2022년 대한임상건강증진학회

추계학술대회

비만약물치료의 최신지견

허　　연(의정부 을지대병원)

대한임상건강증진학회
Korean Society for Health Promotion and Disease Prevention

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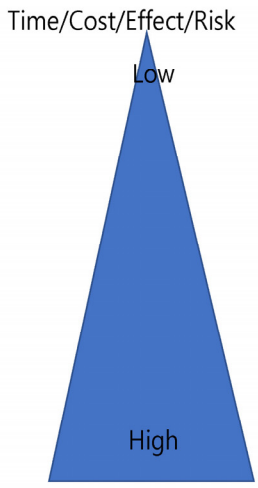
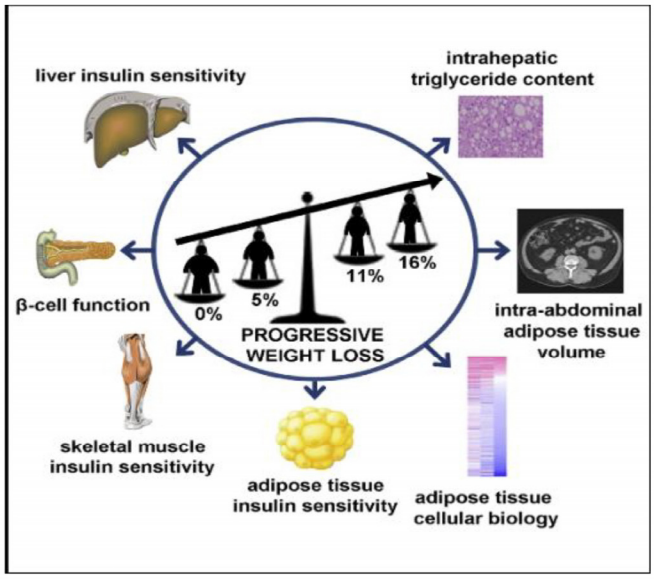
Currently Available options

1. Diet/ Exercise
2. Medication
① BMI 25kg/m^2 이상인 경우
② BMI 23kg/m^2 이상이면서 비만 합병증의 위험이 증가한 경우
3. Surgery
① BMI 35kg/m^2 이상인 경우
② BMI 30kg/m^2 이상이면서 비만 합병증이 동반된 경우
③ BMI 27.5- 30kg/m^2 이면서 비수술적 치료로 혈당이 적절히 조절되지 않는 제2형 당뇨병



More Weight loss produces more health benefits



- Moderate 5% weight loss improves multi-organ insulin sensitivity and b cell function
- Additional weight loss of 11%–16% further increases insulin sensitivity in muscle
- Progressive weight loss causes stepwise changes in adipose tissue biology.

Cell Metab. 2016;23:591-600.

More Weight loss produces more health benefits

Weight loss (%)			
0-5%	5-10%	10-15%	≥ 15%
Hyperglycemia	NAFLD	NASH	HFpEF
Hypertension	Asthma	OSA	CV mortality
	Dyslipidemia	GERD	Remission of T2DM
	PCOS	Knee OA	CVD
	Prevention of T2DM		
	Urinary incontinence		

비만치료 – 약물요법

식욕억제제	○ 식이요법의 이행을 도움 ○ 식욕억제 효과로 섭취 칼로리 감소 (배고프지 않게 하는 효과)
흡수 억제제	○ 지방 흡수 저해 (Orlistat) ○ 탄수화물 흡수 저해
포만감증진제	○ 포만감 증가로 식이 조절 효과 강화 (공복감 최소화)
열생산촉진제	○ 체지방 감량 , 기초대사량 증가
기타 보조치료제	○ 환자의 증상이나 상태에 따라 추가 처방 가능 변비 / 부종 / 복부비만 / 갱년기 여성 /월경불순 등 ○ 식이요법/체중감소시 추가 보충이 필요한 영양소 공급 단백질/아미노산, 식이섬유 ○ 에너지 대사 활성화를 위한 필수 비타민/미네랄 공급
국소지방분해	○ 아미노필린, 메조테라피(Mesotherapy), LLD 등

○ 비만 약물 처방 패턴

약리기전별 약물 1-2종 → 총 6-7종 약물 처방

Medications Approved for Obesity Treatment

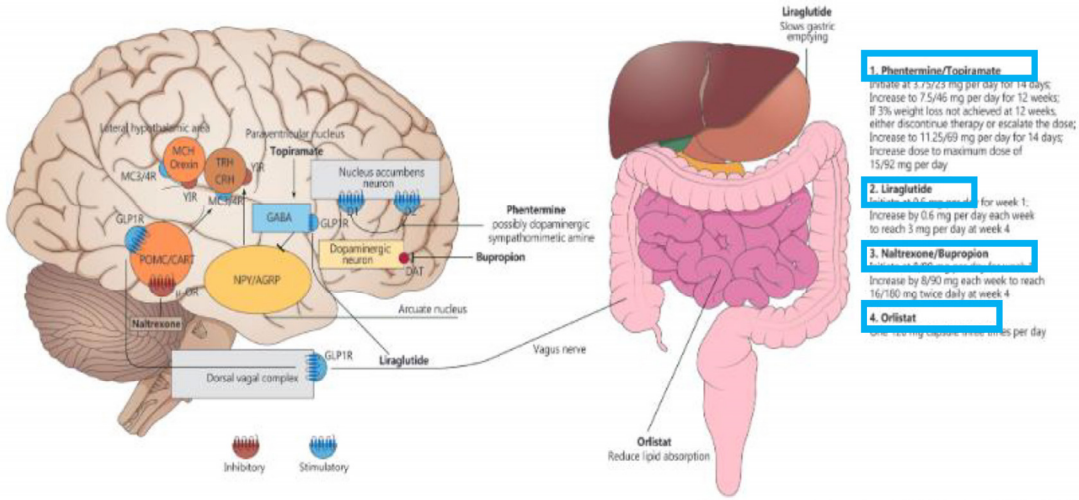
	KFDA	FDA	EMA
Short-term treatment (<12 weeks)			
Phentermine	O	O	X
Phendimetrazine	O	O	X
Diethylpropion	O	O	X
Mazindol	O	O	X
Long-term treatment (≥12 weeks)			
Orlistat	O	O	O
Naltrexone ER/Bupropion ER	O	O	O
Liraglutide	O	O	O
Phentermine/Topiramate ER	O	O	X

Currently approved long-term therapies for obesity

일반 명	용량	임상시험에서 위약 대비 체중감소 (1년)	작용 기전
Orlistat	120mg tid	2.8%	Gastric/pancreatic lipase inhibitor
Naltrexone ER-bupropion ER	32mg/360mg	3.2-5.2%	Opioid antagonist (naltrexone)-anti-depressant (bupropion)
Liraglutide	3.0mg 하루 1회 피하 투여	5.4-6.0%	GLP-1 analogue
Phentermine-topiramate ER	3.75mg/23mg 7.5mg/46mg 11.25mg/69mg 15mg/92mg	6.6-9.3%	Catecholamine release (phentermine)-GABA activation, Glutamate inactivation (topiramate)

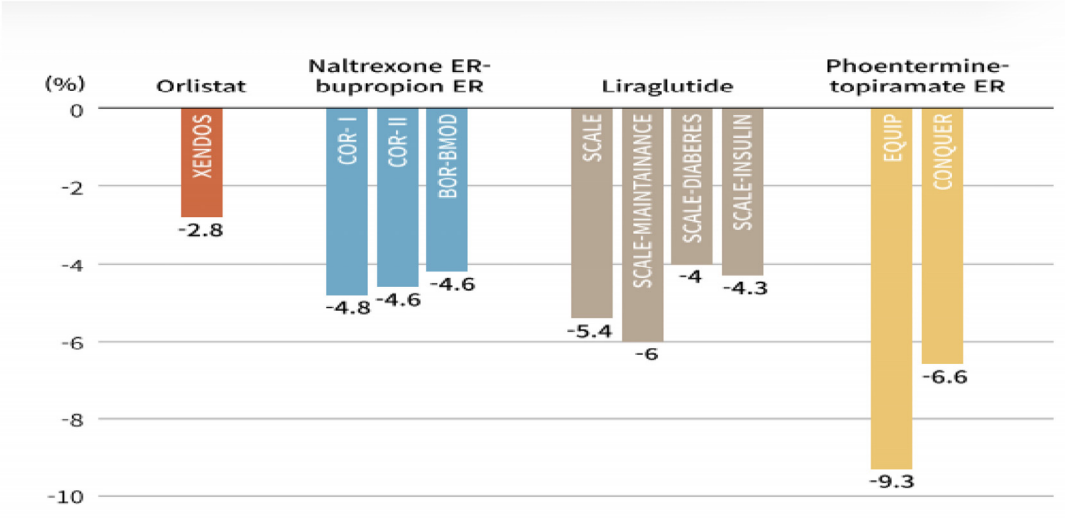
비만 진료지침 2020.

Currently approved long-term therapies for obesity



Diabetes Metab J 2020;44:802-818.

Effects of currently approved long-term therapies for obesity



비만 진료지침 2020.

Side effects of currently therapies for obesity

일반 명	주요 부작용	주요 금기증
Orlistat	지방변, 복부팽만 및 방귀, 배변 증가, 배변 실금	만성 흡수 불량 증후군 환자 또는 담즙 분비 정지 환자
Naltrexone ER-bupropion ER	구역, 변비, 두통, 구토, 어지럼증, 불면, 입마름, 설사, 불안, 안면 홍조, 피로, 떨림, 상복부 통증, 바이러스성 위장염, 이명, 요로 감염, 고혈압, 복부 통증, 다한증, 자극 과민성, 혈압 상승, 미각 이상, 두근거림	1) 조절되지 않는 고혈압 환자 2) 발작 장애 또는 발작 병력이 있는 환자 3) 중추신경계 종양이 있는 환자 4) 알코올 또는 벤조디아제핀계, 바르비탈류, 항간질약 등 약물복용을 갑자기 중단한 환자 5) 양극성 장애 환자 6) 대식증 또는 신경성 식욕부진을 현재 또는 과거에 진단받은 환자 7) 현재 아편성 또는 아편 효능 약 (예, 메사돈) 의존성이 있는 환자 또는 급성 아편금단증상을 지닌 환자 8) MAO 억제제를 투여 중인 환자

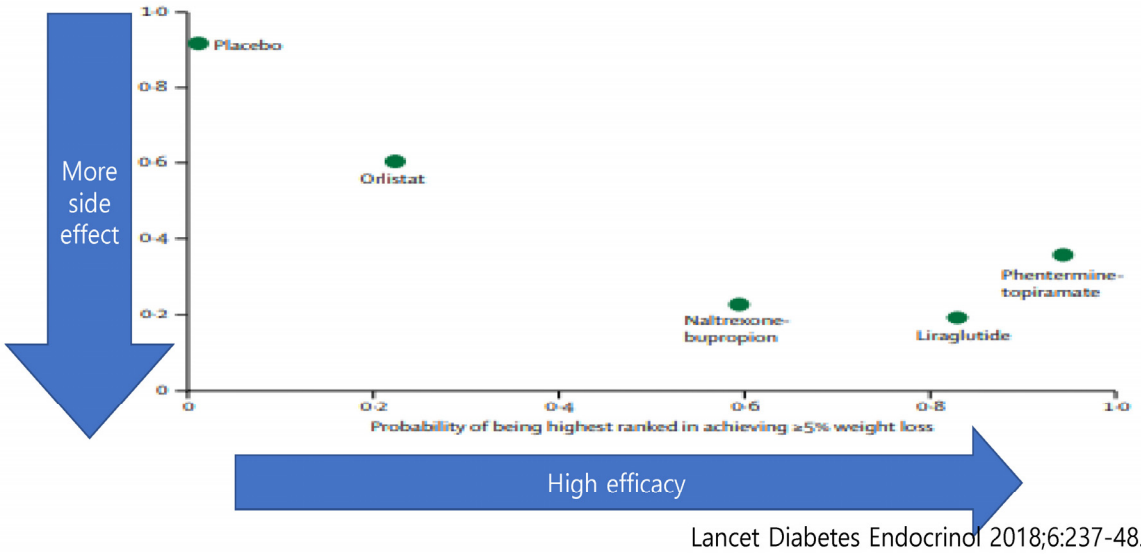
비만 진료지침 2020.

Side effects of currently therapies for obesity

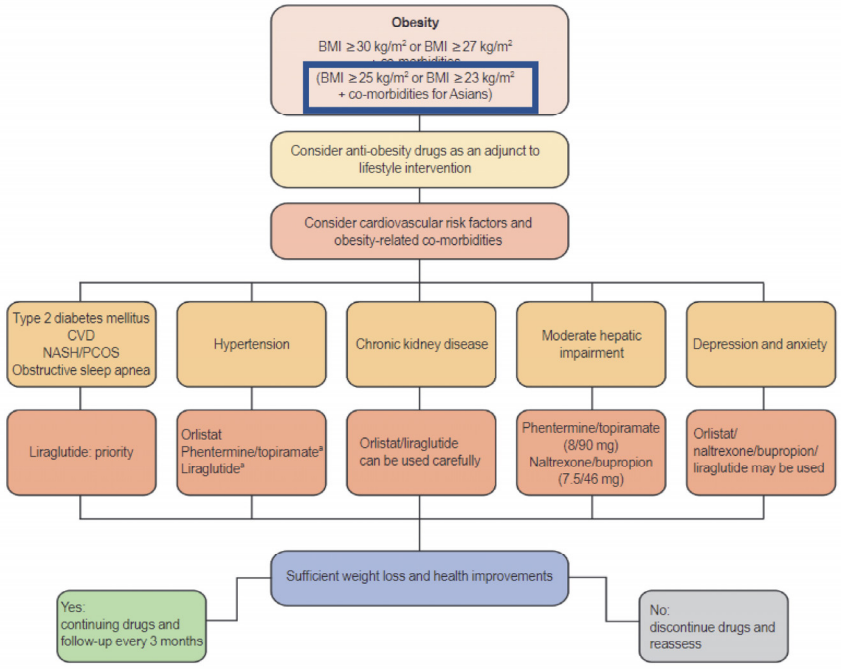
일반 명	주요 부작용	주요 금기증
Liraglutide	구역, 구토, 설사, 변비, 소화장애, 복통, 복부팽만감, 트림, 위식도 역류, 입마름, 위염, 저혈당, 주사 부위 발적 및 가려움, 피로, 무력, 어지러움, 미각 변화, 수면 장애, 담석, 리파제/아밀라제 상승	갑상선 수질암의 가족력이나 과거력을 가진 환자, 다발성 내분비선종증 2형 환자
Phentermine-topiramate ER	1) 감각 이상/미각 이상 2) 기분 장애 및 수면 장애 3) 인지 장애 4) 실험실 검사 수치 이상-혈청 중탄산염 저하, 혈청 칼륨 저하, 혈청 크레아티닌 증가, 신석증	1) 녹내장 환자 2) 갑상선 기능 항진증 환자 3) 14일 이내에 MAO 억제제를 투여한 환자 4) 교감신경 흥분성 아민에 대한 과민 반응 환자 5) 진전된 동맥경화증 환자 6) 심혈관계 질환 환자 7) 중등도-중증의 고혈압 환자 8) 폐동맥 고혈압 환자 9) 약물 남용의 병력이 있는 환자

비만 진료지침 2020.

Efficacy and side effects of the current anti-obesity medications



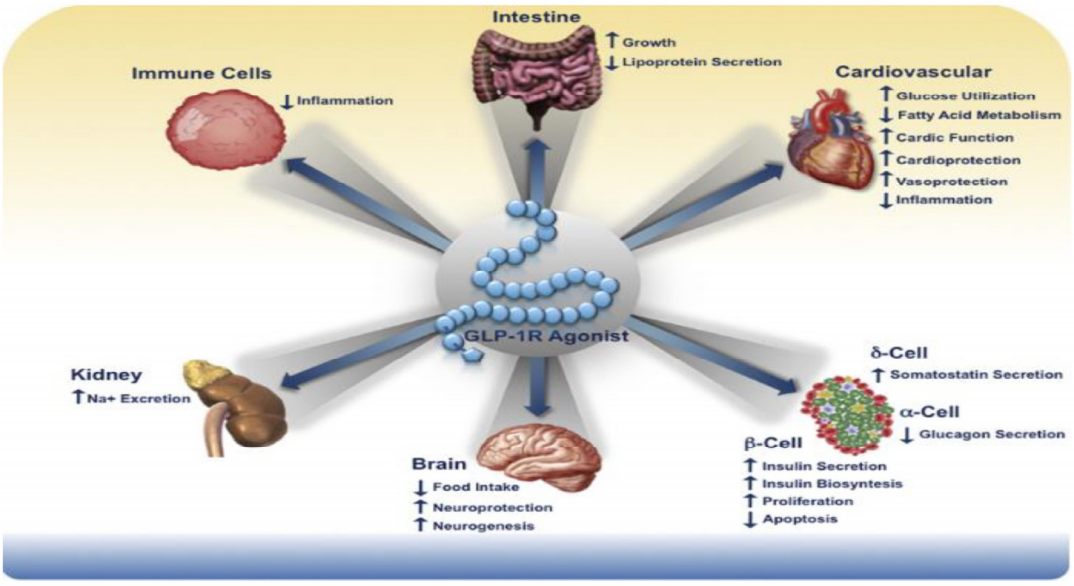
Lancet Diabetes Endocrinol 2018;6:237-48.



Diabetes Metab J 2020;44:802-818.

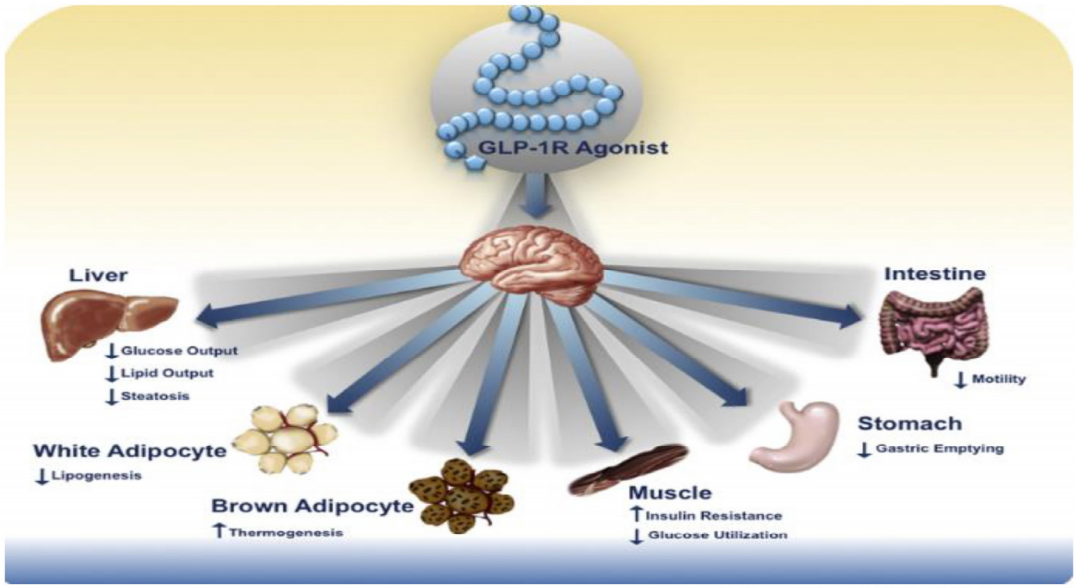
Semaglutide

Direct pharmacological actions of GLP-1R agonists



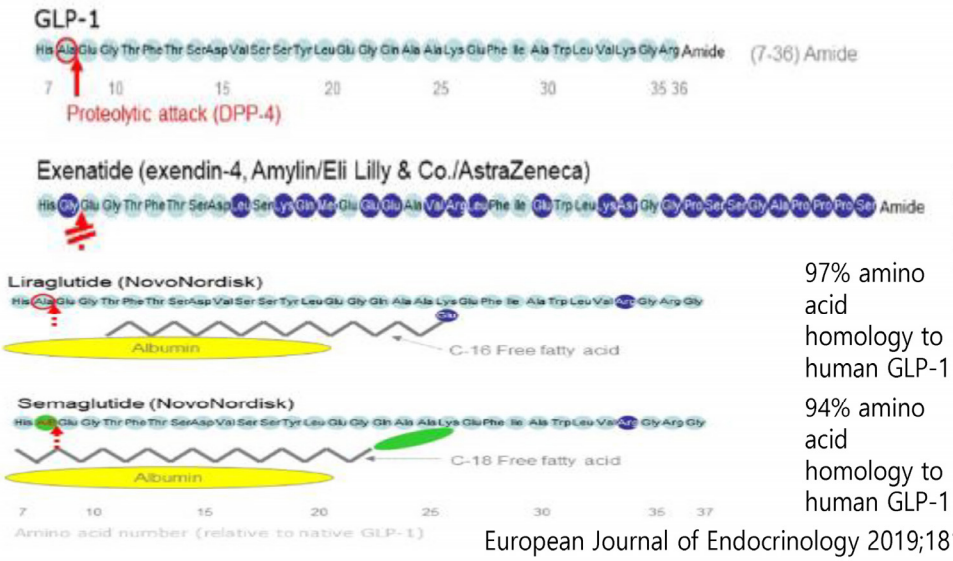
Cell Metab. 2013;17:819-37.

Indirect pharmacological actions of GLP-1R agonists



Cell Metab. 2013;17:819-37.

Molecular structures of GLP-1 receptor agonists



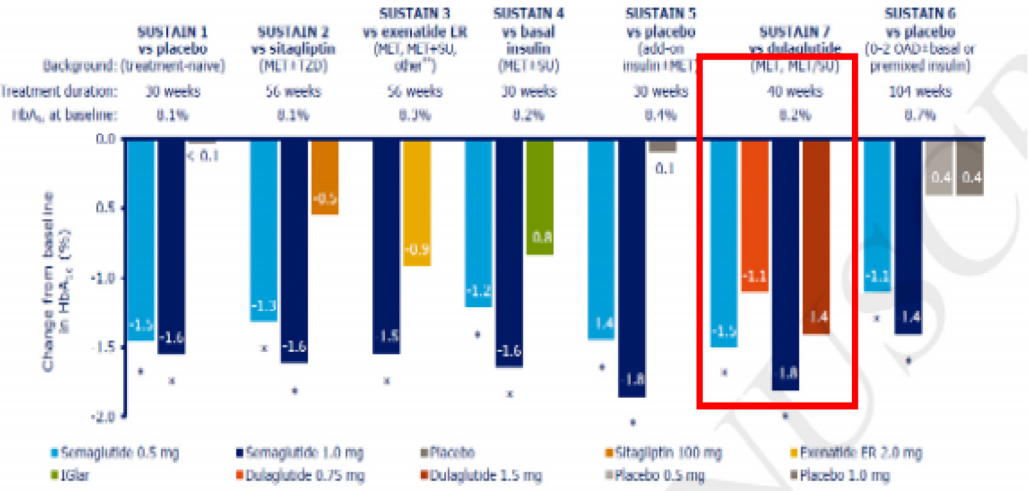
~50% amino acid homology to human GLP-1

97% amino acid homology to human GLP-1

94% amino acid homology to human GLP-1

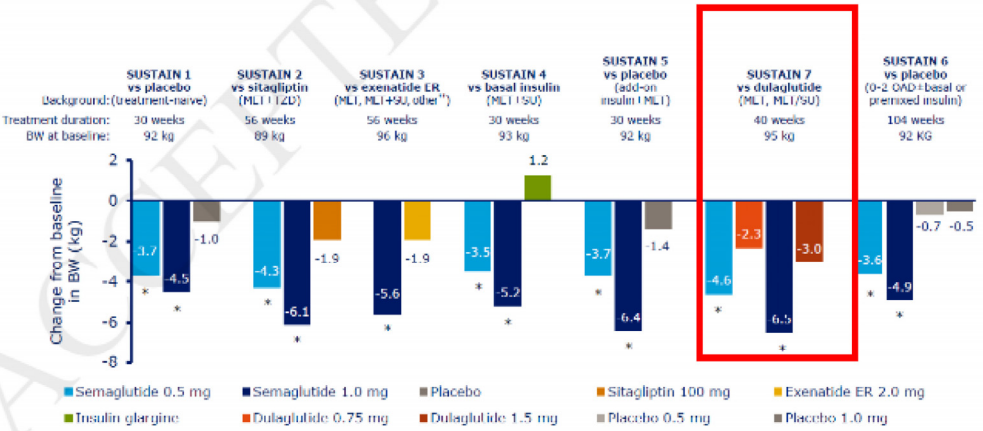
European Journal of Endocrinology 2019;181:R211-R234

The Effect of semaglutide (HbA1c)



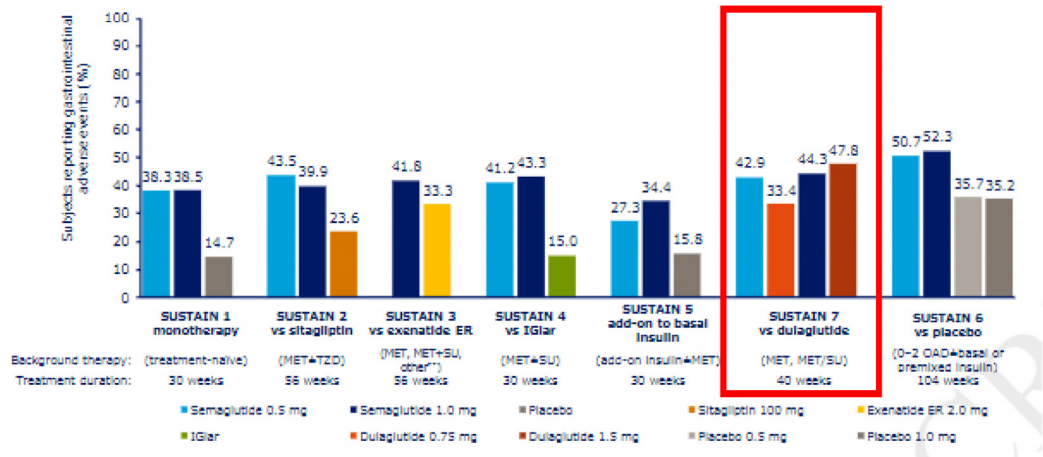
Diabetes & Metabolism 2019;45:409-418.

The Effect of semaglutide (Body weight)



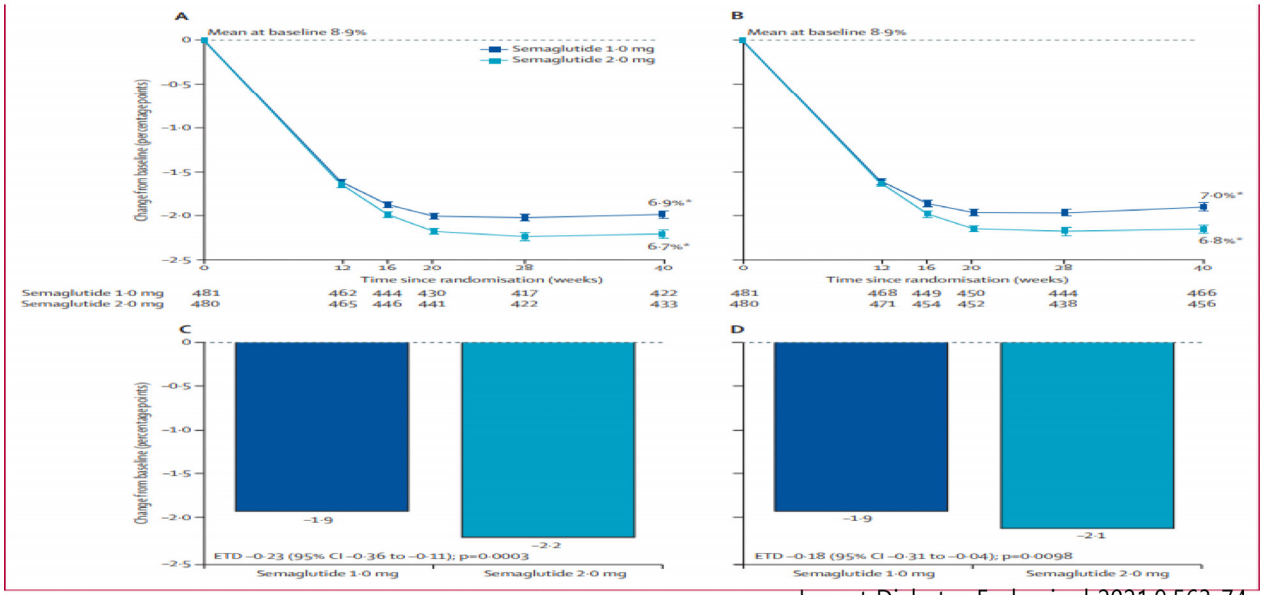
Diabetes & Metabolism 2019;45:409-418.

The GI side effect of semaglutide



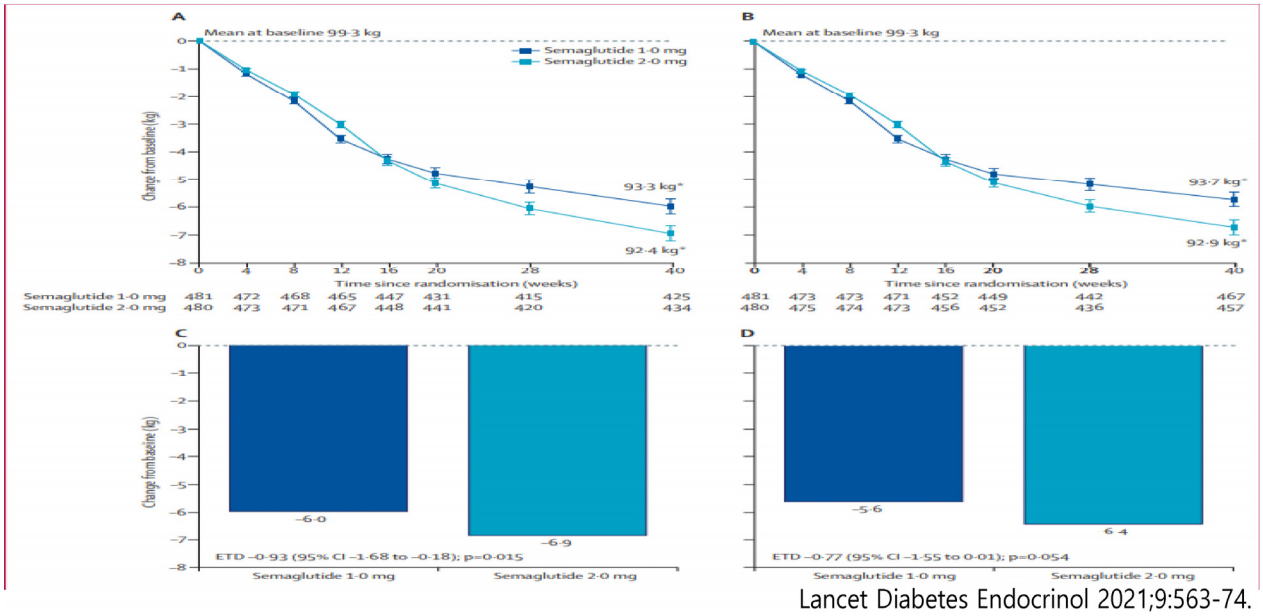
Diabetes & Metabolism 2019;45:409-418.

Semaglutide 2.0mg vs. Semaglutide 1.0mg (HbA1c)



Lancet Diabetes Endocrinol 2021;9:563-74.

Semaglutide 2.0mg vs. Semaglutide 1.0mg (Body weight)



Lancet Diabetes Endocrinol 2021;9:563-74.

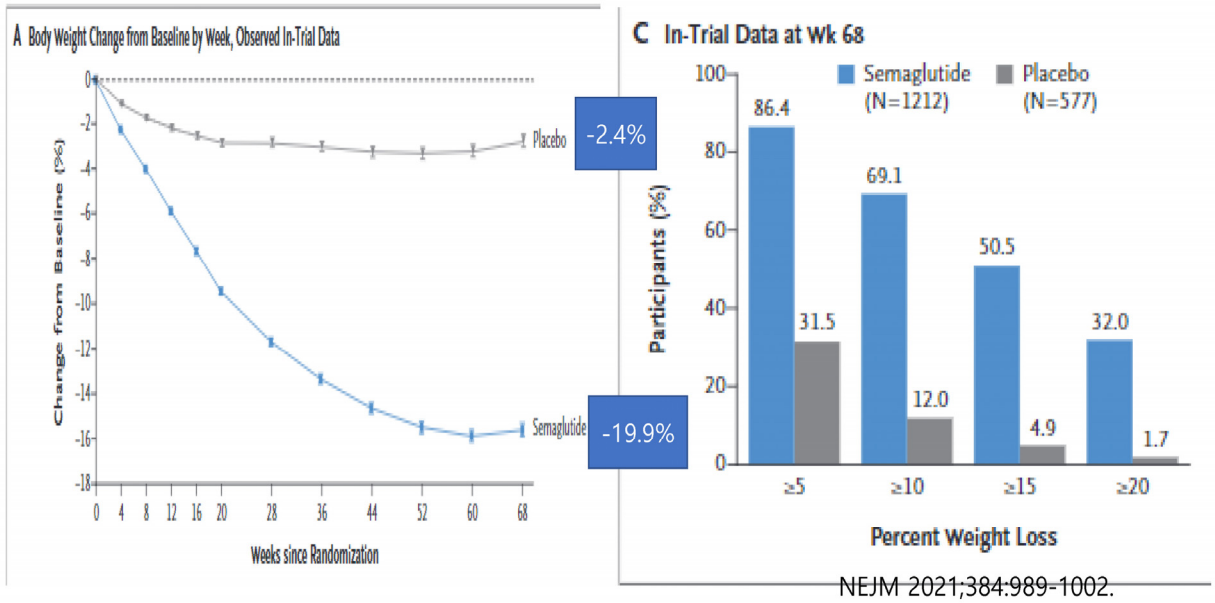
	Semaglutide 1·0 mg (n=480)			Semaglutide 2·0 mg (n=479)		
	n (%)	Events	Events per 100 patient-years of exposure	n (%)	Events	Events per 100 patient-years of exposure
Treatment-emergent adverse events	251 (52%)	828	201·4	272 (57%)	775	189·1
Severity						
Mild	199 (41%)	575	139·8	215 (45%)	552	134·7
Moderate	111 (23%)	216	52·5	108 (23%)	194	47·3
Severe	26 (5%)	37	9·0	19 (4%)	29	7·1
Serious	25 (5%)	40	9·7	21 (4%)	29	7·1
Deaths*	1 (<1%)	1	0·2	2 (<1%)	2	0·5
Treatment-emergent adverse events leading to premature treatment discontinuation						
Overall	22 (5%)	22	5·4	21 (4%)	21	5·1
Gastrointestinal adverse events						
Overall	148 (31%)	353	85·8	163 (34%)	346	84·4
Mild	121 (25%)	250	60·8	134 (28%)	247	60·3
Moderate	54 (11%)	92	22·4	47 (10%)	79	19·3
Severe	8 (2%)	11	2·7	12 (3%)	20	4·9
Treatment-emergent adverse events in >5% in any treatment group by preferred term						
Nausea	70 (15%)	99	24·1	69 (14%)	98	23·9
Diarrhoea	42 (9%)	83	20·2	45 (9%)	51	12·4
Vomiting	32 (7%)	41	10·0	37 (8%)	55	13·4
Dyspepsia	25 (5%)	26	6·3	16 (3%)	17	1·0
Decreased appetite	18 (4%)	18	4·4	29 (6%)	29	1·0
Hypoglycaemia†						
Level 1	54 (11%)	133	32·3	41 (9%)	82	20·0
Level 2	18 (4%)	24	5·8	12 (3%)	19	4·6
Level 3	1 (<1%)‡	1	0·2	2 (<1%)§	2	0·5

*Causes of death were head injury and unknown in the semaglutide 2·0 mg group, and an event of neuromyelitis optica spectrum disorder in the in the semaglutide 1·0 mg group (appendix p 4). †Definition based on International Hypoglycaemia Study Group.[16] ‡Reported after treatment discontinuation during 7-week follow-up, in combination with insulin. §Both in combination with sulfonylurea; one episode was reported after treatment discontinuation during 7-week follow-up.

Table 3: **Safety outcomes in the safety analysis set**

Lancet Diabetes Endocrinol 2021;9:563-74.

Semaglutide 2.4mg vs. placebo (Body weight)- non DM



NEJM 2021;384:989-1002.

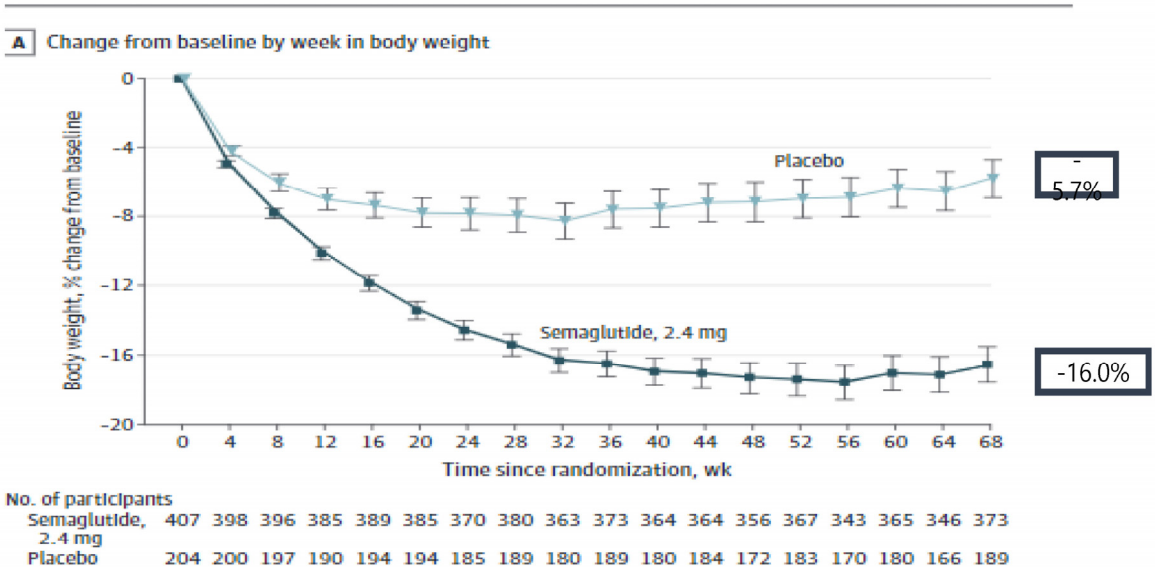
Semaglutide 2.4mg vs. placebo- non DM

Table 2. Coprimary, Confirmatory, and Selected Supportive Secondary and Exploratory End Points for the Treatment Policy Estimand.*

End Point	Semaglutide (N=1306)	Placebo (N=655)	Difference between Semaglutide and Placebo (95% CI)†	Odds Ratio	P Value
Coprimary end points assessed in the overall population					
Percent body-weight change from baseline to wk 68	−14.85	−2.41	−12.44 (−13.37 to −11.51)		<0.001
Participants with body-weight reduction ≥5% at wk 68 — %‡	86.4	31.5		11.2 (8.9 to 14.2)	<0.001
Confirmatory secondary end points assessed in the overall population					
Participants with body-weight reduction ≥10% at wk 68 — %‡	69.1	12.0		14.7 (11.1 to 19.4)	<0.001
Participants with body-weight reduction ≥15% at wk 68 — %‡	50.5	4.9		19.3 (12.9 to 28.8)	<0.001
Change from baseline to wk 68					
Waist circumference — cm	−13.54	−4.13	−9.42 (−10.30 to −8.53)		<0.001
Systolic blood pressure — mm Hg	−6.16	−1.06	−5.10 (−6.34 to −3.87)		<0.001
SF-36 physical functioning score	2.21	0.41	1.80 (1.18 to 2.42)		<0.001
IWQOL-Lite-CT physical function score	14.67	5.25	9.43 (7.50 to 11.35)		<0.001
Supportive secondary end points assessed in the overall population§					
Participants with body-weight reduction ≥20% at wk 68 — %‡	32.0	1.7		26.9 (14.2 to 51.0)	
Change from baseline to wk 68					
Body weight — kg	−15.3	−2.6	−12.7 (−13.7 to −11.7)		
Body-mass index	−5.54	−0.92	−4.61 (−4.96 to −4.27)		
Glycated hemoglobin — percentage points	−0.45	−0.15	−0.29 (−0.32 to −0.26)		
Fasting plasma glucose — mg/dl	−8.35	−0.48	−7.87 (−9.04 to −6.70)		
Diastolic blood pressure — mm Hg	−2.83	−0.42	−2.41 (−3.25 to −1.57)		
Lipid levels, ratio of wk 68 value to baseline¶					
Total cholesterol	0.97	1.00	0.97 (0.95 to 0.98)		
HDL cholesterol	1.05	1.01	1.04 (1.02 to 1.05)		
LDL cholesterol	0.97	1.01	0.96 (0.94 to 0.98)		
VLDL cholesterol	0.78	0.93	0.84 (0.81 to 0.87)		
Free fatty acids	0.83	0.93	0.89 (0.83 to 0.94)		
Triglycerides	0.78	0.93	0.84 (0.81 to 0.87)		
C-reactive protein, ratio of wk 68 value to baseline¶	0.47	0.85	0.56 (0.51 to 0.61)		

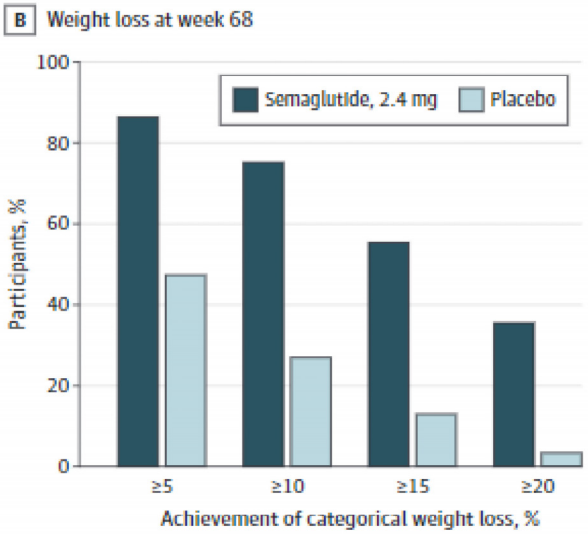
NEJM 2021;384:989-1002.

Semaglutide 2.4mg vs. placebo (Body weight)- with low calorie diet



JAMA. 2021;325(14):1403-1413.

Semaglutide 2.4mg vs. placebo (Body weight)- with low calorie diet



① More participants treated with semaglutide vs placebo lost at least 5% of baseline body weight(86.6% vs 47.6%, respectively;P< .001).

② A higher proportion of participants in the semaglutide vs placebo group achieved weight losses of at least 10% or 15% (75.3% vs 27.0%and 55.8% vs 13.2%, respectively;P< .001).

NEJM 2021;384:989-1002.

Event	Semaglutide, 2.4 mg (n = 407)			Placebo (n = 204)		
	Participants, No. (%)	No. of events	Events per 100 patient-years[b]	Participants, No. (%)	No. of events	Events per 100 patient-years[b]
Participants with ≥1 adverse event[c]	390 (95.8)	4035	766.9	196 (96.1)	1325	506.9
Adverse events leading to treatment discontinuation	24 (5.9)	34	6.5	6 (2.9)	6	2.3
Gastrointestinal disorders	14 (3.4)	20	3.8	0		
Adverse events reported in ≥10% of participants[d]						
Nausea	237 (58.2)	511	97.1	45 (22.1)	60	23
Constipation	150 (36.9)	210	39.9	50 (24.5)	62	23.7
Diarrhea	147 (36.1)	307	58.3	45 (22.1)	62	23.7
Vomiting	111 (27.3)	212	40.3	22 (10.8)	25	9.6
Nasopharyngitis	90 (22.1)	128	24.3	49 (24.0)	70	26.8
Upper respiratory tract infection	85 (20.9)	115	21.9	44 (21.6)	65	24.9
Headache	78 (19.2)	123	23.4	20 (9.8)	25	9.6
Abdominal pain	54 (13.3)	76	14.4	10 (4.9)	11	4.2
Back pain	54 (13.3)	68	12.9	22 (10.8)	24	9.2
Dizziness	52 (12.8)	73	13.9	11 (5.4)	14	5.4
Fatigue	52 (12.8)	69	13.1	15 (7.4)	19	7.3
Flatulence	47 (11.5)	62	11.8	23 (11.3)	24	9.2
Gastroenteritis viral	42 (10.3)	47	8.9	13 (6.4)	13	5
Urinary tract infection	42 (10.3)	61	11.6	10 (4.9)	11	4.2
Abdominal distention	41 (10.1)	55	10.5	20 (9.8)	28	10.7
Sinusitis	39 (9.6)	51	9.7	26 (12.7)	34	13
Adverse events of interest[e]						
Gastrointestinal disorders	337 (82.8)	1760	334.5	129 (63.2)	333	127.4
Psychiatric disorders	60 (14.7)	97	18.4	24 (11.8)	31	11.9
Cardiovascular disorders[f]	40 (9.8)	50	8.9	22 (10.8)	27	9.5
Allergic reactions	35 (8.6)	41	7.8	19 (9.3)	19	7.3
Injection site reactions	22 (5.4)	31	5.9	12 (5.9)	16	6.1
Gallbladder-related disorders	20 (4.9)	24	4.6	3 (1.5)	3	1.1
Cholelithiasis	13 (3.2)	13	2.5	2 (1.0)	2	0.8
Hepatic disorders	8 (2.0)	9	1.7	4 (2.0)	5	1.9
Malignant neoplasms[f]	3 (0.7)	3	0.5	1 (0.5)	1	0.4
Hypoglycemia	2 (0.5)	2	0.4	0		
Acute pancreatitis[g]	0			0		
Acute renal failure	0			0		
Participants with ≥1 serious adverse event[h]	37 (9.1)	55	10.5	6 (2.9)	7	2.7

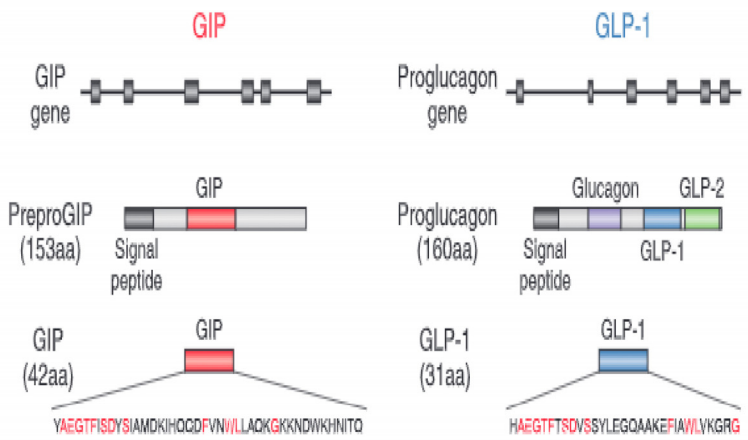
NEJM 2021;384:989-1002.

Once weekly SC dose escalation schedule

- Weeks 1-4: 0.25 mg
- Weeks 5-8: 0.5 mg
- Weeks 9-12: 1 mg
- Week 13-16: 1.7 mg
- Week 17 and onward: 2.4 mg (maintenance)

Tirzepatide

GLP-1 and GIP



GIP: glucose-dependent insulinotropic polypepide
GLP-1: glucagon-like peptide

J Diabetes Investig.2010;1:8-23.

GLP-1 and GIP

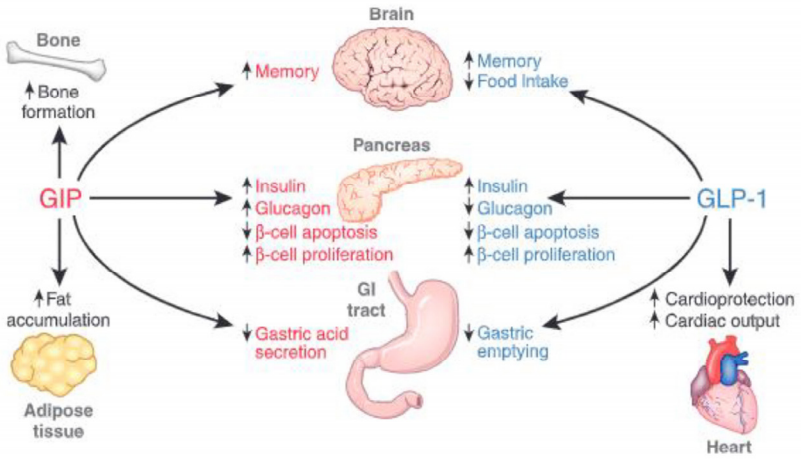
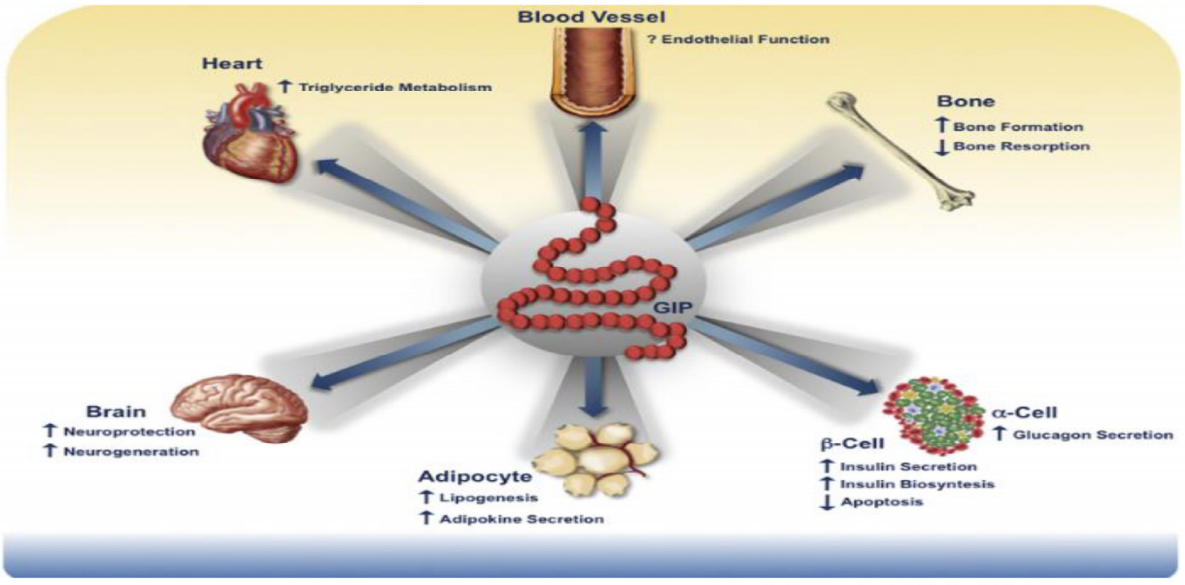


Figure 2 | Pancreatic and exopancreatic function of glucose-dependent insulinotropic polypepide (GIP) and glucagon-like peptide (GLP)-1. GIP acts directly on the endocrine pancreas, bone, fat, gastrointestinal (GI) tract and brain. GLP-1 acts directly on the endocrine pancreas, gastrointestinal tract, heart and brain.

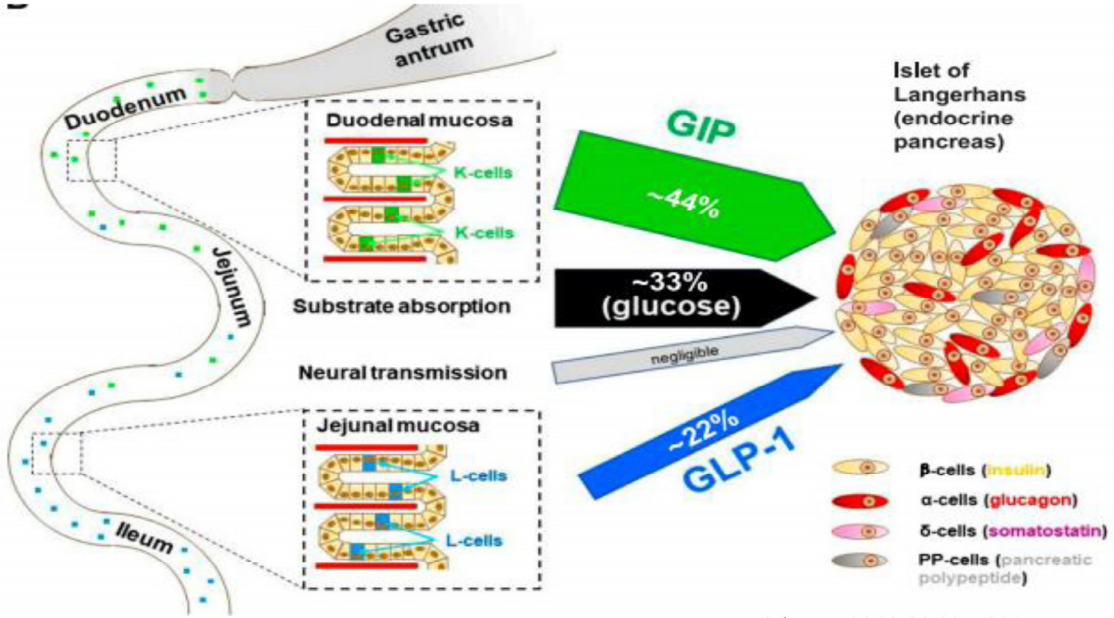
J Diabetes Investig.2010;1:8-23.

Biological actions of GIP



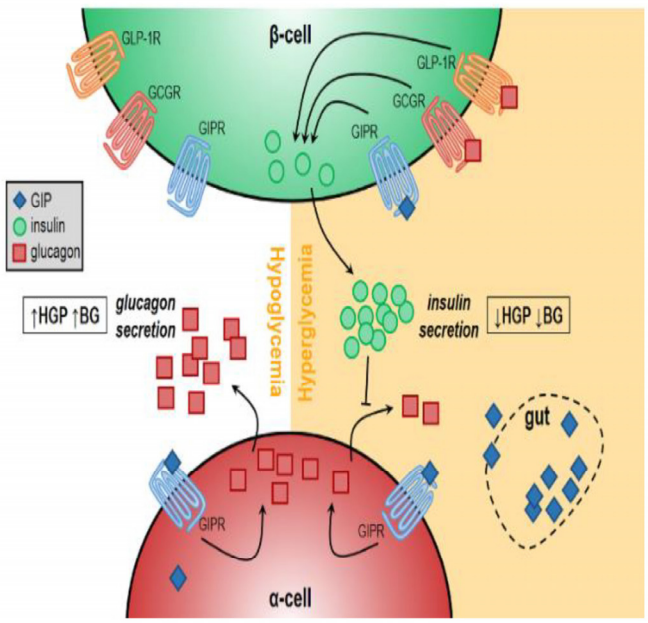
Cell Metab. 2013;17:819-37.

Contribution of GIP on insulin release



Diabetes 2019;68:897-900.

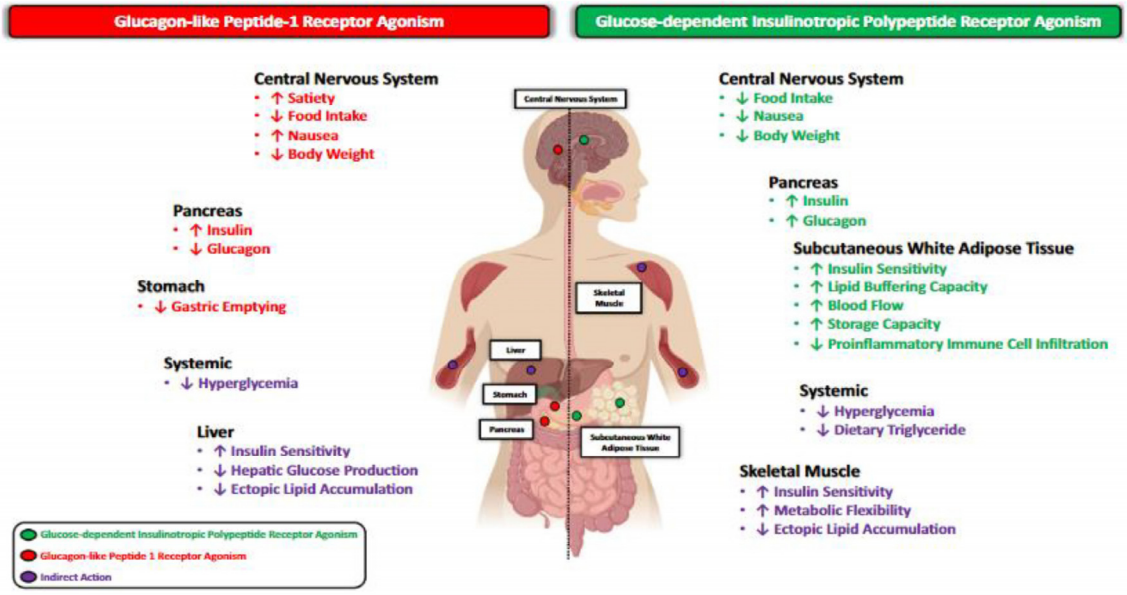
The role of GIP on glucagon secretion



GIP stimulates glucagon secretion in a glucose-dependent manner. Stimulation of glucagon secretion by GIP is more potent at lower glucose concentrations than at higher glucose concentrations. On the other hand, GIP-stimulated insulin section only occurs at high glucose concentrations. The suppressed ability for GIP to stimulate glucagon secretion at high glucose may be due to increased inhibitory tone from β-cells, which suppress α-cell activity and thereby limit GIP-stimulated glucose secretion.

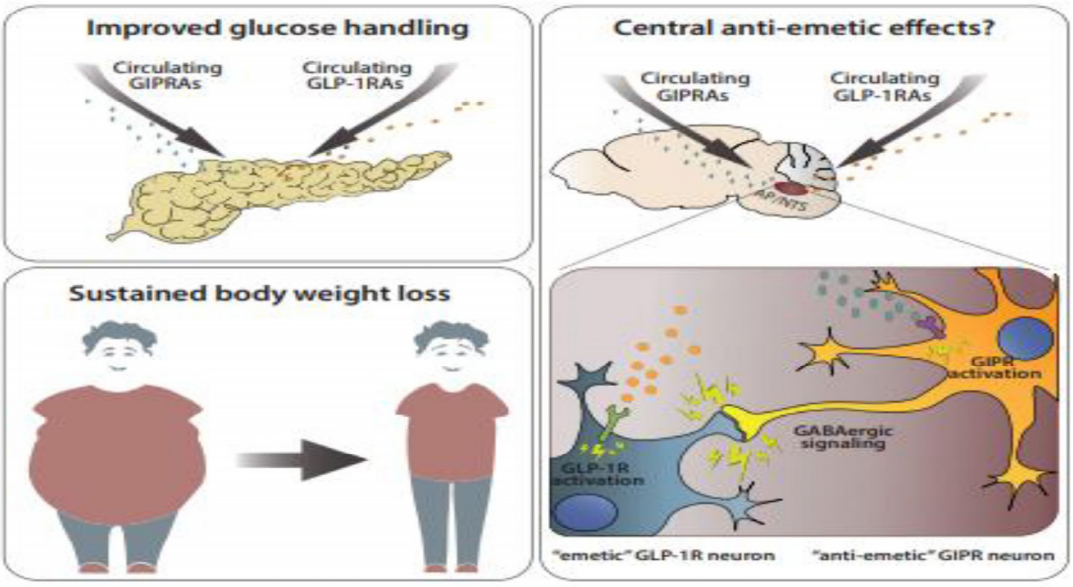
Peptides. 2020;125:170213.

Pleiotropic benefits of dual GIP and GLP-1 agonist inT2DM



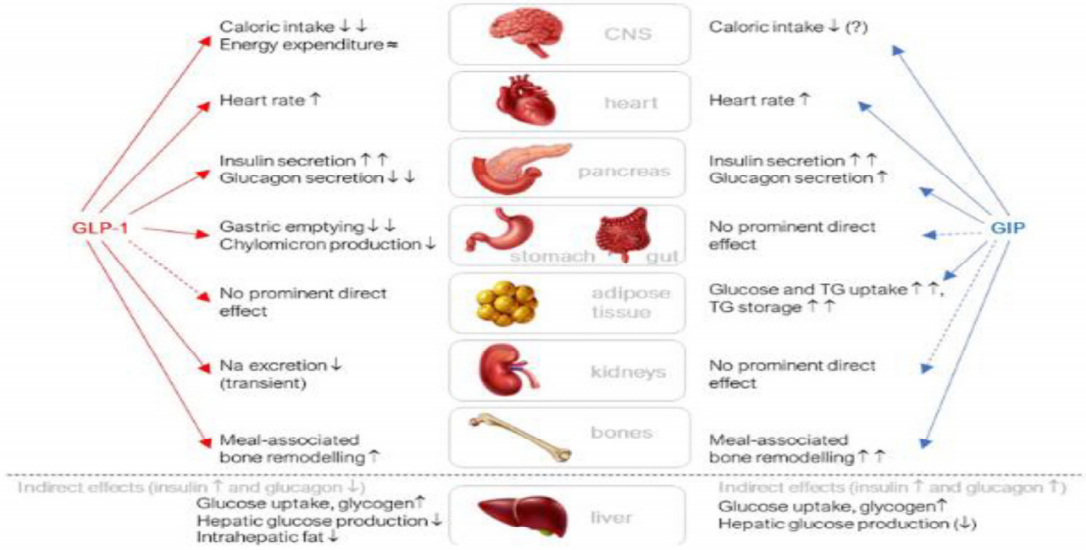
Trends Endocrinol Metab. 2020;31(6):410-421.

Role of GIP in the regulation of GLP-1 nausea



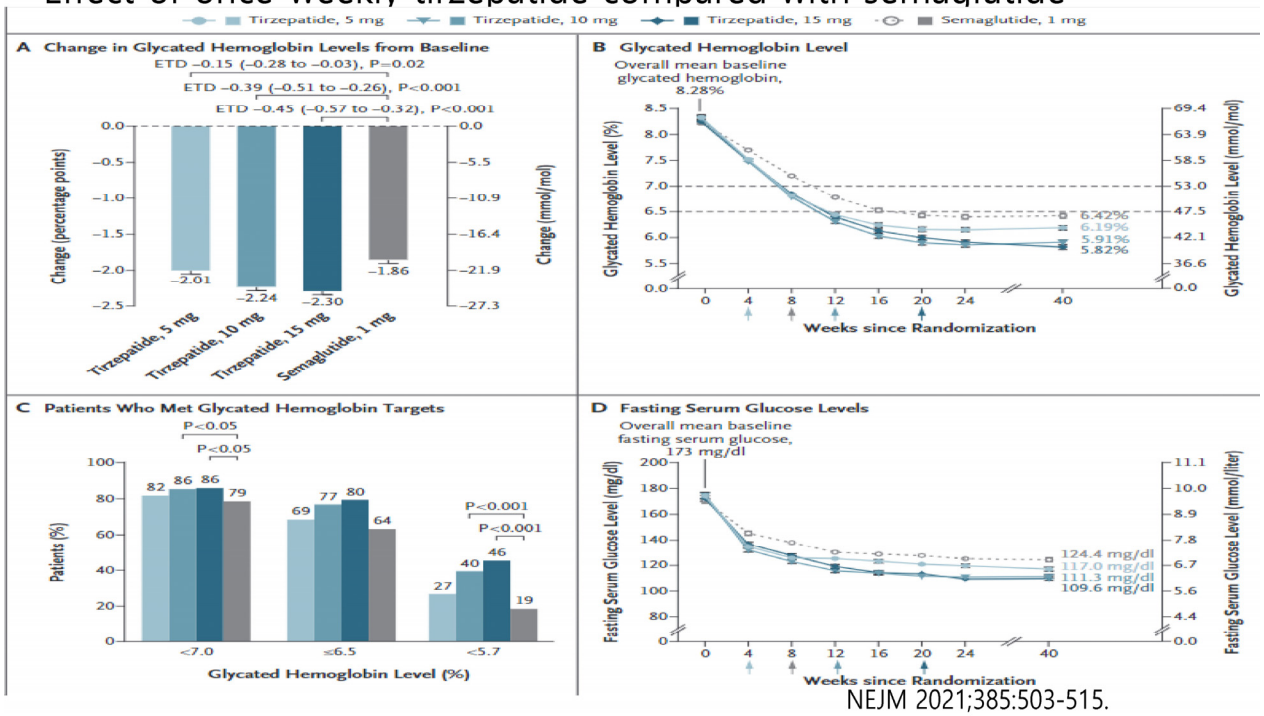
Diabetes.2021;70:1956-1961.

Overview of biological effects at the organ/tissue level



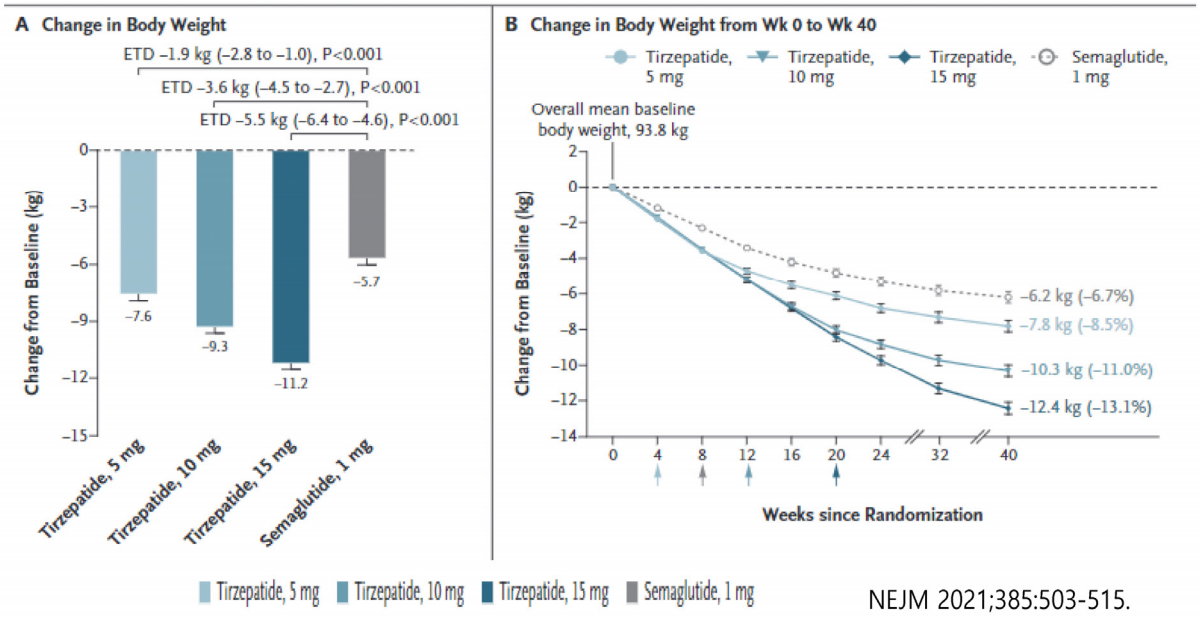
Diabetes Obes Metab.2021;23(S3):5-29

Effect of once-weekly tirzepatide compared with semaglutide



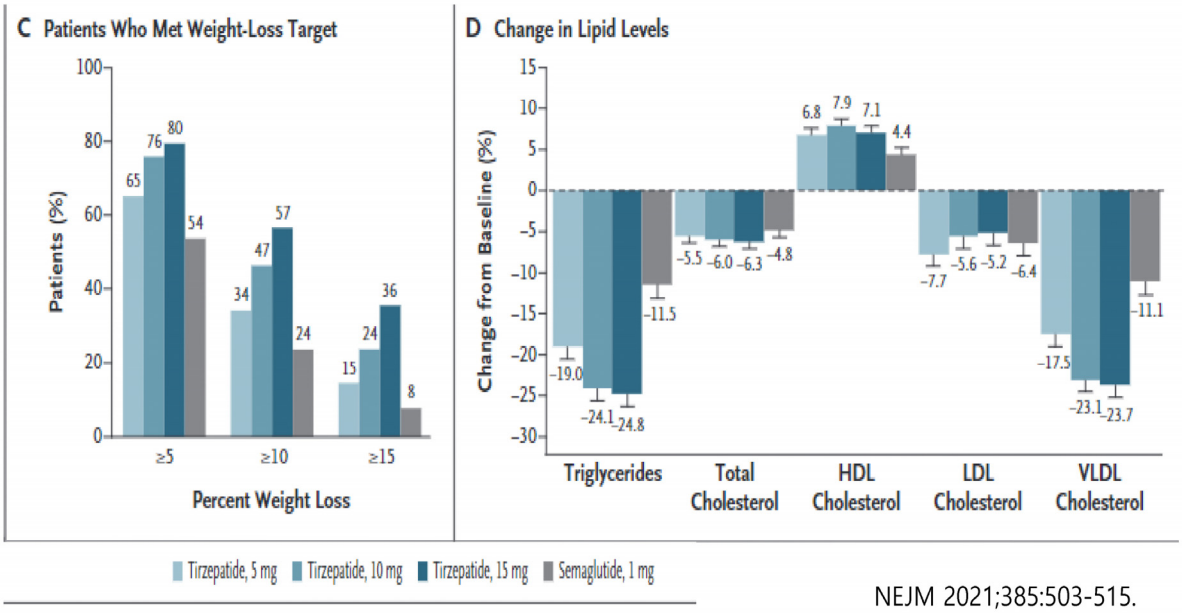
NEJM 2021;385:503-515.

Effect of once-weekly tirzepatide compared with semaglutide



NEJM 2021;385:503-515.

Effect of once-weekly tirzepatide compared with semaglutide



NEJM 2021;385:503-515.

Effect of once-weekly tirzepatide compared with semaglutide

Table 2. Adverse Events and Safety.[a]

Event	Tirzepatide						Semaglutide		Total (N=1878)	
	5 mg (N=470)		10 mg (N=469)		15 mg (N=470)		1 mg (N=469)			
	No. of patients (%)	*No. of events*	*No. of patients (%)*	*No. of events*	*No. of patients (%)*	*No. of events*	*No. of patients (%)*	*No. of events*	*No. of patients (%)*	*No. of events*
Patients with ≥1 adverse event	299 (63.6)	—	322 (68.7)	—	324 (68.9)	—	301 (64.2)	—	1246 (66.3)	—
Patients with ≥1 serious adverse event	33 (7.0)	—	25 (5.3)	—	27 (5.7)	—	13 (2.8)	—	98 (5.2)	—
Death[b]	4 (0.9)	—	4 (0.9)	—	4 (0.9)	—	1 (0.2)	—	13 (0.7)	—
Adverse events leading to discontinuation of tirzepatide or semaglutide	28 (6.0)	—	40 (8.5)	—	40 (8.5)	—	19 (4.1)	—	127 (6.8)	—
Adverse events occurring in ≥0.2% of the overall population (i.e., 3 patients) and leading to discontinuation of tirzepatide or semaglutide										
Nausea	6 (1.3)	—	7 (1.5)	—	4 (0.9)	—	4 (0.9)	—	21 (1.1)	—
Vomiting	1 (0.2)	—	4 (0.9)	—	4 (0.9)	—	3 (0.6)	—	12 (0.6)	—
Diarrhea	1 (0.2)	—	3 (0.6)	—	6 (1.3)	—	1 (0.2)	—	11 (0.6)	—
Abdominal pain	2 (0.4)	—	1 (0.2)	—	2 (0.4)	—	4 (0.9)	—	9 (0.5)	—
Dyspepsia	2 (0.4)	—	1 (0.2)	—	2 (0.4)	—	0	—	5 (0.3)	—
Decreased appetite	1 (0.2)	—	2 (0.4)	—	2 (0.4)	—	0	—	5 (0.3)	—
Fatigue	1 (0.2)	—	1 (0.2)	—	1 (0.2)	—	1 (0.2)	—	4 (0.2)	—
Elevated blood calcitonin level	1 (0.2)	—	1 (0.2)	—	1 (0.2)	—	0	—	3 (0.2)	—
Constipation	0	—	2 (0.4)	—	0	—	1 (0.2)	—	3 (0.2)	—
Covid-19–related pneumonia	1 (0.2)	—	1 (0.2)	—	0	—	1 (0.2)	—	3 (0.2)	—
Injection-site reaction	0	—	2 (0.4)	—	1 (0.2)	—	0	—	3 (0.2)	—

NEJM 2021;385:503-515.

Effect of once-weekly tirzepatide compared with semaglutide

Adverse events occurring in ≥5% of patients in any treatment group, according to preferred term										
Nausea	82 (17.4)	111	90 (19.2)	124	104 (22.1)	136	84 (17.9)	126	360 (19.2)	497
Diarrhea	62 (13.2)	120	77 (16.4)	99	65 (13.8)	102	54 (11.5)	68	258 (13.7)	389
Vomiting	27 (5.7)	35	40 (8.5)	56	46 (9.8)	61	39 (8.3)	53	152 (8.1)	205
Dyspepsia	34 (7.2)	—	29 (6.2)	—	43 (9.1)	—	31 (6.6)	—	137 (7.3)	—
Decreased appetite	35 (7.4)	—	34 (7.2)	—	42 (8.9)	—	25 (5.3)	—	136 (7.2)	—
Constipation	32 (6.8)	—	21 (4.5)	—	21 (4.5)	—	27 (5.8)	—	101 (5.4)	—
Abdominal pain	14 (3.0)	—	21 (4.5)	—	24 (5.1)	—	24 (5.1)	—	83 (4.4)	—
All gastrointestinal adverse events	188 (40.0)	—	216 (46.1)	—	211 (44.9)	—	193 (41.2)	—	808 (43.0)	—
Other adverse events										
Hypoglycemia, blood glucose level <54 mg/dl	3 (0.6)	3	1 (0.2)	2	8 (1.7)	10	2 (0.4)	2	14 (0.7)	17
Severe hypoglycemia	1 (0.2)	1	0	0	1 (0.2)‡	1‡	0	0	2 (0.1)	2
Injection-site reaction	9 (1.9)	—	13 (2.8)	—	21 (4.5)	—	1 (0.2)	—	44 (2.3)	—
Adjudicated pancreatitis	0	—	2 (0.4)	—	2 (0.4)	—	3 (0.6)	—	7 (0.4)	—
Cholelithiasis	4 (0.9)	—	4 (0.9)	—	4 (0.9)	—	2 (0.4)	—	14 (0.7)	—
Hypersensitivity§	9 (1.9)	—	13 (2.8)	—	8 (1.7)	—	11 (2.3)	—	41 (2.2)	—
Diabetic retinopathy¶	0	—	2 (0.4)	—	0	—	0	—	2 (0.1)	—

NEJM 2021;385:503-515.

Once weekly SC dose

- Tirzepatide comes in in six different strengths, each as an individual single-dose pen
- It's recommended to start with the lowest strength (2.5 mg per week).
- After 4 weeks, your dose will likely be raised to 5 mg once a week. After that, your dose can be raised by an additional 2.5 mg every 4 weeks until your blood sugar is well-controlled.
- The maximum dose you should use is 15 mg once a week.

Goal of Obesity management

- 치료 전 체중의 5-10%를 6개월 내에 감량하는 것을 체중감량의 일차 목표로 할 것을 권고한다.
- 비만의 기본적인 치료 방법은, 식사 치료, 운동치료 및 행동치료이며, 약물치료는 이들과 함께 시행하는 부가적인 치료방법으로 사용할 것을 권고한다.
- 약물치료 시작 후 3개월 내에 5% 이상 체중감량이 없다면 약제를 변경하거나 중단할 것을 권고한다.

비만 진료지침 2020.

New Drug for weight management

Goal of Obesity management

- 고도비만 환자에서 체중감량 및 감량된 체중을 유지하고 제2형 당뇨병을 포함한 비만 관련 동반질환의 개선을 위해서 수술치료를 고려한다.
- BMI 35 kg/m^2 이상이거나 BMI 30 kg/m^2 이상이면서 비만 관련 동반질환을 가지고 있는 환자에서 비수술적 치료로 체중 감량에 실패한 경우 비만대사수술을 고려한다.
- BMI 27.5 kg/m^2 이상이면서 비수술적 치료로 혈당이 적절히 조절되지 않는 제2형 당뇨병의 경우 비만대사수술을 시행을 고려한다.

비만 진료지침 2020.