

340 mm

170 mm

170 mm

55 mm

Semaglutide Injection 2mg/3mL (0.68mg/mL), 4mg/3mL (1.34mg/mL) & 8mg/3mL (2.68mg/mL) Prefilled Pen

Semaglutide Injection 2mg/3mL (0.68mg/mL), 4mg/3mL (1.34mg/mL) & 8mg/3mL (2.68mg/mL) Prefilled Pen

For Use in India

WARNING: RISK OF THYROID-C-CELL TUMORS

In rodents, semaglutide causes dose-dependent and treatment-duration-dependent thyroid C-cell tumors at clinically relevant exposures. It is unknown whether semaglutide causes thyroid C-cell tumors, including medullary thyroid carcinoma (MTC), in humans as human response to semaglutide is not known. The incidence of thyroid C-cell tumors has not been determined.

Semaglutide is contraindicated in patients with a personal or family history of MTC or in patients with Multiple Endocrine Neoplasia syndrome type 2 (MEN 2). Counsel patients regarding the potential risk for MTC with the use of semaglutide and inform them of symptoms of thyroid tumors (e.g. a mass in the neck, dysphagia, dyspnea, persistent hoarseness). Routine monitoring of serum calcitonin or using thyroid ultrasound is of uncertain value for early detection of MTC in patients treated with Semaglutide.

1. GENERIC NAME
Semaglutide Injection 2mg/3mL (0.68mg/mL) Prefilled Pen
Semaglutide Injection 4mg/3mL (1.34mg/mL) Prefilled Pen
Semaglutide Injection 8mg/3mL (2.68mg/mL) Prefilled Pen

2. QUALITATIVE AND QUANTITATIVE COMPOSITION
Semaglutide Injection 2mg/3mL (0.68mg/mL)
Each 1 mL of Semaglutide injection contains 0.68mg of Semaglutide.
Semaglutide Injection 4mg/3mL (1.34mg/mL)
Each 1 mL of Semaglutide injection contains 1.34mg of Semaglutide.
Semaglutide Injection 8mg/3mL (2.68mg/mL)
Each 1 mL of Semaglutide injection contains 2.68mg of Semaglutide.

3. DOSAGE FORM AND STRENGTH
Injection (Prefilled Pen), 2mg/3mL (0.68mg/mL), 4mg/3mL (1.34mg/mL) and 8mg/3mL (2.68mg/mL)

4. CLINICAL PARTICULARS

4.1. Indication
Semaglutide is indicated for the treatment of adults with insufficiently controlled type 2 diabetes as an adjunct to diet and exercise, as monotherapy, when metformin-based therapy is considered inappropriate due to intolerance or contraindications, or in addition to the other medicinal products for the treatment of diabetes.

4.2. Posology and Method of Administration

Posology
The starting dose is 0.25 mg semaglutide once weekly. After 4 weeks the dose should be increased to 0.5 mg once weekly. After at least 4 weeks with a dose of 0.5 mg once weekly, the dose can be increased to 1 mg once weekly to further improve glycaemic control. After at least 4 weeks with a dose of 1 mg once weekly, the dose can be increased to 2 mg once weekly to further improve glycaemic control. Semaglutide 0.25 mg is not a maintenance dose. Weekly doses higher than 2 mg are not recommended.

When Semaglutide is added to existing metformin can be continued unchanged.

Missed dose
If a dose is missed, it should be administered as soon as possible and within 5 days after the missed dose. If more than 5 days have passed, the missed dose should be skipped, and the next dose should be administered on the regularly scheduled day. In each case, patients can then resume their regular once weekly dosing schedule.

Changing the dosing day
The day of weekly administration can be changed if necessary, as long as the time between two doses is at least 5 days (>72 hours). After selecting a new dosing day, once-weekly dosing should be continued.

Special populations

Elderly
No dose adjustment is required based on age.

Renal impairment
No dose adjustment is required for patients with mild, moderate or severe renal impairment. Experience with the use of Semaglutide in patients with severe renal impairment is limited. Caution should be exercised when treating these patients with Semaglutide.

Hepatic impairment
No dose adjustment is required for patients with hepatic impairment. Experience with the use of Semaglutide in patients with severe hepatic impairment is limited. Caution should be exercised when treating these patients with Semaglutide.

Pediatric population
The safety and efficacy of Semaglutide in children and adolescents below 18 years have not yet been established. No data are available.

Method of administration
Subcutaneous use.
Semaglutide is to be injected subcutaneously in the abdomen, in the thigh or in the upper arm. The injection site can be changed without dose adjustment. Semaglutide should be administered subcutaneously or intramuscularly.

4.3. Contraindications
Semaglutide is contraindicated in patients with:
• A personal or family history of MTC or in patients with MEN 2.
• A serious hypersensitivity reaction to semaglutide or to any of the excipients in Semaglutide.

4.4. Special Warnings and Precautions for Use

Traceability
In order to improve the traceability of biological medicinal products, the name and the batch number of the administered product should be clearly recorded.

General
Semaglutide should not be used in patients with type 1 diabetes mellitus or for the treatment of diabetic ketoacidosis. Semaglutide is not a substitute for insulin. Diabetic ketoacidosis has been reported in insulin-dependent diabetes patients who had rapid discontinuation or dose reduction of insulin when treated with a GLP-1 receptor agonist as stated in NADA011. Patients should be monitored closely for signs and symptoms of diabetic ketoacidosis. If symptoms are present, patients should be advised to seek immediate medical attention if they occur.

If pancreatitis is suspected, Semaglutide should be discontinued. If the diagnosis of pancreatitis is confirmed, Semaglutide should not be restarted.

In the absence of other signs and symptoms of acute pancreatitis, elevations in pancreatic enzymes alone are not predictive of acute pancreatitis.

Hypoglycaemia
Patients treated with Semaglutide in combination with a sulfonylurea or insulin may have an increased risk of hypoglycaemia. The risk of hypoglycaemia can be lowered by reducing the dose of sulfonylurea or insulin when initiating treatment with Semaglutide.

Nonarteric, arteriole, ischaemic optic neuropathy (NAION)
Data from epidemiological studies may indicate an increased risk of non-arteritic anterior ischaemic optic neuropathy (NAION) during treatment with Semaglutide. There is no identified time interval for when NAION may develop following treatment. Patients reporting a sudden loss of vision (including partial loss) should be urgently referred for ophthalmological examination and treatment with Semaglutide should be discontinued if NAION is confirmed.

Diabetic retinopathy
In patients with diabetic retinopathy treated with insulin and Semaglutide, an increased risk of developing diabetic retinopathy complications has been observed (see section 4.8). Caution should be exercised when using Semaglutide in patients with diabetic retinopathy treated with insulin. These patients should be monitored closely and treated according to clinical guidelines.

Rapid improvement in glucose control has been associated with a temporary worsening of diabetic retinopathy, but other mechanisms cannot be excluded.

There is no experience with Semaglutide 2 mg in patients with type 2 diabetes with uncontrolled or potentially unstable diabetic retinopathy and Semaglutide 2 mg is therefore not recommended in these patients.

Sodium content
This medicinal product contains less than 1 mmol sodium (23 mg) per dose, that is to say essentially 'sodium-free'.

4.5. Drug Interactions
Semaglutide delays gastric emptying and has the potential to impact the rate of absorption of concomitantly administered oral medicinal products. Semaglutide should be used with caution in patients receiving oral medicinal products that require rapid gastrointestinal absorption.

Paracetamol
Semaglutide delays the rate of gastric emptying as assessed by paracetamol pharmacokinetics during a standardized meal test. Paracetamol AUC(0-6h) and Cmax were decreased by 27% and 20%, respectively, following concurrent use of Semaglutide 1 mg. The total paracetamol exposure (AUC(0-∞)) was not affected. No clinically relevant effect on the rate of gastric emptying was observed with Semaglutide 2.4 mg, following 20 weeks of administration of Semaglutide, probably due to a tolerance effect. No dose adjustment or premedication is necessary when administered with Semaglutide.

Oral contraceptives
Semaglutide is not anticipated to decrease the effect of oral contraceptives as Semaglutide did not change the overall exposure of ethinylestradiol and levonorgestrel to a clinically relevant extent. The effect of oral contraceptive (0.02 mg ethinylestradiol/0.15 mg levonorgestrel) was co-administered with Semaglutide. Exposure of ethinylestradiol was not affected, an increase of 20% was observed for levonorgestrel exposure at steady state. Cmax was not affected for any of the compounds.

Atorvastatin
Semaglutide did not change the overall exposure of atorvastatin following a single dose administration of atorvastatin (40 mg). Atorvastatin Cmax was decreased by 38%. This was assessed not to be a clinically relevant effect.

Digoxin
Semaglutide did not change the overall exposure or Cmax of digoxin following a single dose of digoxin (0.5 mg).

Metformin
Semaglutide did not change the overall exposure or Cmax of metformin following dosing of 500 mg twice daily over 3.5 days.

Warfarin and other coumarin derivatives
Semaglutide did not change the overall exposure or Cmax of R- and S-warfarin following a single dose of warfarin (25 mg), and the pharmacodynamic effects of warfarin as measured by the international normalized ratio (INR) were not affected in a clinically relevant manner. However, cases of decreased INR have been reported during concurrent use of semaglutide and warfarin. Upon initiation of semaglutide treatment in patients on warfarin or other coumarin derivatives, frequent monitoring of INR is recommended.

4.6. Use in Special Populations (such as pregnant women, lactating women, paediatric patients etc.)

Women of childbearing potential
Women of childbearing potential are recommended to use contraception when treated with semaglutide.

Pregnancy
Studies in animals have shown reproductive toxicity. There are limited data from the use of semaglutide in pregnant women. Therefore, semaglutide should not be used during pregnancy. If a patient wishes to become pregnant, or pregnancy occurs, semaglutide should be discontinued. Semaglutide should be discontinued at least 2 months before a planned pregnancy due to the long half-life.

Breast-feeding
In lactating rats, semaglutide was excreted in milk. As a result, a breast-fed child cannot be excluded, semaglutide should not be used during breast-feeding.

Fertility
The effect of semaglutide on fertility in humans is unknown. Semaglutide did not affect male fertility in rats. In female rats, an increase in oestrous length and a small reduction in number of ova/ovules were observed at doses associated with maternal body weight loss.

Pediatric Use
Safety and efficacy of semaglutide have not been established in pediatric patients (younger than 18 years).

Geriatric Use
No overall differences in safety or efficacy were detected between these patients and younger patients, but greater sensitivity of some older individuals cannot be ruled out.

Hepatic Impairment
No dose adjustment of semaglutide is recommended for patients with hepatic impairment. In a study in subjects with different degrees of hepatic impairment, no clinically relevant changes in semaglutide pharmacokinetics (PK) was observed.

4.7. Effects on Ability to Drive and Use Machines
Semaglutide has no or negligible influence on the ability to drive or use machines. When it is used in combination with a sulfonylurea or insulin, patients should be advised to take precautions to avoid hypoglycaemia while driving and using machines.

4.8. Undesirable Effects

Clinical Safety Summary
(M) Multicentre, Randomized, Comparative, Active-Controlled, Open-Label, Phase 3 Study to Evaluate the Efficacy and Safety of Semaglutide Injection of MSD Laboratories Private Limited in Comparison with Orlistat (Semaglutide) Injection of Novo Nordisk in patients with Type 2 Diabetes Mellitus (NCT02582027) (Direct link: <http://www.clinicaltrials.gov/ct2/show/study/NCT02582027>)

The safety evaluation of Semaglutide Injection (Semi) in this randomized, comparative clinical study demonstrates that the investigational product is safe and well tolerated, with a safety profile that is comparable to the reference product Orlistat and consistent with the established pharmacological class of GLP-1 receptor agonists.

Among the safety population, the overall incidence, nature, and severity of adverse events were similar between the Test and Reference treatment arms. The majority of reported adverse events were mild to moderate in intensity, transient, and resolved either spontaneously or with standard of care management. No clinically meaningful imbalances in treatment-emergent adverse events were observed between groups, indicating comparable tolerability.

Gastrointestinal adverse events constituted the most frequently reported events in both treatment arms, including nausea, vomiting, gastric, diarrhoea, constipation, and abdominal discomfort. These events occurred at comparable frequencies between the Test and Reference groups and were consistent with the known and expected safety profile of semaglutide. Importantly, no severe (Grade 3-5) gastrointestinal events were reported, and none related to treatment discontinuation.

The incidence of hypoglycaemia was low in both treatment arms, with all reported events being mild in severity. No serious or clinically significant hypoglycaemic episodes occurred, and no participant discontinued treatment due to hypoglycaemia, confirming that effective glycaemic control was achieved without an increased risk of hypoglycaemic events.

Serious adverse events were rare, with no deaths reported during the study. There were no clinically relevant differences between treatment arms with respect to serious adverse events, and none were considered related to the investigational product. Furthermore, no participant discontinued the study due to an adverse event, underscoring the overall good tolerability of Semaglutide injection.

Adverse events that were more frequent in the Semaglutide treatment arm compared to the Orlistat treatment arm were predominantly assessed as unrelated to study treatment. No new or unexpected adverse drug reactions were identified.

Clinical laboratory parameters, vital signs, physical examination findings, and injection site assessments did not reveal any clinically meaningful abnormalities or concerning trends attributable to Semaglutide Injection. No safety concerns related to immunogenicity or diabetic retinopathy progression were identified during the study period.

Overall, the comprehensive safety data demonstrate that Semaglutide Injection has a favourable and well-characterized safety profile, comparable to that of the reference product Orlistat. The absence of new safety signals, low incidence of serious and severe adverse events, and high treatment tolerability support the conclusion that Semaglutide Injection is safe for clinical use in patients with type 2 diabetes mellitus and has a positive benefit-risk balance.

Descriptive statistics of Adverse Event

Adverse Events	Semaglutide Injection (N=148)	Orlistat® (N=148)	Total (n=296)
Number of Subjects	68 (45.95%)	74 (50.00%)	138 (47.97%)
Number of Events	149	152	301

Summary statistics of AEs/SAEs according to preferred terms and system organ class within each arm.

System Organ Class	Preferred Term	Semaglutide Injection (N=148) [n]	Orlistat® (N=148) [n]	Total (n=296) [n]
Gastrointestinal disorders	Abdominal distension	9 (6.1%) [6]	4 (2.7%) [3]	13 (4.4%) [24]
	Abdominal pain upper	1 (0.7%) [1]	0 (0.0%) [0]	1 (0.3%) [1]
	Constipation	5 (3.4%) [5]	7 (4.7%) [9]	12 (4.1%) [14]
	Dyspepsia	7 (4.7%) [9]	11 (7.4%) [13]	18 (6.1%) [21]
Gastrointestinal disorders	Dyspepsia	6 (4.1%) [9]	3 (2.0%) [3]	9 (3.1%) [14]
	Eructation	3 (2.0%) [3]	0 (0.0%) [0]	3 (1.0%) [3]
	Gastritis	16 (10.8%) [22]	15 (10.1%) [18]	31 (10.5%) [40]
	Hypercholesterolaemia	2 (1.4%) [2]	3 (2.0%) [4]	5 (1.7%) [6]
General disorders and administration site conditions	Nausea	31 (20.9%) [43]	28 (18.9%) [39]	59 (19.9%) [82]
	Vomiting	17 (11.5%) [22]	23 (15.5%) [34]	40 (13.5%) [56]
	Asymptomatic	1 (0.7%) [1]	0 (0.0%) [0]	1 (0.3%) [1]
	Decreased appetite	1 (0.7%) [1]	3 (2.0%) [3]	4 (1.4%) [4]
Infections and infestations	Fatigue	0 (0.0%) [0]	2 (1.4%) [2]	2 (0.7%) [2]
	Injection site swelling	0 (0.0%) [0]	1 (0.7%) [1]	1 (0.3%) [1]
	Pain	2 (1.4%) [2]	0 (0.0%) [0]	2 (0.7%) [2]
	Pyrexia	5 (3.4%) [5]	4 (2.7%) [4]	9 (3.0%) [9]
Metabolism and nutrition disorders	Nasopharyngitis	1 (0.7%) [1]	1 (0.7%) [1]	2 (0.7%) [2]
	Rhinitis	0 (0.0%) [0]	1 (0.7%) [1]	1 (0.3%) [1]
	Hypoglycaemia	1 (0.7%) [1]	2 (1.4%) [2]	3 (1.0%) [3]
	Dizziness	2 (1.4%) [2]	1 (0.7%) [1]	3 (1.0%) [3]
Nervous system disorders	Headache	2 (1.4%) [3]	4 (2.7%) [4]	6 (2.0%) [7]
	Cough	1 (0.7%) [1]	1 (0.7%) [1]	2 (0.7%) [2]
	Rhinorrhoea	1 (0.7%) [1]	0 (0.0%) [0]	1 (0.3%) [1]
	Dizziness	1 (0.7%) [1]	1 (0.7%) [1]	2 (0.7%) [2]

BE Study Safety conclusion:
As per BE study (NCT02582027), an open-label, balanced, randomized, two-treatment, single period, single dose, parallel, bioequivalency study of Semaglutide Injection 2 mg/3 mL (0.68 mg/mL) of MSD Laboratories Private Limited, India, compared with Orlistat (Semaglutide) Injection 2 mg/3 mL (0.68 mg/mL) of Novo Nordisk, Canada in healthy adult human subjects under fasting conditions. The following ADRs have been identified:
All the subjects were assessed for safety being throughout the conduct of the study. A total of 38 non-serious adverse events (Upper Respiratory Tract Infection (URI), Vomiting, Headache, Gastritis, Diarrhea and Hypoglycemia) were reported by 26 subjects, of which 13 adverse events were reported following administration of the test product, and 25 adverse events were reported with reference standard product.

Table 1: List of Adverse event(s) Drug product - Test Product (T)

Subject	Preferred Terminology (PT)	Severity	Relationship to the drug product
S09	Headache	Moderate	Unlikely
S36	Diarrhoea	Moderate	Possible
S44	Vomiting	Moderate	Possible
S49	Hypoglycaemia	Mild	Probable
S59	Diarrhoea	Moderate	Possible
S62	Vomiting	Moderate	Possible
S63	Vomiting	Moderate	Possible
S74	Vomiting	Moderate	Possible
S75	Vomiting	Moderate	Possible
S76	Upper Respiratory tract infection	Mild	Probable
S78	Hypoglycaemia	Mild	Probable
S80	Hypoglycaemia	Moderate	Probable

Adverse events reported in the study were assessed to be either mild or moderate in severity and were evaluated to be probable, possible or unlikely in relation to the study drug administered. Subjects were followed up by the Investigator/Physician(s), and all the adverse events reported in the study resolved without any sequelae.

Table 2: Subject - Preferred Terminology (PT) - Severity - Relationship to the drug product

Subject	Preferred Terminology (PT)	Severity	Relationship to the drug product
S08	Vomiting	Moderate	Possible
S11	Upper Respiratory tract infection	Moderate	Probable
S16	Headache	Moderate	Unlikely
S18	Gastritis	Moderate	Possible
S21	Diarrhoea	Moderate	Possible
S21	Vomiting	Moderate	Probable
S21	Gastritis	Moderate	Probable
S38	Vomiting	Moderate	Possible
S45	Gastritis	Moderate	Possible
S45	Nausea	Moderate	Possible
S52	Vomiting	Moderate	Probable
S58	Hypoglycaemia	Mild	Probable
S58	Headache	Moderate	Unlikely
S60	Vomiting	Moderate	Probable
S64	Vomiting	Moderate	Probable
S66	Diarrhoea	Moderate	Probable
S66	Vomiting	Moderate	Probable
S68	Hypoglycaemia	Mild	Probable
S68	Diarrhoea	Moderate	Probable
S69	Hypoglycaemia	Mild	Probable
S76	Hypoglycaemia	Mild	Probable
S78	Hypoglycaemia	Mild	Probable
S79	Hypoglycaemia	Mild	Probable
S79	Hypoglycaemia	Moderate	Probable

The percentage incidence of adverse events with test product is 32.50%, and with reference standard product is 62.50%. There were no serious adverse events either observed or reported during the conduct of the study. This can be concluded that both the test and reference standard products were relatively well tolerated in the selected study population at the administered dose levels.

Reporting of suspected adverse reactions
Reporting suspected adverse reactions after authorization of the medicinal product is important. It allows continued monitoring of the benefit/risk balance of the medicinal product. To report Suspected Adverse Reactions, contact MSD Laboratories Private Limited at pharmacovigilance@msd.com or through company website www.msdlabs.com - Contact us - Medical Enquiry to report a side effect. You can also report side effects directly via the National Pharmacovigilance Programme of India by calling on 1800 180 3024 or you can report to MSN Labs, Plot No. 35, Sector 27, Direct Link, -41 133134745 (WhatsApp). By reporting side effects, you can help provide more information on the safety of this product.

4.9. Overdose
Overdose of up to 4 mg in a single dose, and up to 4 mg in a week have been reported in clinical trials. The most commonly reported adverse reaction was nausea. All patients recovered without complications. There is no specific antidote for overdose with semaglutide. In the event of overdose, appropriate supportive treatment should be initiated according to the patient's clinical signs and symptoms. A prolonged period of observation and treatment for these symptoms may be necessary, taking into account the long half-life of semaglutide of approximately 1 week.

5. PHARMACOLOGICAL PROPERTIES

5.1 Pharmacodynamic Properties

Efficacy Analysis:
Changes in HbA1c from baseline to 24 weeks (visit 2) of treatment (PP Set)

Visit	Semaglutide Injection (T) (N=148)	Orlistat® (R) (N=148)	Estimated Treatment Difference vs Orlistat® (95%CI)
Baseline (%)	8.93 ± 0.75 (146)	9.05 ± 0.80 (145)	-
Week 24 (%)	6.43 ± 0.82 (146)	6.63 ± 0.93 (145)	0.17 (0.03, 0.30)
Change from Baseline (%)	-2.54 (0.07) (146)	-2.40 (0.07) (145)	-

Change in HbA1c from baseline to 12 weeks (visit 3) of treatment (PP Set)

Visit	Semaglutide Injection (T) (N=148)	Orlistat® (R) (N=148)	Estimated Treatment Difference vs Orlistat® (95%CI)	p-value
Baseline (%)	8.93 ± 0.75 (146)	9.05 ± 0.80 (145)	-	-
Week 12 (%)	7.24 ± 0.84 (146)	7.24 ± 0.93 (145)	0.11 (-0.07, 0.29)	0.217
Change from Baseline (%)	-1.71 (0.06) (146)	-1.80 (0.06) (145)	-	-

Change in HbA1c from baseline to 24 weeks (visit 2) of treatment (PP Set)

Visit	Semaglutide Injection (T) (N=148)	Orlistat® (R) (N=148)	Estimated Treatment Difference vs Orlistat® (95%CI)	p-value
Baseline (%)	8.93 ± 0.75 (146)	9.05 ± 0.80 (145)	-	-
Week 12 (%)	7.24 ± 0.84 (146)	7.24 ± 0.93 (145)	0.11 (-0.07, 0.29)	0.217
Change from Baseline (%)	-1.71 (0.06) (146)	-1.80 (0.06) (145)	-	-

Estimated Treatment Difference 95%CI were reported using Linear Model (ANCOVA).

Secondary Endpoints: Changes in body weight and BMI compared from baseline to 12 weeks, 24 weeks of treatment (PP Set (R=29))

Visit	Level	Semaglutide Injection (T) (N=148)	Orlistat® (R) (N=148)	Estimated Treatment Difference vs Orlistat® (95%CI)	p-value	
Body Weight	VISIT 2 / Baseline	Mean ± SD	71.6 ± 12.6 (146)	73.1 ± 14.2 (145)	NA	NA
	Change from Baseline	Mean ± SD	-6.9 ± 12.4 (146)	-6.1 ± 13.5 (145)	0.24 (-0.80, 0.41)	0.333
	Change from Baseline	Mean ± SD	-3.75 (2.06) (146)	-4.00 (2.06) (145)	0.25 (0.18, 0.33)	0.010
	Change from Baseline	Mean ± SD	64.9 ± 12.2 (146)	66.6 ± 13.2 (145)	-0.29 (-0.65, 0.317)	0.268
	Change from Baseline	Mean ± SD	-6.72 (3.06) (146)	-6.57 (3.01) (145)	0.17 (0.18, 0.16)	0.999
BMI	VISIT 2 / Baseline	Mean ± SD	28.0 ± 4.5 (146)	28.6 ± 5.3 (145)	NA	NA
	Change from Baseline	Mean ± SD	-2.8 ± 4.2 (146)	-2.7 ± 5.0 (145)	-0.07 (-0.32, 0.562)	0.181
	Change from Baseline	Mean ± SD	-1.49 (0.53) (146)	-1.60 (0.53) (145)	0.11 (0.08, 0.13)	0.001
	Change from Baseline	Mean ± SD	25.4 ± 4.2 (146)	25.9 ± 4.8 (145)	-0.11 (-0.35, 0.381)	0.133
	Change from Baseline	Mean ± SD	-2.62 (1.47) (146)	-2.37 (1.60) (145)	0.25 (0.18, 0.33)	0.001

Mechanism of action
Semaglutide is a GLP-1 analogue with 94% sequence homology to human GLP-1. Semaglutide acts as a GLP-1 receptor agonist that selectively binds to and activates the GLP-1 receptor, the target for native GLP-1. GLP-1 is a physiological hormone that has multiple actions on glucose, mediated by the GLP-1 receptors. The principal mechanism of proinsulin secretion in the long half-life of semaglutide is a saturable binding, which results in decreased insulin clearance and protection from metabolic degradation. Furthermore, semaglutide is stabilized against degradation by the DPP-4 enzyme. Semaglutide reduces blood glucose through a mechanism where it stimulates insulin secretion and lowers glucagon secretion, both in a glucose-dependent manner. Thus, when blood glucose is high, insulin secretion is stimulated, and glucagon secretion is inhibited. The mechanism of blood glucose lowering also involves a minor delay in gastric emptying in the early postprandial phase.

5.2 Pharmacokinetic Properties

ADME
Absorption/bioavailability of semaglutide is 89%. Maximum concentration of semaglutide is reached to 1 to 3 days post dose. Similar exposure is achieved with subcutaneous administration of semaglutide in the abdomen, thigh, or upper arm. In patients with type 2 diabetes, semaglutide exposure increases in a dose-proportional manner for once-weekly doses of 0.1, 0.25, 0.5, 1, 2, and 4 mg. Steady-state exposure is achieved following 4-5 weeks of once-weekly administration. In patients with type 2 diabetes, the mean population-PK estimated steady-state concentrations following once-weekly subcutaneous administration of 0.5 mg and 1 mg semaglutide were approximately 65.0 ng/mL and 133.0 ng/mL, respectively, in the total comprising semaglutide 1 mg and 2 mg, the mean steady state concentrations were 111.1 ng/mL and 222.1 ng/mL, respectively.

Distribution
The mean apparent volume of distribution of semaglutide following subcutaneous administration in patients with type 2 diabetes is approximately 12.5L. Semaglutide is extensively bound to plasma albumin (>99%).

Elimination
The apparent clearance of semaglutide in patients with type 2 diabetes is approximately 0.05 L/h. With an elimination half-life of approximately 1 week, semaglutide will be present in the circulation for about 6 weeks after the last dose.

The primary route of elimination for semaglutide is metabolism following proteolytic cleavage of the peptide backbone and sequential beta-oxidation of the fatty acid sidechain.

Excretion
The urinary excretion routes of semaglutide-related material via the urine and faeces. Approximately 3% of the dose is excreted in the urine as intact semaglutide.

Specific Populations
Patients with Renal impairment
Renal impairment does not have any impact on the exposure of semaglutide. The pharmacokinetics of semaglutide were evaluated in patients with different degrees of hepatic impairment (mild, moderate, severe) compared with subjects with normal hepatic function in a study with a single-dose of 0.5 mg semaglutide. Semaglutide was not mutagenic or clastogenic in a standard battery of genotoxicity tests (bacterial mutagenicity assays, human lymphocytes chromosome aberration, rat bone marrow micronucleus).

In a combined fertility and embryo-tailor development study in rats, subcutaneous doses of 0.01, 0.03 and 0.09 mg/kg (0.06, 0.2, and 0.6 fold the MRPD) were administered to male and female rats. Males were dosed for 4 weeks prior to mating, and females were dosed for 2 weeks prior to mating and throughout organogenesis until gestation Day 17. No effects were observed on male fertility. In males, a statistically significant increase in the number of sperm was observed at all dose levels, together with a small reduction in numbers of corpora lutea and 0.03 mg/kg/day. These effects were likely an adaptive response secondary to the pharmacological effect of semaglutide on food consumption and body weight.

7.2 Pharmacological Particulars

7.1 Contraindications
None.

7.2 Precautions for use
None.

7.3 Shelf life
None.

7.4 Storage and Handling Instructions
Long-term Storage (Unopened Pen)
• Store in a refrigerator between 2°C to 8°C. Do not freeze.
• Do not store in the freezer or directly adjacent to the refrigerator cooling element.
• Do not freeze; do not use the product if it has been frozen.
• After first use, the pen can be stored for 56 days at a temperature of 15°C to 30°C or in a refrigerator at 2°C to 8°C. Do not freeze.
• Do not use after 56 days, even if still contains product.

8. PATIENT COUNSELLING INFORMATION

Risk of Thyroid C-Cell Tumors
Semaglutide causes thyroid C-cell tumors in rodents and it is unknown whether semaglutide causes thyroid C-cell tumors, including medullary thyroid carcinoma (MTC), in humans as human response to semaglutide is not known. The incidence of thyroid C-cell tumors has not been determined. Counsel patients to report symptoms of thyroid tumors (e.g. a lump in the neck, hoarseness, dysphagia, or dyspnea) to their physician.

Pancreatitis
Inform patients of the potential risk for pancreatitis. Inform patients to discontinue semaglutide promptly and contact their physician if pancreatitis is suspected (severe back pain, nausea, vomiting, and weight loss), and which may or may not be accompanied by elevated pancreatic enzymes.

Diabetic Retinopathy Complications
Inform patients to contact their physician if changes in vision are experienced during treatment with semaglutide.

