2.0 STUDY SUMMARY

<table>
<tr><td colspan="2">Name of Sponsor:</td><td colspan="2">Compound:</td></tr>
<tr><td colspan="2">Title of Protocol: A Comparative, Randomized, Open-Label, Multi-Center, Single Dose Pharmacokinetic, Pharmacodynamic and Safety Study and 25 mg) Between Children, Adolescents, and Adults with Type 2 (Non-Insulin Dependent) Diabetes Mellitus</td><td>IND No.:</td><td>EudraCT No.:</td></tr>
<tr><td colspan="2">Study Number:</td><td colspan="2">Phase: 1</td></tr>
<tr><td colspan="4">Study Design:
This is a comparative, randomized, open-label, multi-center, single-dose pharmacokinetic (PK), pharmacodynamic (PD), and safety study in which 25 mg will be administered to 36 children and adolescents with type 2 diabetes mellitus (T2DM) and 36 gender- and race-matched adults with T2DM as follows:
• Group 1: 12 subjects aged 10 to <14 years (6 of either sex) with T2DM.
• Group 2: 24 subjects aged 14 to <18 years (12 of either sex) with T2DM.
• Group 3: 36 gender and race matched adults with T2DM to Groups 1 and 2, aged 18 to 65 years, inclusive.
The study consists of a Screening period (Days -28 to Day -2), a Treatment period (Day 1 through Day 4), and a 14-(+/-1) day follow-up phone call. Subjects who satisfy the screening evaluation and the selection criteria defined in Sections 7.1 and 7.2 may be enrolled in the study. Subjects will be admitted into the clinic on (Check-in) Day -1 and will remain confined to the clinic until the evening of Day 2. On Day 1, pediatric subjects will receive a single oral dose of alogliptin 12.5 mg or 25 mg in a fasting state followed by breakfast. On Day 1, all adult subjects will receive alogliptin 25 mg in a fasting state followed by breakfast. Blood and urine samples for PK and PD assessments will be collected from all subjects before dosing and at designated timepoints up to 36 hours after dosing during confinement. Subjects will be discharged from the clinic on Day 2, following collection of the 36-hour PK urine sample. Subjects will return to the clinic for PK blood sample collection and other study procedures in the morning on Day 3 (48 hours postdose) and Day 4 (72 hours postdose). Final Visit procedures will be performed on Day 4.</td></tr>
<tr><td colspan="4">Objectives:
The objectives of this study are to determine the pharmacokinetic and pharmacodynamic profiles, safety, and tolerability of a single dose of 12.5 mg and 25 mg in subjects with T2DM who are between 10 to 17 years old and adult subjects with T2DM.</td></tr>
<tr><td colspan="4">Subject Population: Subjects aged 10 to 17 years old with T2DM and adult subjects with T2DM, aged 18 to 65 years, inclusive.</td></tr>
<tr><td colspan="2">Number of Subjects:
72 (36 pediatric subjects, and 36 adults)</td><td colspan="2">Number of Sites:
Up to 6 sites in the US</td></tr>
<tr><td colspan="2">Dose Level(s):
12.5 mg and 25 mg for Pediatric subjects
25 mg for adult subjects</td><td colspan="2">Route of Administration:
Oral</td></tr>
<tr><td colspan="2">Duration of Treatment:
Single oral dose of alogliptin 12.5 mg or 25 mg</td><td colspan="2">Period of Evaluation:
Total Study duration: 47 days (including 28-day Screening Period and 14 (+/-1) day follow-up phone call).</td></tr>
</table>

Main Criteria for Inclusion:

Pediatric subjects:

Subjects must be between 10 and 17 years of age; weigh at least 36 kg (79 lb) and have a screening body mass index (BMI) of at least 18 kg/m^2; have a diagnosis of T2DM based on American Diabetes Association diagnostic criteria; fasting C-peptide concentration ≥0.8 ng/mL (≥0.26 nmol/L) at Screening only, a 2-hour plasma glucose level of ≥ 200mg/dL during an oral glucose tolerance test or random plasma glucose level of 200 mg/dL or glycated Hemoglobin (HbA1c) ≥6.5%. Pediatric subjects may be taking metformin if the dose has been stable for at least 30 days prior to Day 1. All other medications at Screening and throughout the duration of the study will be reviewed and approved by the investigator and Takeda Medical Monitor on a case-by case basis. Subjects and parents or legal guardians must be willing and able to comply with the protocol requirements. Subjects must be capable of understanding an informed consent form (ICF) or assenting to participate, and parents or legal guardians must be able to understand and sign a written ICF prior to the initiation of any study procedures.

Adult subjects:

Subjects must be men or women between 18 to 65 years of age, inclusive; weigh at least 50 kg (110 lb) and have a Screening BMI between 23 kg/m^2 and 45 kg/m^2 (except for Asian or Asian-descendant subjects for whom the range is between 20 kg/m^2 and 35 kg/m^2), have a diagnosis of T2DM based on American Diabetes Association diagnostic criteria; a 2-hour plasma glucose level of ≥ 200mg/dL during an oral glucose tolerance test or random plasma glucose level of ≥ 200 mg/dL, or fasting plasma glucose level of ≥126 mg/dL where fasting is defined as no caloric intake for at least 8 hours or glycated Hemoglobin (HbA1c) ≥6.5%. Adults may be taking concomitant metformin, if the dose has been stable for at least 30 days prior to Day 1. All other medications at Screening and throughout the duration of the study will be reviewed and approved by the investigator and Takeda Medical Monitor on a case-by case basis. Subjects must be willing and able to comply with the protocol requirements and willing to sign a written, informed consent prior to initiation of any study procedures.

Main Criteria for Exclusion:

Subjects will not be enrolled if they have hypersensitivity to alogliptin or related compounds; a history or clinical manifestations of a significant metabolic (excluding T2DM), hematologic, pulmonary, cardiovascular, gastrointestinal, neurologic, hepatic, renal, urologic, immunologic, musculoskeletal or psychiatric disorder; an acute, clinically significant illness (excluding T2DM) within 30 days prior to Day 1; a hemoglobin value of less than 12 g/dL; a serum creatinine level >1.5 mg/dL; creatinine clearance <50 mL/min; an alanine aminotransferase (ALT) or aspartate aminotransferase (AST) level 1.5 times greater than the upper limit of normal for pediatric subjects and 2 times greater than the upper limit of normal for adult subjects, active liver disease, or jaundice at Screening or Check-in (Day -1) for adult matches; systolic blood pressure >140 mm Hg or diastolic blood pressure >90 mm Hg; participated in another investigational study or taken an investigational drug within 30 days prior to Day 1; received or donated blood or blood products within 30 days prior to the beginning of the study; or previously received alogliptin. Subjects who have taken any medication, supplements or food products described in the Excluded Medication Section 7.3.

Main Criteria for Evaluation and Analyses:

Pharmacokinetics: Plasma pharmacokinetic endpoints for alogliptin are maximum observed plasma concentration (Cmax), time to reach Cmax (Tmax), area under the plasma concentration-time curve from time 0 to time of the last quantifiable concentration (AUC[0-tlqc]), area under the plasma concentration-time curve from time 0 to infinity (AUC[0-inf]), apparent clearance after oral administration (CL/F) and apparent volume of distribution (Vz/F).

Urine pharmacokinetic endpoints for alogliptin are total amount of drug excreted in urine from 0 to 24 hours and 0 to 36 hours postdose (Ae[0-24] and Ae[0-36], respectively), renal clearance from 0 to 24 hours postdose (CLr[0-24]), and fraction of drug excreted in urine from 0 to 24 hours and 0 to 36 hours postdose (Fe[0-24] and Fe[0-36]).

Pharmacodynamics: Pharmacodynamic endpoints for DPP-4 inhibition and GLP-1 are area under the plasma effect-time curve from time 0 to 24 hours postdose (AUEC[0-24]), maximum observed effect (Emax), time to reach maximum observed effect (Tmax), and observed effect at 24 hours after dosing (E24).

Safety: Safety endpoints are incidence of adverse events (AEs), clinical laboratory test (hematology, serum chemistry, urinalysis, fasting glucose, and blood glucose monitoring) results, vital signs measurements, 12-lead electrocardiogram results, and physical examination findings.
Efficacy: Because this is primarily a pharmacokinetic and pharmacodynamic study, no efficacy measurements will be assessed.
Sample Size Justification: The sample size for this study of 36 pediatric subjects and 36 gender- and race-matched adult subjects was chosen mainly by clinical judgment and review of the past PK studies of similar nature, not on statistical considerations.
Statistical Considerations: Descriptive statistics (eg, number of subjects, mean, standard deviation, coefficient of variation, median, minimum, and maximum) will be used to summarize the plasma and urine pharmacokinetic parameters for alogliptin after a single dose by subject groups and dose levels. In addition, geometric means will be computed for AUC(0-tlqc), AUC(0-inf), and Cmax. Dose normalized values will also be reported for the following PK parameters: AUC(0-tlqc), AUC(0-inf), and Cmax. Descriptive statistics (eg, number of subjects, mean, SD, %CV, median, minimum, and maximum) will be used to summarize the pharmacodynamic parameters for DPP-4 inhibition and GLP-1 concentrations by subject group and dose level. Additional analysis will be performed as deemed appropriate.