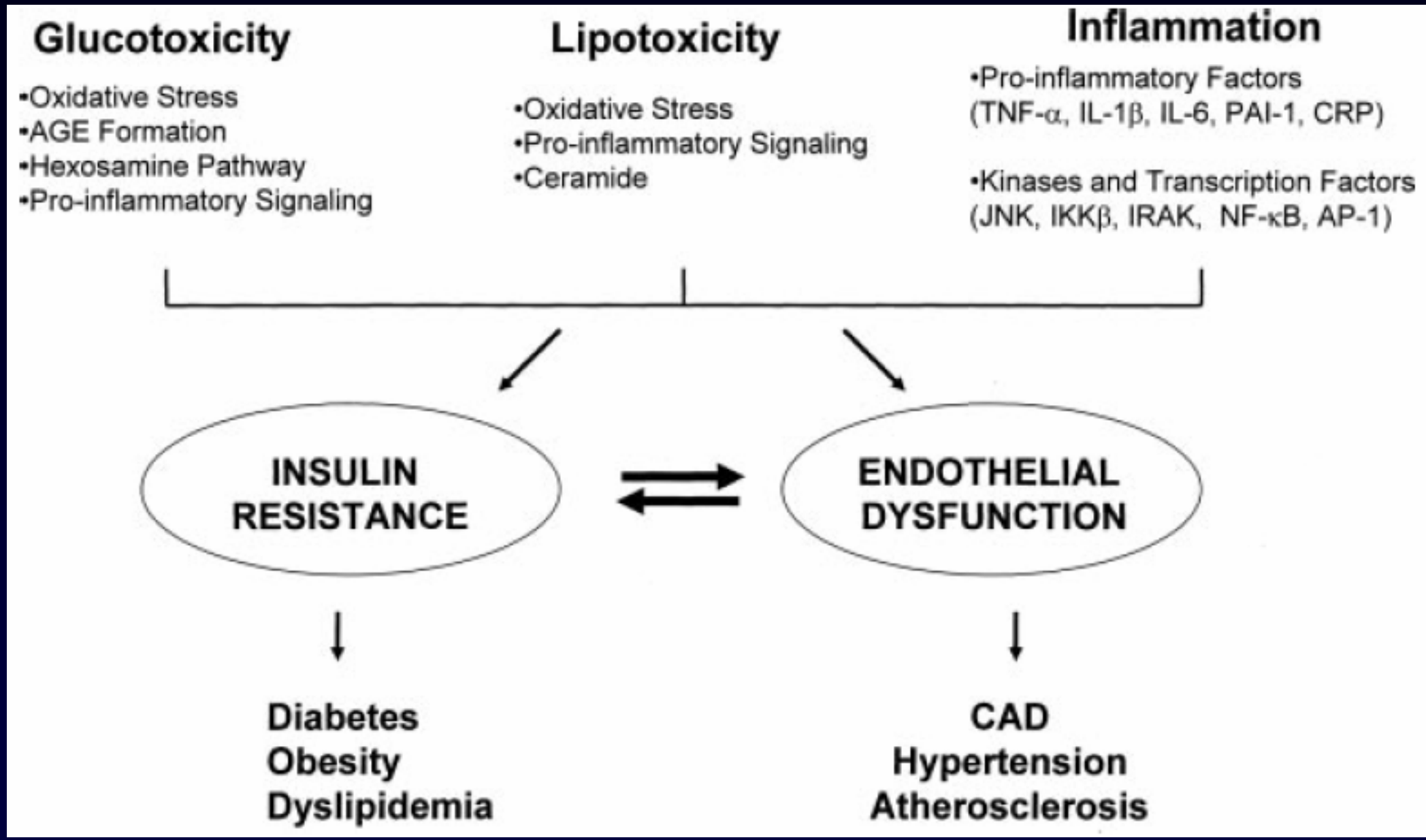


Grundy. Atlas of atherosclerosis 2005

Fatty acids enhance vascular α-adrenergic sensitivity



Stepniakowski et al.
Hypertension 1995



Kim et al. Circulation 2006

Predictors of forearm blood during after Ach infusions

Variables	partial r^2	total r^2	p
Insulin	23.5	23.5	0.0001
WHR	16.6	40.0	0.0001
BMI	8.0	48.1	0.0003

Perticone et al. Diabetes 2001

Visceral adiposity and hypertension in Japanese Americans

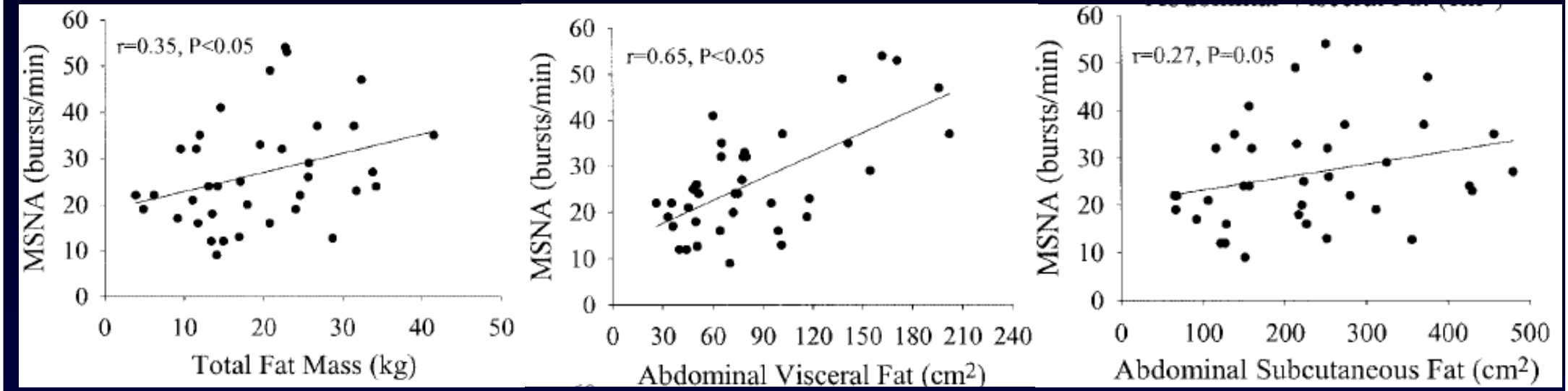
Variables	OR	p
Visceral fat area	1.68	0.003
Fasting insulin	1.49	0.001
Age	2.25	<0.001
2h plasma glucose	1.41	0.007

Visceral fat is a correlate of hypertension independent of fasting plasma insulin

Hayashi et al. Circulation 2003

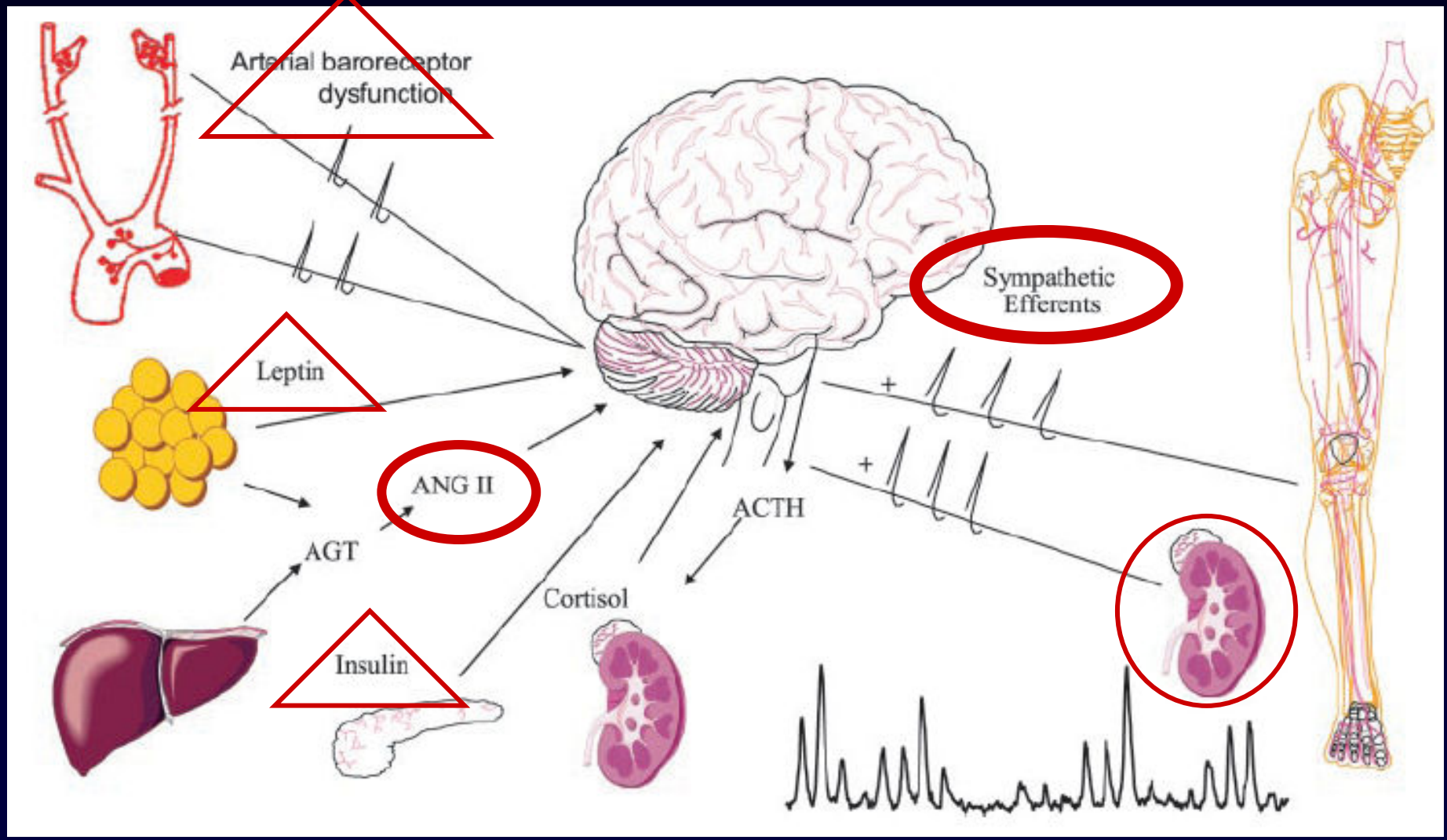
Poirier et al. Hypertension 2005

Obesity and SNS activation



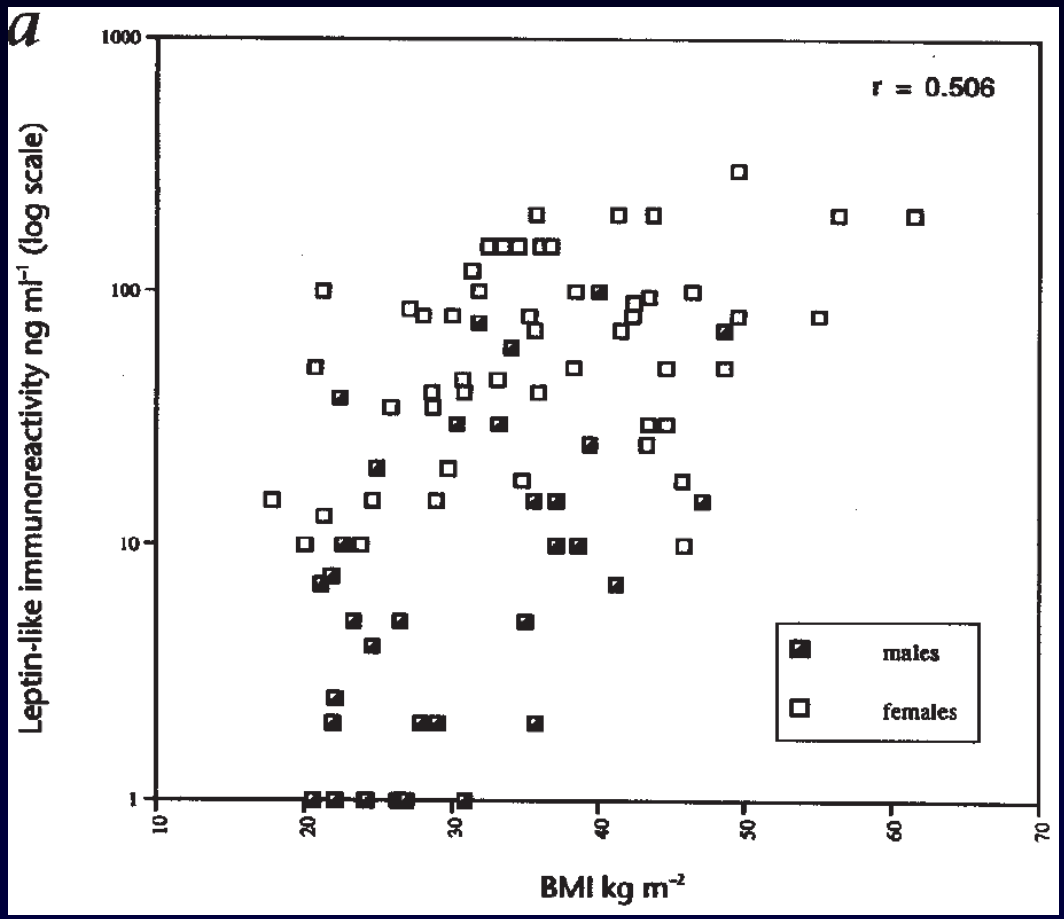
Alvarez et al.
Circulation 2002

Obesity and SNS activation



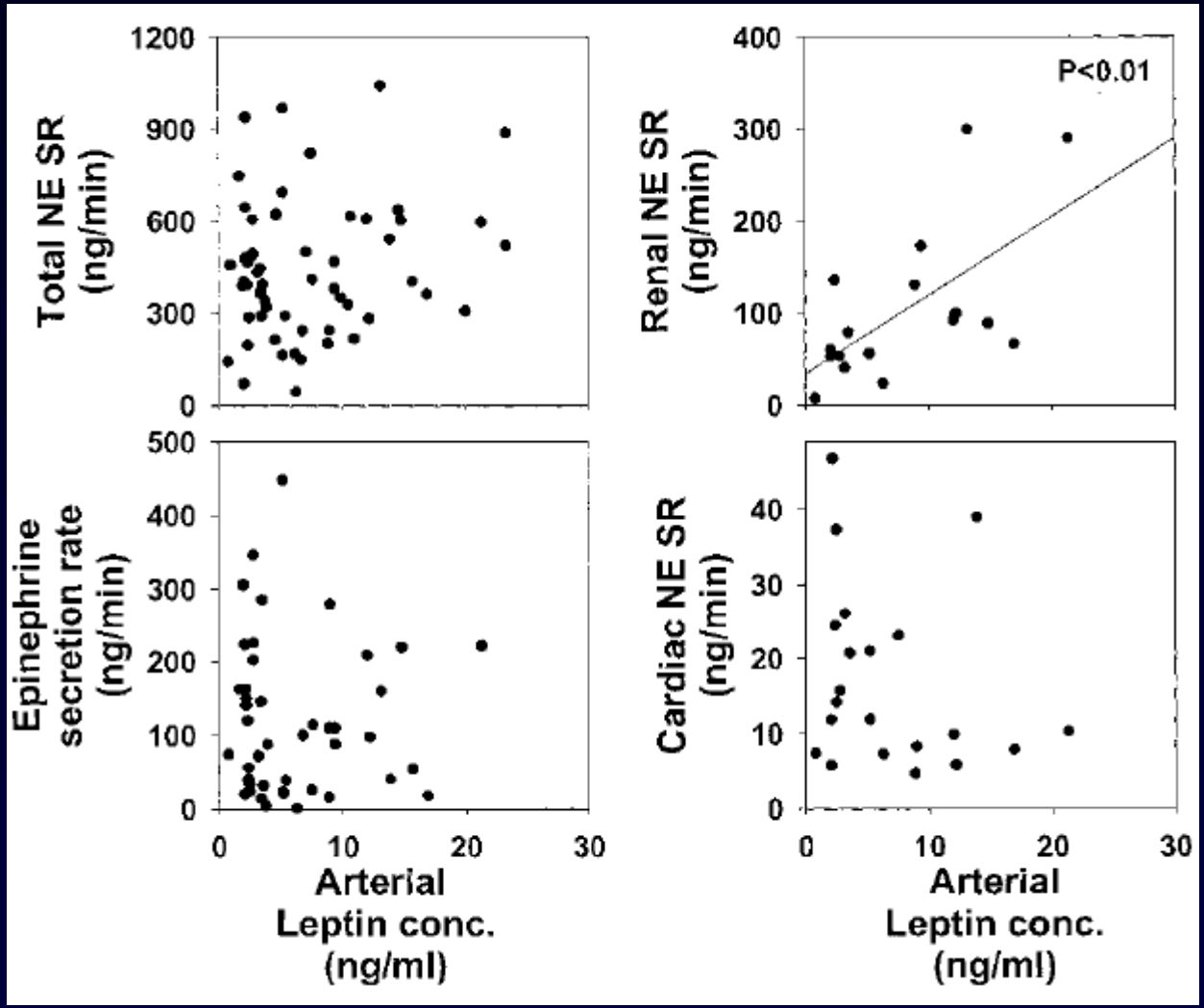
Davy et al. Am J Physiol 2004

Leptin levels in human and rodent: Measurement of plasma leptin and *ob* RNA in obese and weight-reduced subjects



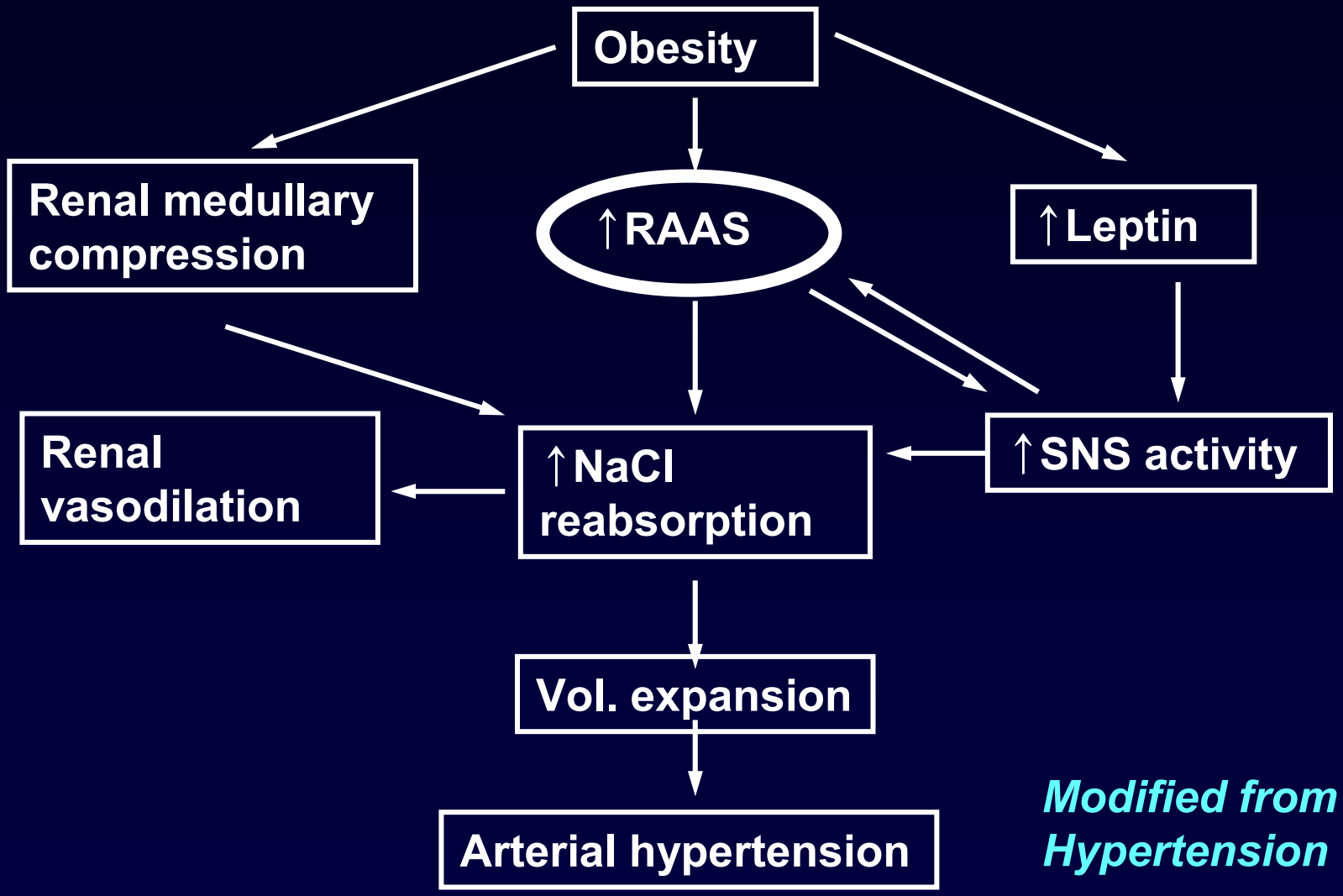
Maffei et al. Nat Med 1995

Sympathetic nerve system and leptin



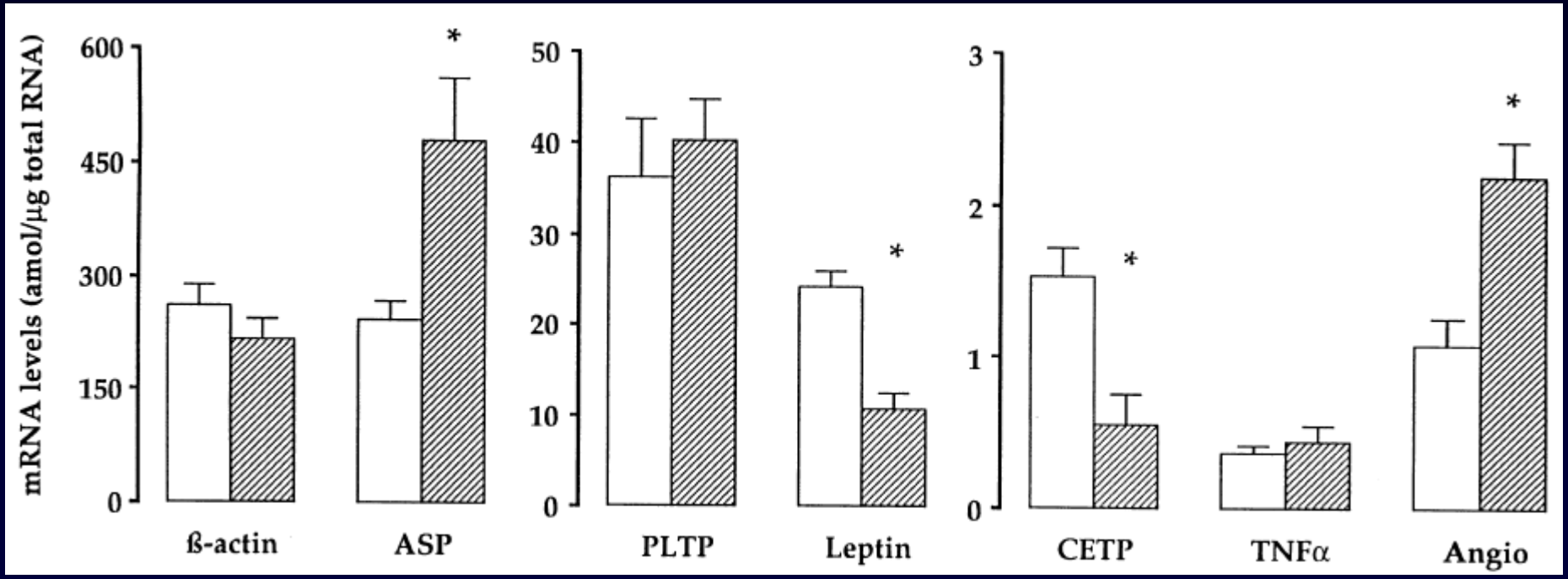
Eikelis et al.
Hypertension 2003

Obesity and renin angiotensin system



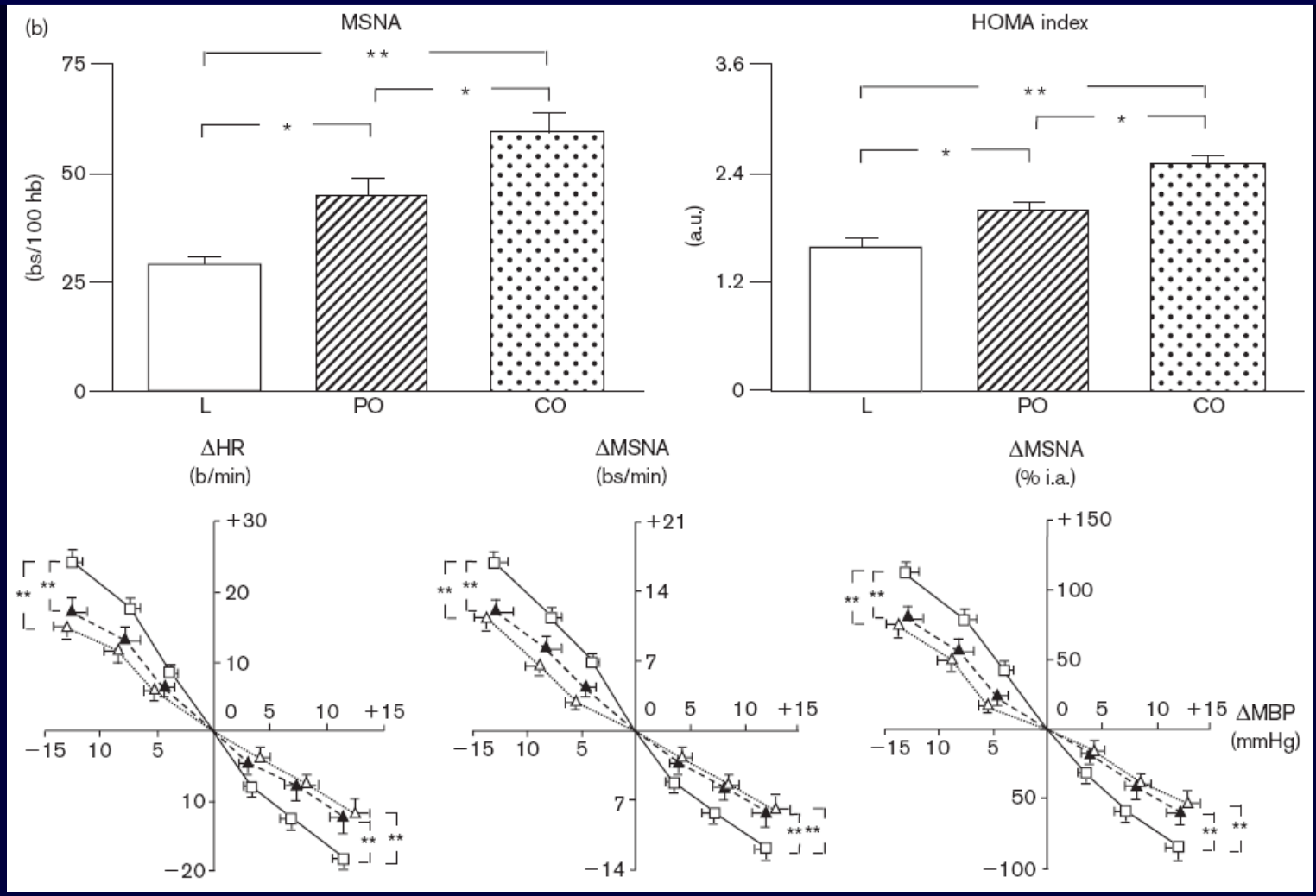
Modified from Sharma. Hypertension 2004

Angiotensinogen mRNA in subcutaneous vs visceral fat



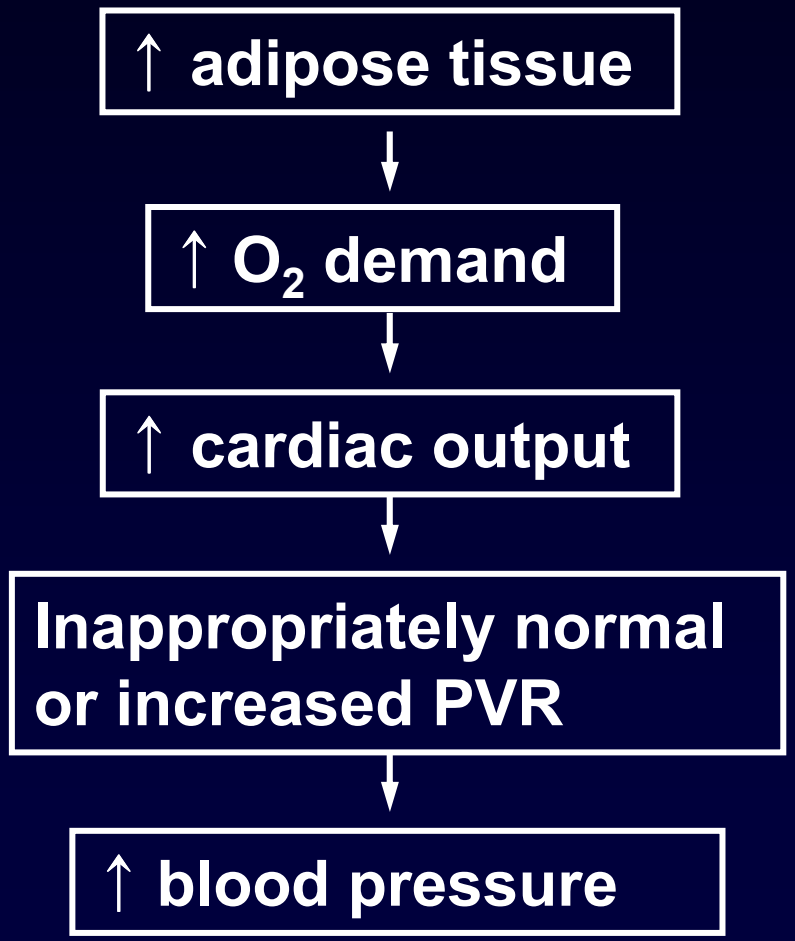
Dussere et al. Biochimica et Biophysica Acta 2000

Relation of body fat distribution to SNS, baroreflex and HOMA index



Grassi et al. J Hypertens 2004

Adiposity and hemodynamic alterations

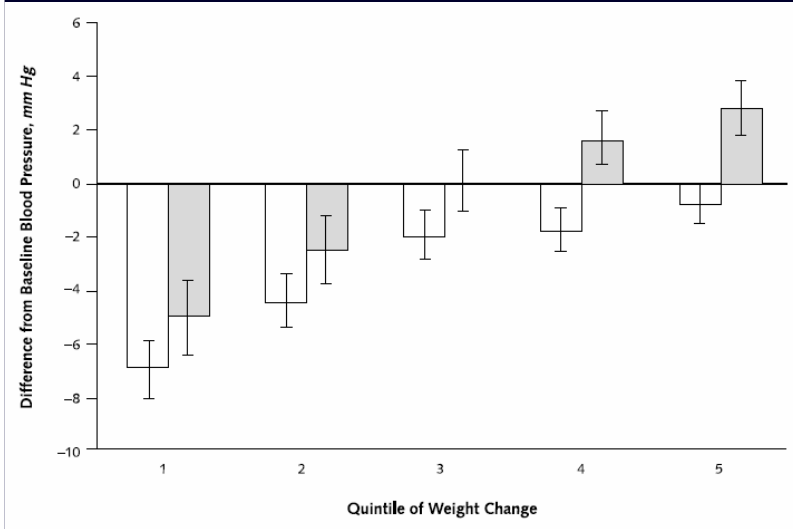


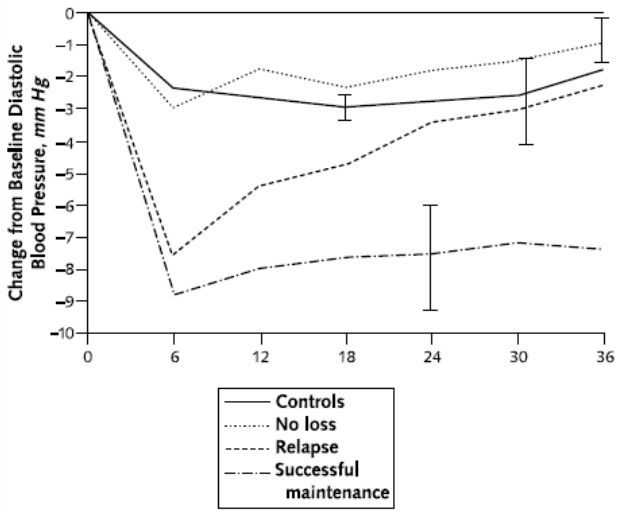
Poirier et al. Circulation 2006

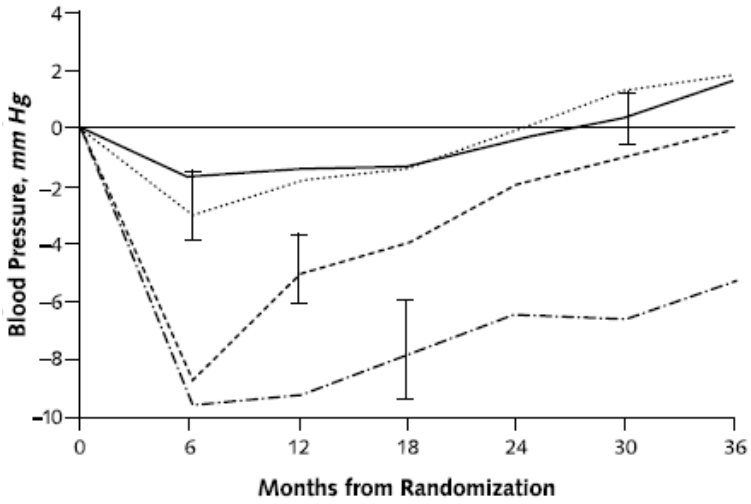
Treatment of Obese Hypertensive Patients

Long-Term Weight Loss and Changes in Blood Pressure: Results of the Trials of Hypertension Prevention, Phase II

Victor J. Stevens, PhD; Eva Obarzanek, PhD; Nancy R. Cook, ScD; I-Min Lee, MD, ScD; Lawrence J. Appel, MD, MPH; Delia Smith West, PhD; N. Carole Milas, MS, RD; Mildred Mattfeldt-Beman, PhD; Lorna Belden, MS, RD; Charlotte Bragg, MS, RD; Marian Millstone, MS; James Raczynski, PhD; Amy Brewer, MS, RD; Bali Singh, MS, RD; and Jerome Cohen, MD, for the Trials of Hypertension Prevention Research Group



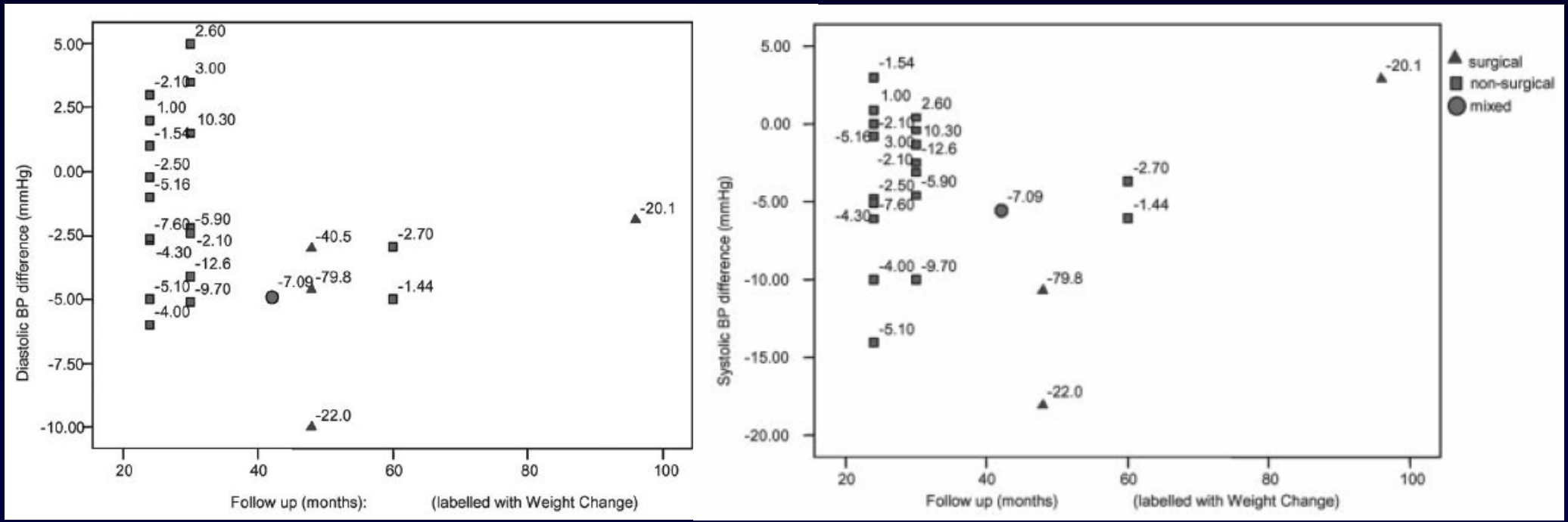




Stevens et al. Ann Intern Med 2001

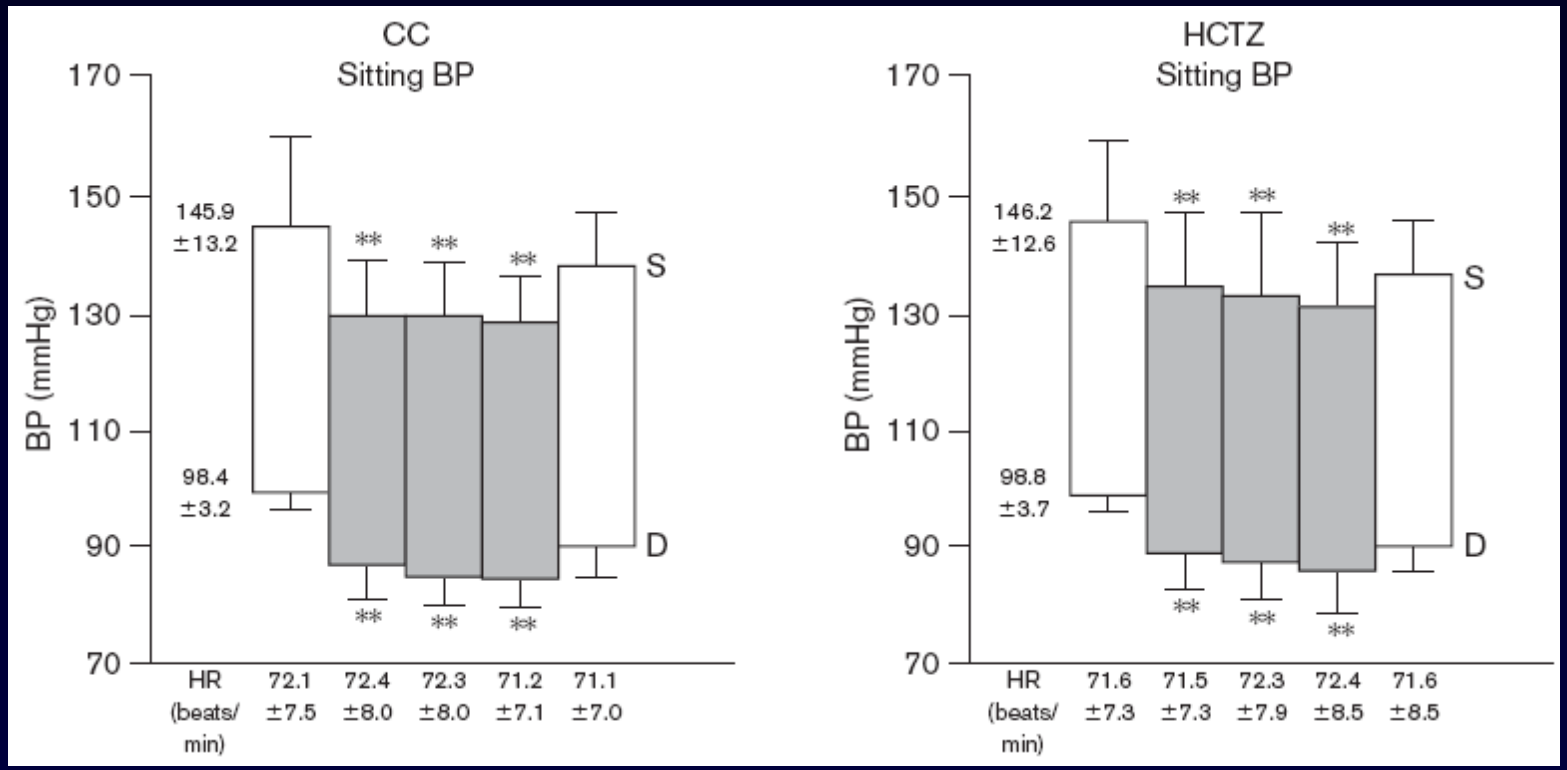
Effect of weight loss on long-term hypertension outcomes

- Review of 13 studies with 5000 patients



Aucott et al. Hypertension 2005

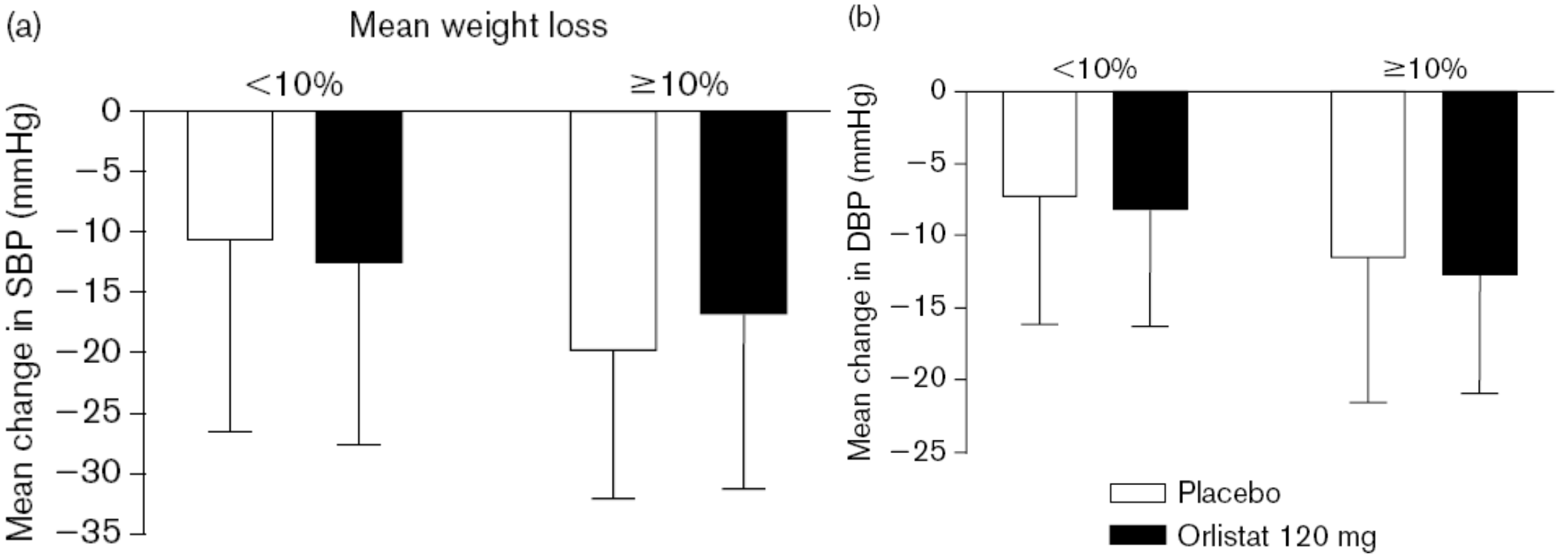
Candesartan vs HCTZ in obese hypertensive pateints



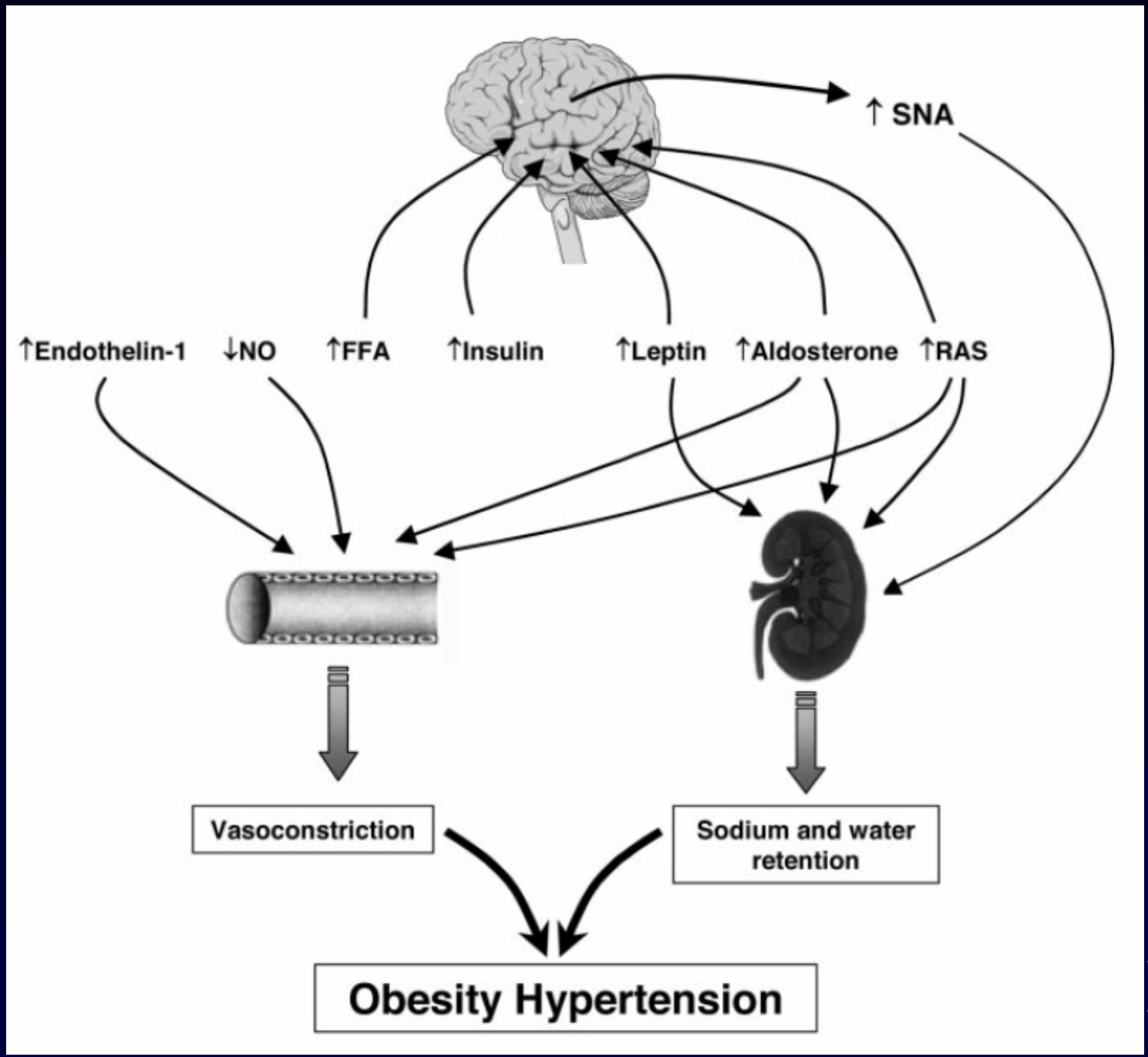
Grassi et al. J Hypertens 2003

Orlistat-induced weight loss and blood pressure

- A meta-analysis of 628 pateints in 5 RCTs



Sharma et al. J Hypertens 2002



Rahmouni et al. Hypertension 2005

Thank You for Your Attention