ore 16.30 - 18.00

09|06
2025

science expert inHIV webinar educazionale

L’approccio endocrinologico: farmaci GLP-1 agonisti

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Meccanismo d’azione dei GLP1-agonisti (GIP/GLP1 agonista)

Anti-obesity medications (AOMs) Timeline

1900 – **Thyroid Hormone**
Increase BMR, Decrease LDL-C

1933 – **2,4-Dinitrophenol**
Increase BMR; discontinued due to hyperthermia, tachycardia, diaphoresis and tachypnoe

1940 – **Methamphetamine**
Anorectic effect
1979 discontinued due to high risk of abusiveness and addiction

1941 – **Rainbow Pills**
Anorectic (amphetamines) + thermogenic (thyroid hormone) effects
1968 discontinued due to anxiety and death

1956 – **Amphetamine congeners**
Phenmetrazine
1965 discontinued
Phenilpropalonamine
2000 discontinued

1973 – **Serotonergics**
Fenfluramine
Dexfenfluramine
1977 discontinued due to valvular insufficiency, pulmonary hypertension, cardiac fibrosis

1997 – **Sibutramine**
Decrease food intake
Increase BMR
2011 discontinued due to non-fatal MI, stroke and others side effects

1999 – **Orlistat**
Intestinal lipase inhibitor
Commercialy available

2006 – **Rimonabant**
CB1-R blockers
2009 discontinued due to suicidal thoughts and depression

2012 – **Lorcaserin**
selective 5-HT2c agonist
2020 discontinued due to cancer risk

2013 – **Phentermine-Topiramate**
Anorectic effect
Not approved by EMA

2014 – **Naltrexone-Bupropione**
Anorectic effect
Liraglutide 3 mg
GLP1-Ra

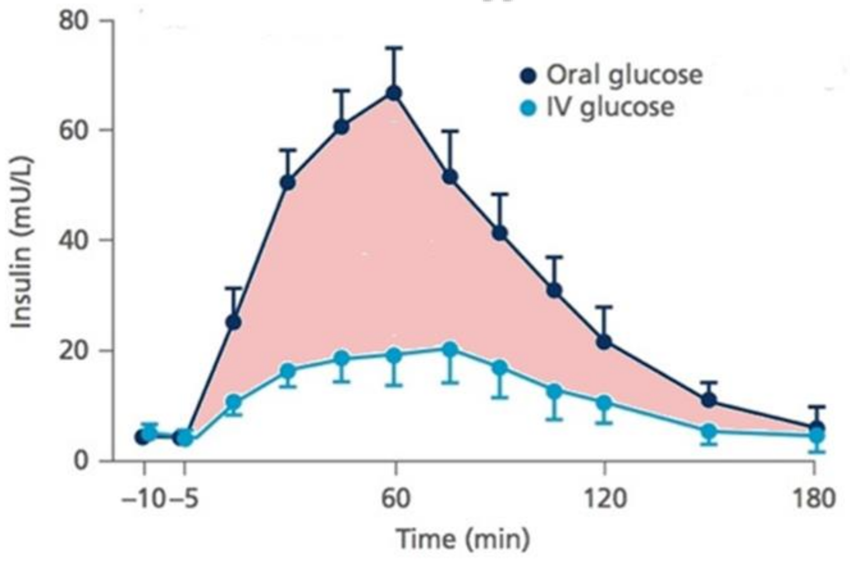
2021 – **Semaglutide 2.4 mg**
GLP1-Ra

2023 – **Tirzepatide**
Dual agonism GLP1/GIP

RED discontinued drugs
BLUE available drugs

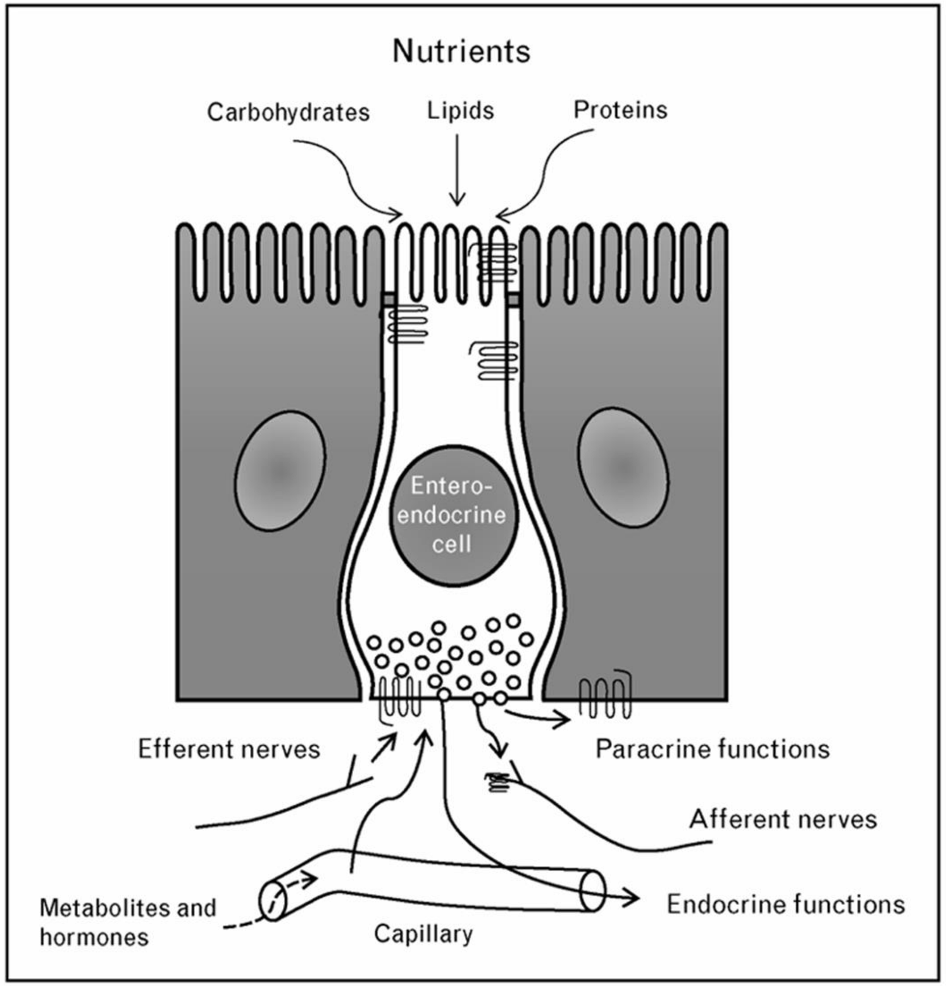
BMR, basal metabolic rate; CB1-R, cannabinoid-1 receptor; 5-HT2c, serotonin receptor 2c; LDL-C, low density lipoprotein cholesterol; MI, myocardial infarction

Incretin Effect



Nauck M *et al*. **Diabetologia, 1986**; 29(1):46-52.

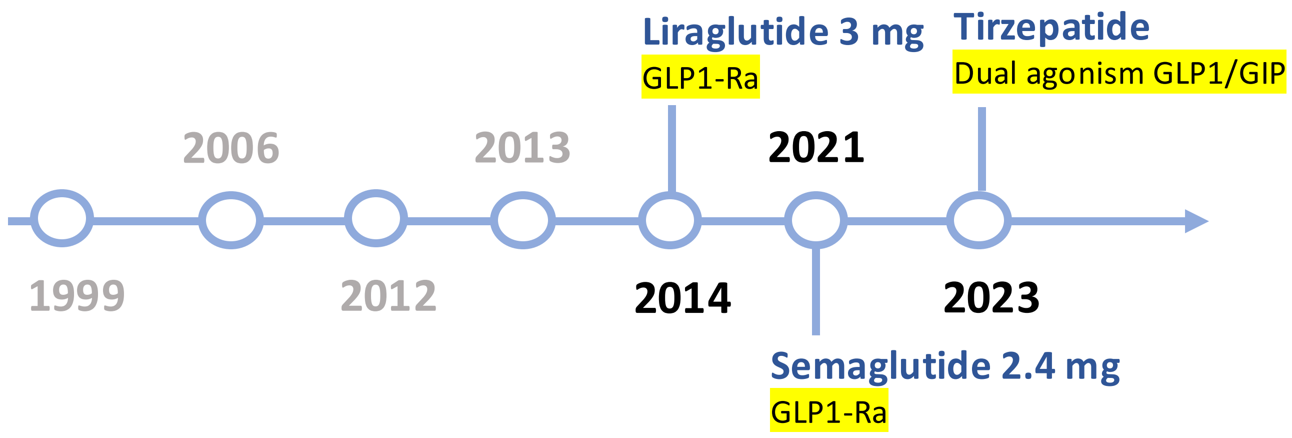
Incretin Hormones

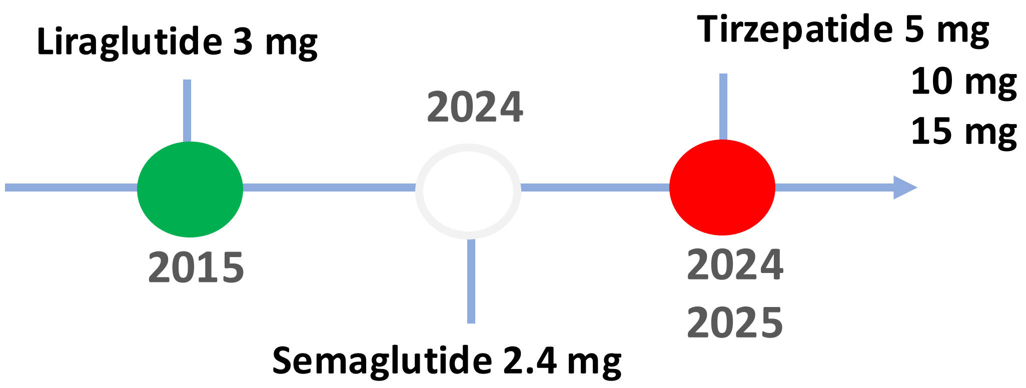


Gutierrez-Aguilar and **Woods**.
Curr Opin Endocrinol Diabetes Obes, 2011; 18(1):35-41.

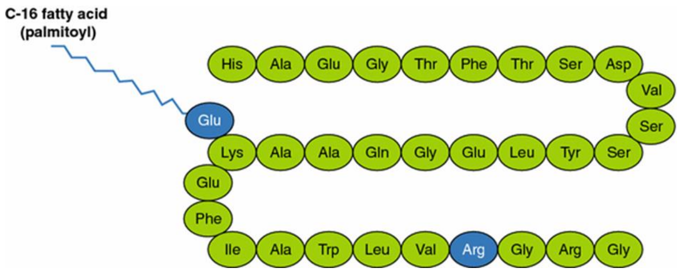
1973 — **GIP, glucose-dependent insulinotropic polypeptide** (Dupre J. JCEM, 1973)

1987 — **GLP-1, glucagon-like peptide-1**
(Mojsov. J Clin Invest, 1987 – Drucker. Proc Natl Acad Sci, 1987)

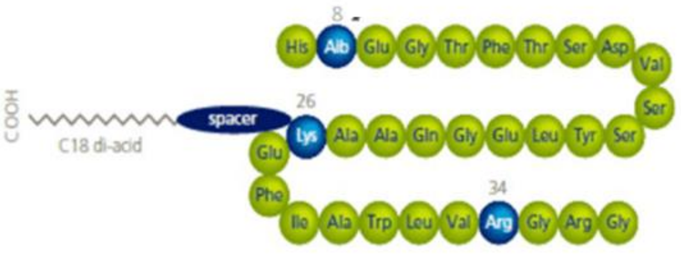




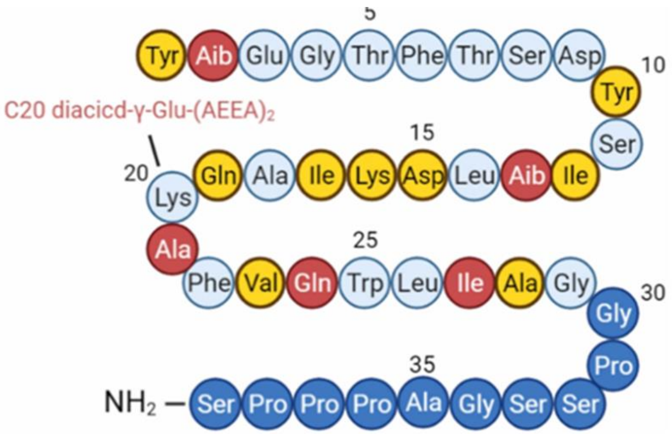
liraglutide



semaglutide

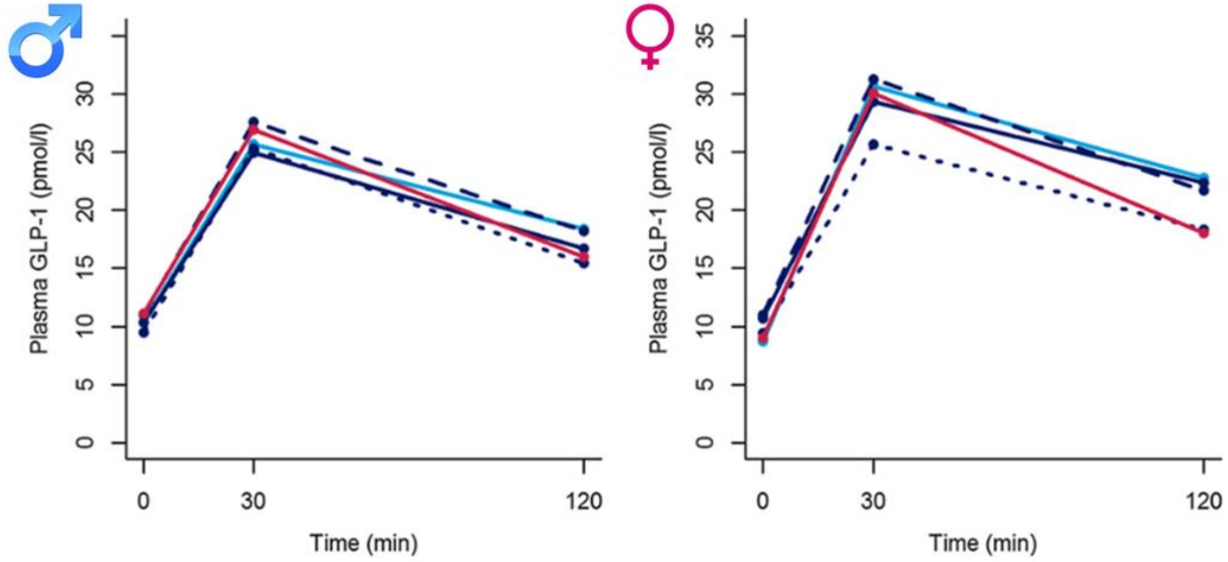


tirzepatide



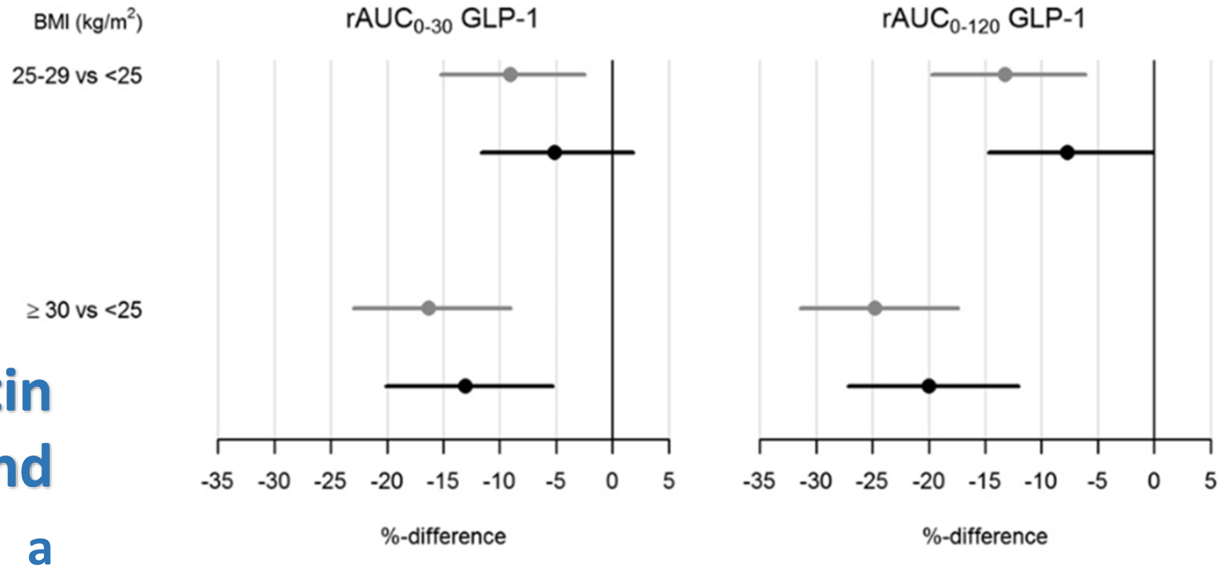
PLASMA GLP-1 CONCENTRATIONS DURING OGTT

Compared with individuals with NGT, women with prediabetes/DM2 had 25% lower GLP-1 response, and both men and women with **pre-diabetes/DM2 had 16–21% lower 120-min GLP-1 concentrations**



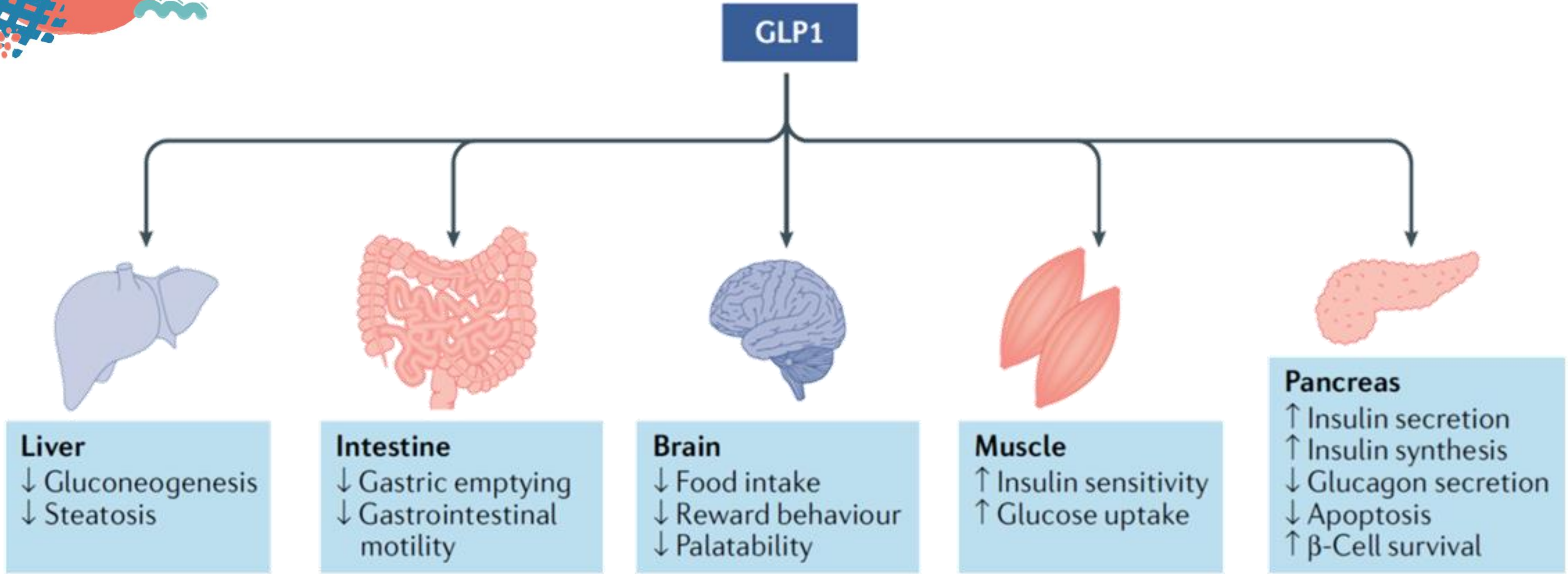
PLASMA GLP-1 RESPONSE IN OBESITY

Both early and full relative GLP-1 responses were **decreased by 20% in obesity and 8% in overweight compared with normal weight** after adjustment for age, sex and glucose tolerance status



"...The findings indicate that **alterations in incretin hormone release contribute to glucose and appetite dysregulation** rather than being a consequence of type 2 diabetes or obesity..."

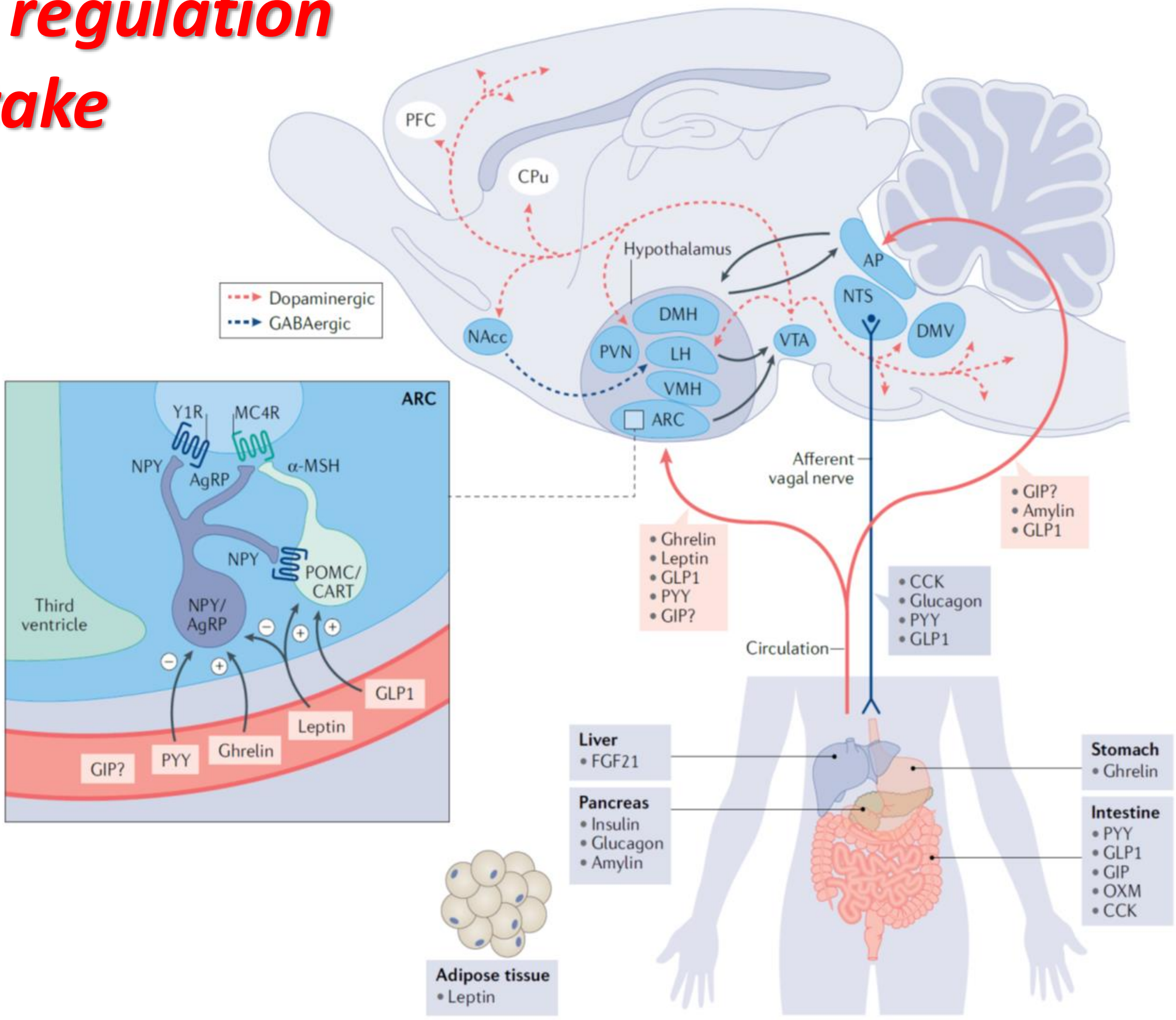
Færch K *et al*. **Diabetes, 2015**; 64(7):2513-25.



Müller TD *et al*. **Nat Rev Drug Discov 2022**; 21(3):201-223.

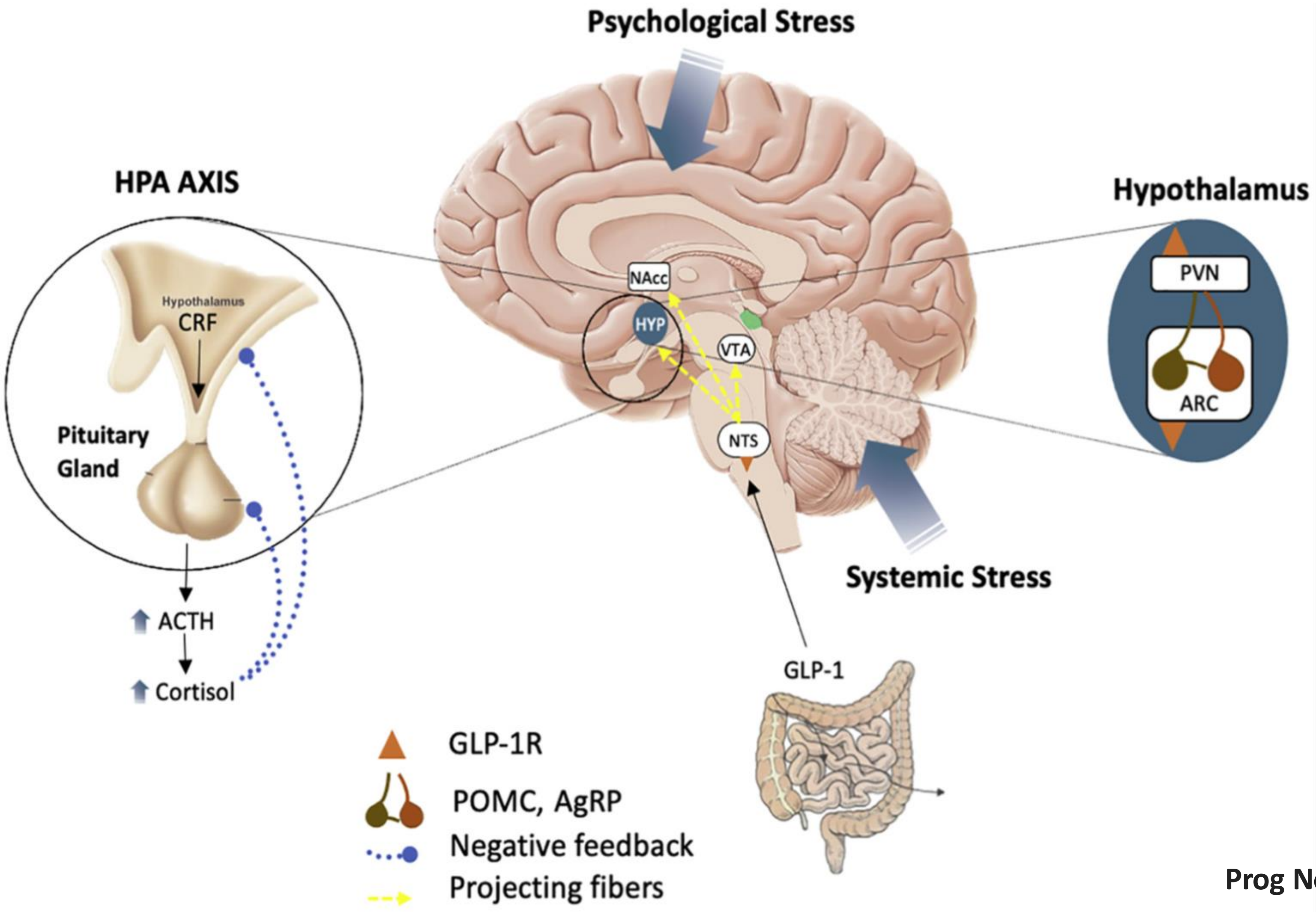
Gut–brain regulation of food intake

Peripheral hormones integrate in central control of homeostatic and hedonic eating behaviour



Müller TD *et al*.
Nat Rev Drug Discov 2022; 21(3):201-223.

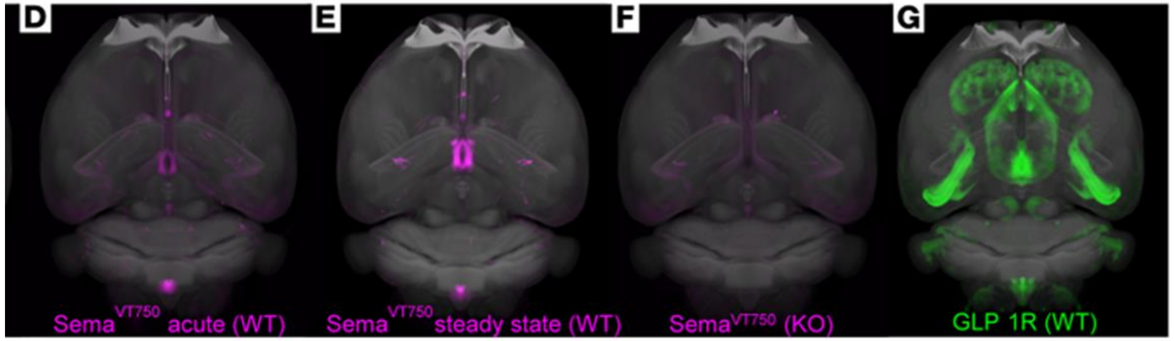
Reward, appetite and stress regions of the brain containing GLP-1R and putative mechanism of GLP-1 action on the hypothalamic-pituitaryadrenocortical (HPA) axis via the nucleus of the solitary tract (NTS)



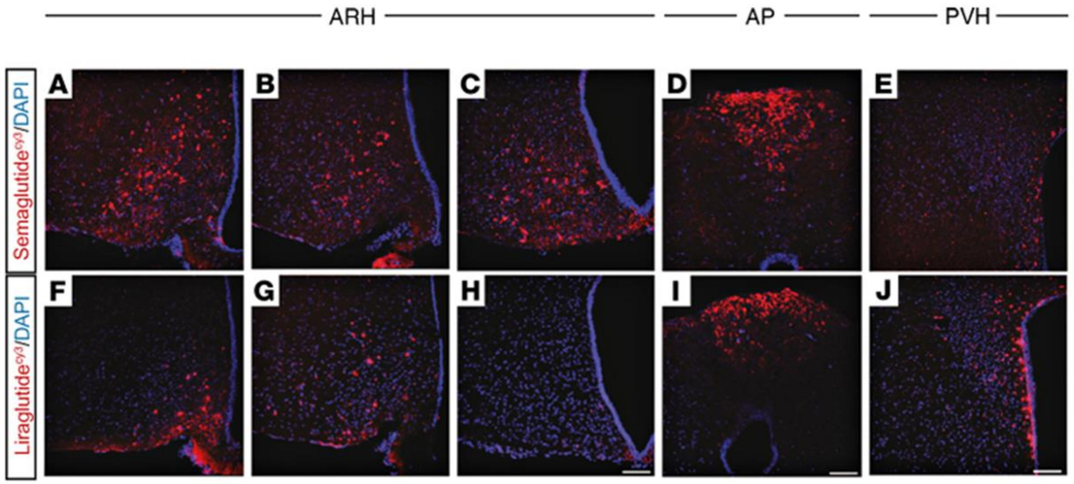
AgRP: Agouti-related peptide
ARC: Arcuate nucleus
CRF: Corticotropin releasing factor
GLP-1R: Glucagon like peptide 1 receptor
HPA: hypothalamic-pituitary-adrenocortical
NAcc: Nucleus accumbens
NTS: Nucleus solitary tract
POMC: Pro-opiomelanocortin
PVN: Paraventricular nucleus
VTA: Ventral tegmental area

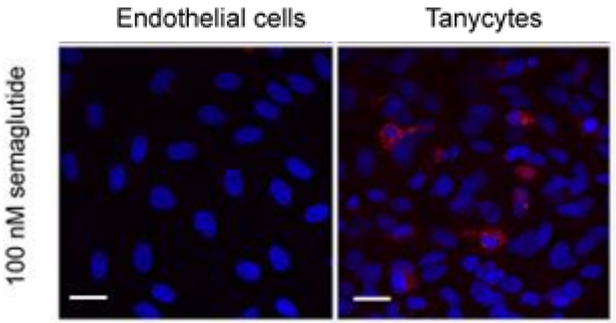
Guerrero-Hreins E *et al.*
Prog Neuropsychopharmacol Biol Psychiatr, 2021; 110:110303.

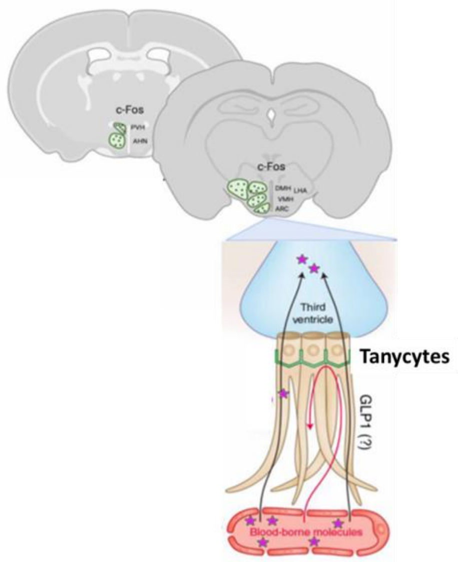
Semaglutide distribution in mouse brain



Distribution of semaglutide and liraglutide in hypothalamus and area postrema

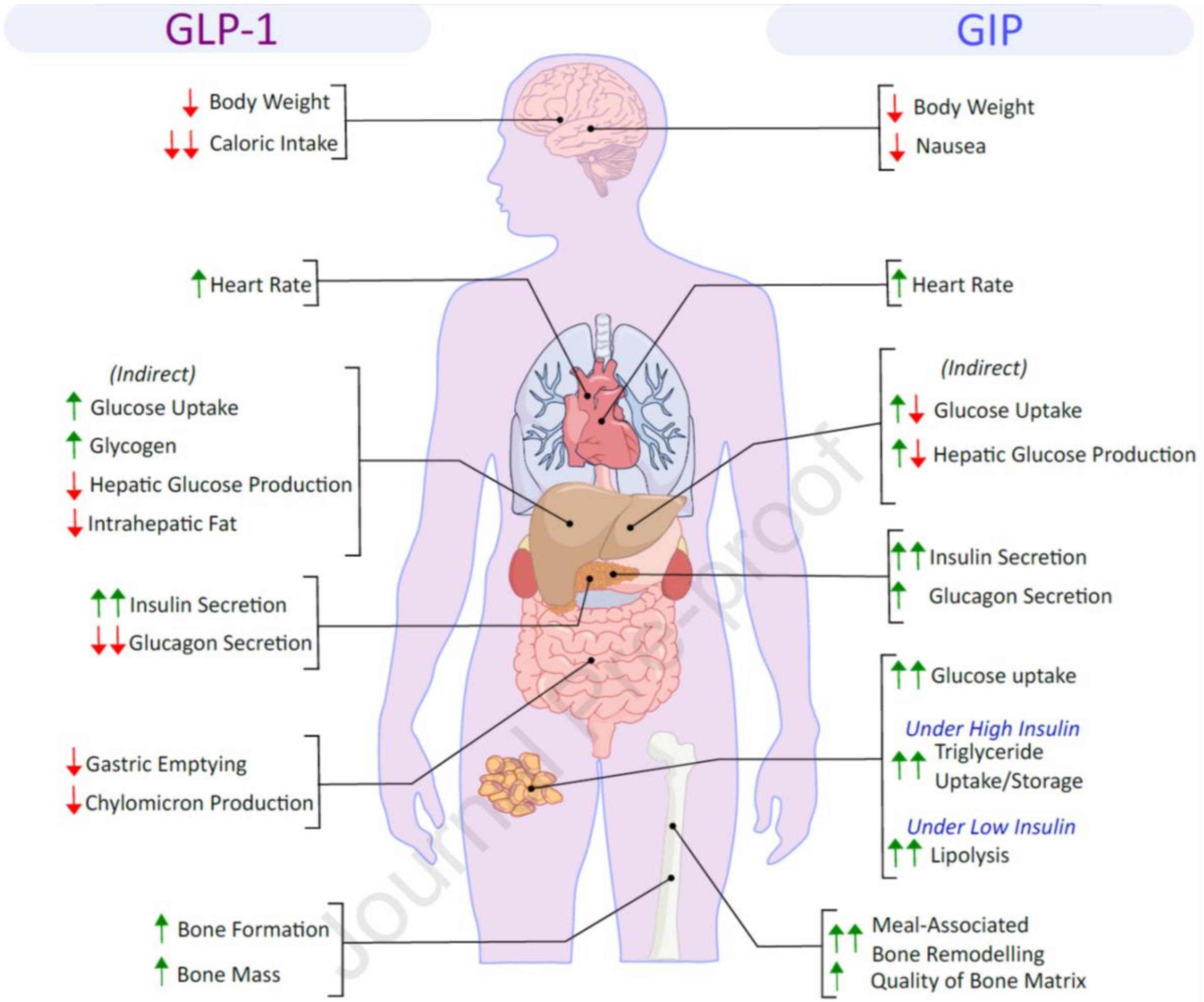






GLP-1R expression in rat tissue was detected within α tanycytes.

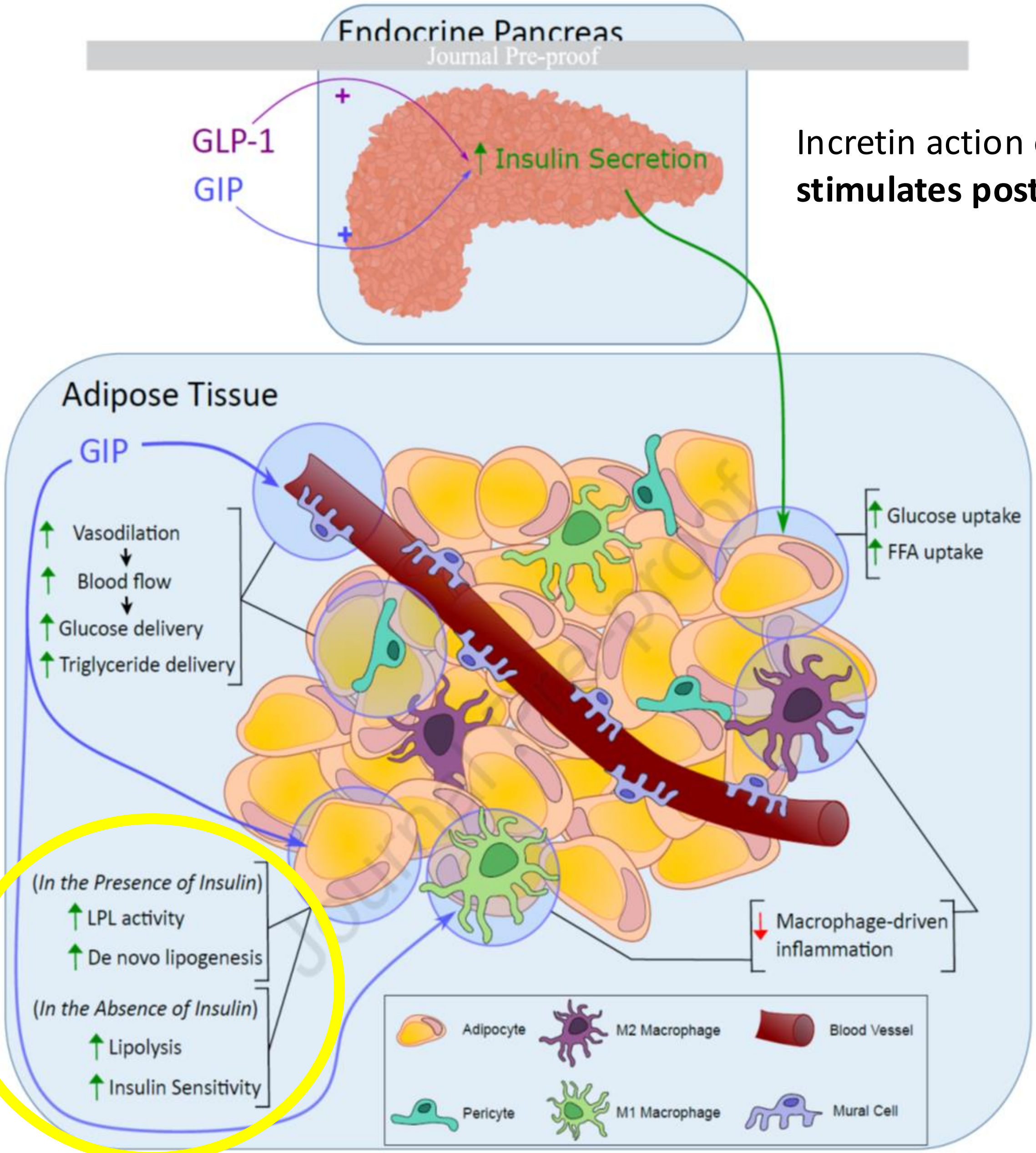
Gabery S *et al.* **JCI Insight, 2020**; 5(6):e133429.



Müller TD et al. **Mol Metab, 2025**: 102118.

THE EFFECT OF *GIP* ON ADIPOSE TISSUE.

GIP signals directly in WAT, stimulating blood flow and the delivery of circulating nutrients, **increasing LPL activity, de novo lipogenesis, insulin sensitivity and lipolysis.**



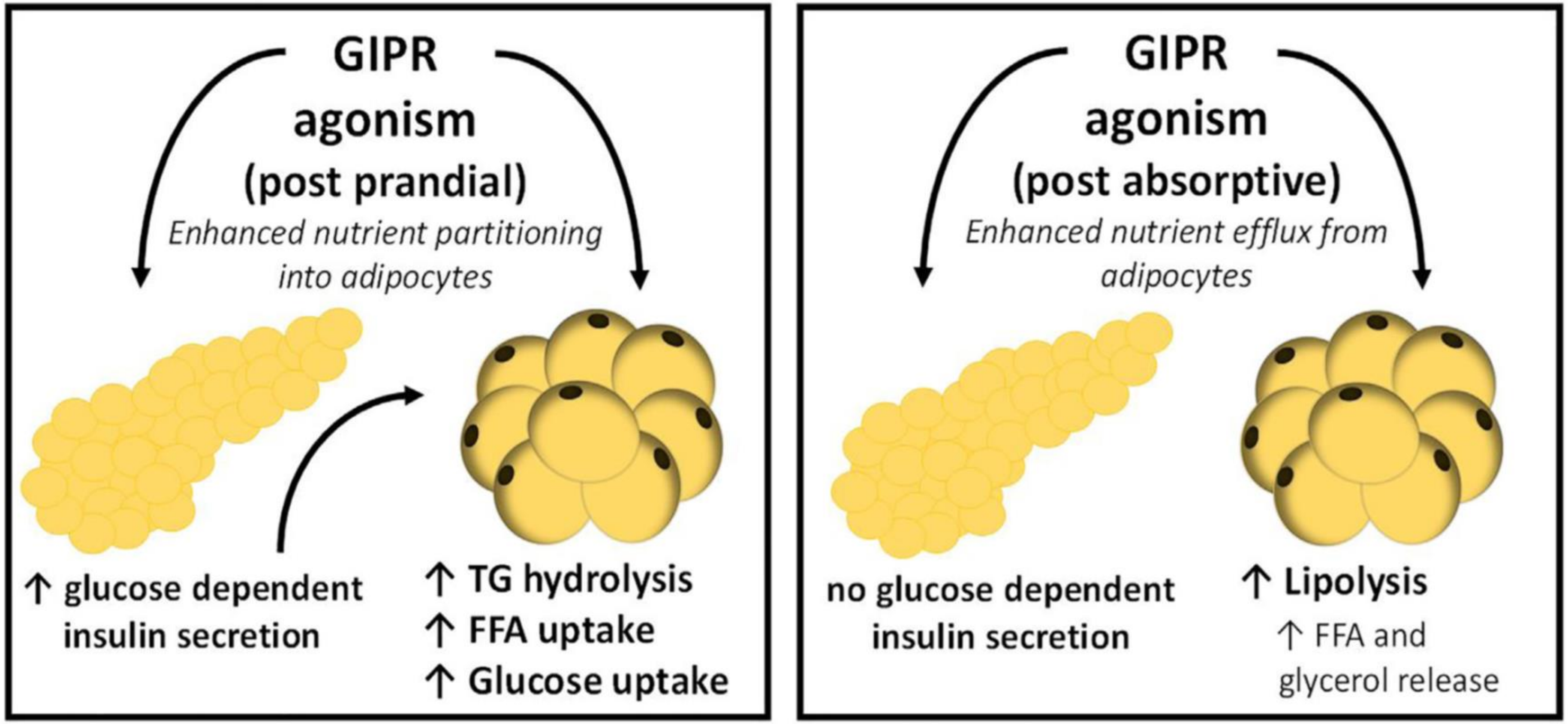
Incretin action on the endocrine pancreas **stimulates postprandial insulin release.**

Insulin signalling in adipocytes **stimulates glucose and FFA uptake.**

GIP decreases macrophage-dependent **inflammation.**

Müller TD *et al*. **Mol Metab, 2025**: 102118.

The fasted and fed effects of long-acting GIPR agonism by tirzepatide regulating adipose tissue function

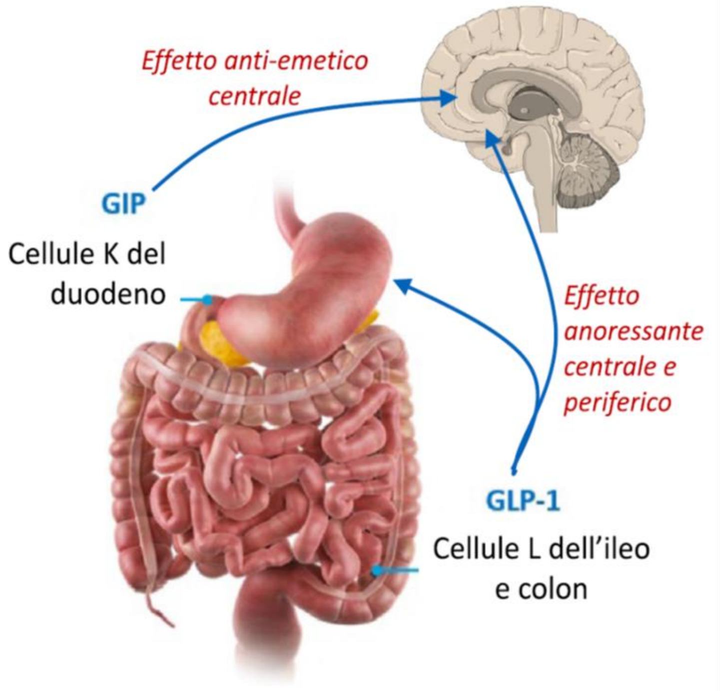


Long-acting GIPR agonism regulation of plasma lipids and glucose under post-prandial/hyperglycemic conditions

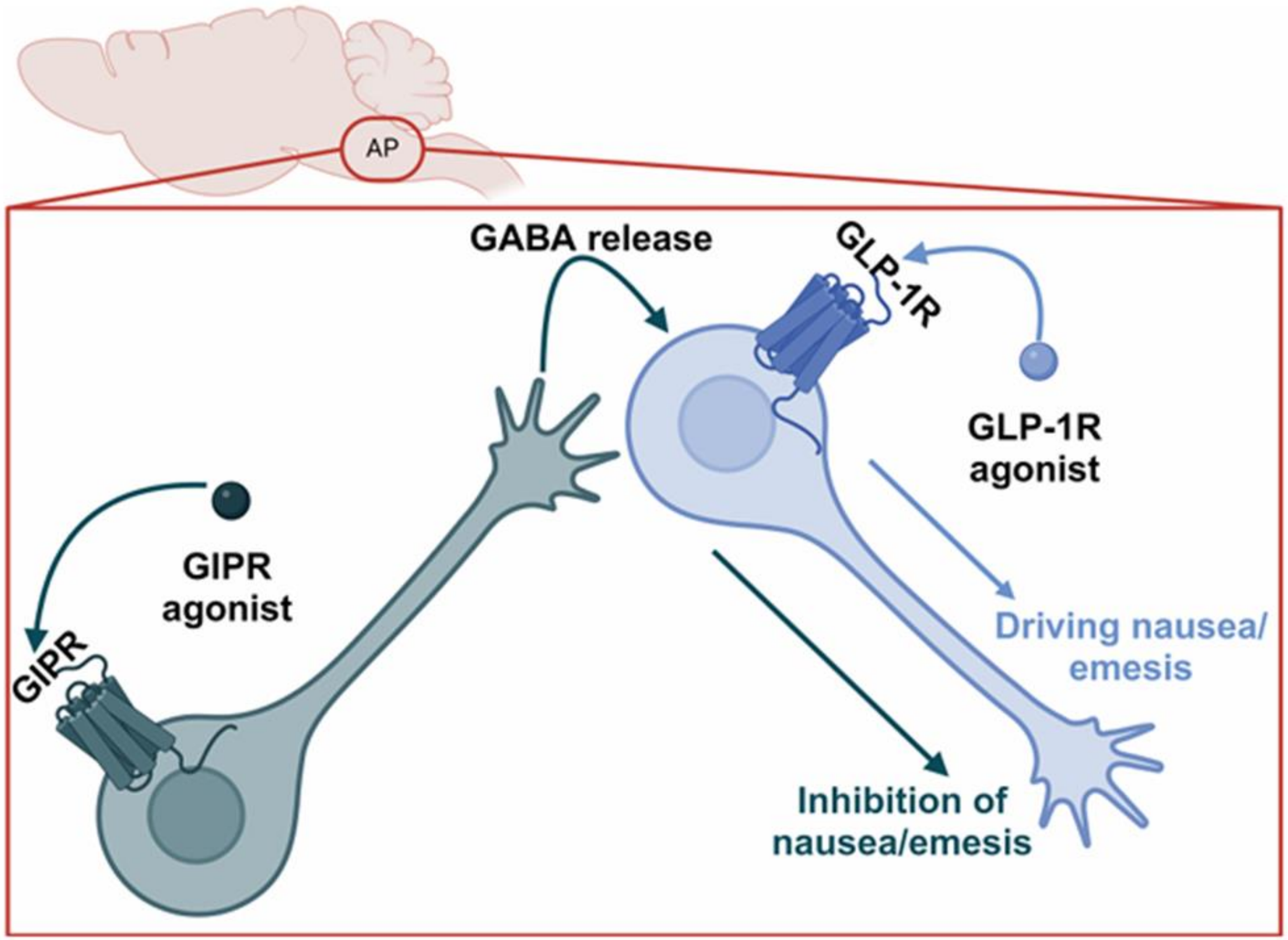
Long-acting GIPR agonism regulation of plasma lipid metabolism under postabsorptive/fasted conditions

Regmi A *et al*. **Cell Metab, 2024**; 36(8):1898-1899.

The suppression of GLP-1R agonist-induced nausea and emesis by GIPR agonism in the *area postrema*



Fadini GP. L'Endocrinologo, 2023.



Douros JD *et al.* Front Endocrinol (Lausanne), 2025; 16:1530985.

Evidenze cliniche sull'efficacia nella popolazione generale e indicazioni pratiche

LIRAGLUTIDE

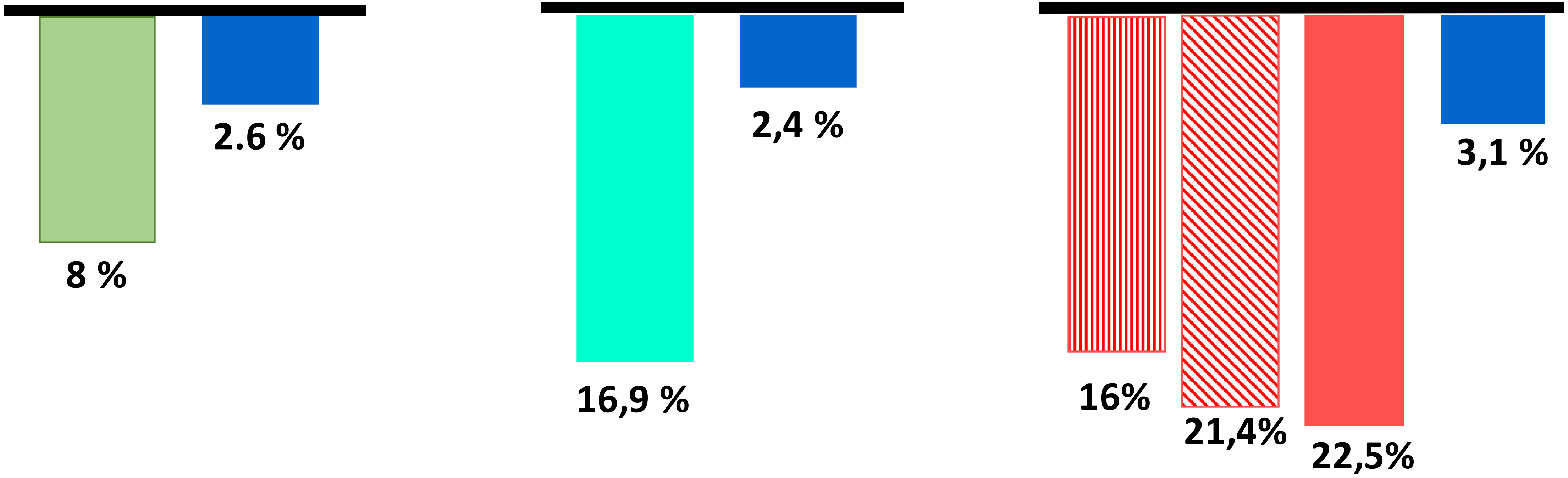
SCALE Obesity & Prediabetes
56 weeks; N=3731

SEMAGLUTIDE

STEP 1
Obesity or overweight without T2D
68 weeks; N=1961

TIRZEPATIDE

SURMOUNT 1
Obesity or overweight
72 weeks; N=2593



liraglutide 3 mg *semaglutide 2.4 mg* *tirzepatide 5 mg* *tirzepatide 10 mg* *tirzepatide 15 mg* *placebo*

Pi-Sunyer X *et al.*
N Engl J Med, 2015; 373(1):11-22.

Wilding JPH *et al.*
N Engl J Med, 2021; 384(11):989-1002.

Jastreboff AM *et al.*
N Engl J Med, 2022; 387(3):205-216.

SELECT trial

Primary objective

To demonstrate that s.c. semaglutide 2.4 mg OW lowers the incidence of MACE versus placebo, both added to SoC, in people with established CVD and overweight or obesity

Trial design

- **Overweight or obesity**
- **Established CVD***
- **No prior history of diabetes**

Semaglutide 2.4 mg OW

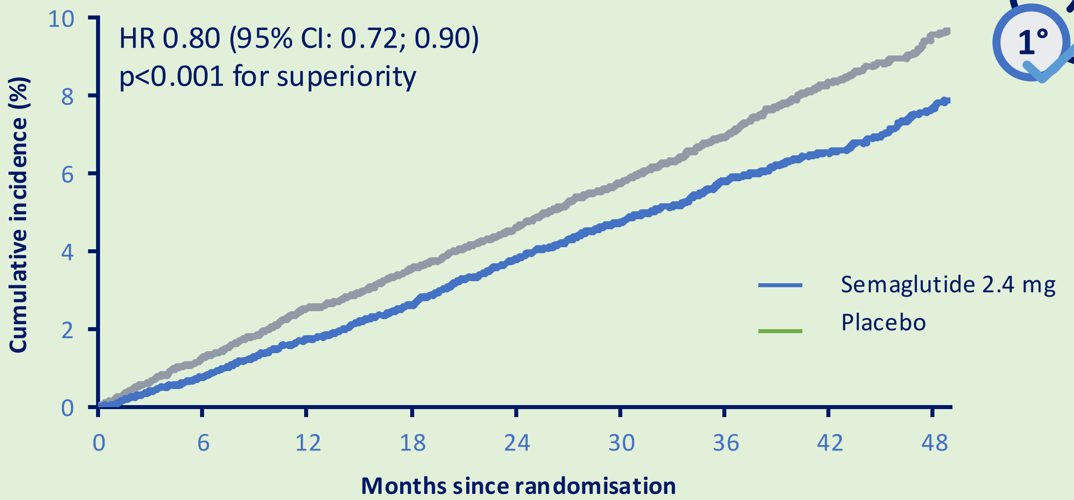
Placebo

Event driven
Mean follow-up: 39.8 months

41	804	17,604
countries	sites	patients

Primary endpoint

Semaglutide 2.4 mg reduced the risk of MACE by 20% *vs pcb*



No. at risk

	0	6	12	18	24	30	36	42	48
Semaglutide	8,803	8,695	8,561	8,427	8,254	7,229	5,777	4,126	1,734
Placebo	8,801	8,652	8,487	8,326	8,164	7,101	5,660	4,015	1,672

Confirmatory secondary endpoints

HRs (95% CI) for the confirmatory secondary endpoints were[1]:

- Death from CV causes: 0.85 (0.71; 1.01); p=0.07
- HF composite[†]: 0.82 (0.71; 0.96)
- Death from any cause: 0.81 (0.71; 0.93)

Lincoff AM *et al*. N Engl J Med, 2023; 389(24):2221-2232.

SELECT kidney outcomes

To examine the effect of semaglutide 2.4 mg s.c. once weekly vs placebo on kidney outcomes in the SELECT trial

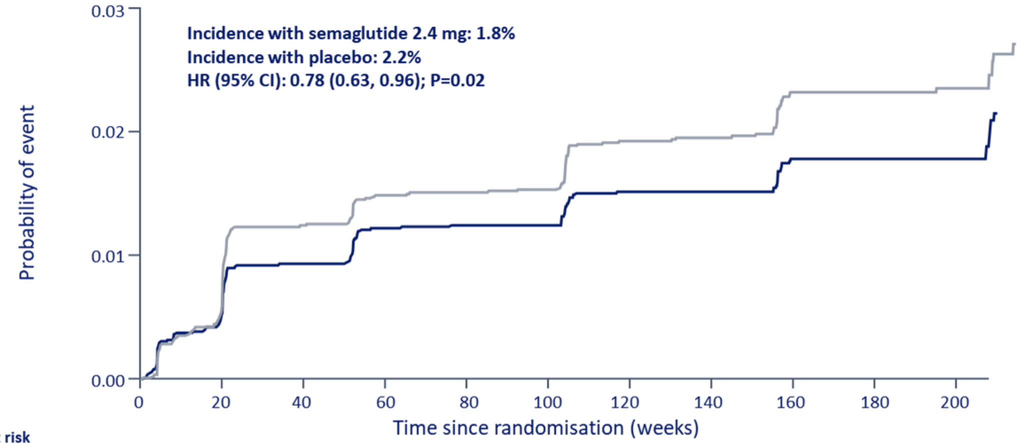
A 5-component composite kidney endpoint

- Death from kidney causes
- Initiation of chronic kidney replacement therapy (dialysis or transplantation)
- Onset of persistent[a] eGFR <15 mL/min/1.73 m^2
- Persistent ≥50% reduction in eGFR compared with baseline[a]
- Onset of persistent macroalbuminuria[a]

[a] ***persistent***: two or more new measures at least 4 weeks apart

Change in eGFR at 104 weeks

Change in UACR at 104 weeks



No. at risk											
Semaglutide	8,803	8,716	8,623	8,536	8,464	8,390	7,904	6,747	5,813	4,540	2,643
Placebo	8,801	8,699	8,573	8,483	8,392	8,321	7,842	6,665	5,734	4,456	2,576

CI, confidence interval
eGFR, estimated glomerular filtration rate
HR, hazard ratio

Semaglutide 2.4 mg reduced the risk of the main kidney composite endpoint by 22% compared with placebo

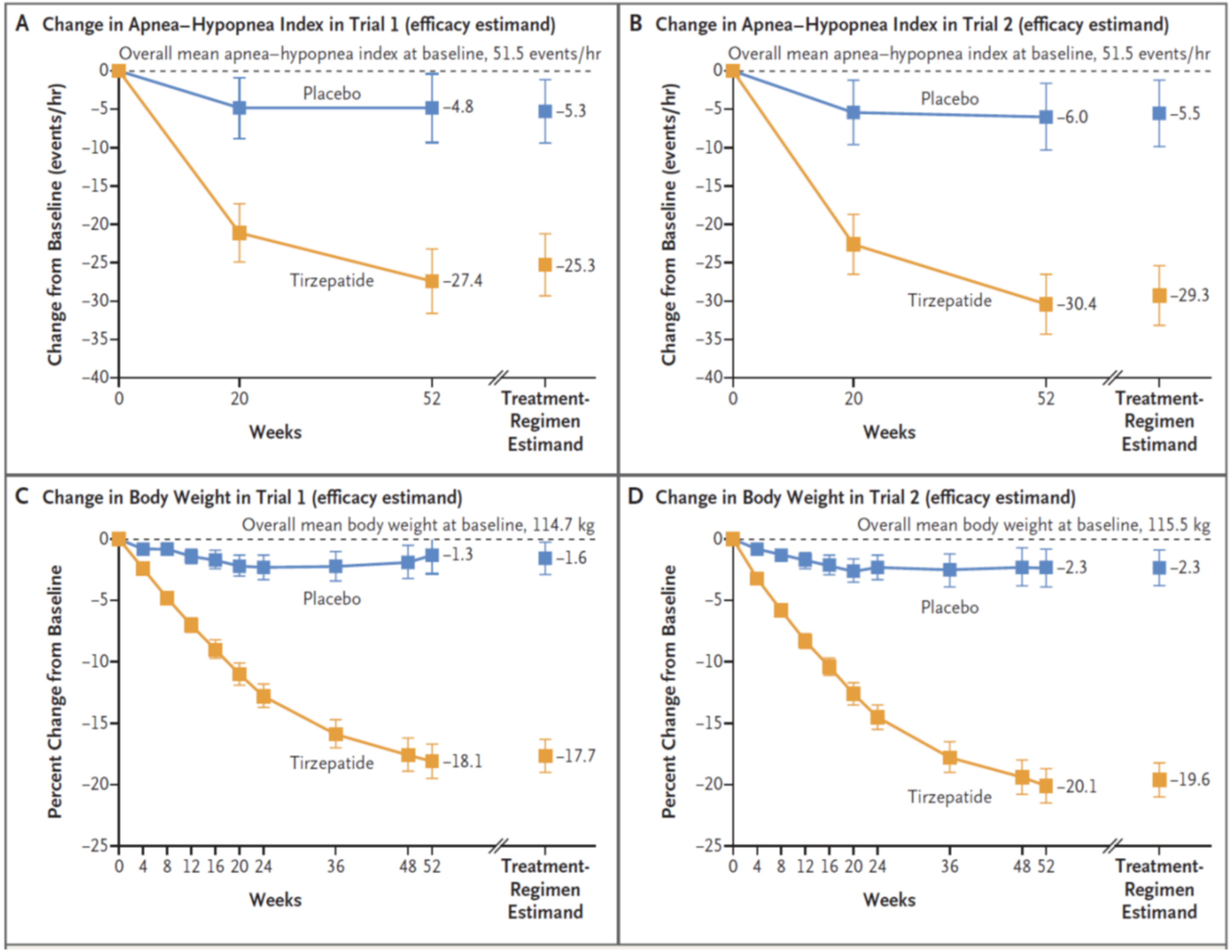
Colhoun HM *et al*. **Nat Med. 2024**; 30(7):2058-2066.

SURMOUNT-OSA

TRIAL 1

no-PAP therapy at baseline

1:1, tirzepatide (10 mg or 15 mg) or placebo for 52 weeks

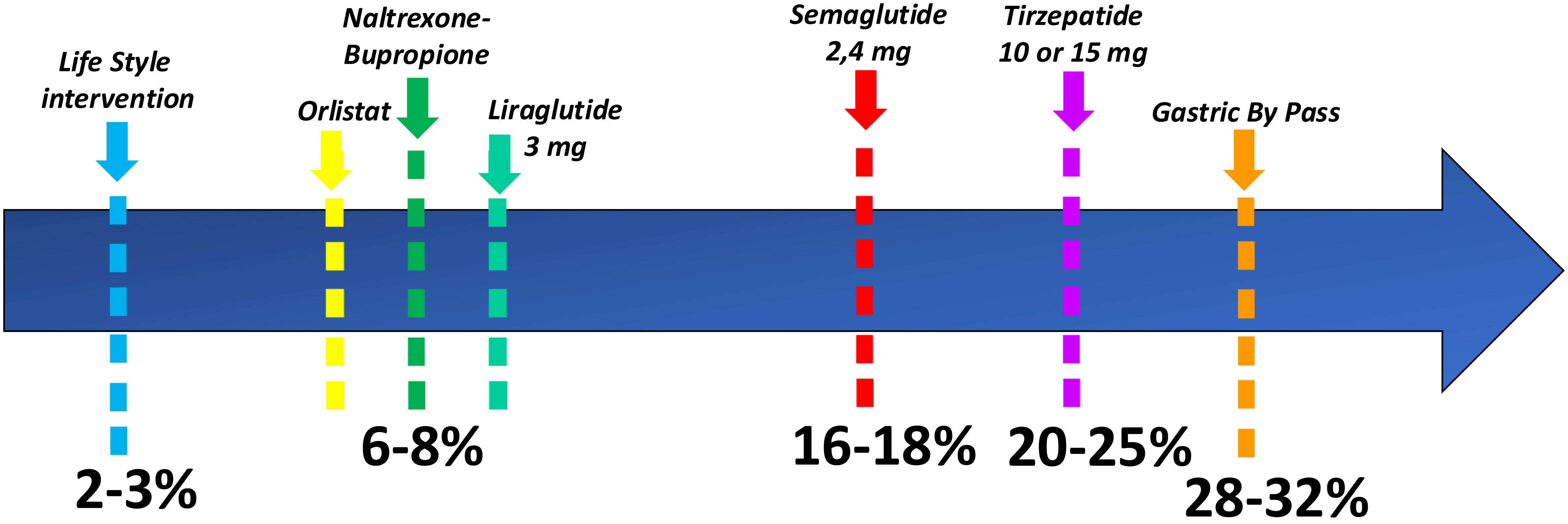


TRIAL 2

PAP therapy at baseline

1:1, tirzepatide (10 mg or 15 mg) or placebo for 52 weeks

Malhotra A *et al.* N Engl J Med, 2024; 391(13):1193-1205.


Life Style intervention
Orlistat
Naltrexone-Bupropione
Liraglutide 3 mg
Semaglutide 2,4 mg
Tirzepatide 10 or 15 mg
Gastric By Pass
2-3%
6-8%
16-18%
20-25%
28-32%

OBIETTIVO TERAPIA: COMPLICANZE ASSOCIATE ALL'OBESITÀ PIUTTOSTO CHE 'PESO IDEALE'

0%-5%
- ✓ **Ipertensione**
- ✓ Iperglicemia

5%-10%
- ✓ **Prevenzione DM2**
- ✓ MASLD
- ✓ PCOS
- ✓ **Dislipidemia**

10%-15%
- ✓ CVD
- ✓ Incontinenza urinaria
- ✓ MASH
- ✓ OSA
- ✓ MRGE
- ✓ Gonartrosi

>15%
- ✓ Remissione DM2
- ✓ Mortalità CV
- ✓ HFpEF

Maggiore il calo ponderale, maggiori i benefici per la salute

DM2, diabete mellito 2; MASLD, metabolic dysfunction-associated steatotic liver disease; PCOS, polycistic ovary syndrome; CVD, cardiovascular disease; MASH, metabolic dysfunction-associated steatohepatitis; OSA, obstructive sleep apnea; MRGE, malattia da reflusso gastro-esofageo;CV, cardiovascolare; HFpEF, heart failure preserved ejection fraction.

Cornler MA. **Am J Manag Care, 2022**; 28:S288-S296; **Garvey WT** *et al*. **Endocr Pract, 2016**; 22:1-203; **Look AHEAD** Reserach Group. **Lancet Diab Endocrinol, 2016**; 4:913-921; **Lean ME** *et al*. **Lancet, 2018**; 391:541-551; **Benraoune F** *et al*. **Curr Opin Cardiol, 2011**; 26:555-561; **Sundstrom J** *et al*. **Circulation, 2017**; 135:1577-1585.

LIRAGLUTIDE

Calo ponderale medio 8% circa

Buon profilo di sicurezza e *post hoc* sicurezza CV
(liraglutide 3,0 mg non associato a un rischio CV eccessivo)

Controindicazioni. L'uso di liraglutide 3 mg non è raccomandato nelle seguenti condizioni: compromissione renale severa (eGFR < 30 ml/mn); compromissione epatica severa; insufficienza cardiaca congestizia di classe NYHA IV; nei pazienti affetti da malattia infiammatoria intestinale e gastroparesi diabetica; gravidanza e allattamento; programmazione di gravidanza.

LIRAGLUTIDE

Posologia. La dose di mantenimento di liraglutide 3 mg una volta al giorno è raggiunta iniziando con una dose di 0.6 mg/die per una settimana e proseguendo con titolazione come da seguente schema

Settimana 1 → liraglutide 0.6 mg sc/giorno

Settimana 2 → liraglutide 1.2 mg sc/giorno

Settimana 3 → liraglutide 1.8 mg sc/giorno

Settimana 4 → liraglutide 2.4 mg sc/giorno

Settimana 5 → liraglutide 3 mg sc/giorno (dose di mantenimento)

Il trattamento deve essere interrotto dopo 12 settimane alla dose di 3.0 mg/die se i pazienti non hanno perso almeno il 5% del peso corporeo iniziale. L'effetto del trattamento è stato documentato solo per un anno. La necessità di proseguire il trattamento deve essere rivalutata ogni anno.

Modalità di somministrazione. Uso sottocutaneo, una volta al giorno, in qualsiasi ora del giorno, indipendentemente dai pasti. Il farmaco deve essere iniettato nell'addome, nella coscia o nella parte superiore del braccio.

SEMAGLUTIDE

Calo ponderale medio 16-18% circa

Buon profilo di sicurezza; riduzione MACE 20%; riduzione rischio di malattia renale (endopoint composito) del 22%

Controindicazioni. L'uso di semaglutide 2.4 mg non è raccomandato nelle seguenti condizioni: compromissione renale severa; compromissione epatica severa; insufficienza cardiaca congestizia di classe NYHA IV; soggetti con diabete mellito di tipo 2 complicato da retinopatia non controllata o potenzialmente instabile; soggetti con diabete mellito di tipo 1; gravidanza e allattamento; programmazione di gravidanza (2 mesi prima).

SEMAGLUTIDE

Posologia. La dose di mantenimento di semaglutide 2.4 mg una volta a settimana è raggiunta iniziando con una dose di 0.25 mg e proseguendo con titolazione come da seguente schema

Settimane 1-4 → semaglutide 0,25 mg sc/settimana

Settimane 5-8 → semaglutide 0,5 mg sc/settimana

Settimane 9-12 → semaglutide 1 mg sc/settimana

Settimane 13-16 → semaglutide 1,7 mg sc/settimana

Settimane > 16 → semaglutide 2,4 mg sc/settimana (dose di mantenimento)

Qualora dovessero manifestarsi sintomi gastrointestinali significativi, occorre considerare di ritardare l'aumento della dose o di ritornare alla dose precedente fino al miglioramento dei sintomi.

Modalità di somministrazione. Uso sottocutaneo, una volta a settimana, in qualsiasi ora del giorno, indipendentemente dai pasti. Il farmaco deve essere iniettato nell'addome, nella coscia o nella parte superiore del braccio.

TIRZEPATIDE

Calo ponderale medio da 16 a 25% circa

Buon profilo di sicurezza: minore comparsa nausea e migliore tolleranza

Trials dedicati per OSA, EFpHF. Non disponibili ancora risultati di CVOT

Controindicazioni. L'uso non è raccomandato nelle seguenti condizioni: gravidanza e allattamento; programmazione di gravidanza. L'esperienza con l'uso di tirzepatide nei soggetti con compromissione renale severa e/o terminale e compromissione epatica severa è limitata, pertanto prestare attenzione quando si utilizza la molecola in queste categorie. Cautela nei pazienti con storia di pancreatite o nei soggetti con diabete complicato da retinopatia proliferativa o edema maculare.

TIRZEPATIDE

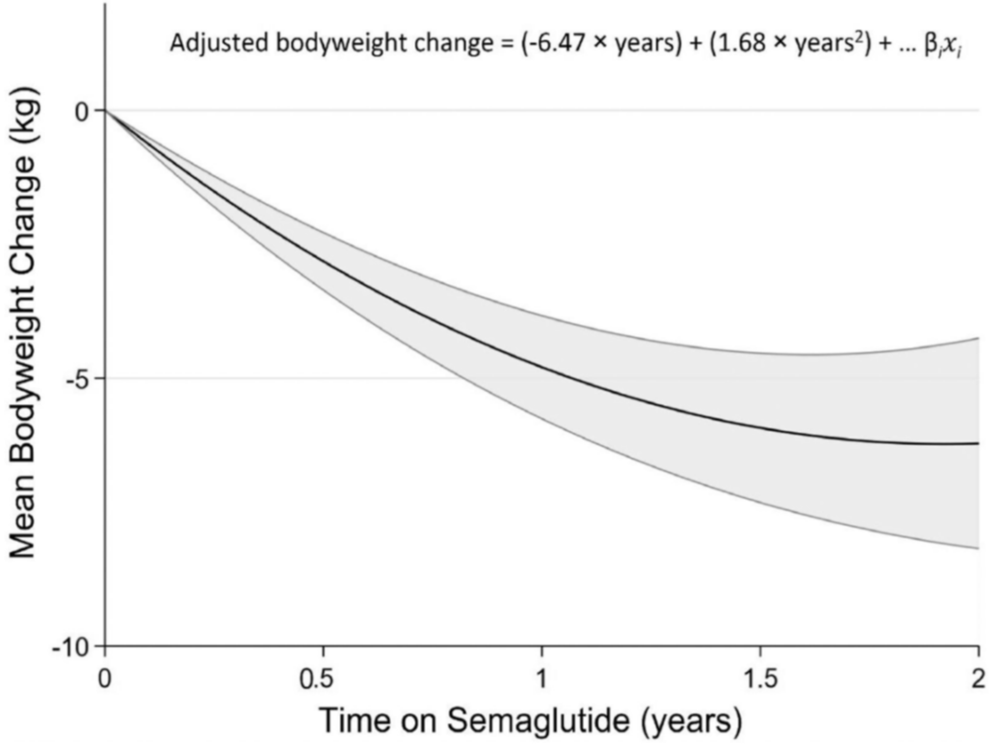
Posologia. La dose iniziale di tirzepatide è di 2,5 mg a settimana. Dopo 4 settimane, la dose deve essere aumentata a 5 mg una volta a settimana. Se necessario, è possibile aumentare la dose con incrementi di 2,5 mg dopo un minimo di 4 settimane con la dose in uso. Le dosi di mantenimento raccomandate sono 5 mg, 10 mg e 15 mg.

Modalità di somministrazione. Uso sottocutaneo, una volta a settimana, in qualsiasi ora del giorno, indipendentemente dai pasti. Il farmaco deve essere iniettato nell'addome, nella coscia o nella parte superiore del braccio. Per le specifiche indicazioni sulla modalità di somministrazione far riferimento al foglio illustrativo contenuto nella confezione.

Evidenze cliniche sull’efficacia nella popolazione con HIV

Weight Loss Associated with Semaglutide Treatment Among PWH
REAL-WORLD EVIDENCE

Variable	Mean (SD) or n(%)
N	222
Age (years)	52.8 (10.2)
Males	166 (74.8)
HbA1c % (n=219)	7.7 (2.2)
Diabetes	170 (76.6)
Treated Hypertension	167 (75.22)
Weight (kg)	107.6 (23.0)
BMI[a](kg/m^2)	35.5 (7.0)
CD4 cell count (n=220)	796 (392)
HIV VL <50 copies/mL	198 (89.2)
ART	216 (97.3)
Integrase inhibitor	183 (82.4)
TAF	154 (69.37)
Metformin	121 (54.5)
Insulin	86 (38.7)
Antipsychotic	40 (18.0)
SGLT-2 inhibitor	34 (15.3)



- 6.47 kg at 1 year
(95% CI −7.67 to −5.18)

Haidar L *et al*. **AIDS, 2024**; 38(4):531-535.

Once-weekly semaglutide in people with HIV-associated lipohypertrophy: a randomised, double-blind, placebo-controlled phase 2b single-centre clinical trial

- ≥ 18 years with HIV-1 infection
- cumulative ART duration ≥ 1 year
- stable ART regimen ≥ 12 weeks
- HIV-1 RNA <400 copies per mL ≥ 6 months before screening
- Increased abdominal girth after ART initiation and BMI ≥ 25 kg/m²
- A known history of type 1 or type 2 diabetes was exclusionary.

Semaglutide (n=54) | Placebo (n=54)

Semaglutide 0.25 mg sc ow / **PCB** — **4 weeks**

Semaglutide 0.5 mg sc ow / **PCB** — **4 weeks**

Semaglutide 1 mg sc ow / **PCB** — **24 weeks**

ESTIMATED EFFECT SIZES OF SEMAGLUTIDE

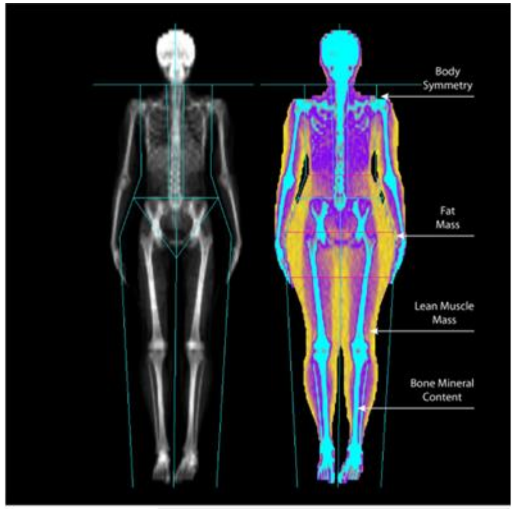
	β*	SE	95% CI of β	p value	% change†
Anthropometric measurements					
ln weight, kg	–0·11	0·04	–0·19 to –0·03	0·0057‡	–10·4%
BMI, kg/m²	–4·15	1·33	–6·77 to –1·54	0·0018‡	–11·2%
Waist circumference, cm²	–9·32	2·67	–14·55 to –4·10	<0·0001‡	–8·3%
ln waist-to-hip ratio	–0·02	0·01	–0·05 to 0·00	0·0854‡	–2·3%
Whole-body dual-energy x-ray absorptiometry measurements					
ln total body fat, kg	–0·21	0·06	–0·33 to –0·08	0·0009‡	–18·9%
ln total limb fat, kg	–0·19	0·07	–0·32 to –0·05	0·0065‡	–17·3%
ln trunk fat, kg	–0·24	0·07	–0·37 to –0·11	<0·0001‡	–21·6%
Total lean body mass, kg	–2·98	1·96	–6·83 to 0·86	0·13	–5·7%
CT area and volume measurements					
Abdominal total adipose tissue, cm²	–72·07	19·29	–109·88 to 34·26	<0·0001‡	–15·1%
Abdominal subcutaneous adipose tissue, cm²	–42·01	17·08	–75·49 to –8·52	0·0138‡	–11·2%
Abdominal visceral adipose tissue, cm²	–30·82	9·85	–50·13 to –11·51	0·0017‡	–30·6%
ln visceral adipose tissue: total adipose tissue ratio	–0·12	0·08	–0·27 to 0·03	0·11	–11·5%
ln pericardial fat, mL	–0·18	0·12	–0·41 to 0·05	0·13	–16·5%
ln total right psoas muscle, cm²	–0·05	0·05	–0·15 to 0·04	0·28	–5·3%
CT density measurements					
Liver, Hounsfield unit	3·55	1·97	–0·30 to 7·41	0·0702‡	6·2%
Abdominal total adipose tissue, Hounsfield unit	0·52	0·93	–1·30 to 2·33	0·58	0·6%
Abdominal subcutaneous adipose tissue, Hounsfield unit	–0·12	0·98	–2·05 to 1·82	0·90	0·1%
Abdominal visceral adipose tissue, Hounsfield unit	3·70	1·25	1·25 to 6·15	0·0031‡	–4·4%
Pericardial fat, Hounsfield unit	0·80	0·57	–0·33 to 1·93	0·17	–0·7%
Total right psoas muscle, Hounsfield unit	–0·51	1·28	–3·02 to 1·99	0·69	–1·1%

Eckard AR *et al*. **Lancet Diabetes Endocrinol, 2024**; 12:523–34.

Once-weekly semaglutide in people with HIV-associated lipohypertrophy: a randomised, double-blind, placebo-controlled phase 2b single-centre clinical trial

Example image

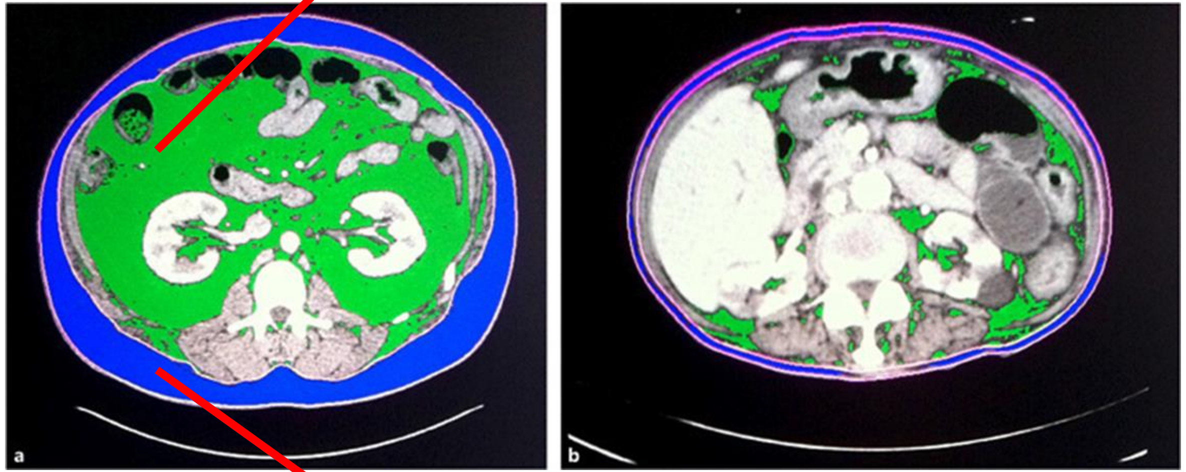
Waist circumference
(β −9·32 cm², 95% CI −14·55 to −4·10; % change −8·3%)



Example image

DEXA- total body fat
(β −0·21 cm², 95% CI −0·33 to −0·08; % change −18·9%)

CT- abdominal visceral adipose tissue
(β −30·82 cm², 95% CI −50·13 to −11·51; % change −30·6%)



Example image

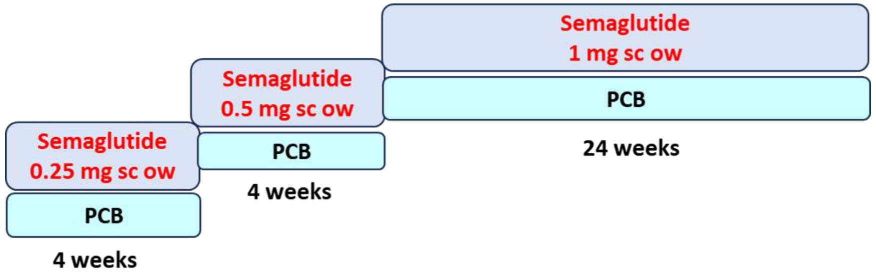
CT- abdominal subcutaneous adipose tissue
(β −42·01 cm², 95% CI −75·49 to −8·52; % change −11·2%)

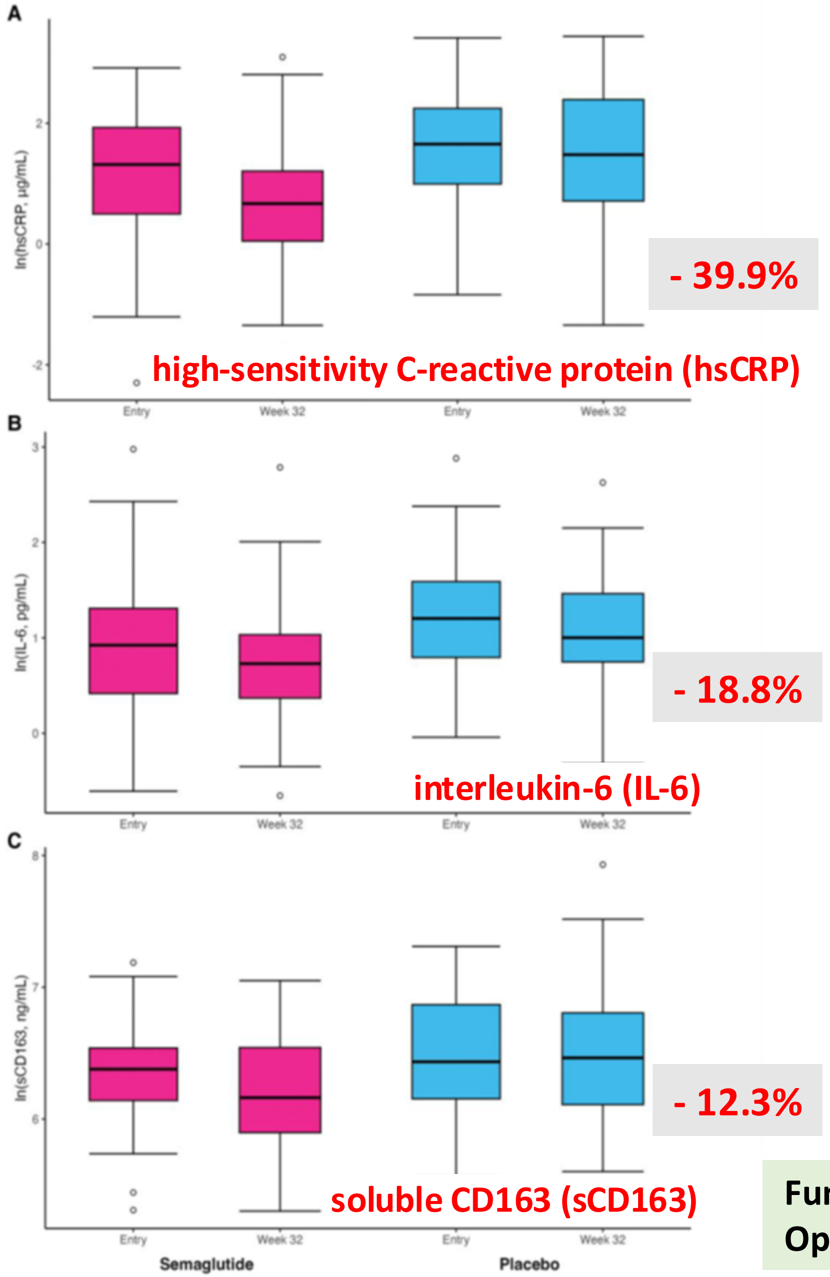
Eckard AR *et al*. Lancet Diabetes Endocrinol, 2024; 12:523–34.

Effects of Semaglutide on **Inflammation** and **Immune Activation** in HIV-associated Lipohypertrophy

- PWH ≥18 years of age with HIV-1 infection
- cumulative ART duration ≥ 1 year
- stable ART regimen ≥ 12 weeks
- HIV-1 RNA <400 copies per mL ≥ 6 months before screening
- BMI ≥ 25 kg/m2, increased waist circumference/waist-to-hip ratio and increased abdominal girth after ART initiation
- Without type 1 or type 2 diabetes and/or CVD

1: 1 **Semaglutide** (n=54) and **Placebo** (n=54)





…semaglutide can reduce markers of inflammation in PWH…

…the significant decreases in levels of hsCRP, IL-6, and sCD163 are intriguing and potentially biologically important…

…future studies including assessments of the long-term effects of GLP-1RAs on immune function, CV risk, and cognitive function in PWH should be considered…

Funderburg NT *et al.*
Open Forum Infect Dis, 2025; 12(4):ofaf152.

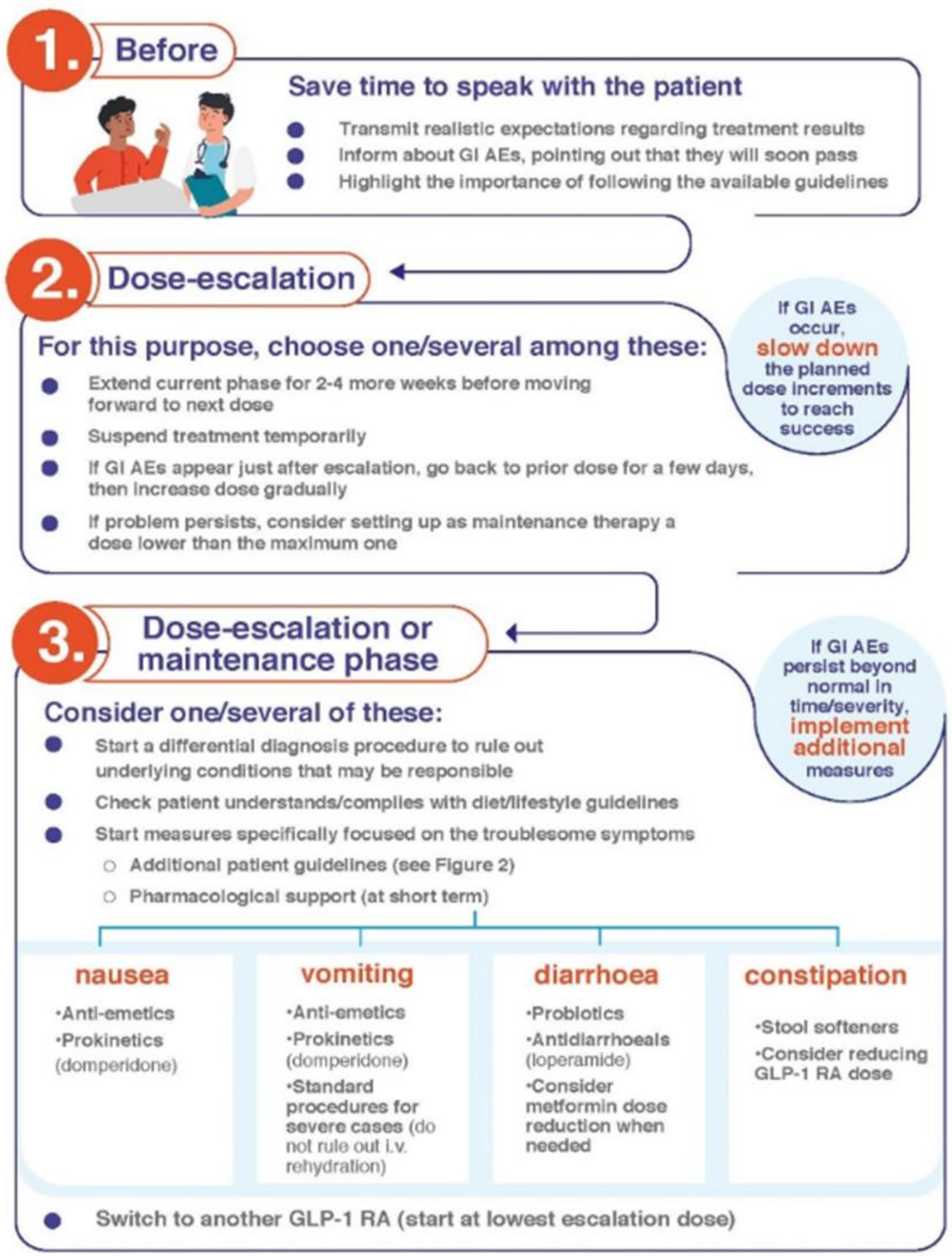
Effetti collaterali e considerazioni di sicurezza

Frequency of GI AEs in clinical trials with GLP-1 RA in people with obesity or T2D.

GLP-1 RA	Program	Patient Profile	Dose	Method of Administration	Nausea	Vomiting	Diarrhoea	Constipation
Semaglutide	SUSTAIN	T2D	1 mg	s.c. once weekly	15–24	7–15	7–19	4–7
Semaglutide	STEP	Obesity *	2.4 mg	s.c. once weekly	14–58	22–27	10–36	12–37
Semaglutide	PIONEER	T2D	14 mg	p.o. SID	8–23	6–12	5–15	7–12
Liraglutide	LEAD	T2D	1.8 mg	s.c. SID	10–40	4–17	8–19	11
Liraglutide	SCALE	Obesity *	3 mg	s.c. SID	27–48	7–23	16–26	12–30
Dulaglutide	AWARD	T2D	1.5 mg	s.c. once weekly	15–29	7–17	11–17	n.r.
Exenatide	DURATION	T2D	2 mg	s.c. once weekly	5–14	<1–6	5–11	1–8
Exenatide	—	T2D	10 µg	s.c. BID	35–59	9–14	4–9	5
Lixisenatide	GETGOAL	T2D	20 µg	s.c. SID	16–40	7–18	4–12	5†

Gorgojo-Martínez JJ *et al*. **J Clin Med, 2022**; 12(1):145.

MINIMIZING OCCURRENCE/SEVERITY OF GASTROINTESTINAL ADVERSE EVENTS



Gorgojo-Martínez JJ *et al.* **J Clin Med, 2022**; 12(1):145.

Frequency of pancreatobiliary complications in clinical trials with GLP-1 RA in obesity or T2D

GLP-1 RA	Program	Refs	Target Patient	Dose	Administration	Cholelithiasis	AP
Semaglutide	SUSTAIN	9	T2D	1 mg	s.c. once weekly	0–2	0-<1
Semaglutide	STEP	10	Obesity *	2.4 mg	s.c. once weekly	<1–3	0-<1
Semaglutide	PIONEER	11	T2D	14 mg	p.o. QD	0-<1	0-<1
Liraglutide	LEAD	12	T2D	1.8 mg	s.c. QD	0	0-<1
Liraglutide	SCALE	13	Obesity *	3 mg	s.c. QD	<1–1	0-<1
Dulaglutide	AWARD	14	T2D	1.5 mg	s.c. once weekly	0	<1
Exenatide	DURATION	15	T2D	2 mg	s.c. once weekly	0-<1	0-<1
Exenatide	—	16	T2D	10 µg	s.c. BID	0	0
Lixisenatide	GETGOAL	17	T2D	20 µg	s.c. QD	0	0

Gorgojo-Martínez JJ *et al*. **J Clin Med, 2022**; 12(1):145.

Obesity is

~~My fault~~

~~My choice~~

~~My destiny~~

A Disease

GRAZIE PER L'ATTENZIONE

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