

# Xultophy® 100/3.6

## insulin degludec & liraglutide injection

100 units/mL & 3.6 mg/mL

### HIGHLIGHTS OF PRESCRIBING INFORMATION

These highlights do not include all the information needed to use XULTOPHY® 100/3.6 safely and effectively. See full prescribing information for XULTOPHY® 100/3.6. XULTOPHY® 100/3.6 (insulin degludec and liraglutide) injection, for subcutaneous use  
Initial U.S. Approval: 2016

#### WARNING: RISK OF THYROID C-CELL TUMORS

See full prescribing information for complete boxed warning.

- **Liraglutide, one of the components of XULTOPHY® 100/3.6, causes thyroid C-cell tumors at clinically relevant exposures in both genders of rats and mice. It is unknown whether XULTOPHY® 100/3.6 causes thyroid C-cell tumors, including medullary thyroid carcinoma (MTC), in humans, as the human relevance of liraglutide-induced rodent thyroid C-cell tumors has not been determined (5.1, 13.1).**
- **XULTOPHY® 100/3.6 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 of MTC and the symptoms of thyroid tumors (4, 5.1).**

#### RECENT MAJOR CHANGES

Indications and Usage .....05/2025  
Warnings and Precautions, Severe Gastrointestinal Adverse Reactions (5.8) .....05/2025  
Warnings and Precaution, Pulmonary Aspiration During General Anesthesia or Deep Sedation (5.13) .....11/2024

#### INDICATIONS AND USAGE

XULTOPHY® 100/3.6 is a combination of insulin degludec, a long-acting human insulin analog, and liraglutide, a glucagon-like peptide-1 (GLP-1) receptor agonist, indicated as an adjunct to diet and exercise to improve glycemic control in adults with type 2 diabetes mellitus.

##### Limitations of Use (1):

- Not recommended as first-line therapy for patients inadequately controlled on diet and exercise.
- Coadministration with any other product containing liraglutide or another GLP-1 receptor agonist is not recommended.
- Not recommended for the treatment of diabetic ketoacidosis.
- Has not been studied in combination with prandial insulin.

#### DOSAGE AND ADMINISTRATION

- Administer once daily at same time each day with or without food (2.1).
- XULTOPHY® 100/3.6 pen delivers doses from 10 to 50 units with each injection (2.1, 2.2); each XULTOPHY® 100/3.6 dosage unit contains 1 unit of insulin degludec and 0.036 mg of liraglutide (2.1).

### FULL PRESCRIBING INFORMATION: CONTENTS\*

#### WARNING: RISK OF THYROID C-CELL TUMORS

##### 1 INDICATIONS AND USAGE

##### 2 DOSAGE AND ADMINISTRATION

- 2.1 Important Dosage Information
- 2.2 Recommended Starting Dosage
- 2.3 Titration of XULTOPHY® 100/3.6
- 2.4 Recommendations Regarding Missed Doses
- 2.5 Important Administration Instructions

##### 3 DOSAGE FORMS AND STRENGTHS

##### 4 CONTRAINDICATIONS

##### 5 WARNINGS AND PRECAUTIONS

- 5.1 Risk of Thyroid C-cell Tumors
- 5.2 Acute Pancreatitis
- 5.3 Never Share a XULTOPHY® 100/3.6 Pen Between Patients
- 5.4 Hyperglycemia or Hypoglycemia with Changes in Insulin Regimen
- 5.5 Overdose due to Medication Errors
- 5.6 Hypoglycemia
- 5.7 Acute Kidney Injury Due to Volume Depletion
- 5.8 Severe Gastrointestinal Adverse Reactions

- Maximum daily dosage is 50 units (50 units of insulin degludec and 1.8 mg of liraglutide) (2.1).
- Recommended starting dosage in patients naïve to basal insulin or GLP-1 receptor agonist is 10 units (10 units of insulin degludec and 0.36 mg of liraglutide) injected subcutaneously once-daily (2.2).
- Discontinue therapy with liraglutide or basal insulin prior to initiation of XULTOPHY® 100/3.6 (2.2).
- Recommended starting dosage in patients currently on basal insulin or GLP-1 receptor agonist is 16 units (16 units of insulin degludec and 0.58 mg of liraglutide) injected subcutaneously once-daily (2.2).
- See Full Prescribing Information for titration recommendations (2.3).
- Inject XULTOPHY® 100/3.6 subcutaneously into the thigh, upper arm, or abdomen (2.5).
- Rotate injection sites to reduce risk of lipodystrophy and localized cutaneous amyloidosis (2.5).
- Do not administer intravenously or by an infusion pump (2.5).
- Do not dilute or mix with any other insulin products or solutions (2.5).

#### DOSAGE FORMS AND STRENGTHS

Injection 100 units/mL of insulin degludec and 3.6 mg/mL of liraglutide available in:

- 3 mL single-patient-use pen (3).

#### CONTRAINDICATIONS

- Patients with a personal or family history of medullary thyroid carcinoma or in patients with Multiple Endocrine Neoplasia syndrome type 2 (4).
- During episodes of hypoglycemia (4).
- Patients with a serious hypersensitivity reaction to insulin degludec, liraglutide, or any of the excipients in XULTOPHY® 100/3.6 (4).

#### WARNINGS AND PRECAUTIONS

- **Acute Pancreatitis:** Has been observed in patients treated with GLP-1 receptor agonists, including liraglutide. Discontinue if pancreatitis is suspected (5.2).
- **Never share a XULTOPHY® 100/3.6 pen** between patients, even if the needle is changed (5.3).
- **Hyperglycemia or hypoglycemia with changes in insulin regimen:** Make changes to a patient's insulin regimen (e.g., insulin strength, manufacturer, type, injection site or method of administration) under close medical supervision with increased frequency of blood glucose monitoring (5.4).
- **Overdose due to medication errors:** XULTOPHY® 100/3.6 contains two drugs. Instruct patients to check label before injection since accidental mix-ups with insulin containing products can occur. Do not exceed the maximum dose or administer with other GLP-1 receptor agonists (5.5).
- **Hypoglycemia:** May be life-threatening. Increase monitoring with changes to: dosage, concomitant drugs, meal pattern, physical activity; and in patients with renal impairment or hepatic impairment or hypoglycemia unawareness (5.6).

##### 5.9 Hypersensitivity Reactions

##### 5.10 Acute Gallbladder Disease

##### 5.11 Hypokalemia

##### 5.12 Fluid Retention and Congestive Heart Failure with Concomitant Use of a PPAR Gamma Agonist

##### 5.13 Pulmonary Aspiration During General Anesthesia or Deep Sedation

##### 6 ADVERSE REACTIONS

##### 6.1 Clinical Trial Experience

##### 6.2 Postmarketing Experience

##### 7 DRUG INTERACTIONS

##### 7.1 Medications that Can Affect Glucose Metabolism

##### 7.2 Effects of Delayed Gastric Emptying on Oral Medications

##### 8 USE IN SPECIFIC POPULATIONS

##### 8.1 Pregnancy

##### 8.2 Lactation

##### 8.4 Pediatric Use

##### 8.5 Geriatric Use

##### 8.6 Renal Impairment

##### 8.7 Hepatic Impairment

##### 10 OVERDOSAGE

- **Acute Kidney Injury Due to Volume Depletion:** Monitor renal function in patients reporting adverse reactions that could lead to volume depletion (5.7).
- **Severe Gastrointestinal Adverse Reactions:** Use has been associated with gastrointestinal adverse reactions, sometimes severe. XULTOPHY® 100/3.6 is not recommended in patients with severe gastroparesis (5.8).
- **Hypersensitivity Reactions:** Severe, life-threatening, generalized allergy, including anaphylaxis, angioedema, bronchospasm, hypotension, and shock can occur. If a hypersensitivity reaction occurs, discontinue and treat per standard of care (5.9).
- **Acute Gallbladder Disease:** If cholelithiasis or cholecystitis are suspected, gallbladder studies are indicated (5.10).
- **Hypokalemia:** May be life-threatening. Monitor potassium levels in patients at risk for hypokalemia and treat if indicated (5.11).
- **Fluid retention and congestive heart failure with use of thiazolidinediones (TZDs):** Observe for signs and symptoms of heart failure; consider dosage reduction or discontinuation if heart failure occurs (5.12).
- **Pulmonary Aspiration During General Anesthesia or Deep Sedation:** Has been reported in patients receiving GLP-1 receptor agonists undergoing elective surgeries or procedures. Instruct patients to inform healthcare providers of any planned surgeries or procedures (5.13).

#### ADVERSE REACTIONS

- Most common adverse reactions (incidence ≥5%) in clinical trials are nasopharyngitis, headache, nausea, diarrhea, increased lipase and upper respiratory tract infection (6).
- Immunogenicity-related events, including urticaria, were more common among liraglutide-treated patients (0.8%) than among comparator-treated patients (0.4%) in clinical trials (12.6).

To report SUSPECTED ADVERSE REACTIONS, contact Novo Nordisk Inc. at 1-800-727-6500 or FDA at 1-800-FDA-1088 or [www.fda.gov/medwatch](http://www.fda.gov/medwatch).

#### DRUG INTERACTIONS

- **Drugs that affect glucose metabolism:** Adjustment of XULTOPHY® 100/3.6 dosage may be needed; closely monitor blood glucose (7.1).
- **Anti-Adrenergic drugs** (e.g., beta-blockers, clonidine, guanethidine, and reserpine): Hypoglycemia signs and symptoms may be reduced or absent (7.1).
- **Effects of delayed gastric emptying on oral medications:** May impact absorption of concomitantly administered oral medications (7.2).

#### USE IN SPECIFIC POPULATIONS

Pregnancy: XULTOPHY® 100/3.6 should be used during pregnancy only if the potential benefit justifies the potential risk to the fetus (8.1).

See 17 for PATIENT COUNSELING INFORMATION and Medication Guide.

Revised: 05/2025

##### 11 DESCRIPTION

##### 12 CLINICAL PHARMACOLOGY

##### 12.1 Mechanism of Action

##### 12.2 Pharmacodynamics

##### 12.3 Pharmacokinetics

##### 12.6 Immunogenicity

##### 13 NONCLINICAL TOXICOLOGY

##### 13.1 Carcinogenesis, Mutagenesis, Impairment of Fertility

##### 14 CLINICAL STUDIES

##### 14.1 Overview of Clinical Studies

##### 14.2 Patients with Type 2 Diabetes Mellitus Uncontrolled on OAD Treatment

##### 14.3 Patients currently on basal insulin or GLP-1 receptor agonist

##### 14.4 Cardiovascular Outcomes Trials in Patients with Type 2 Diabetes Mellitus and Atherosclerotic Cardiovascular Disease Conducted with Liraglutide 1.8 mg and Insulin Degludec

##### 16 HOW SUPPLIED/STORAGE AND HANDLING

##### 17 PATIENT COUNSELING INFORMATION

\*Sections or subsections omitted from the full prescribing information are not listed.

## FULL PRESCRIBING INFORMATION

**WARNING: RISK OF THYROID C-CELL TUMORS**

- Liraglutide, one of the components of XULTOPHY® 100/3.6, causes dose-dependent and treatment-duration-dependent thyroid C-cell tumors at clinically relevant exposures in both genders of rats and mice. It is unknown whether XULTOPHY® 100/3.6 causes thyroid C-cell tumors, including medullary thyroid carcinoma (MTC), in humans, as the human relevance of liraglutide-induced rodent thyroid C-cell tumors has not been determined [see *Warnings and Precautions* (5.1) and *Nonclinical Toxicology* (13)].
- XULTOPHY® 100/3.6 is contraindicated in patients with a personal or family history of MTC and in patients with Multiple Endocrine Neoplasia syndrome type 2 (MEN 2). Counsel patients regarding the potential risk for MTC with the use of XULTOPHY® 100/3.6 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 XULTOPHY® 100/3.6 [see *Contraindications* (4), *Warnings and Precautions* (5.1)].

**1 INDICATIONS AND USAGE**

XULTOPHY® 100/3.6 is a combination of insulin degludec and liraglutide and is indicated as an adjunct to diet and exercise to improve glycemic control in adults with type 2 diabetes mellitus.

**Limitations of Use:**

- XULTOPHY® 100/3.6 contains liraglutide. Coadministration with any other product containing liraglutide or another glucagon-like peptide-1 (GLP-1) receptor agonist is not recommended [see *Warnings and Precautions* (5.5)].
- XULTOPHY® 100/3.6 is not recommended for the treatment of diabetic ketoacidosis.
- XULTOPHY® 100/3.6 has not been studied in combination with prandial insulin.

**2 DOSAGE AND ADMINISTRATION****2.1 Important Dosage Information**

- XULTOPHY® 100/3.6 is a combination of insulin degludec and liraglutide.
- Administer XULTOPHY® 100/3.6 by subcutaneous injection once-daily at the same time each day with or without food.
- The XULTOPHY® 100/3.6 pen delivers doses from 10 to 50 units with each injection. Table 1 presents the units of insulin degludec and the milligrams of liraglutide in each dosage of XULTOPHY® 100/3.6 [see *Dosage and Administration* (2.2)].
- The maximum dosage of XULTOPHY® 100/3.6 is 50 units daily (50 units of insulin degludec and 1.8 mg of liraglutide) [see *Warnings and Precautions* (5.5)].

**2.2 Recommended Starting Dosage****In patients naïve to basal insulin or a GLP-1 receptor agonist**

- The recommended starting dosage of XULTOPHY® 100/3.6 is 10 units (10 units of insulin degludec and 0.36 mg of liraglutide) injected subcutaneously once-daily (see Table 1).

**In patients currently on basal insulin or a GLP-1 receptor agonist**

- Discontinue therapy with basal insulin or GLP-1 receptor agonist prior to initiation of XULTOPHY® 100/3.6.
- The recommended starting dosage of XULTOPHY® 100/3.6 is 16 units (16 units of insulin degludec and 0.58 mg of liraglutide) injected subcutaneously once-daily (see Table 1).

**Table 1. Units of Insulin Degludec and Milligrams of Liraglutide in Each Dosage of XULTOPHY® 100/3.6**

XULTOPHY® 100/3.6 (dose counter display)*	insulin degludec component dose	liraglutide component dose	Comment
--	---	---	Priming symbol
10	10 units	0.36 mg	Recommended starting dose for patients naïve to basal insulin or GLP-1 receptor agonist
11	11 units	0.4 mg	
12	12 units	0.43 mg	
13	13 units	0.47 mg	
14	14 units	0.5 mg	
15	15 units	0.54 mg	
16	16 units	0.58 mg	Recommended starting dose for patients currently on basal insulin or GLP-1 receptor agonist
17	17 units	0.61 mg	
18	18 units	0.65 mg	
19	19 units	0.68 mg	
20	20 units	0.72 mg	
21	21 units	0.76 mg	
22	22 units	0.79 mg	
23	23 units	0.83 mg	
24	24 units	0.86 mg	
25	25 units	0.9 mg	
26	26 units	0.94 mg	
27	27 units	0.97 mg	
28	28 units	1.01 mg	
29	29 units	1.04 mg	
30	30 units	1.08 mg	
31	31 units	1.12 mg	
32	32 units	1.15 mg	
33	33 units	1.19 mg	
34	34 units	1.22 mg	
35	35 units	1.26 mg	
36	36 units	1.3 mg	
37	37 units	1.33 mg	
38	38 units	1.37 mg	
39	39 units	1.4 mg	
40	40 units	1.44 mg	
41	41 units	1.48 mg	
42	42 units	1.51 mg	
43	43 units	1.55 mg	
44	44 units	1.58 mg	
45	45 units	1.62 mg	
46	46 units	1.66 mg	
47	47 units	1.69 mg	
48	48 units	1.73 mg	
49	49 units	1.76 mg	
50	50 units	1.8 mg	Maximum daily dosage [see <i>Warnings and Precautions</i> (5.5)]

\*The dose counter on the XULTOPHY® 100/3.6 pen displays numbers for the even units and displays lines for the odd units.

**2.3 Titration of XULTOPHY® 100/3.6**

- After starting the recommended starting dosage of XULTOPHY® 100/3.6 [see *Dosage and Administration* (2.2)], titrate the dosage upwards or downwards by two units (see Table 2) once weekly or twice weekly (every three to four days), based on the patient's metabolic needs, blood glucose monitoring results, and glycemic control goal until the desired fasting plasma glucose is achieved.
- To minimize the risk of hypoglycemia or hyperglycemia, additional titration may be needed with changes in physical activity, meal patterns (i.e., macronutrient content or timing of food intake), or renal or hepatic function; during acute illness; or when used with other medications [see *Warnings and Precautions* (5.4) and *Drug Interactions* (7)].

**Table 2. Recommended Titration of XULTOPHY® 100/3.6 (Once or Twice Weekly)**

Self-Monitored Fasting Plasma Glucose	XULTOPHY® 100/3.6 Dosage Adjustment
Above target range	+ 2 units (2 units of insulin degludec and 0.072 mg of liraglutide)
Within target range	0 units
Below target range	- 2 units (2 units of insulin degludec and 0.072 mg of liraglutide)

**2.4 Recommendations Regarding Missed Doses**

- Instruct patients who miss a dose of XULTOPHY® 100/3.6 to resume the once-daily dosage regimen as prescribed with the next scheduled dose. Do not administer an extra dose or increase the dose to make up for the missed dose.
- If more than three days have elapsed since the last XULTOPHY® 100/3.6 dose, reinstitute XULTOPHY® 100/3.6 at the recommended starting dose to mitigate the risk of gastrointestinal adverse reactions associated with reinitiation of treatment [see *Dosage and Administration* (2.1, 2.2, 2.3)].

**2.5 Important Administration Instructions**

- The XULTOPHY® 100/3.6 pen is for single-patient-use only [see *Warnings and Precautions* (5.3)].
- Train patients on proper use and injection technique before initiating XULTOPHY® 100/3.6.
- Always check the label on the XULTOPHY® 100/3.6 pen before administration [see *Warnings and Precautions* (5.5)].
- Inspect visually for particulate matter and discoloration prior to administration. Only use XULTOPHY® 100/3.6 if the solution appears clear and colorless.
- Inject XULTOPHY® 100/3.6 subcutaneously into the thigh, upper arm, or abdomen.
- Rotate injection sites within the same region from one injection to the next to reduce the risk of lipodystrophy and localized cutaneous amyloidosis. Do not inject into areas of lipodystrophy or localized cutaneous amyloidosis [see *Warnings and Precautions* (5.4), *Adverse Reactions* (6.1, 6.3)].
- During changes to a patient's insulin regimen, increase the frequency of blood glucose monitoring [see *Warnings and Precautions* (5.4)].
- Use XULTOPHY® 100/3.6 with caution in patients with visual impairment who may rely on audible clicks to dial their dose.
- The XULTOPHY® 100/3.6 pen dials in one-unit increments.
- Do not administer XULTOPHY® 100/3.6 intravenously or in an insulin infusion pump.
- Do not dilute or mix XULTOPHY® 100/3.6 with any other insulin or solutions.
- Do not split the dose of XULTOPHY® 100/3.6.

**3 DOSAGE FORMS AND STRENGTHS**

Injection: 100 units/mL insulin degludec and 3.6 mg/mL liraglutide available as a clear, colorless solution in a 3 mL pre-filled, disposable, single-patient-use pen injector.

**4 CONTRAINDICATIONS**

XULTOPHY® 100/3.6 is contraindicated:

- In patients with a personal or family history of medullary thyroid carcinoma (MTC) or in patients with Multiple Endocrine Neoplasia syndrome type 2 (MEN 2) [see *Warnings and Precautions* (5.1)].
- During episodes of hypoglycemia [see *Warnings and Precautions* (5.6)].
- In patients with hypersensitivity to insulin degludec, liraglutide, or any of the excipients in XULTOPHY® 100/3.6. Serious hypersensitivity reactions including anaphylactic reactions and angioedema have been reported with liraglutide, one of the components of XULTOPHY® 100/3.6 [see *Warnings and Precautions* (5.9)].

**5 WARNINGS AND PRECAUTIONS****5.1 Risk of Thyroid C-cell Tumors**

Liraglutide, one of the components of XULTOPHY® 100/3.6, causes dose-dependent and treatment-duration-dependent thyroid C-cell tumors (adenomas and/or carcinomas) at clinically relevant exposures in both genders of rats and mice [see *Nonclinical Toxicology* (13.1)]. Malignant thyroid C-cell carcinomas were detected in rats and mice. It is unknown whether XULTOPHY® 100/3.6 will cause thyroid C-cell tumors, including medullary thyroid carcinoma (MTC), in humans, as the human relevance of liraglutide-induced rodent thyroid C-cell tumors has not been determined.

Cases of MTC in patients treated with liraglutide have been reported in the postmarketing period; the data in these reports are insufficient to establish or exclude a causal relationship between MTC and liraglutide use in humans.



XULTOPHY® 100/3.6 is contraindicated in patients with a personal or family history of MTC or in patients with MEN 2. Counsel patients regarding the potential risk for MTC with the use of XULTOPHY® 100/3.6 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 XULTOPHY® 100/3.6. Such monitoring may increase the risk of unnecessary procedures, due to low test specificity for serum calcitonin and a high background incidence of thyroid disease. Significantly elevated serum calcitonin may indicate MTC and patients with MTC usually have calcitonin values >50 ng/L. If serum calcitonin is measured and found to be elevated, the patient should be further evaluated. Patients with thyroid nodules noted on physical examination or neck imaging should also be further evaluated.

## 5.2 Acute Pancreatitis

Acute pancreatitis, including fatal and non-fatal hemorrhagic or necrotizing pancreatitis, has been observed in patients treated with GLP-1 receptor agonists, including liraglutide, one of the components of XULTOPHY® 100/3.6 [see *Adverse Reactions* (6)].

After initiation of XULTOPHY® 100/3.6, observe patients carefully for signs and symptoms of pancreatitis (including persistent severe abdominal pain, sometimes radiating to the back and which may or may not be accompanied by vomiting). If pancreatitis is suspected, discontinue XULTOPHY® 100/3.6 and initiate appropriate management.

## 5.3 Never Share a XULTOPHY® 100/3.6 Pen Between Patients

XULTOPHY® 100/3.6 pen must never be shared between patients, even if the needle is changed. Sharing of the pen poses a risk for transmission of blood-borne pathogens.

## 5.4 Hyperglycemia or Hypoglycemia with Changes in Insulin Regimen

Changes in an insulin regimen (e.g., insulin strength, manufacturer, type, injection site or method of administration) may affect glycemic control and predispose to hypoglycemia [see *Warnings and Precautions* (5.6)] or hyperglycemia. Repeated insulin injections into areas of lipodystrophy or localized cutaneous amyloidosis have been reported to result in hyperglycemia; and a sudden change in the injection site (to an unaffected area) has been reported to result in hypoglycemia [see *Adverse Reactions* (6.1, 6.3)]. Make any changes to a patient's insulin regimen under close medical supervision with increased frequency of blood glucose monitoring. Advise patients who have repeatedly injected into areas of lipodystrophy or localized cutaneous amyloidosis to change the injection site to unaffected areas and closely monitor for hypoglycemia. Adjustments in concomitant oral anti-diabetic treatment may be needed. When initiating XULTOPHY® 100/3.6, follow dosing recommendations [see *Dosage and Administration* (2.1, 2.2, 2.3)].

## 5.5 Overdose due to Medication Errors

XULTOPHY® 100/3.6 contains two drugs: insulin degludec and liraglutide. Administration of more than 50 units of XULTOPHY® 100/3.6 daily can result in overdose of the liraglutide component. Do not exceed the 1.8 mg maximum recommended dose of liraglutide or use with other GLP-1 receptor agonists.

Accidental mix-ups between insulin products have been reported. To avoid medication errors between XULTOPHY® 100/3.6 (an insulin containing product) and other insulin products, instruct patients to always check the label before each injection.

## 5.6 Hypoglycemia

Hypoglycemia is the most common adverse reaction of insulin containing products, including XULTOPHY® 100/3.6 [see *Adverse Reactions* (6.1)]. Severe hypoglycemia can cause seizures, may be life-threatening or cause death. Hypoglycemia can impair concentration ability and reaction time; this may place the patient and others at risk in situations where these abilities are important (e.g., driving or operating other machinery). XULTOPHY® 100/3.6 (an insulin-containing product) or any insulin, should not be used during episodes of hypoglycemia [see *Contraindications* (4)].

Hypoglycemia can happen suddenly and symptoms may differ in each patient and change over time in the same patient. Symptomatic awareness of hypoglycemia may be less pronounced in patients with longstanding diabetes, in patients with diabetic neuropathy, in patients using drugs that block the sympathetic nervous system (e.g., beta-blockers) [see *Drug Interactions* (7.1)], or who experience recurrent hypoglycemia.

The long-acting effect of insulin degludec may delay recovery from hypoglycemia compared to shorter acting insulins.

### Risk Factors for Hypoglycemia

The risk of hypoglycemia generally increases with intensity of glycemic control. The risk of hypoglycemia after an injection is related to the duration of action of the insulin [see *Clinical Pharmacology* (12.2)] and, in general, is highest when the glucose lowering effect of the insulin is maximal. As with all insulin containing products, the glucose lowering effect time course of XULTOPHY® 100/3.6 may vary among different patients or at different times in the same patients and depends on many

conditions, including the area of injection as well as the injection site blood supply and temperature.

Other factors which may increase the risk of hypoglycemia include changes in meal pattern (e.g., macronutrient content or timing of meals), changes in level of physical activity, or changes to concomitant drugs [see *Drug Interactions* (7.1)]. Patients with renal or hepatic impairment may be at higher risk of hypoglycemia [see *Use in Specific Populations* (8.6, 8.7)].

### Risk Mitigation Strategies for Hypoglycemia

Patients and caregivers must be educated to recognize and manage hypoglycemia. Self-monitoring of blood glucose plays an essential role in the prevention and management of hypoglycemia. In patients at higher risk for hypoglycemia and patients who have reduced symptomatic awareness of hypoglycemia, increased frequency of blood glucose monitoring is recommended.

## 5.7 Acute Kidney Injury Due to Volume Depletion

There have been postmarketing reports of acute kidney injury, in some cases requiring hemodialysis, in patients treated with liraglutide, one of the components of XULTOPHY® 100/3.6 [see *Adverse Reactions* (6.2)]. The majority of the reported events occurred in patients who experienced gastrointestinal reactions leading to dehydration such as nausea, vomiting, or diarrhea [see *Adverse Reactions* (6.1)]. Monitor renal function in patients reporting adverse reactions to XULTOPHY® 100/3.6 that could lead to volume depletion, especially during dosage initiation and escalation of XULTOPHY® 100/3.6.

## 5.8 Severe Gastrointestinal Adverse Reactions

Use of GLP-1 receptor agonists, including liraglutide, one of the components of XULTOPHY® 100/3.6, has been associated with gastrointestinal adverse reactions, sometimes severe [see *Adverse Reactions* (6)]. In a XULTOPHY® 100/3.6 clinical trial severe gastrointestinal adverse reactions were reported among patients receiving XULTOPHY® 100/3.6 (0.8 %) and patients receiving the active comparators liraglutide (2.9%) and insulin degludec (0.2%) [see *Clinical Studies* (14.2)]. XULTOPHY® 100/3.6 is not recommended in patients with severe gastroparesis.

## 5.9 Hypersensitivity Reactions

Severe, life-threatening, generalized allergy, including anaphylaxis, angioedema, bronchospasm, hypotension, and shock can occur with insulins, including XULTOPHY® 100/3.6. Allergic reactions (manifested with signs and symptoms such as urticaria, rash, pruritus) have been reported with XULTOPHY® 100/3.6. There have been postmarketing reports of serious hypersensitivity reactions (e.g., anaphylactic reactions and angioedema) in patients treated with liraglutide, one of the components of XULTOPHY® 100/3.6 [see *Adverse Reactions* (6.2)]. If a hypersensitivity reaction occurs, discontinue XULTOPHY® 100/3.6; treat promptly per standard of care, and monitor until signs and symptoms resolve.

Anaphylaxis and angioedema have been reported with other GLP-1 receptor agonists. Use caution in a patient with a history of anaphylaxis or angioedema with another GLP-1 receptor agonist because it is unknown whether such patients will be predisposed to these reactions with XULTOPHY® 100/3.6. XULTOPHY® 100/3.6 is contraindicated in patients who have had hypersensitivity reactions to insulin degludec, liraglutide or one of the excipients of these products [see *Contraindications* (4)].

## 5.10 Acute Gallbladder Disease

Acute events of gallbladder disease such as cholelithiasis or cholecystitis have been reported in GLP-1 receptor agonist trials and postmarketing. In a cardiovascular outcomes trial (LEADER trial) [see *Clinical Studies* (14.4)], 3.1% of patients treated with liraglutide, one of the components of XULTOPHY® 100/3.6, versus 1.9% of placebo treated patients reported an acute event of gallbladder disease, such as cholelithiasis or cholecystitis [see *Adverse Reactions* (6.1)]. If cholelithiasis is suspected, gallbladder studies and appropriate clinical follow-up are indicated.

## 5.11 Hypokalemia

All insulin-containing products, including XULTOPHY® 100/3.6, cause a shift in potassium from the extracellular to intracellular space, possibly leading to hypokalemia. Untreated hypokalemia may cause respiratory paralysis, ventricular arrhythmia, and death. Monitor potassium levels in patients at risk for hypokalemia if indicated (e.g., patients using potassium-lowering medications, patients taking medications sensitive to serum potassium concentrations).

## 5.12 Fluid Retention and Congestive Heart Failure with Concomitant Use of a PPAR Gamma Agonist

Thiazolidinediones (TZDs), which are peroxisome proliferator-activated receptor (PPAR)-gamma agonists can cause dose related fluid retention, when used in combination with insulin containing products, including XULTOPHY® 100/3.6. Fluid retention may lead to or exacerbate congestive heart failure. Patients treated with insulin containing products, including XULTOPHY® 100/3.6 and a PPAR-gamma agonist should be observed for signs and symptoms of congestive heart failure. If congestive heart failure develops, it should be managed according to current standards of care and discontinuation or dose reduction of the PPAR-gamma agonist must be considered.

## 5.13 Pulmonary Aspiration During General Anesthesia or Deep Sedation

XULTOPHY® 100/3.6 delays gastric emptying [see *Clinical Pharmacology* (12.1)]. There have been rare postmarketing reports of pulmonary aspiration in patients receiving GLP-1 receptor agonists undergoing elective surgeries or procedures requiring general anesthesia or deep sedation who had residual gastric contents despite reported adherence to preoperative fasting recommendations.

Available data are insufficient to inform recommendations to mitigate the risk of pulmonary aspiration during general anesthesia or deep sedation in patients taking XULTOPHY® 100/3.6, including whether modifying preoperative fasting recommendations or temporarily discontinuing XULTOPHY® 100/3.6 could reduce the incidence of retained gastric contents. Instruct patients to inform healthcare providers prior to any planned surgeries or procedures if they are taking XULTOPHY® 100/3.6.

## 6 ADVERSE REACTIONS

The following serious adverse reactions are described below or elsewhere in the prescribing information:

- Risk of Thyroid C-cell Tumors [see *Warnings and Precautions* (5.1)]
- Acute Pancreatitis [see *Warnings and Precautions* (5.2)]
- Hypoglycemia [see *Warnings and Precautions* (5.6)]
- Acute Kidney Injury Due to Volume Depletion [see *Warnings and Precautions* (5.7)]
- Severe Gastrointestinal Adverse Reactions [see *Warnings and Precautions* (5.8)]
- Hypersensitivity Reactions [see *Warnings and Precautions* (5.9)]
- Acute Gallbladder Disease [see *Warnings and Precautions* (5.10)]
- Hypokalemia [see *Warnings and Precautions* (5.11)]
- Pulmonary Aspiration During General Anesthesia or Deep Sedation [see *Warnings and Precautions* (5.13)]

### 6.1 Clinical Trial Experience

Because clinical trials are conducted under widely varying conditions, adverse reaction rates observed in the clinical trials of a drug cannot be directly compared to rates in the clinical trials of another drug and may not reflect the rates observed in practice.

#### Xultophy® 100/3.6

The data in Table 3 reflect the exposure of 1881 patients to XULTOPHY® 100/3.6 and a mean duration of exposure of 33 weeks in trials NCT01336023, NCT01618162, NCT02773368, NCT01676116, NCT01392573, NCT01952145 [see *Clinical Studies* (14.2 and 14.3)]. The mean age was 57 years and 3% were older than 75 years; 53% were male, 75% were White, 6% were Black or African American and 16% were Hispanic or Latino. The mean body mass index (BMI) was 31.8 kg/m<sup>2</sup>. The mean duration of diabetes was 9 years and the mean HbA<sub>1c</sub> at baseline was 8.2%. A history of neuropathy, ophthalmopathy, nephropathy and cardiovascular disease at baseline was reported in 25%, 12%, 7% and 6% respectively. The mean estimated glomerular filtration rate (eGFR) at baseline was 88.3 mL/min/1.73 m<sup>2</sup> and 6% of the patients had an eGFR less than 60 mL/min/1.73 m<sup>2</sup>.

**Table 3. Adverse Reactions Occurring in ≥5% of XULTOPHY® 100/3.6-Treated Patients with Type 2 Diabetes Mellitus**

	XULTOPHY® 100/3.6 N = 1881 %
Nasopharyngitis	10
Headache	9
Nausea	8
Diarrhea	8
Increased Lipase	7
Upper respiratory tract infection	6

#### Hypoglycemia

Hypoglycemia was the most commonly observed adverse reaction in patients treated with insulin and insulin containing products, including XULTOPHY® 100/3.6 [see *Warnings and Precautions* (5.6)]. The number of reported hypoglycemia episodes depended on the definition of hypoglycemia used, insulin dose, intensity of glucose control, background therapies, and other intrinsic and extrinsic patient factors. For these reasons, comparing rates of hypoglycemia in clinical trials for XULTOPHY® 100/3.6 with the incidence of hypoglycemia for other products may be misleading and also, may not be representative of hypoglycemia rates that will occur in clinical practice.

In the phase 3 clinical program [see *Clinical Studies* (14)], events of severe hypoglycemia were defined as an episode requiring assistance of another person to actively administer carbohydrate, glucagon, or other resuscitative actions (Table 4). Hypoglycemia episodes with a glucose level below 54 mg/dL associated with or without symptoms is shown in Table 4. No clinically important differences in risk of severe hypoglycemia between XULTOPHY® 100/3.6 and comparators were observed in clinical trials.

**Table 4. Hypoglycemia Episodes Reported in XULTOPHY® 100/3.6-Treated Patients with T2DM**

	Patients naïve to basal insulin or GLP-1 receptor agonist			Patients currently on GLP-1 receptor agonist	Patients currently on basal insulin	
	XULTOPHY® 100/3.6 NCT01336023	XULTOPHY® 100/3.6 NCT01618162	XULTOPHY® 100/3.6 NCT02773368	XULTOPHY® 100/3.6 NCT01676116	XULTOPHY® 100/3.6 NCT01392573	XULTOPHY® 100/3.6 NCT01952145
<b>Total Subjects (N)</b>	<b>825</b>	<b>288</b>	<b>209</b>	<b>291</b>	<b>199</b>	<b>278</b>
<b>Severe Hypoglycemia (%)†</b>	0.2	0.7	0.5	0.3	0.5	0.0
Hypoglycemia with a glucose level <54 mg/dL (%)*	27.6	37.2	14.4	27.1	22.1	24.8

†Episode requiring assistance of another person to actively administer carbohydrate, glucagon, or other resuscitative actions.

\*Episodes of hypoglycemia with a glucose level below 54 mg/dL that are associated with or without symptoms of hypoglycemia.

#### Gastrointestinal Adverse Reactions

Gastrointestinal adverse reactions including nausea, diarrhea, vomiting, constipation, dyspepsia, gastritis, abdominal pain, flatulence, eructation, gastroesophageal reflux disease, abdominal distension and decreased appetite have been reported in patients treated with XULTOPHY® 100/3.6. In a XULTOPHY® 100/3.6 clinical trial severe gastrointestinal adverse reactions were reported among patients receiving XULTOPHY® 100/3.6 (0.8%) and patients receiving the active comparators liraglutide (2.9%) and insulin degludec (0.2%) [see *Clinical Studies* (14.2)]. Gastrointestinal adverse reactions may occur more frequently at the beginning of XULTOPHY® 100/3.6 therapy and diminish within a few days or weeks on continued treatment.

#### Papillary thyroid carcinoma

##### Liraglutide

In glycemic control trials of liraglutide, there were 7 reported cases of papillary thyroid carcinoma in patients treated with liraglutide and 1 case in a comparator-treated patient (1.5 vs. 0.5 cases per 1000 patient years). Most of these papillary thyroid carcinomas were <1 cm in greatest diameter and were diagnosed in surgical pathology specimens after thyroidectomy prompted by findings on protocol-specified screening with serum calcitonin or thyroid ultrasound.

#### Pancreatitis

##### Liraglutide

In glycemic control trials of liraglutide, there have been 13 cases of pancreatitis among liraglutide-treated patients and 1 case in a comparator (glimepiride) treated patient (2.7 vs. 0.5 cases per 1000 patient-years). Nine of the 13 cases with liraglutide were reported as acute pancreatitis and four were reported as chronic pancreatitis. In one case in a liraglutide-treated patient, pancreatitis, with necrosis, was observed and led to death; however clinical causality could not be established. Some patients had other risk factors for pancreatitis, such as a history of cholelithiasis or alcohol abuse.

#### Cholelithiasis and cholecystitis

##### Liraglutide

In glycemic control trials of liraglutide, the incidence of cholelithiasis was 0.3% in both liraglutide-treated and placebo-treated patients. The incidence of cholecystitis was 0.2% in both liraglutide treated and placebo-treated patients.

In a cardiovascular outcomes trial (LEADER trial) [see *Clinical Studies* (14.4)], the incidence of cholelithiasis was 1.5% (3.9 cases per 1000 patient years of observation) in liraglutide-treated and 1.1% (2.8 cases per 1000 patient years of observation) in placebo-treated patients, both on a background of standard of care. The incidence of acute cholecystitis was 1.1% (2.9 cases per 1000 patient years of observation) in liraglutide-treated and 0.7% (1.9 cases per 1000 patient years of observation) in placebo-treated patients. The majority of events required hospitalization or cholecystectomy.

#### Initiation of insulin containing products and intensification of glucose control

Intensification or rapid improvement in glucose control has been associated with a transitory, reversible ophthalmologic refraction disorder, worsening of diabetic retinopathy, and acute painful peripheral neuropathy. However, long-term glycemic control decreases the risk of diabetic retinopathy and neuropathy.

#### Lipodystrophy

Long-term use of insulin containing products, including XULTOPHY® 100/3.6, can cause lipodystrophy at the site of repeated injections. Lipodystrophy includes lipohypertrophy (thickening of adipose tissue) and lipoatrophy (thinning of adipose tissue), and may affect absorption [see *Dosage and Administration* (2.5)].

#### Peripheral Edema

XULTOPHY® 100/3.6 may cause sodium retention and edema, particularly if previously poor metabolic control is improved rapidly by intensified therapy.

#### Weight Gain

Weight gain can occur with insulin containing products, including XULTOPHY® 100/3.6, and has been attributed to the anabolic effects of insulin. In study A, after 26 weeks of treatment, patients converting to XULTOPHY® 100/3.6 from liraglutide had a mean increase in body weight of 2 kg.

#### Injection Site reactions

As with any insulin and GLP-1 receptor agonist-containing products, patients taking XULTOPHY® 100/3.6 may experience injection site reactions, including injection site hematoma, pain, hemorrhage, erythema, nodules, swelling, discoloration, pruritus, warmth, and injection site mass. In the clinical program, the proportion of injection site reactions occurring in patients treated with XULTOPHY® 100/3.6 was 2.6%. These reactions were usually mild and transitory and they normally disappear during continued treatment.

#### Hypersensitivity Reactions

Severe, life-threatening, generalized allergy, including anaphylaxis, generalized skin reactions, angioedema, bronchospasm, hypotension, and shock have occurred with insulin, including XULTOPHY® 100/3.6 and may be life threatening [see *Warnings and Precautions* (5.8)]. Hypersensitivity (manifested with swelling of tongue and lips, diarrhea, nausea, tiredness, and itching) and urticaria were reported.

#### Laboratory tests

##### Bilirubin

##### Liraglutide

In the five glycemic control trials of at least 26 weeks duration, mildly elevated serum bilirubin concentrations (elevations to no more than twice the upper limit of the reference range) occurred in 4.0% of liraglutide-treated patients, 2.1% of placebo-treated patients and 3.5% of active-comparator-treated patients. This finding was not accompanied by abnormalities in other liver tests. The significance of this isolated finding is unknown.

##### Calcitonin

##### XULTOPHY® 100/3.6

Calcitonin, a biological marker of MTC, was measured throughout the XULTOPHY® 100/3.6 clinical development program. Among patients with pretreatment calcitonin <20 ng/L, calcitonin elevations to >20 ng/L occurred in 0.7% of XULTOPHY® 100/3.6-treated patients, 0.7% of placebo-treated patients, and 1.1% and 0.7% of active-comparator-treated patients (basal insulins and GLP-1s respectively). The clinical significance of these findings is unknown.

##### Liraglutide

Calcitonin, a biological marker of MTC, was measured throughout the liraglutide clinical development program. At the end of the glycemic control trials, adjusted mean serum calcitonin concentrations were higher in liraglutide-treated patients compared to placebo-treated patients but not compared to patients receiving active comparator. Between group differences in adjusted mean serum calcitonin values were approximately 0.1 ng/L or less. Among patients with pretreatment calcitonin <20 ng/L, calcitonin elevations to >20 ng/L occurred in 0.7% of liraglutide-treated patients, 0.3% of placebo-treated patients, and 0.5% of active-comparator-treated patients. The clinical significance of these findings is unknown.

##### Lipase and Amylase

##### Liraglutide

In one glycemic control trial in renal impairment patients, a mean increase of 33% for lipase and 15% for amylase from baseline was observed for liraglutide-treated patients while placebo-treated patients had a mean decrease in lipase of 3% and a mean increase in amylase of 1%.

In a cardiovascular outcomes trial (LEADER trial) [see *Clinical Studies* (14.4)], serum lipase and amylase were routinely measured. Among liraglutide-treated patients, 7.9% had a lipase value at any time during treatment of greater than or equal to 3 times the upper limit of normal compared with 4.5% of placebo-treated patients, and 1% of liraglutide-treated patients had an amylase value at any time during treatment of

greater than or equal to 3 times the upper limit of normal versus 0.7% of placebo-treated patients.

The clinical significance of elevations in lipase or amylase with liraglutide is unknown in the absence of other signs and symptoms of pancreatitis [see *Warnings and Precautions* (5.2)].

#### Vital signs

Mean increases from baseline in heart rate of 2 to 3 beats per minute have been observed with XULTOPHY® 100/3.6 which is attributable to the liraglutide component.

## 6.2 Postmarketing Experience

The following additional adverse reactions have been reported during post-approval use. Because these events are reported voluntarily from a population of uncertain size, it is generally not possible to reliably estimate their frequency or establish a causal relationship to drug exposure.

#### Insulin degludec

Localized cutaneous amyloidosis at the injection site has occurred. Hyperglycemia has been reported with repeated insulin injections into areas of localized cutaneous amyloidosis; hypoglycemia has been reported with a sudden change to an unaffected injection site.

#### Liraglutide

- **Gastrointestinal:** Acute pancreatitis; hemorrhagic and necrotizing pancreatitis sometimes resulting in death; ileus, and nausea, vomiting and diarrhea leading to dehydration

- **Hepatobiliary:** Elevations of liver enzymes, hyperbilirubinemia, cholestasis, cholecystitis, cholelithiasis requiring cholecystectomy, hepatitis

- **Hypersensitivity:** Angioedema, anaphylactic reactions, rash, pruritus

- **Neoplasms:** Medullary thyroid carcinoma

- **Neurologic:** Dysgeusia, dysesthesia, dizziness

- **Pulmonary:** Pulmonary aspiration has occurred in patients receiving GLP-1 receptor agonists undergoing elective surgeries or procedures requiring general anesthesia or deep sedation.

- **Renal:** Acute renal failure or worsening of chronic renal failure, sometimes requiring hemodialysis; and increased serum creatinine

- **Skin and subcutaneous tissue:** Cutaneous amyloidosis, alopecia

## 7 DRUG INTERACTIONS

### 7.1 Medications that Can Affect Glucose Metabolism

A number of medications affect glucose metabolism and may require dose adjustment of XULTOPHY® 100/3.6 and particularly close monitoring [see *Dosage and Administration* (2.2); *Warnings and Precautions* (5.6)].

Drugs That May Increase the Risk of Hypoglycemia	
<b>Drugs:</b>	Antidiabetic agents, ACE inhibitors, angiotensin II receptor blocking agents, disopyramide, fibrates, fluoxetine, monoamine oxidase inhibitors, pentoxifylline, pramlintide, salicylates, somatostatin analogs (e.g., octreotide), and sulfonamide antibiotics
<b>Intervention:</b>	Dosage reductions and increased frequency of glucose monitoring may be required when XULTOPHY® 100/3.6 is co-administered with these drugs.
Drugs That May Decrease the Blood Glucose Lowering Effect of XULTOPHY® 100/3.6	
<b>Drugs:</b>	Atypical antipsychotics (e.g., olanzapine and clozapine), corticosteroids, danazol, diuretics, estrogens, glucagon, isoniazid, niacin, oral contraceptives, phenothiazines, progestogens (e.g., in oral contraceptives), protease inhibitors, somatropin, sympathomimetic agents (e.g., albuterol, epinephrine, terbutaline), and thyroid hormones.
<b>Intervention:</b>	Dosage increases and increased frequency of glucose monitoring may be required when XULTOPHY® 100/3.6 is co-administered with these drugs.
Drugs That May Increase or Decrease the Blood Glucose Lowering Effect of XULTOPHY® 100/3.6	
<b>Drugs:</b>	Alcohol, beta-blockers, clonidine, and lithium salts. Pentamidine may cause hypoglycemia, which may sometimes be followed by hyperglycemia.
<b>Intervention:</b>	Dosage adjustment and increased frequency of glucose monitoring may be required when XULTOPHY® 100/3.6 is co-administered with these drugs.



## Drugs That May Blunt Signs and Symptoms of Hypoglycemia

<b>Drugs:</b>	Beta-blockers, clonidine, guanethidine, and reserpine
<b>Intervention:</b>	Increased frequency of glucose monitoring may be required when XULTOPHY® 100/3.6 is co-administered with these drugs.

## 7.2 Effects of Delayed Gastric Emptying on Oral Medications

Liraglutide-containing products, including XULTOPHY® 100/3.6, cause a delay of gastric emptying, and thereby have the potential to impact the absorption of concomitantly administered oral medications. In clinical pharmacology trials, liraglutide did not affect the absorption of the tested orally administered medications to any clinically relevant degree [see *Clinical Pharmacology* (12.3)]. Nonetheless, caution should be exercised when oral medications are concomitantly administered with liraglutide containing products.

## 8 USE IN SPECIFIC POPULATIONS

### 8.1 Pregnancy

#### Risk Summary

Based on animal reproduction studies, there may be risks to the fetus from exposure to liraglutide during pregnancy. XULTOPHY® 100/3.6 should be used during pregnancy only if the potential benefit justifies the potential risk to the fetus.

There are no available data with XULTOPHY® 100/3.6, insulin degludec or liraglutide in pregnant women to inform a drug associated risk for major birth defects and miscarriage. There are clinical considerations regarding the risks of poorly controlled diabetes in pregnancy [see *Clinical Considerations*].

For insulin degludec, rats and rabbits were exposed in animal reproduction studies at 5 times (rat) and 10 times (rabbit) the human exposure at a dose of 0.75 U/kg/day. No adverse outcomes were observed for pregnant animals and offspring [see *Data*].

For liraglutide, animal reproduction studies identified increased adverse developmental outcomes from exposure during pregnancy. Liraglutide exposure was associated with early embryonic deaths and an imbalance in some fetal abnormalities in pregnant rats administered liraglutide during organogenesis at doses that approximate clinical exposures at the maximum recommended human dose (MRHD) of 1.8 mg/day. In pregnant rabbits administered liraglutide during organogenesis, decreased fetal weight and an increased incidence of major fetal abnormalities were seen at exposures below the human exposures at the MRHD [see *Data*].

In the U.S. general population, the estimated background risk of major birth defects and miscarriage in clinically recognized pregnancies is 2 to 4% and 15 to 20%, respectively. The estimated background risk of major birth defects is 6 to 10% in women with pre-gestational diabetes with a peri-conceptional HbA<sub>1c</sub> >7 and has been reported to be as high as 20 to 25% in women with a peri-conceptional HbA<sub>1c</sub> >10. The estimated background risk of miscarriage for the indicated population is unknown.

#### Clinical Considerations

##### Disease-Associated Maternal and/or Embryo/fetal Risk

Hypoglycemia and hyperglycemia occur more frequently during pregnancy in patients with pre-gestational diabetes. Poorly controlled diabetes in pregnancy increases the maternal risk for diabetic ketoacidosis, pre-eclampsia, spontaneous abortions, preterm delivery, and delivery complications. Poorly controlled diabetes mellitus increases the fetal risk for major birth defects, stillbirth, macrosomia related morbidity.

#### Data

##### Animal Data

##### Insulin degludec

Insulin degludec was investigated in studies covering fertility, embryo-fetal development and pre- and post-natal development in rats and during the period of embryo-fetal development in rabbits. Human insulin (NPH insulin) was included as comparator. In these studies insulin degludec was given subcutaneously at up to 21 U/kg/day in rats and 3.3 U/kg/day in rabbits, resulting in 5 times (rat) and 10 times (rabbit) the human exposure (AUC) at a human subcutaneous dose of 0.75 U/kg/day. Overall the effects of insulin degludec were similar to those observed with human insulin.

##### Liraglutide

Female rats given subcutaneous doses of 0.1, 0.25 and 1.0 mg/kg/day liraglutide beginning 2 weeks before mating through gestation day 17 had estimated systemic exposures 0.8-, 3-, and 11-times the human exposure at the MRHD based on plasma AUC comparison. The number of early embryonic deaths in the 1 mg/kg/day group increased slightly. Fetal abnormalities and variations in kidneys and blood vessels, irregular ossification of the skull, and a more complete state of ossification occurred at all doses. Mottled liver and minimally kinked ribs occurred at the highest dose. The incidence of fetal malformations in liraglutide-treated groups exceeding concurrent

and historical controls were misshapen oropharynx and/or narrowed opening into larynx at 0.1 mg/kg/day and umbilical hernia at 0.1 and 0.25 mg/kg/day.

Pregnant rabbits given subcutaneous doses of 0.01, 0.025 and 0.05 mg/kg/day liraglutide from gestation day 6 through day 18 inclusive, had estimated systemic exposures less than the human exposure at the MRHD of 1.8 mg/day at all doses, based on plasma AUC. Liraglutide decreased fetal weight and dose dependently increased the incidence of total major fetal abnormalities at all doses. The incidence of malformations exceeded concurrent and historical controls at 0.01 mg/kg/day (kidneys, scapula), ≥ 0.01 mg/kg/day (eyes, forelimb), 0.025 mg/kg/day (brain, tail and sacral vertebrae, major blood vessels and heart, umbilicus), ≥ 0.025 mg/kg/day (sternum) and at 0.05 mg/kg/day (parietal bones, major blood vessels). Irregular ossification and/or skeletal abnormalities occurred in the skull and jaw, vertebrae and ribs, sternum, pelvis, tail, and scapula; and dose-dependent minor skeletal variations were observed. Visceral abnormalities occurred in blood vessels, lung, liver, and esophagus. Bilobed or bifurcated gallbladder was seen in all treatment groups, but not in the control group.

In pregnant female rats given subcutaneous doses of 0.1, 0.25 and 1.0 mg/kg/day liraglutide from gestation day 6 through weaning or termination of nursing on lactation day 24, estimated systemic exposures were 0.8-, 3-, and 11-times human exposure at the MRHD of 1.8 mg/day, based on plasma AUC. A slight delay in parturition was observed in the majority of treated rats. Group mean body weight of neonatal rats from liraglutide-treated dams was lower than neonatal rats from control group dams. Bloody scabs and agitated behavior occurred in male rats descended from dams treated with 1 mg/kg/day liraglutide. Group mean body weight from birth to postpartum day 14 trended lower in F2 generation rats descended from liraglutide-treated rats compared to F2 generation rats descended from controls, but differences did not reach statistical significance for any group.

### 8.2 Lactation

#### Risk Summary

There are no data on the presence of liraglutide or insulin degludec in human milk, the effects on the breastfed infant, or the effects on milk production. In lactating rats, insulin degludec and liraglutide, the two components of XULTOPHY® 100/3.6, were present in milk.

The developmental and health benefits of breastfeeding should be considered along with the mother's clinical need for XULTOPHY® 100/3.6 and any potential adverse effects on the breastfed infant from XULTOPHY® 100/3.6 or from the underlying maternal condition.

#### Data

##### Insulin degludec

In lactating rats, insulin degludec was present in milk at a concentration lower than that in plasma.

##### Liraglutide

In lactating rats, liraglutide was present unchanged in milk at concentrations approximately 50% of maternal plasma concentrations.

### 8.4 Pediatric Use

Safety and effectiveness of XULTOPHY® 100/3.6 have not been established in pediatric patients.

### 8.5 Geriatric Use

Of the total number of 1881 subjects in clinical studies of XULTOPHY® 100/3.6, 375 (19.9%) were 65 years and over, while 52 (2.8%) were 75 years and over [see *Clinical Studies* (14)]. No overall differences in safety or effectiveness of XULTOPHY® 100/3.6 were observed between patients 65 years of age and older and younger patients.

Age had no clinically relevant effect on the pharmacokinetics of XULTOPHY® 100/3.6 [see *Clinical Pharmacology* (12.3)].

In geriatric patients with diabetes, the initial dosing, dose increments, and maintenance dosage should be conservative to avoid hypoglycemic reactions. Hypoglycemia may be more difficult to recognize in geriatric patients.

### 8.6 Renal Impairment

#### XULTOPHY® 100/3.6

There is limited experience with XULTOPHY® 100/3.6 in patients with mild and moderate kidney impairment and when used in these patients, additional glucose monitoring and XULTOPHY® 100/3.6 dose adjustments may be required on an individual basis. XULTOPHY® 100/3.6 has not been studied in patients with severe kidney impairment [see *Warnings and Precautions* (5.7) and *Clinical Pharmacology* (12.3)].

#### Insulin degludec

No clinically relevant difference in the pharmacokinetics of insulin degludec was identified in a study comparing healthy subjects and subjects with kidney impairment including subjects with end stage kidney disease.

#### Liraglutide

The safety and efficacy of liraglutide was evaluated in a 26 week clinical study that included patients with moderate kidney impairment (eGFR 30 to 60 mL/min/1.73 m<sup>2</sup>). In the liraglutide treatment arm of a cardiovascular outcomes trial (LEADER trial) [see *Clinical Studies* (14.4)], 1932 (41.4%) patients had mild kidney impairment, 999 (21.4%) patients had moderate renal impairment and 117 (2.5%) patients had

severe kidney impairment at baseline. No overall differences in safety or efficacy were seen in these patients compared to patients with normal kidney function.

There is limited experience with liraglutide in patients with end stage kidney disease.

### 8.7 Hepatic Impairment

#### XULTOPHY® 100/3.6

XULTOPHY® 100/3.6 has not been studied in patients with hepatic impairment.

#### Insulin degludec

No clinically relevant difference in the pharmacokinetics of insulin degludec, one of the components of XULTOPHY® 100/3.6, was identified in a study comparing healthy subjects and subjects with hepatic impairment (mild, moderate, and severe hepatic impairment) [see *Clinical Pharmacology* (12.3)].

#### Liraglutide

There is limited experience in patients with mild, moderate or severe hepatic impairment with liraglutide, one of the components of XULTOPHY® 100/3.6 [see *Clinical Pharmacology* (12.3)].

## 10 OVERDOSAGE

Hypoglycemia (from insulin and liraglutide) and gastrointestinal adverse reactions (from liraglutide) may develop if a patient is dosed with more XULTOPHY® 100/3.6 than required.

An excess of insulin-containing products like XULTOPHY® 100/3.6 relative to food intake, energy expenditure, or both may lead to severe and sometimes prolonged and life-threatening hypoglycemia and hypokalemia [see *Warnings and Precautions* (5.6, 5.10)]. Mild episodes of hypoglycemia usually can be treated with oral glucose. Lowering the drug dosage, and adjustments in meal patterns, or exercise may be needed. More severe episodes of hypoglycemia with coma, seizure, or neurologic impairment may be treated with intramuscular/subcutaneous glucagon for emergency use or concentrated intravenous glucose. After apparent clinical recovery from hypoglycemia, continued observation and additional carbohydrate intake may be necessary to avoid reoccurrence of hypoglycemia. Hypokalemia must be corrected appropriately.

Overdoses have been reported in clinical trials and postmarketing use of liraglutide, one of the components of XULTOPHY® 100/3.6. Effects have included severe nausea and severe vomiting. In the event of overdose, consider contacting the Poison Help line (1-800-222-1222) or a medical toxicologist for additional overdose management recommendations. Initiate appropriate supportive treatment according to the patient's clinical signs and symptoms.

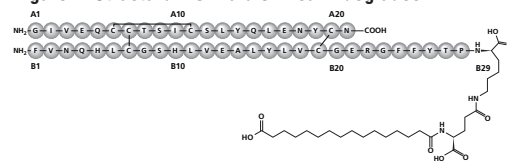
## 11 DESCRIPTION

### Insulin degludec

Insulin degludec is a long-acting basal human insulin analog. Insulin degludec is produced by a process that includes expression of recombinant DNA in *Saccharomyces cerevisiae* followed by chemical modification.

Insulin degludec differs from human insulin in that the amino acid threonine in position B30 has been omitted and a side-chain consisting of glutamic acid and a C16 fatty acid has been attached (chemical name: LysB29(Nε-hexadecanoyl-γ-Glu) des(B30) human insulin). Insulin degludec has a molecular formula of C<sub>274</sub>H<sub>411</sub>N<sub>65</sub>O<sub>81</sub>S<sub>6</sub> and a molecular weight of 6.104 kDa. It has the following structure:

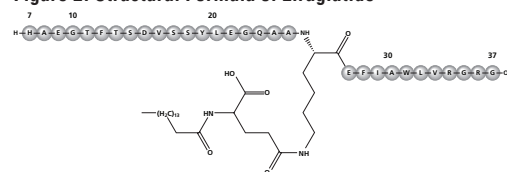
**Figure 1. Structural Formula of Insulin degludec**



### Liraglutide

Liraglutide is an analog of human GLP-1 and acts as a GLP-1 receptor agonist. The peptide precursor of liraglutide, produced by a process that includes expression of recombinant DNA in *Saccharomyces cerevisiae*, has been engineered to be 97% homologous to native human GLP-1 by substituting arginine for lysine at position 34. Liraglutide is made by attaching a C16 fatty acid (palmitic acid) with a glutamic acid spacer on the remaining lysine residue at position 26 of the peptide precursor. The molecular formula of liraglutide is C<sub>172</sub>H<sub>265</sub>N<sub>43</sub>O<sub>51</sub> and the molecular weight is 3.751 kDa. It has the following structure:

**Figure 2. Structural Formula of Liraglutide**



XULTOPHY® 100/3.6 (insulin degludec and liraglutide) injection, for subcutaneous use, is a combination of a long-acting basal human insulin analog, insulin degludec, and a GLP-1 receptor agonist, liraglutide.

XULTOPHY® 100/3.6 is a sterile, aqueous, clear, and colorless solution. Each pre-filled pen contains 3 mL equivalent to 300 units insulin degludec and 10.8 mg liraglutide. Each mL contains 100 units insulin degludec and 3.6 mg liraglutide.

XULTOPHY® 100/3.6 contains the following inactive ingredients per mL: glycerol (19.7 mg), phenol (5.7 mg), zinc (55 mcg), and Water for Injection, USP. XULTOPHY® 100/3.6 has a pH of approximately 8.15. Hydrochloric acid or sodium hydroxide may be added to adjust pH.

## 12 CLINICAL PHARMACOLOGY

### 12.1 Mechanism of Action

#### XULTOPHY® 100/3.6

XULTOPHY® 100/3.6 is a combination product consisting of insulin degludec and liraglutide.

#### Insulin degludec

The primary activity of insulin degludec is the regulation of glucose metabolism. Insulin and its analogs lower blood glucose by stimulating peripheral glucose uptake, especially by skeletal muscle and fat, and by inhibiting hepatic glucose production. Insulin also inhibits lipolysis and proteolysis, and enhances protein synthesis.

#### Liraglutide

Liraglutide is a GLP-1 receptor agonist that increases glucose-dependent insulin release, decreases glucagon secretion, and slows gastric emptying.

### 12.2 Pharmacodynamics

Following a single dose administration, XULTOPHY® 100/3.6 has a duration of action reflecting the combination of the individual glucodynamic action profiles of insulin degludec and liraglutide.

Following once-daily administration, XULTOPHY® 100/3.6 lowers fasting plasma glucose levels and postprandial glucose levels.

#### Cardiac Electrophysiology (QTc):

##### XULTOPHY® 100/3.6

The effect of XULTOPHY® 100/3.6 on QTc has not been studied.

#### Liraglutide

The effect of liraglutide, one of the components of XULTOPHY® 100/3.6, on cardiac repolarization was tested in a QTc study. Liraglutide, at steady state concentrations with daily doses up to 1.8 mg, did not produce QTc prolongation.

### 12.3 Pharmacokinetics

Overall, the pharmacokinetics of insulin degludec and liraglutide were not affected in a clinically relevant manner when administered as XULTOPHY® 100/3.6.

#### Absorption

In patients with type 2 diabetes mellitus (mean body weight 87.5 kg) reaching the maximum daily dose (50 units/1.8 mg) of XULTOPHY® 100/3.6, the estimated mean steady-state exposure (AUC 0-24 h) of insulin degludec was 113 h\*nmol/L and of liraglutide 1227 h\*ng/mL based on population pharmacokinetic analysis. The corresponding maximum concentrations were 5196 pmol/L for insulin degludec and 55 ng/mL for liraglutide. Steady state concentrations of insulin degludec and liraglutide are reached after 2-3 days of daily administration.

#### Distribution

Insulin degludec and liraglutide are extensively bound to plasma proteins >99% and >98%, respectively.

#### Elimination

The half-life of insulin degludec is approximately 25 hours and the half-life of liraglutide is approximately 13 hours.

#### Metabolism

##### Insulin degludec

Degradation of insulin degludec is similar to that of human insulin; all metabolites formed are inactive.

##### Liraglutide

During the initial 24 hours following administration of a single [<sup>3</sup>H]-liraglutide dose to healthy subjects, the major component in plasma was intact liraglutide. Liraglutide is endogenously metabolized in a similar manner to large proteins without a specific organ as a major route of elimination.

#### Specific Populations

##### Geriatric Patients

Age had no clinically relevant effect on the pharmacokinetics of XULTOPHY® 100/3.6 based on results from a population pharmacokinetic analysis including adult patients up to 83 years treated with XULTOPHY® 100/3.6 [see Use in Specific Populations (8.5)].

##### Male and Female Patients

There were no clinically relevant differences in the pharmacokinetics of XULTOPHY® 100/3.6 in male and female patients, based on results from a population pharmacokinetic analysis.

#### Racial or Ethnic Groups

There were no clinically relevant differences in the pharmacokinetics of XULTOPHY® 100/3.6 between the racial and ethnic groups investigated, based on results from a population pharmacokinetic analysis.

#### Body weight

The effect of body weight on the exposure level of the components of XULTOPHY® 100/3.6 was investigated in the population pharmacokinetic analysis. Exposure levels decreased with increase in baseline body weight for both insulin degludec and liraglutide.

#### Patients with Renal Impairment

##### XULTOPHY® 100/3.6

There is limited experience with XULTOPHY® 100/3.6 in patients with mild and moderate renal impairment. XULTOPHY® 100/3.6 has not been studied in patients with severe renal impairment [see Warnings and Precautions (5.7)].

##### Insulin degludec

Insulin degludec has been studied in a pharmacokinetic study in 32 subjects (n=6/group) with normal or impaired renal function/end-stage renal disease following administration of a single dose (0.4 U/kg) of insulin degludec. Renal function was defined using creatinine clearance (Cl<sub>cr</sub>) as follows: >80 mL/min (normal), 50-80 mL/min (mild), 30-50 mL/min (moderate) and <30 mL/min (severe). Subjects requiring dialysis were classified as having end-stage renal disease (ESRD). Total exposure (AUC<sub>0-24h</sub>, SD) of insulin degludec was similar in subjects with normal and impaired renal function. No clinically relevant difference in the pharmacokinetics of insulin degludec was identified between healthy subjects and subjects with renal impairment. Hemodialysis did not affect clearance of insulin degludec (CL/F<sub>0-24h</sub>, SD) in subjects with ESRD [see Warnings and Precautions (5.7)].

##### Liraglutide

The single-dose pharmacokinetics of liraglutide were evaluated in subjects with varying degrees of renal impairment. Subjects with mild (estimated creatinine clearance 50-80 mL/min) to severe (estimated creatinine clearance <30 mL/min) renal impairment and subjects with end-stage renal disease requiring dialysis were included in the trial. Compared to healthy subjects, liraglutide AUC in mild, moderate, and severe renal impairment and in end-stage renal disease was on average 35%, 19%, 29% and 30% lower, respectively [see Warnings and Precautions (5.7)].

#### Patients with Hepatic Impairment

##### XULTOPHY® 100/3.6

XULTOPHY® 100/3.6 has not been studied in patients with hepatic impairment.

##### Insulin degludec

Insulin degludec has been studied in a pharmacokinetic study in 24 subjects (n=6/group) with normal or impaired hepatic function (mild, moderate, and severe hepatic impairment) following administration of a single dose (0.4 U/kg) of insulin degludec. Hepatic function was defined using Child-Pugh Scores ranging from 5 (mild hepatic impairment) to 15 (severe hepatic impairment). No clinically relevant differences in the pharmacokinetics of insulin degludec were identified between healthy subjects and subjects with hepatic impairment [see Hepatic Impairment (8.7)].

##### Liraglutide

The single-dose pharmacokinetics of liraglutide were evaluated in subjects with varying degrees of hepatic impairment. Subjects with mild (Child Pugh score 5-6) to severe (Child Pugh score > 9) hepatic impairment were included in the trial. Compared to healthy subjects, liraglutide AUC in subjects with mild, moderate and severe hepatic impairment was on average 11%, 14% and 42% lower, respectively.

#### Drug Interaction Studies

##### In vitro assessment of drug-drug interactions

*In vitro* data suggest that the potential for pharmacokinetic drug interactions related to CYP interaction and protein binding is low for both the liraglutide and insulin degludec components of XULTOPHY® 100/3.6.

The delay of gastric emptying with liraglutide one of the components of XULTOPHY® 100/3.6 may influence absorption of concomitantly administered oral medicinal products. Interaction studies did not show any clinically relevant delay of absorption.

##### In vivo assessment of drug-drug interactions

##### Liraglutide

The drug-drug interaction studies were performed at steady state with liraglutide 1.8 mg/day. Before administration of concomitant treatment, subjects underwent a 0.6 mg weekly dose increase to reach the maximum dose of 1.8 mg/day. Administration of the interacting drugs was timed so that C<sub>max</sub> of liraglutide (8-12 h) would coincide with the absorption peak of the co-administered drugs.

##### Digoxin

A single dose of digoxin 1 mg was administered 7 hours after the dose of liraglutide at steady state. The concomitant administration with liraglutide resulted in a reduction of digoxin AUC by 16%; C<sub>max</sub> decreased by 31%. Digoxin median time to maximal concentration (T<sub>max</sub>) was delayed from 1 h to 1.5 h.

##### Lisinopril

A single dose of lisinopril 20 mg was administered 5 minutes after the dose of liraglutide at steady state. The co-administration with liraglutide resulted in a reduction of lisinopril AUC by 15%; C<sub>max</sub> decreased by 27%. Lisinopril median T<sub>max</sub> was delayed from 6 h to 8 h with liraglutide.

##### Atorvastatin

Liraglutide did not change the overall exposure (AUC) of atorvastatin following a single dose of atorvastatin 40 mg, administered 5 hours after the dose of liraglutide at steady state. Atorvastatin C<sub>max</sub> was decreased by 38% and median T<sub>max</sub> was delayed from 1 to 3 hours with liraglutide.

##### Acetaminophen

Liraglutide did not change the overall exposure (AUC) of acetaminophen following a single dose of acetaminophen 1000 mg, administered 8 hours after the dose of liraglutide at steady state. Acetaminophen C<sub>max</sub> was decreased by 31% and median T<sub>max</sub> was delayed up to 15 minutes.

##### Griseofulvin

Liraglutide did not change the overall exposure (AUC) of griseofulvin following co-administration of a single dose of griseofulvin 500 mg with liraglutide at steady state. Griseofulvin C<sub>max</sub> increased by 37% while median T<sub>max</sub> did not change.

##### Oral Contraceptives

A single dose of an oral contraceptive combination product containing 0.03 mg ethinylestradiol and 0.15 mg levonorgestrel was administered under fed conditions and 7 hours after the dose of liraglutide at steady state. Liraglutide lowered ethinylestradiol and levonorgestrel C<sub>max</sub> by 12% and 13%, respectively. There was no effect of liraglutide on the overall exposure (AUC) of ethinylestradiol. Liraglutide increased the levonorgestrel AUC<sub>0-∞</sub> by 18%. Liraglutide delayed T<sub>max</sub> for both ethinylestradiol and levonorgestrel by 1.5 hours.

### 12.6 Immunogenicity

The observed incidence of anti-drug antibodies is highly dependent on the sensitivity and specificity of the assay. Differences in assay methods preclude meaningful comparisons of the incidence of anti-drug antibodies in the studies described below with the incidence of anti-drug antibodies in other studies, including those of XULTOPHY® 100/3.6, insulin degludec, or liraglutide.

#### XULTOPHY® 100/3.6

Administration of XULTOPHY® 100/3.6 may cause formation of antibodies against insulin degludec and/or liraglutide. In rare cases, the presence of such antibodies may necessitate adjustment of the XULTOPHY® 100/3.6 dose in order to correct a tendency to hyper- or hypoglycemia. During the 26-52 week clinical trials where antibodies were measured in patients receiving XULTOPHY® 100/3.6, 90/812 (11%) patients were positive for insulin degludec specific antibodies at end of treatment vs. 22/936 (2%) at baseline, 250/811 (31%) patients were positive for antibodies cross-reacting with human insulin at end of treatment vs. 136/930 (15%) at baseline, 17/815 (2%) of patients developed treatment induced anti-liraglutide antibodies. No patients had pre-existing anti-liraglutide antibodies. Antibody formation has not been associated with reduced efficacy of XULTOPHY® 100/3.6.

#### Liraglutide

A subset of liraglutide-treated patients (1104 of 2501, 44%) in five adult double-blind clinical trials of 26 weeks duration or longer were tested for the presence of anti-liraglutide antibodies at the end of treatment [see Clinical Studies (14.1)] and 102/1104 (9%) of liraglutide-treated patients developed anti-liraglutide antibodies. Of these 102 liraglutide-treated patients, 56 (5%) patients developed antibodies that cross-reacted with native GLP-1. These cross-reacting antibodies were not tested for neutralizing effect against native GLP-1, and thus the potential for clinically significant neutralization of native GLP-1 was not assessed. Antibodies that had a neutralizing effect on liraglutide in an *in vitro* assay occurred in 12 (1%) of the liraglutide-treated patients. There was no identified clinically significant effect of anti-liraglutide antibodies on effectiveness of liraglutide.

In five double-blind glycemic control trials of liraglutide, events from a composite of adverse events potentially related to immunogenicity (e.g. urticaria, angioedema) occurred among 0.8% of liraglutide-treated patients and among 0.4% of comparator-treated patients. Urticaria accounted for approximately one-half of the events in this composite for liraglutide-treated patients. Patients who developed anti-liraglutide antibodies were not more likely to develop events from the immunogenicity events composite than were patients who did not develop anti-liraglutide antibodies.

In a cardiovascular outcomes trial (LEADER trial) [see Clinical Studies (14.4)], anti-liraglutide antibodies were detected in 11 out of the 1247 (0.9%) liraglutide-treated patients with antibody measurements. Of the 11 liraglutide-treated patients who developed anti-liraglutide antibodies, none were observed to develop neutralizing antibodies to liraglutide, and 5 patients (0.4%) developed cross-reacting antibodies against native GLP-1.

#### TRESIBA® (insulin degludec)

In a 52-week study of adult insulin-naïve type 2 diabetes mellitus patients of the patients who received insulin degludec, 13/760 (2%)



patients were positive at baseline for anti-insulin degludec antibodies and 46/744 (6%) patients developed anti-insulin degludec antibodies at least once during the study. The 58/60 (97%) patients who were positive for anti-insulin degludec antibodies were also positive for anti-human insulin antibodies.

### 13 NONCLINICAL TOXICOLOGY

#### 13.1 Carcinogenesis, Mutagenesis, Impairment of Fertility

##### XULTOPHY® 100/3.6

No studies have been conducted with the XULTOPHY® 100/3.6 combination to evaluate carcinogenesis, mutagenesis or impairment of fertility. The following data are based upon studies with insulin degludec and liraglutide individually.

##### Insulin degludec

Standard 2-year carcinogenicity studies in animals have not been performed to evaluate the carcinogenic potential of insulin degludec. In a 52-week study including human insulin (NPH insulin) as comparator, Sprague-Dawley rats were dosed subcutaneously with insulin degludec at 3.3, 6.7, and 10 U/kg/day, resulting in 5 times the human exposure (AUC) when compared to a human subcutaneous dose of 0.75 U/kg/day. Human insulin was dosed at 6.7 U/kg/day. No treatment-related increases in incidences of hyperplasia, benign or malignant tumors were recorded in female mammary glands from rats dosed with insulin degludec and no treatment related changes in the female mammary gland cell proliferation were found using BrdU incorporation. Further, no treatment related changes in the occurrence of hyperplastic or neoplastic lesions were seen in any animals dosed with insulin degludec when compared to vehicle or human insulin.

Genotoxicity testing of insulin degludec was not performed.

In a combined fertility and embryo-fetal study in male and female rats, treatment with insulin degludec up to 21 U/kg/day (approximately 5 times the human subcutaneous dose of 0.75 U/kg/day, based on U/body surface area) prior to mating and in female rats during gestation had no effect on mating performance and fertility.

##### Liraglutide

A 104-week carcinogenicity study was conducted in male and female CD-1 mice at doses of 0.03, 0.2, 1.0, and 3.0 mg/kg/day liraglutide administered by bolus subcutaneous injection yielding systemic exposures 0.2-, 2-, 10- and 45-times the human exposure, respectively, at the MRHD of 1.8 mg/day based on plasma AUC comparison. A dose-related increase in benign thyroid C-cell adenomas was seen in the 1.0 and the 3.0 mg/kg/day groups with incidences of 13% and 19% in males and 6% and 20% in females, respectively. C-cell adenomas did not occur in control groups or 0.03 and 0.2 mg/kg/day groups. Treatment-related malignant C-cell carcinomas occurred in 3% of females in the 3.0 mg/kg/day group. Thyroid C-cell tumors are rare findings during carcinogenicity testing in mice. A treatment-related increase in fibrosarcomas was seen on the dorsal skin and subcutis, the body surface used for drug injection, in males in the 3 mg/kg/day group. These fibrosarcomas were attributed to the high local concentration of drug near the injection site. The liraglutide concentration in the clinical formulation (6 mg/mL) is 10-times higher than the concentration in the formulation used to administer 3 mg/kg/day liraglutide to mice in the carcinogenicity study (0.6 mg/mL).

A 104-week carcinogenicity study was conducted in male and female Sprague Dawley rats at doses of 0.075, 0.25 and 0.75 mg/kg/day liraglutide administered by bolus subcutaneous injection with exposures 0.5-, 2- and 8-times the human exposure, respectively, resulting from the MRHD based on plasma AUC comparison. A treatment-related increase in benign thyroid C-cell adenomas was seen in males in 0.25 and 0.75 mg/kg/day liraglutide groups with incidences of 12%, 16%, 42%, and 46% and in all female liraglutide-treated groups with incidences of 10%, 27%, 33%, and 56% in 0 (control), 0.075, 0.25, and 0.75 mg/kg/day groups, respectively. A treatment-related increase in malignant thyroid C-cell carcinomas was observed in all male liraglutide-treated groups with incidences of 2%, 8%, 6%, and 14% and in females at 0.25 and 0.75 mg/kg/day with incidences of 0%, 0%, 4%, and 6% in 0 (control), 0.075, 0.25, and 0.75 mg/kg/day groups, respectively. Thyroid C-cell carcinomas are rare findings during carcinogenicity testing in rats.

Studies in mice demonstrated that liraglutide-induced C-cell proliferation was dependent on the GLP-1 receptor and that liraglutide did not cause activation of the REarranged during Transfection (RET) proto-oncogene in thyroid C-cells.

Human relevance of thyroid C-cell tumors in mice and rats is unknown and has not been determined by clinical studies or nonclinical studies [see Boxed Warning and Warnings and Precautions (5.1)].

Liraglutide was negative with and without metabolic activation in the Ames test for mutagenicity and in a human peripheral blood lymphocyte chromosome aberration test for clastogenicity. Liraglutide was negative in repeat-dose *in vivo* micronucleus tests in rats.

In rat fertility studies using subcutaneous doses of 0.1, 0.25 and 1.0 mg/kg/day liraglutide, males were treated for 4 weeks prior to and throughout mating and females were treated 2 weeks prior to and throughout mating until gestation day 17. No direct adverse effects on

male fertility was observed at doses up to 1.0 mg/kg/day, a high dose yielding an estimated systemic exposure 11-times the human exposure at the MRHD, based on plasma AUC. In female rats, an increase in early embryonic deaths occurred at 1.0 mg/kg/day. Reduced body weight gain and food consumption were observed in females at the 1.0 mg/kg/day dose.

### 14 CLINICAL STUDIES

#### 14.1 Overview of Clinical Studies

A total of 3908 patients with type 2 diabetes mellitus participated in 6 randomized, parallel and active or placebo-controlled phase 3 trials of 26 weeks duration.

Three studies were conducted in patients inadequately controlled on one or more OADs (e.g. metformin, pioglitazone, sulfonylurea, or sodium-glucose cotransporter-2 inhibitors (SGLT2i) (Tables 5-7). Three studies were conducted in patients converting from liraglutide or basal insulin: one study was conducted in patients converting from liraglutide (with doses up to 1.8 mg), (Table 8), one study was conducted in patients converting from any basal insulin (Table 9), and one study was conducted in patients converting from insulin glargine U-100 (Table 10).

In all trials, XULTOPHY® 100/3.6 was titrated twice weekly by increments or decrements of 2 units (2 units insulin degludec/0.072 mg liraglutide), towards a pre-specified fasting blood glucose target. The same titration algorithm was applied for basal insulin comparators.

#### 14.2 Patients with Type 2 Diabetes Mellitus Uncontrolled on OAD Treatment

NCT01336023: The efficacy and safety of XULTOPHY® 100/3.6 compared to insulin degludec and liraglutide, all administered once-daily, was studied in a 26-week randomized, open-label, three-arm parallel trial in 1660 patients with type 2 diabetes mellitus inadequately controlled on 1-2 OADs (metformin or metformin with or without pioglitazone).

The mean age of the trial population was 55 years and mean duration of diabetes was 7 years. 51% were male. 62% were White, 7% were Black or African American and 15% were Hispanic or Latino ethnicity. 5% of patients had eGFR < 60mL/min/1.73m<sup>2</sup>; no patients had eGFR < 30mL/min/1.73m<sup>2</sup>. The mean BMI was 31.2 kg/m<sup>2</sup>.

The starting dose of XULTOPHY® 100/3.6 was 10 units (10 units insulin degludec/0.36 mg liraglutide). The starting dose of insulin degludec was 10 units. XULTOPHY® 100/3.6 and insulin degludec were titrated twice weekly towards a target fasting blood glucose goal of 72-90 mg/dL. Patients in the liraglutide arm followed a fixed dose escalation scheme with a starting dose of 0.6 mg and a dose increase of 0.6 mg weekly until a daily dose of 1.8 mg was reached. Patients continued on pre-trial treatment with metformin or metformin and pioglitazone throughout the trial.

At the end of 26 weeks, treatment with XULTOPHY® 100/3.6, insulin degludec, and liraglutide resulted in a reduction in HbA<sub>1c</sub> from baseline of 1.81%, 1.35% and 1.21%, respectively, (see Table 5). The end of trial dose of XULTOPHY® 100/3.6 was 38 units (38 units insulin degludec/1.37 mg liraglutide).

#### Table 5. Results of a 26-Week Trial with XULTOPHY® 100/3.6 in Patients with Type 2 Diabetes Mellitus Inadequately Controlled on Metformin Alone or in Combination with Pioglitazone

	XULTOPHY® 100/3.6 + metformin ± pioglitazone	Insulin degludec + metformin ± pioglitazone	Liraglutide + metformin ± pioglitazone
<b>Total (N)</b>	833	413	414
<b>HbA<sub>1c</sub> (%)</b>			
Baseline	8.3	8.3	8.3
End of Trial (LS Mean) <sup>a</sup>	6.5	6.9	7.1
Change from baseline (LS Mean) <sup>a</sup>	-1.81	-1.35	-1.21
Estimated treatment difference [95% CI] <sup>a</sup>	--	-0.46% [-0.59; -0.34] <sup>a</sup>	-0.60% [-0.72; -0.47] <sup>a</sup>
Percentage of patients achieving HbA <sub>1c</sub> <7% <sup>##</sup>	74.1%	60.5%	56.0%
<b>Fasting Plasma Glucose (FPG)(mg/dL)</b>			
Baseline	166	169	163
End of Trial (LS Mean) <sup>a</sup>	104	107	133
Change from baseline (LS Mean) <sup>a</sup>	-61.8	-59.2	-32.4

<sup>a</sup>p<0.01. Primary endpoint was tested for non-inferiority of XULTOPHY® 100/3.6 to insulin degludec based on pre-specified non-inferiority margin of 0.3% and for superiority of XULTOPHY® 100/3.6 to liraglutide.

<sup>##</sup>Estimated using an ANCOVA with treatment, baseline HbA<sub>1c</sub> stratum, sub-study, concomitant diabetes treatment and country as factors and baseline response as covariate. Multiple imputation modelled "return to baseline" of the treatment effect for subjects having missing week 26 data.

<sup>##</sup>Patients with missing HbA<sub>1c</sub> value at week 26 data were considered non-responders. There were 11.8% of subjects in the XULTOPHY® 100/3.6 arm, 12.3% in the insulin degludec arm and 15.5% in the liraglutide arm for whom HbA<sub>1c</sub> data was missing at week 26.

NCT01618162: The efficacy and safety of XULTOPHY® 100/3.6 compared to placebo were studied in a 26-week randomized, double-blind, treat-to-target trial in 435 patients with type 2 diabetes mellitus inadequately controlled on sulfonylurea alone or in combination with metformin.

The mean age of the trial population was 60 years, and mean duration of diabetes was 9 years. 52% were male. 75% were White, 7% were Black or African American and 9% were Hispanic or Latino ethnicity. 11% of patients had eGFR < 60mL/min/1.73m<sup>2</sup>; no patients had eGFR < 30mL/min/1.73m<sup>2</sup>. The mean BMI was 31.5 kg/m<sup>2</sup>.

XULTOPHY® 100/3.6 was started at 10 units (10 units insulin degludec/0.36 mg liraglutide) and titrated twice weekly towards a target fasting blood glucose goal of 72-108 mg/dL. Patients continued on pre-trial treatment with sulfonylurea, with or without metformin throughout the trial.

Treatment with XULTOPHY® 100/3.6 for 26 weeks resulted in a statistically significant reduction in mean HbA<sub>1c</sub> compared to placebo (see Table 6). The end of trial dose of XULTOPHY® 100/3.6 was 28 units (28 units insulin degludec/1.01 mg liraglutide).

#### Table 6. Results of a 26-Week Trial with XULTOPHY® 100/3.6 in Patients with Type 2 Diabetes Mellitus Inadequately Controlled on Sulfonylurea Alone or in Combination with Metformin

	XULTOPHY® 100/3.6 + sulfonylurea <sup>***</sup> ± metformin	Placebo + sulfonylurea <sup>***</sup> ± metformin
<b>Total (N)</b>	289	146
<b>HbA<sub>1c</sub> (%)</b>		
Baseline	7.9	7.9
End of Trial (LS Mean) <sup>a</sup>	6.5	7.3
Change from baseline (LS Mean) <sup>a</sup>	-1.42	-0.62
Estimated treatment difference [95% CI] <sup>a</sup>	-0.81% [-0.98; -0.63] <sup>a</sup>	
Percentage of patients achieving HbA <sub>1c</sub> <7% <sup>##</sup>	70.9%	26.7%
<b>FPG (mg/dL)</b>		
Baseline	164	165
End of Trial (LS Mean) <sup>a</sup>	118	152
Change from baseline (LS Mean) <sup>a</sup>	-46.2	-12.1

<sup>a</sup>p<0.01. Primary endpoint was tested for superiority of XULTOPHY® 100/3.6 to placebo.

<sup>##</sup>Estimated using an ANCOVA with treatment, region and pre-trial medication as fixed factors and baseline response as covariate. Multiple imputation modelled "jump-to-control" of the treatment effect for subjects having missing week 26 data.

<sup>##</sup>Patients with missing HbA<sub>1c</sub> value at week 26 data were considered non-responders.

There were 12.8% of subjects in the XULTOPHY® 100/3.6 arm and 24.7% in the placebo arm for whom HbA<sub>1c</sub> data was missing at week 26.

<sup>\*\*\*</sup>Dose of sulfonylurea was ≥ half of the maximum approved dose.

NCT02773368: The efficacy and safety of XULTOPHY® 100/3.6 compared to insulin glargine U-100, both administered once-daily, were studied in a 26-week randomized, open-label, two-arm parallel trial in 420 patients with type 2 diabetes mellitus inadequately controlled on a SGLT2i alone or in combination with other OADs [with or without metformin, pioglitazone, and/or dipeptidyl peptidase-4 (DPP-4) inhibitor]. At randomization, the DPP-4 inhibitor was discontinued.

The mean age of the trial population was 57 years and mean duration of diabetes was 10 years. 59% were male. 82% were White, 1% were Black or African American and 16% were Hispanic or Latino ethnicity. 3% of patients had eGFR < 60mL/min/1.73m<sup>2</sup>; none of the patients had eGFR < 30mL/min/1.73m<sup>2</sup>. The mean BMI was 31.2 kg/m<sup>2</sup>.

The starting dose of XULTOPHY® 100/3.6 was 10 units (10 units insulin degludec/0.36 mg liraglutide). The starting dose of insulin glargine U-100 was 10 units. XULTOPHY® 100/3.6 and insulin glargine U-100 were titrated twice weekly to target a fasting blood glucose goal of 72-90 mg/dL. Patients could not increase the dose of XULTOPHY® 100/3.6 and insulin glargine U-100 by more than 4 units per week, and there was no maximum allowed dose of insulin glargine. The patients continued on pre-trial treatment with SGLT2i, with or without other OADs throughout the entire trial. The targeted fasting blood glucose goal was achieved by 49.0% of patients randomized to XULTOPHY® 100/3.6 and 41.9% of patients randomized to insulin glargine at 26 weeks.

At the end of 26 weeks, XULTOPHY® 100/3.6 resulted in a reduction in HbA<sub>1c</sub> from baseline of 1.97% and insulin glargine U-100 resulted in a reduction of 1.59% (see Table 7). At the end of trial, the average dose

of XULTOPHY® 100/3.6 was 36 units (36 units insulin degludec/1.3 mg liraglutide) and the dose of insulin glargine was 54 units; it is unclear that these observed differences in insulin doses are clinically important. The difference in HbA<sub>1c</sub> effect observed at 26 weeks may not necessarily reflect the effect in the care setting where insulin glargine may be more rapidly titrated.

**Table 7. Results of a 26-Week Trial in Patients with Type 2 Diabetes Mellitus Inadequately Controlled on SGLT2i Alone or in Combination with Metformin, Pioglitazone and/or DPP4 Inhibitor**

	XULTOPHY® 100/3.6 + SGLT2i ± metformin± pioglitazone	Insulin Glargine U-100 + SGLT2i ± metformin± pioglitazone
<b>Total (N)</b>	210	210
<b>HbA<sub>1c</sub> (%)</b>		
Baseline	8.2	8.4
End of Trial (LS Mean) <sup>#</sup>	6.3	6.7
Change from baseline (LS Mean) <sup>#</sup>	-1.97	-1.59
Estimated treatment difference [95% CI] <sup>#</sup>	-0.38% [-0.54; -0.23] <sup>A</sup>	
Percentage of patients achieving HbA <sub>1c</sub> <7% <sup>**</sup>	79.5%	68.6%
<b>FPG (mg/dL)</b>		
Baseline	171	172
End of Trial (LS Mean) <sup>***</sup>	108	112
Change from baseline (LS Mean) <sup>***</sup>	-63.8	-59.9

<sup>A</sup>Primary endpoint was tested for non-inferiority of XULTOPHY® 100/3.6 to insulin glargine U-100 on a non-inferiority margin of 0.3%.

<sup>#</sup>Estimated using an ANCOVA with treatment, pre-trial OAD group and region as factors and corresponding baseline value as covariate. For HbA<sub>1c</sub> (%), missing week 26 measurements from subjects who discontinued early were multiply-imputed using information from subjects who also discontinued early but still had a week 26 measurement (retrieved dropouts).

<sup>\*\*</sup>Patients with missing HbA<sub>1c</sub> value at week 26 data were considered non-responders. There were 6.2% of subjects in the XULTOPHY® 100/3.6 arm and 2.4% in the insulin glargine U-100 arm for whom HbA<sub>1c</sub> data was missing at week 26.

<sup>\*\*\*</sup>Missing week 26 FPG measurements from subjects who discontinued early were imputed using multiple imputation with a mean for each subject equal to their respective baseline value.

### 14.3 Patients currently on basal insulin or GLP-1 receptor agonist

#### Converting to XULTOPHY® 100/3.6 from GLP-1 receptor agonist

**NCT01676116:** The efficacy and safety of XULTOPHY® 100/3.6 (once-daily) compared to unchanged pre-trial liraglutide up to a dose of 1.8 mg daily, were studied in a 26-week randomized, open-label, treat-to-target (fasting blood glucose goal of 72-90 mg/dL) trial. The trial included 348 patients with type 2 diabetes mellitus inadequately controlled on liraglutide and metformin alone or in combination with pioglitazone, sulfonylurea or both. Oral anti-diabetic drugs (OADs) were continued at pre-trial doses throughout the trial, and 22% of subjects were treated with sulfonylureas (SU) in combination with metformin with or without pioglitazone. The mean age of the population was 58 years, and mean duration of diabetes was 10 years. 49% were male. 91% were White, 8% Black or African American. 11% were Hispanic or Latino ethnicity. 6% of patients had eGFR < 60mL/min/1.73m<sup>2</sup>; no patient had eGFR < 30mL/min/1.73m<sup>2</sup>. The mean BMI was 33.1 kg/m<sup>2</sup>. The starting dose of XULTOPHY® 100/3.6 was 16 units (16 units insulin degludec/0.58 mg liraglutide), and the average starting dose of liraglutide was 1.7 mg. XULTOPHY® 100/3.6 was titrated twice weekly to target a fasting blood glucose goal of 72-90 mg/dL. The end of trial dose of XULTOPHY® 100/3.6 was 44 units (44 units insulin degludec/1.58 mg liraglutide). The primary endpoint, change in HbA<sub>1c</sub>, was tested for superiority of XULTOPHY® 100/3.6 to unchanged liraglutide therapy.

At the end of 26 weeks, there was a reduction in HbA<sub>1c</sub> from baseline of 1.31% for XULTOPHY® 100/3.6 and 0.36% for liraglutide (see Table 8).

**Table 8. Results of a 26-Week Trial with XULTOPHY® 100/3.6 in Patients with Type 2 Diabetes Mellitus Inadequately Controlled on Liraglutide up to 1.8 mg Daily**

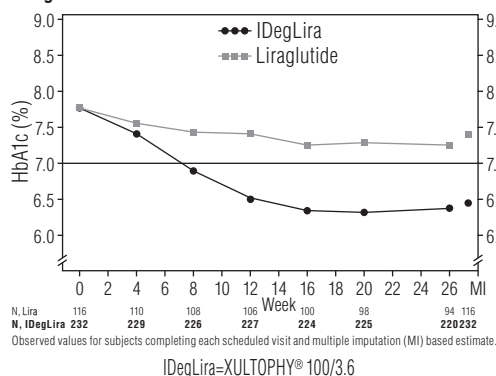
	XULTOPHY® 100/3.6 + metformin± pioglitazone±SU	liraglutide 1.8 mg+ metformin± pioglitazone±SU
<b>Total (N)</b>	232	116
<b>HbA<sub>1c</sub> (%)</b>		
Baseline	7.8	7.8
End of Trial (LS Mean) <sup>#</sup>	6.4	7.4
Change from baseline (LS Mean) <sup>#</sup>	-1.31	-0.36
Estimated treatment difference [95% CI]	-0.95 [-1.15; -0.75] <sup>A</sup>	
Percentage of patients achieving HbA <sub>1c</sub> <7% <sup>**</sup>	74.6%	30.2%
<b>FPG (mg/dL)</b>		
Baseline	161	169
End of Trial (LS Mean) <sup>#</sup>	112	153
Change from baseline (LS Mean) <sup>#</sup>	-51.1	-10.9

<sup>A</sup>Test for superiority evaluated at 5.0% level for significance, (p<0.0001)

<sup>#</sup>Estimated using an ANCOVA with treatment, pre-trial liraglutide and region as fixed factors and baseline response as covariate. Multiple imputation modelled "return to baseline" of the treatment effect for subjects having missing week 26 data.

<sup>\*\*</sup>Patients with missing HbA<sub>1c</sub> data at week 26 were considered as non-responders. There were 5.2% of subjects in the XULTOPHY® 100/3.6 arm and 19.0% in the liraglutide arm for whom HbA<sub>1c</sub> data was missing at week 26.

**Figure 3. Mean HbA<sub>1c</sub> (%) By Treatment Week in Patients with Type 2 Diabetes Mellitus Inadequately Controlled on Liraglutide**



#### Converting from basal insulin

**NCT01392573:** The efficacy and safety of XULTOPHY® 100/3.6 compared to insulin degludec, both once daily and added on to metformin, were studied in a 26-week randomized, double-blind, trial in 398 patients with type 2 diabetes mellitus inadequately controlled on basal insulin and metformin alone or in combination with sulfonylurea/glinides. Basal insulin and sulfonylurea/glinides were discontinued at randomization.

The mean age of the trial population was 57 years, and mean duration of diabetes was 11 years. 55% were male. 77% were White, 5% Black or African American. 10% were Hispanic or Latino ethnicity. 7% of patients had eGFR < 60mL/min/1.73m<sup>2</sup>; no patient had eGFR < 30mL/min/1.73m<sup>2</sup>. The mean BMI was 33.7 kg/m<sup>2</sup>. The mean dose of metformin and basal insulin in patients entering the trial was approximately 2 g and 29 units, respectively.

The starting dose of XULTOPHY® 100/3.6 and insulin degludec was 16 units (16 units insulin degludec/0.58 mg liraglutide) and 16 units, respectively. XULTOPHY® 100/3.6 and degludec were to be titrated twice weekly to target a fasting blood glucose goal of 72-90 mg/dL. Patients could not increase their dose by more than 4 units per week, and the maximum dose of insulin degludec was limited to 50 units. The targeted fasting blood glucose goal was achieved in 24.0% of patients randomized to insulin degludec and in 31.6% of the patients randomized to XULTOPHY® 100/3.6 at 26 weeks.

At the end of 26 weeks, reductions in HbA<sub>1c</sub> from baseline of 1.94% for XULTOPHY® 100/3.6 and 1.05% for insulin degludec limited to 50 units daily were observed (see Table 9). The mean difference (95% CI) in HbA<sub>1c</sub> reduction between XULTOPHY® 100/3.6 and insulin degludec was -0.89 [-1.10; -0.68] and statistically significant. The trial was designed to show the contribution of the liraglutide component to glycemic lowering and the insulin degludec dosing algorithm was selected to isolate the effect of the GLP-1 component. At the end of the trial, the doses of insulin degludec were equivalent between treatment groups. The mean final dose of XULTOPHY® 100/3.6 and insulin

degludec was 46 units (for XULTOPHY® 100/3.6: 46 units insulin degludec/1.66 mg liraglutide). The difference in glucose lowering effect observed in the trial may not necessarily reflect the effect that will be observed in the care setting where insulin degludec dosage can be different than that used in the trial.

**Table 9. Results of a 26-Week Trial in Patients with Type 2 Diabetes Mellitus Inadequately Controlled on Basal Insulin**

	XULTOPHY® 100/3.6 + metformin	Insulin degludec* + metformin
<b>Total (N)</b>	199	199
<b>HbA<sub>1c</sub> (%)</b>		
Baseline	8.7	8.8
End of Trial (LS Mean) <sup>#</sup>	6.9	7.7
Change from baseline (LS Mean) <sup>#</sup>	-1.94	-1.05
Estimated treatment difference [95% CI] <sup>#</sup>	-0.89 [-1.10; -0.68] <sup>A</sup>	
Percentage of patients achieving HbA <sub>1c</sub> <7% <sup>**</sup>	57.3%	22.6%
<b>FPG (mg/dL)</b>		
Baseline	175	172
End of Trial (LS Mean) <sup>#</sup>	110	118
Change from baseline (LS Mean) <sup>#</sup>	-63.5	-55.5

<sup>A</sup>p<0.01. The trial was designed to show the contribution of the liraglutide component to glycemic lowering and the insulin degludec dosing algorithm was selected to isolate the effect of the GLP-1 component. At the end of the trial, the doses of insulin degludec were equivalent between treatment groups. The mean final dose of XULTOPHY® 100/3.6 and insulin degludec was 46 units (for XULTOPHY® 100/3.6: 46 units insulin degludec/1.66 mg liraglutide). The difference in glucose lowering effect observed in the trial may not necessarily reflect the effect that will be observed in the care setting where alternative insulin degludec dosage can be used.

\*Maximum dose 50 units

<sup>#</sup>Estimated using an ANCOVA with treatment, country, and previous antidiabetic treatment as fixed factors and baseline response as covariate. Multiple imputation modelled "jump to control" of the treatment effect for subjects having missing week 26 data.

<sup>\*\*</sup>Patients with missing HbA<sub>1c</sub> data at week 26 were considered non-responders. There were 11.1% of subjects in the XULTOPHY® 100/3.6 arm and 13.1% in the insulin degludec arm for whom HbA<sub>1c</sub> data was missing at week 26.

**NCT01952145:** The efficacy and safety of XULTOPHY® 100/3.6 compared to insulin glargine U-100, both once daily and added on to metformin, were studied in a 26-week randomized, open-label, two-arm parallel trial in 557 patients with type 2 diabetes mellitus inadequately controlled on insulin glargine U-100 and metformin.

The mean age of the trial population was 59 years and mean duration of diabetes was 12 years. 50% were male. 95% were White, 2% Black or African American. 43% were Hispanic or Latino ethnicity, 6% of patients had eGFR < 60mL/min/1.73m<sup>2</sup>; one patient had eGFR < 30mL/min/1.73m<sup>2</sup>. The mean BMI was 32 kg/m<sup>2</sup>. The mean dose of insulin glargine U-100 in patients entering the trial was 32 units.

XULTOPHY® 100/3.6 and insulin glargine were to be titrated twice weekly to target a fasting blood glucose goal of 72-90 mg/dL. The starting dose of XULTOPHY® 100/3.6 was 16 units (16 units insulin degludec/0.58 mg liraglutide). The average starting dose of insulin glargine U-100 was 32 units. Patients could not increase the dose of the two products by more than 4 units per week and there was no maximum allowed dose of insulin glargine. The targeted fasting plasma blood glucose goal was achieved in 39.6% of patients randomized to insulin glargine and 32.9% of the patients randomized to XULTOPHY® 100/3.6 at 26 weeks.

At the end of 26 weeks, treatment with XULTOPHY® 100/3.6 resulted in a reduction in HbA<sub>1c</sub> from baseline of 1.67% and was 1.16% for insulin glargine U-100 (see Table 10) and excluded the pre-specified non-inferiority margin of 0.3%. At the end of the trial, the average dose of XULTOPHY® 100/3.6 was 41 units (41 units insulin degludec/1.48 mg liraglutide) and the dose of glargine was 66 units, it is unclear that these observed differences in insulin doses are clinically important. The difference in HbA<sub>1c</sub> effect observed at 26 weeks may not necessarily reflect the effect in the care setting where insulin glargine may be more rapidly titrated.



**Table 10. Results of a 26-Week Trial in Patients with Type 2 Diabetes Mellitus Inadequately Controlled on Insulin Glargine U-100**

	XULTOPHY® 100/3.6 + metformin	Insulin glargine U-100 + metformin
<b>Total (N)</b>	278	279
<b>HbA<sub>1c</sub> (%)</b>		
Baseline	8.4	8.2
End of Trial (LS Mean) <sup>#</sup>	6.6	7.1
Change from baseline (LS Mean) <sup>#</sup>	-1.67	-1.16
Estimated treatment difference [95% CI]	-0.51 [-0.67; -0.34] <sup>A</sup>	
Percentage of patients achieving HbA <sub>1c</sub> <7% <sup>##</sup>	68.3%	46.2%
<b>FBG (mg/dL)</b>		
Baseline	161	160
End of Trial (LS Mean) <sup>#</sup>	110	110
Change from baseline (LS Mean) <sup>#</sup>	-49.9	-49.6

<sup>A</sup>p<0.01. Primary endpoint was tested for noninferiority of XULTOPHY® 100/3.6 to insulin glargine U-100. The difference in glucose lowering effect observed in the trial may not necessarily reflect the effect that will be observed in the care setting where alternative insulin glargine dosage can be used.

<sup>#</sup>Estimated using an ANCOVA with treatment and region as fixed factors and baseline response as covariate. Multiple imputation modelled "return to baseline" of the treatment effect for subjects having missing week 26 data.

<sup>##</sup>Patients with missing HbA<sub>1c</sub> value at week 26 data were considered non-responder. There were 10.1% of subjects in the XULTOPHY® 100/3.6 arm and 4.7% in the insulin glargine U-100 arm for whom HbA<sub>1c</sub> data was missing at week 26.

#### 14.4 Cardiovascular Outcomes Trials in Patients with Type 2 Diabetes Mellitus and Atherosclerotic Cardiovascular Disease Conducted with Liraglutide 1.8 mg and Insulin Degludec

The effect of XULTOPHY® 100/3.6 on the risk of cardiovascular outcomes in patients with type 2 diabetes mellitus and atherosclerotic cardiovascular disease has not been established. The studies below were conducted with liraglutide 1.8 mg and insulin degludec, individually.

##### Liraglutide 1.8 mg

The LEADER trial (NCT01179048) randomized 9340 patients with inadequately controlled type 2 diabetes mellitus and cardiovascular disease to liraglutide 1.8 mg or placebo in addition to standard of care treatments for type 2 diabetes mellitus for a median follow up of 3.5 years.

Patients either were 50 years of age or older with established, stable cardiovascular, cerebrovascular, peripheral artery disease, chronic kidney disease or chronic heart failure (80% of patients) or were 60 years of age or older and had other specified risk factors for cardiovascular disease (20% of patients). The population was 64% male, 78% White, 10% Asian, and 8% Black or African American; 12% of the population was Hispanic or Latino. The mean duration of type 2 diabetes mellitus was 13 years, the mean HbA<sub>1c</sub> was 8.7% and the mean BMI was 33 kg/m<sup>2</sup>; the mean eGFR at baseline was 79 mL/min/1.73 m<sup>2</sup>.

In total, 96.8% of the patients completed the trial; vital status was available for 99.7%. The primary endpoint was the time from randomization to first occurrence of a major adverse cardiovascular event (MACE) defined as: cardiovascular death, non-fatal myocardial infarction, or non-fatal stroke. No increased risk for MACE was observed with liraglutide 1.8 mg. The total number of primary component MACE endpoints was 1302 (608[13.0%] with liraglutide 1.8 mg and 694 [14.9%] with placebo).

##### Insulin degludec

The DEVOTE trial (NCT01959529) randomized 7,637 patients with inadequately controlled type 2 diabetes mellitus and cardiovascular disease to either insulin degludec or insulin glargine U-100. Each was administered once-daily in addition to standard of care treatments for diabetes for a median duration of follow up of 2 years.

Patients either were 50 years of age or older and had established, stable cardiovascular, cerebrovascular, peripheral artery disease, chronic kidney disease or chronic heart failure (85% of patients) or were 60 years of age or older and had other specified risk factors for cardiovascular disease (15% of patients). The population was 63% male, 76% White 11% Black or African American, and 10% Asian; 15% of the population was Hispanic or Latino. The mean HbA<sub>1c</sub> was 8.4% and the mean BMI was 33.6 kg/m<sup>2</sup>. The baseline mean eGFR was 68 mL/min/1.73m<sup>2</sup>.

In total, 98% of the patients completed the trial; vital status was known at the end of the trial for 99%. The primary endpoint was the time from randomization to the first occurrence of MACE, defined as:

cardiovascular death, non-fatal myocardial infarction, or non-fatal stroke. No increased risk for MACE was observed with insulin degludec when compared to insulin glargine U-100. The total number of primary MACE endpoints was 681 (325 [8.5%] with insulin degludec and 356 [9.3%] with insulin glargine).

## 16 HOW SUPPLIED/STORAGE AND HANDLING

### How Supplied

XULTOPHY® 100/3.6 (insulin degludec and liraglutide) injection is an injection supplied as a clear, colorless solution in a 3 mL pre-filled, disposable, single-patient use pen injector. The XULTOPHY® 100/3.6 pen dials in one unit increments.

Dosage Unit/Strength	Package size	NDC #
3 mL single-patient-use XULTOPHY® 100/3.6 pen (100 units/mL insulin degludec and 3.6 mg/mL liraglutide)	Package of 5	0169-2911-15

### Recommended Storage

Dispense in the original sealed carton with the enclosed Instructions for Use.

Prior to first use, XULTOPHY® 100/3.6 should be stored between 2°C and 8°C (36°F to 46°F) until the expiration date printed on the label. Store pre-filled pens in the carton so they will stay clean and protected from light. Do not store in the freezer or directly adjacent to the refrigerator cooling element. Do not freeze. Do not use XULTOPHY® 100/3.6 if it has been frozen.

After first use, the XULTOPHY® 100/3.6 pen can be stored for 21 days at controlled room temperature (59°F to 86°F; 15°C to 30°C) or in a refrigerator (36°F to 46°F; 2°C to 8°C). Keep all XULTOPHY® 100/3.6 pens away from direct heat and light.

Always remove the needle after each injection and store the XULTOPHY® 100/3.6 pen without a needle attached. This prevents contamination and/or infection, or leakage of the XULTOPHY® 100/3.6 pen, and will ensure accurate dosing. Always use a new needle for each injection to prevent contamination.

The storage conditions are summarized in Table 11:

**Table 11. Storage Conditions for XULTOPHY® 100/3.6 Pen**

Prior to first use	After first use	
Refrigerated 36°F to 46°F (2°C to 8°C)	Room Temperature 59°F to 86°F (15°C to 30°C)	Refrigerated 36°F to 46°F (2°C to 8°C)
Until expiration date	21 Days	

## 17 PATIENT COUNSELING INFORMATION

Advise the patient to read the FDA-approved patient labeling (Medication Guide and Instructions for Use)

### Risk of Thyroid C-cell Tumors

Inform patients that liraglutide, one of the components of XULTOPHY® 100/3.6, causes benign and malignant thyroid C-cell tumors in mice and rats and that the human relevance of this finding is unknown. Counsel patients to report symptoms of thyroid tumors (e.g., a lump in the neck, hoarseness, dysphagia or dyspnea) to their physician [see *Boxed Warning and Warnings and Precautions* (5.1)].

### Acute Pancreatitis

Inform patients of the potential risk for pancreatitis acute pancreatitis and its symptoms: severe abdominal pain that may radiate to the back, and which may or may not be accompanied by vomiting. Instruct patients to discontinue XULTOPHY® 100/3.6 promptly and contact their physician if pancreatitis is suspected [see *Warnings and Precautions* (5.2)].

### Never Share a XULTOPHY® 100/3.6 Pen Between Patients

Advise patients that they must never share a XULTOPHY® 100/3.6 pen with another person, even if the needle is changed, because doing so carries a risk for transmission of blood-borne pathogens [see *Warnings and Precautions* (5.3)].

### Hyperglycemia or Hypoglycemia with Changes in Insulin Regimen

Inform patients that hyperglycemia is the most common adverse reaction with insulin products. Inform patients of the symptoms of hypoglycemia (e.g. impaired ability to concentrate and react). This may present a risk in situations where these abilities are especially important, such as driving or operating other machinery. Advise patients who have frequent hypoglycemia or reduced or absent warning signs of hypoglycemia to use caution when driving or operating machinery.

Advise patients that changes in insulin regimen can predispose to hyperglycemia or hypoglycemia and that changes in insulin regimen should be made under close medical supervision [see *Warnings and Precautions* (5.4)].

### Overdose due to Medication Errors

Inform patients that XULTOPHY® 100/3.6 contains two drugs: insulin degludec and liraglutide. Accidental mix-ups between insulin products have been reported. To avoid medication errors between XULTOPHY®

100/3.6 (an insulin containing product) and other insulin products, instruct patients to always check the label before each injection.

Advise patients that the administration of more than 50 units of XULTOPHY® 100/3.6 daily can result in overdose of the liraglutide component. Instruct patients not to administer concurrently with other glucagon-like peptide-1 receptor agonists [see *Warnings and Precautions* (5.5)].

### Acute Kidney Injury Due to Volume Depletion

Inform patients of the potential risk of acute kidney injury due to dehydration associated with gastrointestinal adverse reactions. Advise patients to take precautions to avoid fluid depletion. Inform patients of the signs and symptoms of acute kidney injury and instruct them to promptly report any of these signs or symptoms or persistent (or extended) nausea, vomiting, and diarrhea to their healthcare provider [see *Warnings and Precautions* (5.7)].

### Severe Gastrointestinal Adverse Reactions

Inform patients of the potential risk of severe gastrointestinal adverse reactions. Instruct patients to contact their healthcare provider if they have severe or persistent gastrointestinal symptoms [see *Warnings and Precautions* (5.8)].

### Hypersensitivity Reactions

Inform patients that serious hypersensitivity reactions have been reported during postmarketing use of liraglutide, one of the components of XULTOPHY® 100/3.6.

Advise patients on the symptoms of hypersensitivity reactions and instruct them must stop taking XULTOPHY® 100/3.6 and seek medical advice promptly [see *Warnings and Precautions* (5.9)].

### Acute Gallbladder Disease

Inform patients of the potential risk for cholelithiasis or cholecystitis. Instruct patients to contact their physician if cholelithiasis or cholecystitis is suspected for appropriate clinical follow-up [see *Warnings and Precautions* (5.10)].

### Pulmonary Aspiration During General Anesthesia or Deep Sedation

Inform patients that XULTOPHY® 100/3.6 may cause their stomach to empty more slowly which may lead to complications with anesthesia or deep sedation during planned surgeries or procedures. Instruct patients to inform healthcare providers prior to any planned surgeries or procedures if they are taking XULTOPHY® 100/3.6 [see *Warnings and Precautions* (5.13)].

### Pregnancy

Advise a pregnant woman of the potential risk to a fetus. Advise women to inform their healthcare provider if they are pregnant or intend to become pregnant [see *Use in Specific Populations* (8.1)].

### Missed Dose

Inform patients not to take an extra dose of XULTOPHY® 100/3.6 or increase the dose to make up for the missed dose. Instruct patients who miss a dose of XULTOPHY® 100/3.6 to resume the once- daily dosage regimen as prescribed with the next scheduled dose. If more than three days have elapsed since the last XULTOPHY® 100/3.6 dose, reinitiate XULTOPHY® 100/3.6 at the recommended starting dose to reduce the risk of gastrointestinal adverse reactions associated with reinitiation of treatment. XULTOPHY® 100/3.6 should be titrated at the direction of a healthcare provider [see *Dosage and Administration* (2.1, 2.2, 2.3, 2.4)].

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**PATENT Information:** <http://novonordisk-us.com/products/product-patents.html>

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<p style="text-align: center;"><b>Medication Guide</b>  <b>XULTOPHY® 100/3.6 (ZUL-to-fye)</b>  <b>(insulin degludec and liraglutide) Injection, for subcutaneous injection</b></p>	
<p>Read this Medication Guide before you start using XULTOPHY® 100/3.6 and each time you get a refill. There may be new information. This information does not take the place of talking to your healthcare provider about your medical condition or your treatment.</p>	<p><b>How should I use XULTOPHY® 100/3.6?</b></p> <ul style="list-style-type: none"> <li>• Read the <b>Instructions for Use</b> that comes with XULTOPHY® 100/3.6.</li> <li>• Use XULTOPHY® 100/3.6 exactly as your healthcare provider tells you to.</li> <li>• Do not change your dosing schedule without first talking to your healthcare provider. The dose counter on your XULTOPHY® 100/3.6 pen shows the number of units of XULTOPHY® 100/3.6 to be injected.</li> <li>• <b>Your healthcare provider should show you how to use XULTOPHY® 100/3.6 before you use it for the first time.</b></li> <li>• Inject XULTOPHY® 100/3.6 under the skin (subcutaneously) of your thigh, upper arm or stomach (abdomen).</li> <li>• <b>Do not</b> inject XULTOPHY® 100/3.6 into a vein (intravenously) or use in an insulin infusion pump.</li> <li>• <b>Use XULTOPHY® 100/3.6 at the same time each day with or without food.</b></li> <li>• If you miss a dose of XULTOPHY® 100/3.6, resume your 1 time daily dosing schedule at the next scheduled dose. Do not take 2 doses at the same time or increase your dose to make up for the missed dose. If you miss more than 3 days of XULTOPHY® 100/3.6, call your healthcare provider for further instructions about taking XULTOPHY® 100/3.6 at the right dose and to help lower your chance of having an upset stomach.</li> <li>• Do not dilute XULTOPHY® 100/3.6 with any other liquids.</li> <li>• Do not mix XULTOPHY® 100/3.6 with any other insulin products or GLP-1 receptor agonists in the same injection.</li> <li>• Do not split your dose of XULTOPHY® 100/3.6. Give your full dose of XULTOPHY® 100/3.6 in 1 injection.</li> <li>• Check the Pen label each time you give your injection to make sure you are using the correct medicine.</li> <li>• <b>Do not take more than 50 units of XULTOPHY® 100/3.6 each day.</b> XULTOPHY® 100/3.6 contains two medicines: insulin degludec and liraglutide. If you take too much XULTOPHY® 100/3.6, it can cause severe nausea and vomiting. Do not take XULTOPHY® 100/3.6 with other GLP-1 receptor agonists. If you take too much XULTOPHY® 100/3.6, call your healthcare provider or go to the nearest hospital emergency room right away.</li> <li>• <b>Change (rotate) your injection sites within the area you choose with each injection</b> to reduce your risk of getting lipodystrophy (pits in skin or thickened skin) and localized cutaneous amyloidosis (skin with lumps) at the injection sites. <ul style="list-style-type: none"> <li>◦ <b>Do not</b> use the exact same spot for each injection.</li> <li>◦ <b>Do not</b> inject where the skin has pits, is thickened, or has lumps.</li> <li>◦ <b>Do not</b> inject where the skin is tender, bruised, scaly or hard, or into scars or damaged skin</li> </ul> </li> <li>• <b>Do not share your XULTOPHY® 100/3.6 pen with other people, even if the needle has been changed.</b> You may give other people a serious infection or get a serious infection from them.</li> <li>• If you take too much XULTOPHY® 100/3.6, call your healthcare provider or the Poison Help line at 1-800-222-1222 or go to the nearest hospital emergency room right away.</li> <li>• <b>Check your blood sugar levels.</b> Ask your healthcare provider what your blood sugar should be and when you should check your blood sugar levels.</li> </ul>
<p><b>What is the most important information I should know about XULTOPHY® 100/3.6?</b>  <b>XULTOPHY® 100/3.6 may cause serious side effects, including:</b></p> <ul style="list-style-type: none"> <li>• <b>Possible thyroid tumors, including cancer.</b> Tell your healthcare provider if you get a lump or swelling in your neck, hoarseness, trouble swallowing, or shortness of breath. These may be symptoms of thyroid cancer. In studies with rats and mice, liraglutide, one of the components of XULTOPHY® 100/3.6, and medicines that work like liraglutide caused thyroid tumors, including thyroid cancer. It is not known if XULTOPHY® 100/3.6 will cause thyroid tumors or a type of thyroid cancer called medullary thyroid carcinoma (MTC) in people.</li> <li>• Do not use XULTOPHY® 100/3.6 if you or any of your family have ever had a type of thyroid cancer called medullary thyroid carcinoma (MTC), or if you have an endocrine system condition called Multiple Endocrine Neoplasia syndrome type 2 (MEN 2).</li> </ul>	
<p><b>What is XULTOPHY® 100/3.6?</b></p> <ul style="list-style-type: none"> <li>• XULTOPHY® 100/3.6 is an injectable prescription medicine that contains 2 diabetes medicines, insulin degludec, 100 units/mL, and liraglutide, 3.6 mg/mL that is used along with diet and exercise to improve blood sugar (glucose) in adults with type 2 diabetes mellitus.</li> <li>• XULTOPHY® 100/3.6 is not recommended as the first choice of medicine for treating diabetes.</li> <li>• XULTOPHY® 100/3.6 is not recommended for people who take liraglutide or other medicines called glucagon-like peptide-1 (GLP-1) receptor agonists.</li> <li>• XULTOPHY® 100/3.6 is not for use in people with diabetic ketoacidosis (increased ketones in the blood or urine).</li> <li>• It is not known if XULTOPHY® 100/3.6 can be used with mealtime insulin.</li> <li>• It is not known if XULTOPHY® 100/3.6 is safe and effective for use in children.</li> </ul>	
<p><b>Who should not use XULTOPHY® 100/3.6?</b>  <b>Do not use XULTOPHY® 100/3.6 if:</b></p> <ul style="list-style-type: none"> <li>• you or any of your family have ever had a type of thyroid cancer called medullary thyroid carcinoma (MTC) or if you have an endocrine system condition called Multiple Endocrine Neoplasia syndrome type 2 (MEN 2).</li> <li>• you are having an episode of low blood sugar (hypoglycemia).</li> <li>• you are allergic to insulin degludec, liraglutide or any of the ingredients in XULTOPHY® 100/3.6. See the end of this Medication Guide for a complete list of ingredients in XULTOPHY® 100/3.6. See <b>“What are the possible side effects of XULTOPHY® 100/3.6?”</b> for symptoms of a serious allergic reaction.</li> </ul>	
<p><b>What should I tell my healthcare provider before using XULTOPHY® 100/3.6?</b>  <b>Before using XULTOPHY® 100/3.6, tell your healthcare provider about all your medical conditions, including if you:</b></p> <ul style="list-style-type: none"> <li>• have or have had problems with your pancreas.</li> <li>• have heart failure or other heart problems. If you have heart failure, it may get worse while you take TZDs with XULTOPHY® 100/3.6.</li> <li>• have severe problems with your stomach, such as slowed emptying of your stomach (gastroparesis) or problems with digesting food.</li> <li>• are taking certain medicines called GLP-1 receptor agonists.</li> <li>• are scheduled to have surgery or other procedures that use anesthesia or deep sleepiness (deep sedation).</li> <li>• are pregnant or plan to become pregnant. It is not known if XULTOPHY® 100/3.6 will harm your unborn baby. Tell your healthcare provider if you become pregnant or think you may be pregnant while using XULTOPHY® 100/3.6.</li> <li>• are breastfeeding or plan to breastfeed. It is not known if XULTOPHY® 100/3.6 passes into your breast milk. Talk to your healthcare provider about the best way to feed your baby while using XULTOPHY® 100/3.6.</li> </ul> <p><b>Tell your healthcare provider about all the medicines you take</b>, including prescription and over-the-counter medicines, vitamins, and herbal supplements. XULTOPHY® 100/3.6 may affect the way some medicines work, and some medicines may affect the way XULTOPHY® 100/3.6 works.</p> <p><b>Before using XULTOPHY® 100/3.6, talk to your healthcare provider about low blood sugar and how to manage it.</b> Tell your healthcare provider if you are taking other medicines to treat diabetes.</p> <p>Know the medicines you take. Keep a list of them to show your healthcare provider and pharmacist when you get a new medicine</p>	<p><b>What should I avoid while taking XULTOPHY® 100/3.6?</b>  <b>While taking XULTOPHY® 100/3.6 do not:</b></p> <ul style="list-style-type: none"> <li>• drive or operate heavy machinery, until you know how XULTOPHY® 100/3.6 affects you.</li> <li>• drink alcohol or use prescription or over-the-counter medicines that contain alcohol.</li> </ul>



**What are the possible side effects of XULTOPHY® 100/3.6?**

**XULTOPHY® 100/3.6 may cause serious side effects that can lead to death, including:**

- **See “What is the most important information I should know about XULTOPHY® 100/3.6?”**
- **inflammation of your pancreas (pancreatitis).** Stop using XULTOPHY® 100/3.6 and call your healthcare provider right away if you have severe pain in your stomach area (abdomen) that will not go away, with or without vomiting. You may feel the pain from your abdomen to your back.
- **low blood sugar (hypoglycemia).** Your risk for getting low blood sugar may be higher if you use XULTOPHY® 100/3.6 with another medicine that can cause low blood sugar.  
**Signs and symptoms of low blood sugar may include:**
  - dizziness or light-headedness
  - blurred vision
  - anxiety, irritability, or mood changes
  - sweating
  - slurred speech
  - hunger
  - confusion or drowsiness
  - shakiness
  - weakness
  - headache
  - fast heartbeat
  - feeling jittery
- **dehydration leading to kidney problems.** Diarrhea, nausea, and vomiting may cause a loss of fluids (dehydration) which may cause kidney problems. It is important for you to drink fluids to help reduce your chance of dehydration. Tell your healthcare provider right away if you have nausea, vomiting, or diarrhea that does not go away.
- **severe stomach problems.** Stomach problems, sometimes severe, have been reported in people who use XULTOPHY® 100/3.6. Tell your healthcare provider if you have stomach problems that are severe or will not go away.
- **serious allergic reactions.** Stop using XULTOPHY® 100/3.6 and get medical help right away, if you have any symptoms of a serious allergic reaction including:
  - hives
  - swelling of your face, lips, tongue, or throat
  - rash
  - problems breathing or swallowing
  - itching
  - sudden coughing
  - fast heartbeat
  - chest pain or tightness
  - fainting or feeling dizzy
- **gallbladder problems.** Gallbladder problems have happened in some people who take XULTOPHY® 100/3.6. Tell your healthcare provider right away if you get symptoms of gallbladder problems which may include:
  - pain in your upper stomach (abdomen)
  - yellowing of skin or eyes (jaundice)
  - fever
  - clay-colored stools
- **low potassium in your blood (hypokalemia).**
- **heart failure.** Taking certain diabetes pills called thiazolidinediones or TZDs with XULTOPHY® 100/3.6 may cause heart failure in some people. This can happen even if you have never had heart failure or heart problems before. If you already have heart failure, it may get worse while you take TZDs with XULTOPHY® 100/3.6. Your healthcare provider should monitor you closely while you are taking TZDs with XULTOPHY® 100/3.6. Tell your healthcare provider if you have any new or worse symptoms of heart failure including shortness of breath, tiredness, swelling of your ankles or feet and sudden weight gain. Treatment with TZDs and XULTOPHY® 100/3.6 may need to be adjusted or stopped by your healthcare provider if you have new or worse heart failure.
- **food or liquid getting into the lungs during surgery or other procedures that use anesthesia or deep sleepiness (deep sedation).** XULTOPHY® 100/3.6 may increase the chance of food getting into your lungs during surgery or other procedures. Tell all your healthcare providers that you are taking XULTOPHY® 100/3.6 before you are scheduled to have surgery or other procedures.

**The most common side effects of XULTOPHY® 100/3.6 include** stuffy or runny nose, sore throat, headache, nausea, diarrhea, increased blood levels of lipase, and upper respiratory tract infection. Talk to your healthcare provider about any side effect that bothers you or does not go away.

These are not all the possible side effects of XULTOPHY® 100/3.6.

Call your doctor for medical advice about side effects. You may report side effects to FDA at 1-800-FDA-1088.

**Keep XULTOPHY® 100/3.6 and all medicines out of the reach of children.**

**General information about the safe and effective use of XULTOPHY® 100/3.6.**

Medicines are sometimes prescribed for purposes other than those listed in a Medication Guide. Do not use XULTOPHY® 100/3.6 for a condition for which it was not prescribed. Do not give XULTOPHY® 100/3.6 to other people, even if they have the same symptoms that you have. It may harm them.

You can ask your pharmacist or healthcare provider for information about XULTOPHY® 100/3.6 that is written for health professionals.

**What are the ingredients in XULTOPHY® 100/3.6?**

**Active Ingredients:** insulin degludec and liraglutide

**Inactive Ingredients:** glycerol, phenol, zinc, and Water for Injection. Hydrochloric acid or sodium hydroxide may be added to adjust pH.

Manufactured by: Novo Nordisk Inc., Plainsboro, NJ 08536, U.S. License Number 1261

For more information, go to [www.novonordisk-us.com](http://www.novonordisk-us.com) or call 1-800-727-6500 (Se habla español).

This Medication Guide has been approved by the U.S. Food and Drug Administration.

Revised: 05/2025

# Instructions for Use

## XULTOPHY® 100/3.6 (ZUL-to-fye)

(insulin degludec and liraglutide) injection

- Do not share your XULTOPHY® 100/3.6 pen with another person. You may give an infection to them or get an infection from them.
- XULTOPHY® 100/3.6 pen ("pen") is a prefilled disposable, single-patient-use pen containing 300 units of insulin degludec and 10.8 mg of liraglutide (insulin degludec and liraglutide) injection. You can inject doses from 10 to 50 units in a single injection (with each unit of insulin degludec, the pen also delivers 0.036 mg of liraglutide). The dose can be increased by 1 unit at a time. The dose equals the number of units shown in the dose counter.
- People who are blind or have vision problems should not use the pen without help from a person trained to use the pen.

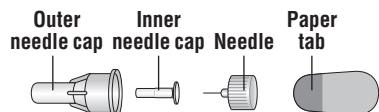
## Supplies you will need to give your XULTOPHY® 100/3.6 injection:

- XULTOPHY® 100/3.6 pen
- a new NovoFine or NovoTwist needle
- alcohol swab
- a sharps container for throwing away used pens and needles. See "After your injection" at the end of these instructions.

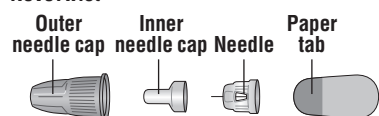
## Preparing your XULTOPHY® 100/3.6 pen:

- Wash your hands with soap and water.
- Before you start to prepare your injection, check the XULTOPHY® 100/3.6 pen label before each use to make sure it is your XULTOPHY® 100/3.6 pen.
- XULTOPHY® 100/3.6 should look clear and colorless. Do not use XULTOPHY® 100/3.6 if it is cloudy or colored.
- Do not use XULTOPHY® 100/3.6 past the expiration date printed on the label or 21 days after you start using the pen.
- Always use a new needle for each injection to help ensure sterility and prevent blocked needles. Do not reuse or share needles with another person. You may give other people a serious infection or get a serious infection from them.

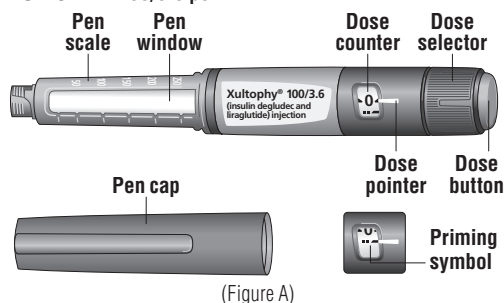
### NovoFine®



### NovoTwist®



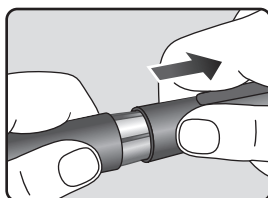
### XULTOPHY® 100/3.6 pen



(Figure A)

## Step 1:

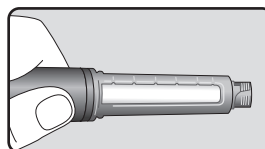
- Pull pen cap straight off (See Figure B).



(Figure B)

## Step 2:

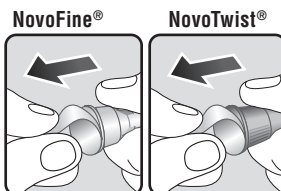
- Check the liquid in the pen (See Figure C). XULTOPHY® 100/3.6 should look clear and colorless. Do not use it if it looks cloudy or colored.



(Figure C)

## Step 3:

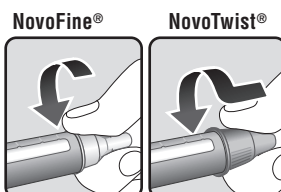
- Select a new needle.
- Pull off the paper tab from the outer needle cap (See Figure D).



(Figure D)

## Step 4:

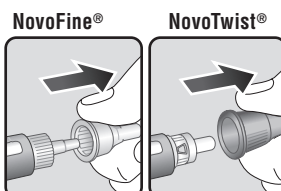
- Push the capped needle straight onto the pen and twist the needle on until it is tight (See Figure E).



(Figure E)

## Step 5:

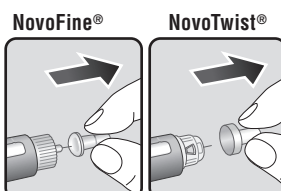
- Pull off the outer needle cap. Do not throw it away (See Figure F).



(Figure F)

## Step 6:

- Pull off the inner needle cap and throw it away (See Figure G).

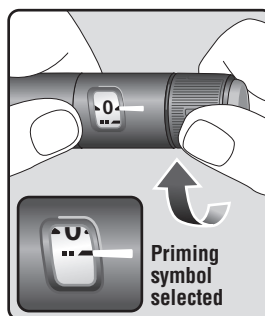


(Figure G)

## Priming your XULTOPHY® 100/3.6 pen:

## Step 7:

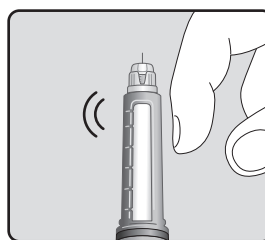
- Turn the dose selector to select the priming symbol (---). (See Figure H).



(Figure H)

## Step 8:

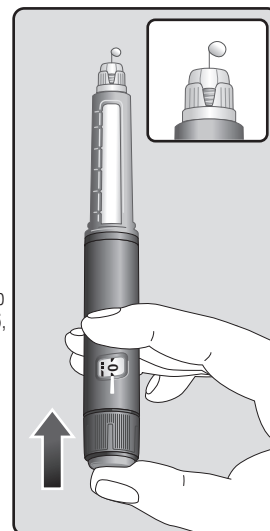
- Hold the pen with the needle pointing up. Tap the top of the pen gently a few times to let any air bubbles rise to the top (See Figure I).



(Figure I)

## Step 9:

- Hold the pen with the needle pointing up. Press and hold in the dose button until the dose counter shows "0". The "0" must line up with the dose pointer.
- A drop of XULTOPHY® 100/3.6 should be seen at the needle tip (See Figure J).
  - If you do not see a drop of XULTOPHY® 100/3.6, repeat steps 7 to 9, no more than 6 times, until a drop of XULTOPHY® 100/3.6 appears at the needle tip.
  - If you still do not see a drop of XULTOPHY® 100/3.6, change the needle and repeat steps 7 to 9.



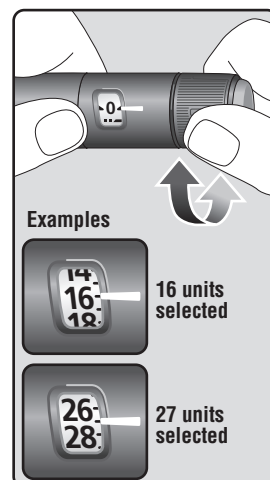
(Figure J)

## Selecting your dose: Make sure you prime your pen before setting your dose.

## Step 10:

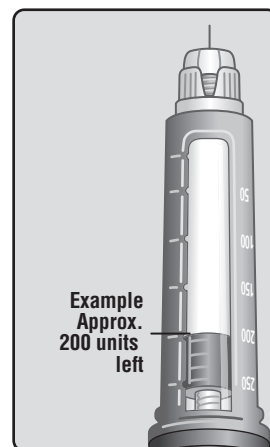
XULTOPHY® 100/3.6 pen is made to deliver the number of units that your healthcare provider prescribed. Take your dose exactly as your healthcare provider tells you to. Do not change your dosing schedule without first talking to your healthcare provider.

- Turn the dose selector to select the dose you need to inject. The dose pointer should line up with your dose (See Figure K).
  - If you select the wrong dose, you can turn the dose selector forwards or backwards to the correct dose.
  - The even numbers are printed on the dial.
  - The odd numbers are shown as lines.



(Figure K)

- The XULTOPHY® 100/3.6 pen scale will show you how much XULTOPHY® 100/3.6 is left in your pen (See Figure L).



(Figure L)

- To see how much XULTOPHY® 100/3.6 is left in your pen:
  - Turn the dose selector until it stops. The dose counter will line up with the dose that is left in your pen. If the dose counter shows 50, there is a dose of at least 50 units left in your pen.
  - If the dose counter shows between 10 and 50, the number shown in the dose counter is the total units left in your pen.
- If there is not enough XULTOPHY® 100/3.6 left in your pen for a full dose, do not use it. Use a new XULTOPHY® 100/3.6 pen.

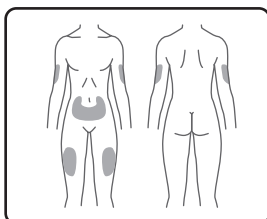


### Giving your injection:

- Inject your XULTOPHY® 100/3.6 exactly as your healthcare provider has shown you. Your healthcare provider should tell you if you need to pinch the skin before injecting.
- XULTOPHY® 100/3.6 can be injected under the skin (subcutaneously) of your stomach area (abdomen), upper legs (thighs) or upper arms.
- Change (rotate) your injection sites within the area you choose for each dose to reduce your risk of getting lipodystrophy (pits in skin or thickened skin) and localized cutaneous amyloidosis (skin with lumps) at the injection sites. **Do not** use the same injection site for each injection. **Do not** inject where the skin has pits, is thickened, or has lumps. **Do not** inject where the skin is tender, bruised, scaly or hard, or into scars or damaged skin.

### Step 11:

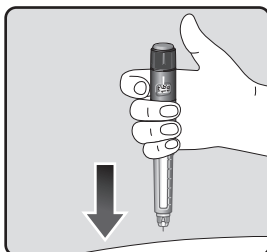
- Choose your injection site (stomach, upper legs or upper arms) and wipe the skin with an alcohol swab (See Figure M). Let the injection site dry before you inject your dose.



(Figure M)

### Step 12:

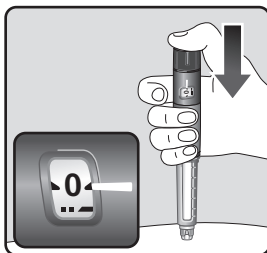
- Insert the needle into your skin** (See Figure N).
  - Make sure you can see the dose counter.** Do not cover it with your fingers, this can stop your injection.



(Figure N)

### Step 13:

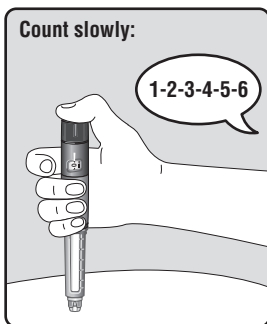
- Press and hold down the dose button until the dose counter shows "0"** (See Figure O).
  - The "0" must line up with the dose pointer. You may hear or feel a click.



(Figure O)

### Step 14:

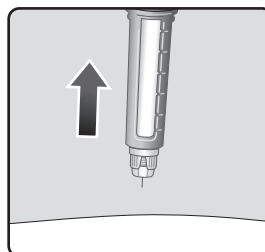
- Keep the needle in your skin after the dose counter has returned to "0" and slowly count to 6** (See Figure P).
  - When the dose counter returns to "0", you will not get your full dose until 6 seconds later.**
  - If the needle is removed before you count to 6, you may see a stream of XULTOPHY® 100/3.6 coming from the needle tip.**
  - If you see a stream of XULTOPHY® 100/3.6 coming from the needle tip you will not get your full dose. If this happens you should check your blood sugar levels more often because you may need more XULTOPHY® 100/3.6.**



(Figure P)

### Step 15:

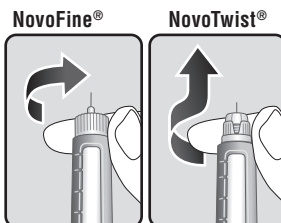
- Pull the needle out of your skin** (See Figure Q).
  - If you see blood after you take the needle out of your skin, press the injection site lightly with a piece of gauze or an alcohol swab. **Do not** rub the area.



(Figure Q)

### Step 16:

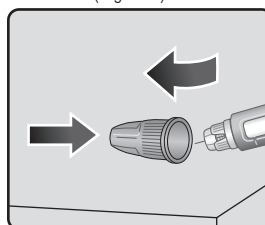
- Carefully remove the needle from the pen after each use and throw it away** (See Figure R).
  - Do not** recap the needle. Recapping the needle can lead to needle stick injury.



(Figure R)

**Note:** If you do not have a sharps container, follow the steps below:

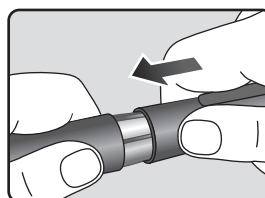
- Carefully slip the needle into the outer needle cap (See Figure S). Safely remove the needle and throw it away as soon as you can.
- Do not** store the pen with the needle attached. Storing without the needle attached helps prevent leaking, blocking of the needle, and air from entering the pen.



(Figure S)

### Step 17:

- Replace the pen cap by pushing it straight on (See Figure T).



(Figure T)

### After your injection:

- The used XULTOPHY® pen may be thrown away in your household trash after you have removed the needle.
- Put your used needles in a FDA-cleared sharps disposal container right away after use. Do not throw away (dispose of) loose needles in your household trash.
- If you do not have a FDA-cleared sharps disposal container, you may use a household container that is:
  - made of a heavy-duty plastic
  - can be closed with a tight-fitting, puncture resistant lid, without sharps being able to come out
  - upright and stable during use
  - leak-resistant
  - properly labeled to warn of hazardous waste inside the container
- When your sharps disposal container is almost full, you will need to follow your community guidelines for the right way to dispose of your sharps disposal container. There may be state or local laws about how you should throw away used needles and syringes. For more information about the safe sharps disposal, and for specific information about sharps disposal in the state that you live in, go to the FDA's website at: <http://www.fda.gov/safesharpsdisposal>.
- Do not dispose of your used sharps disposal container in your household trash unless your community guidelines permit this. Do not recycle your used sharps disposal container.

### How should I store my XULTOPHY® 100/3.6 pen?

#### Before use:

- Store unused XULTOPHY® 100/3.6 pens in the refrigerator at 36°F to 46°F (2°C to 8°C).
- Do not freeze XULTOPHY® 100/3.6. Do not use XULTOPHY® 100/3.6 if it has been frozen.
- Unused pens may be used until the expiration date printed on the label, if kept in the refrigerator.
- If XULTOPHY® 100/3.6 is stored outside of refrigeration prior to first use, it should be used or thrown away within 21 days.
- Store the pens in the carton they come in to keep them clean and protected from light.

#### Pen in use:

- Store the pen you are currently using at room temperature at 59°F to 86°F (15°C to 30°C) or in a refrigerator at 36°F to 46°F (2°C to 8°C).
- Do not freeze XULTOPHY® 100/3.6. Do not use XULTOPHY® 100/3.6 if it has been frozen.
- Keep XULTOPHY® 100/3.6 away from heat and light.
- The XULTOPHY® 100/3.6 pen you are using should be thrown away after 21 days, even if it still has XULTOPHY® 100/3.6 left in it and the expiration date has not passed.

### General Information about the safe and effective use of XULTOPHY® 100/3.6.

- Keep XULTOPHY® 100/3.6 pens and needles out of the reach of children.**
- Always use a new needle for each injection.**

This Instructions for Use has been approved by the U.S. Food and Drug Administration.

#### Manufactured by:

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For additional information about Xultophy® 100/3.6 go to: [www.Xultophy10036.com](http://www.Xultophy10036.com)

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