

Research Prize Swiss Society of Cardiology 2015

**Rapid and body weight-independent
improvement of endothelial and high density
lipoprotein function after Roux-en-Y gastric
bypass: Role of Glucagon-like preptide-1**

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foundation for
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Bariatric surgery reduces cardiovascular morbidity and mortality

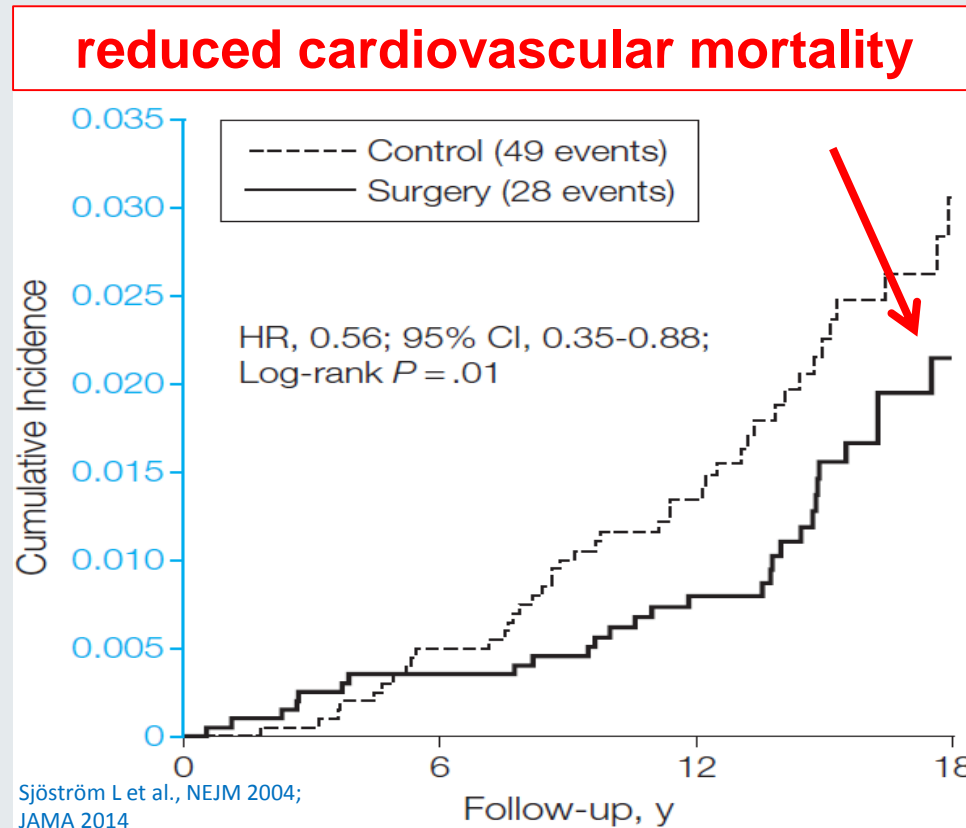
Bariatric surgery (RYGB) is the **only effective** treatment against severe obesity (BMI > 35 Kg/m²)

-long lasting weight loss **15-35%**

Diabetes improves **immediately (days)** after bariatric surgery, before any significant weight loss

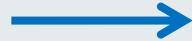
Umeda LM et al, Obes Surg 2011

Pournaras D et al, Ann Surg 2010

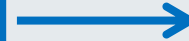


How does this happens?

RYGB/VSG
Change Gut
Physiology



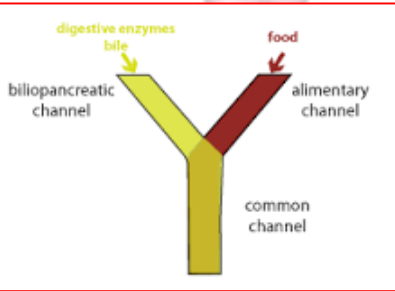
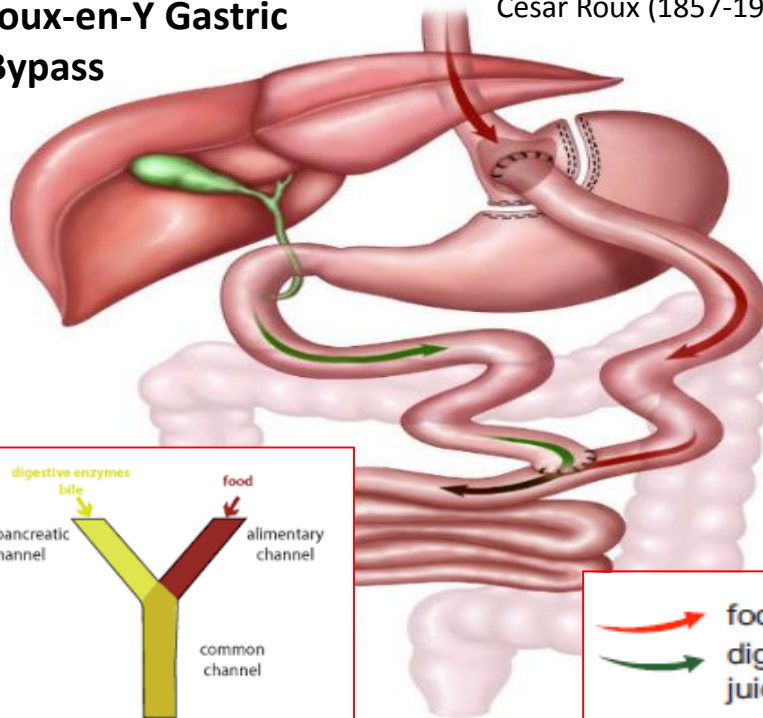
Modulation
GUT
Hormones



Benefits
Whole Body

**Roux-en-Y Gastric
Bypass**

César Roux (1857-1934)



**Glucagon Like Peptide-1 (GLP-1) increase
after RYGB**

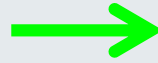
Patti MA et al. Obesity 2009

Jørgensen NB et al Diabetes 2013

**glucagon-like peptide (GLP1)
has pleiotropic cardio-metabolic
actions**

Campbell, J. et al Cell Metabolism. 2013

Increased
GLP-1 after RYGB



Endothelial,
HDL
function ?

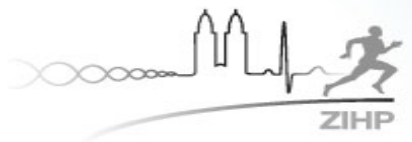
YES

Rapid and body weight-independent improvement of endothelial and high-density lipoprotein function after Roux-en-Y gastric bypass:
role of glucagon-like peptide-1.

Osto E. et al. Circulation 2015; 131:871-881

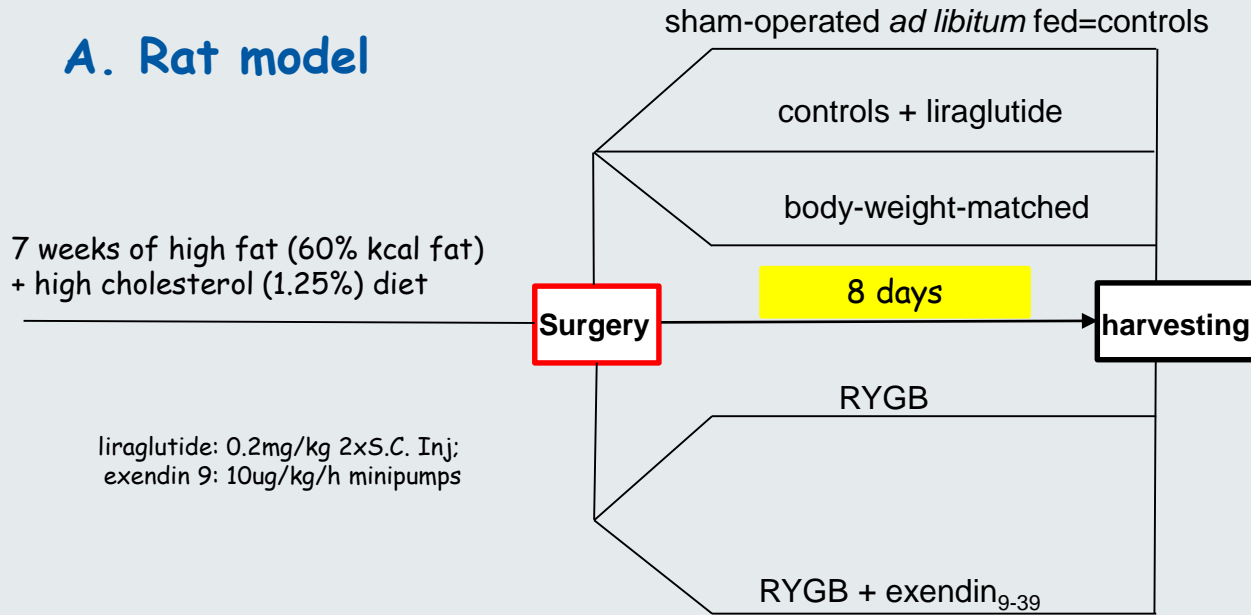


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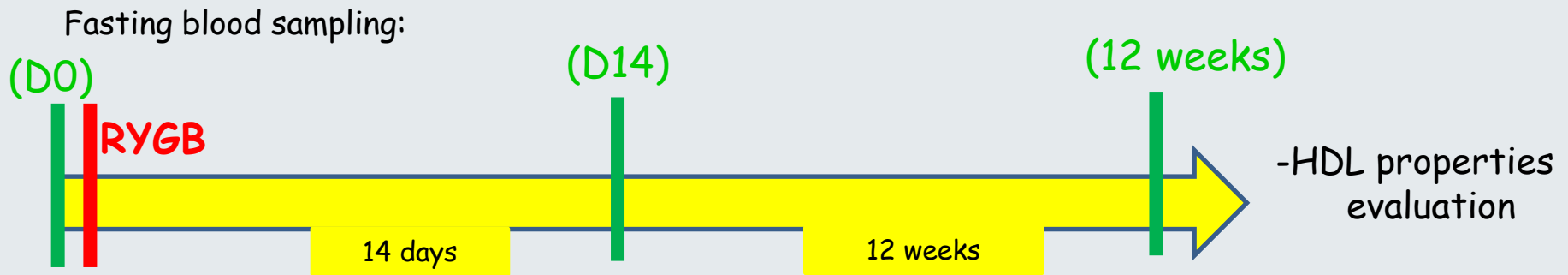
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A. Rat model

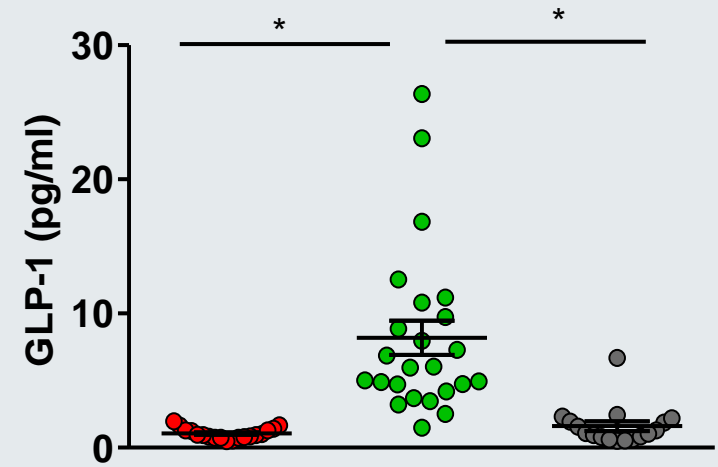
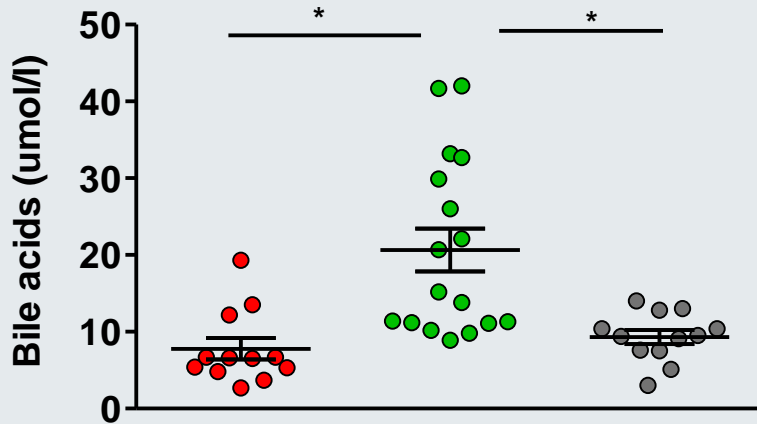


-endothelial function
-HDL properties evaluation

B. 29 Patients-28 Healthy -29 BMI-matched to 12weeks



Results

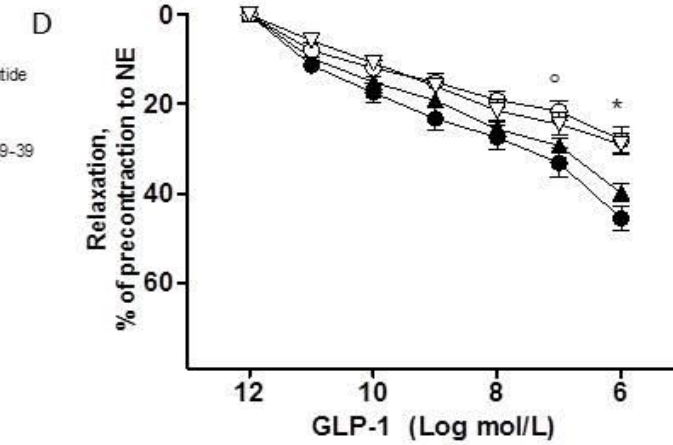
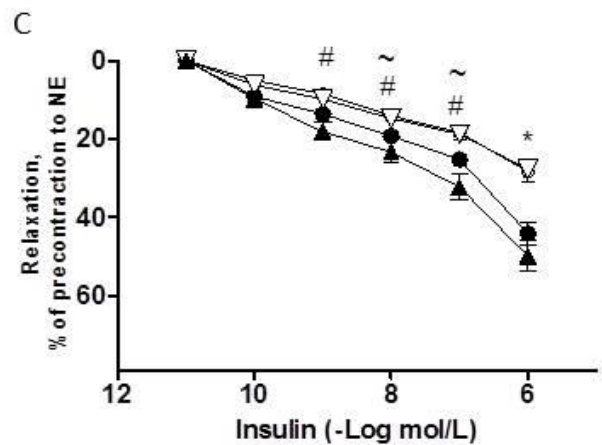
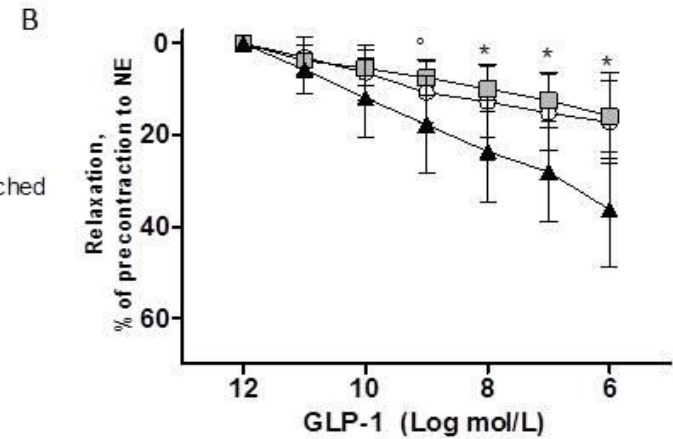
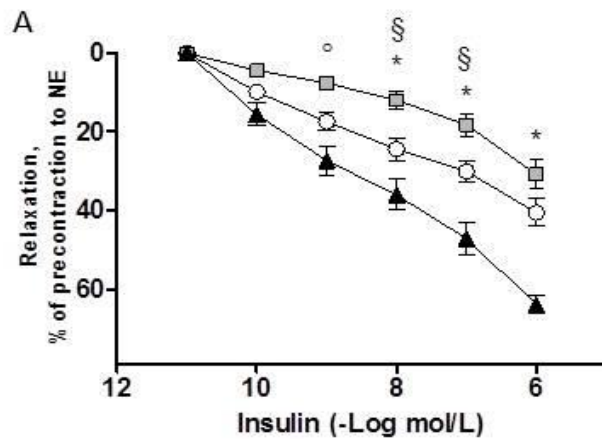


- controls
- RYGB
- weight-matched

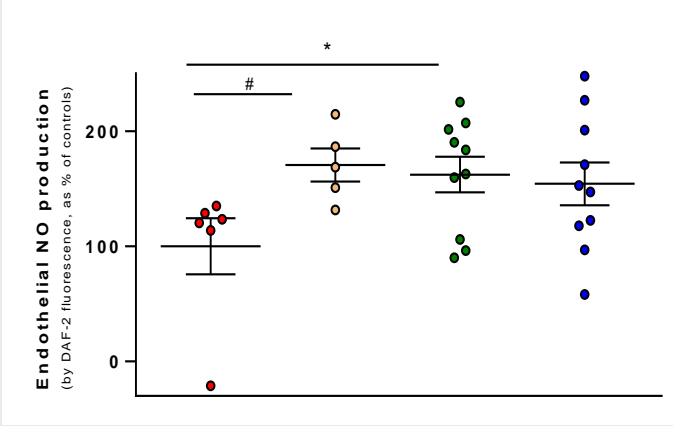
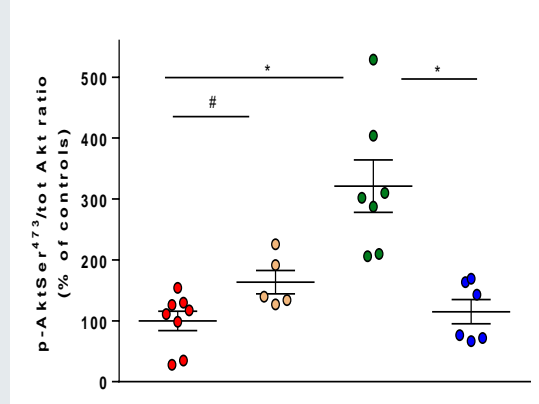
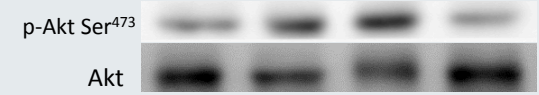
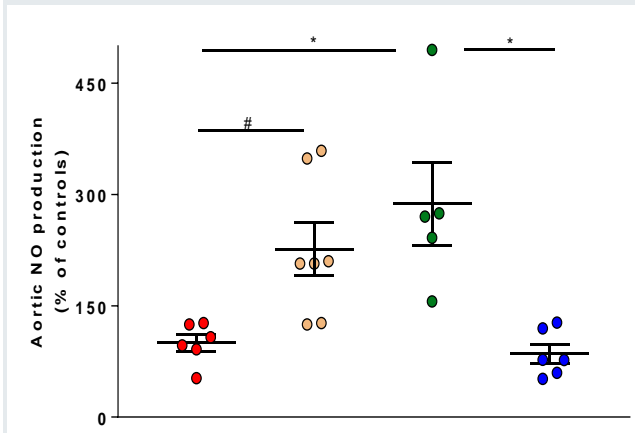
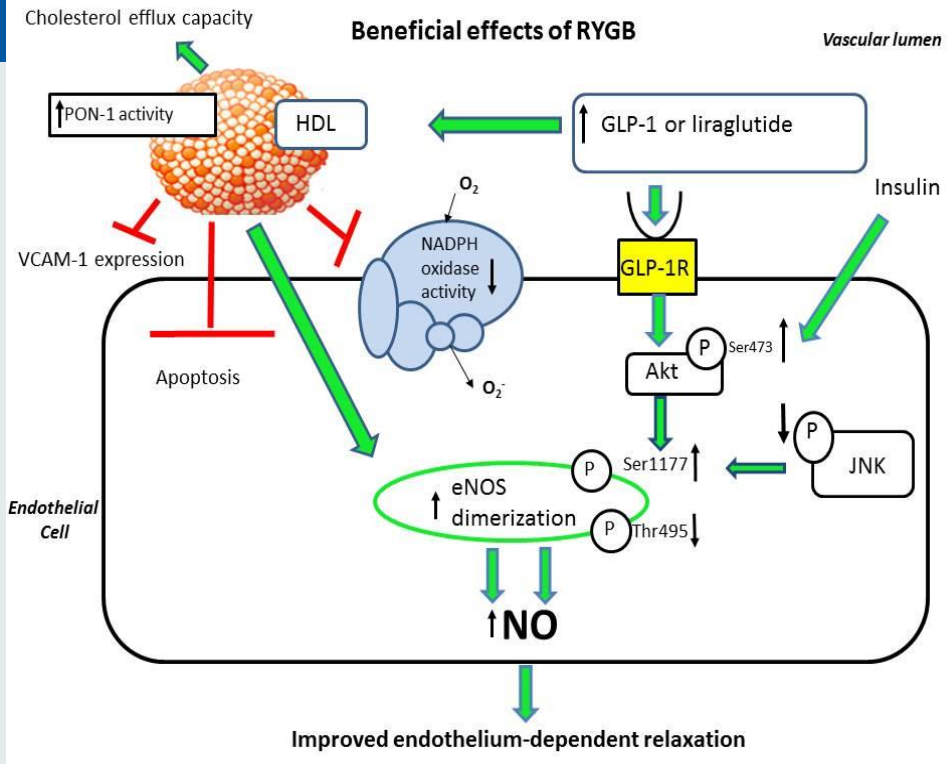
	D0	RYGB D14 (n=29)	12W	BMI-matched to 12W RYGB (n=29)	Healthy (n=28)
GLP-1, pg/ml	0.70±0.11	3.88±0.49 ^b	2.3±0.42 ^b		1.5±1.9
Bile acids, umol/L	8.23±0.49 ^a	9.40±0.53 ^a	11.79±0.75 ^{bc}		12.09±0.73
Glucose, mmol/L	6.40±0.25 ^a	5.39±0.11 ^b	5.12±0.11 ^b	5.49±0.27	5.29±0.15
Insulin, u UI/ml	19.91±2.87 ^a	13.49±1.48 ^{ab}	11.60±1.48 ^b	13.91±1.64	6.18±1.0
HOMA IR	2.62±0.34 ^a	1.81±0.16 ^{ab}	1.44±0.16 ^{bc}	1.81±0.21	0.82±0.14

Osto E et al. Circulation 2015

Endothelial vasorelaxation



Pre-incubation with L-NAME completely inhibited the relaxation induced by both insulin and GLP-1

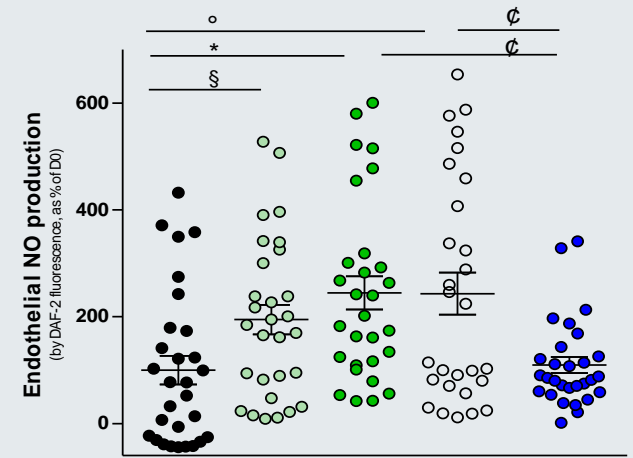
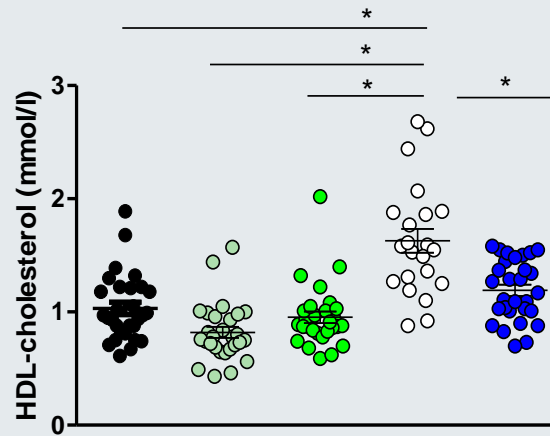


- reduced oxidative stress, increased aortic NO bioavailability
- GLP-1-dependent signaling was selectively activated in rat aortae after RYGB independently from weight loss and was mimicked by liraglutide treatment

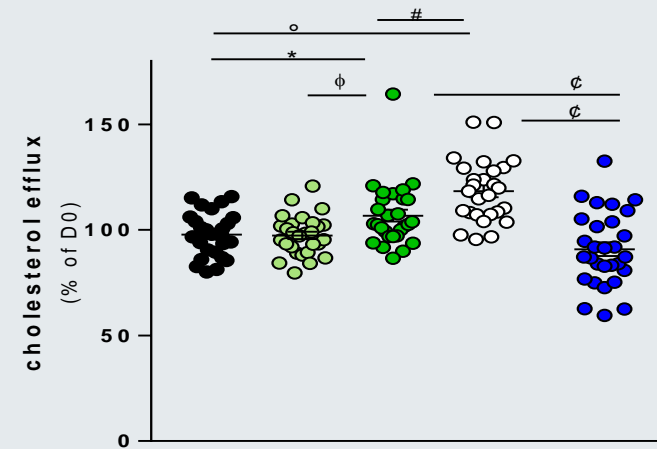
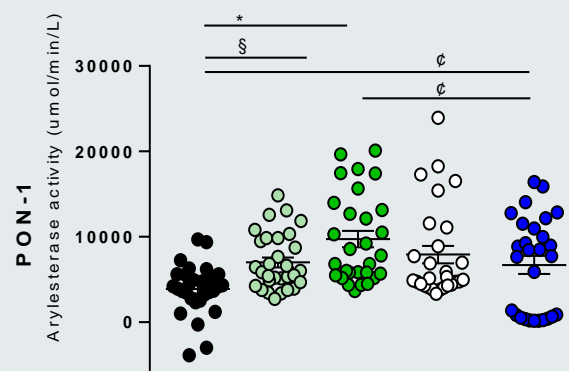
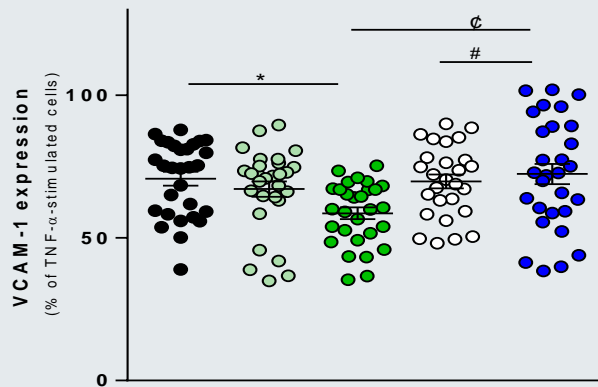
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HDL properties in Patients

A certain degree of weight and BMI is not sufficient or critical per se to improve the protective properties of HDL



- D0
- healthy
- D14
- BMI-matched
- W12



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The superior benefits of bariatric surgery compared to current conservative management likely result from the influence of surgery on several cardio-metabolic aspects. Some of these may be GLP-1 mediated.

Understanding how bariatric surgery leads to these cardio-metabolic benefits may help to design novel therapeutic strategies against morbid obesity and in particular its severe cardiovascular risk.

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Thank you for your attention !



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