Summary of Results for Laypersons

What was the Study Called?

An Exploratory Study to Investigate the Effects of Ipragliflozin (ASP1941) on Glucose Homeostasis and Urinary Glucose Excretion in Healthy Subjects and Subjects with Type 2 Diabetes Mellitus (T2DM)

Why was this Study Needed?

Type 2 diabetes is a disease which is characterized by too much glucose or sugar in the blood. Medicines to help type 2 diabetes patients regulate their blood sugar are already available, but some of them may cause unwanted effects and some do not work in all patients. Ipragliflozin (also known as ASP1941 and Suglat®) is a medicine that is being developed to help control blood sugar in patients with type 2 diabetes.

This study was designed to find out how ipragliflozin goes through the body and effects blood sugar levels in patients with type 2 diabetes (patients) and in healthy volunteers (healthy subjects). The study was conducted in 2 parts (Part A and Part B).

Part A: The main question that Part A of the study helped answer was how ipragliflozin effects blood glucose levels and glucose absorption, production, and utilization in the body.

Blood samples were tested after fasting (nothing to eat since the night before) and after eating a meal. A sugar tolerance test was also performed after fasting.

Part B: The main question that Part B of the study helped answer was how different dose levels of study medicine (12.5 mg and 100 mg) effected blood sugar levels in patients with type 2 diabetes.

This study took place at 1 clinic in Germany. Part A was conducted between October 2011 and January 2012. Part B was conducted from November 2011 and February 2012. When the study ended, the sponsor (Astellas) reviewed all the study information and created a report of the results. This is a summary of that report.

What Kind of Study was This and Who Took Part in it?

Part A was a double-blinded, placebo-controlled, crossover study.

- A “blinded” study is when patients, healthy subjects and the researchers do not know who took which of the treatments (ipragliflozin or placebo).
- A “placebo” is a dummy treatment such as a tablet or capsule that looks like a medicine, but does not have any medicine in it. Using a placebo helps make study results fair and unbiased, because researchers, patients and healthy subjects cannot tell who is taking a placebo, and who is taking the real medicine.
- In a “crossover” patients and healthy subjects are given both treatments during the study. In this case, patients and healthy subjects were given both ipragliflozin and placebo.

Patients and healthy subjects were picked for each treatment group by chance alone. Men and women with type 2 diabetes (patients) and without type 2 diabetes (healthy subjects) between 35 and 65 years old were enrolled in the study. Study volunteers were placed in 1 of 2 treatment groups:

- Ipragliflozin 100 mg taken once daily for 5 days in Period 1, followed by 5 days of no study medicine, followed by placebo taken once daily for 5 days in Period 2.
- Placebo taken once daily for 5 days in Period 1, followed by 5 days of no study medicine, followed by ipragliflozin 100 mg taken once daily for 5 days in Period 2.

Seven to 14 days after the last dose of study medicine, all patients and healthy subjects returned to the clinic for a final study visit.

A total of 24 men and women (12 healthy subjects and 12 patients with type 2 diabetes) were enrolled in Part A of the study.

	Part A **Number of Patients**
Age Group Aged between 35 and 65 years	 24
Men Women	13 11
EU Countries Outside EU	24 0

Part B was an open-label, crossover study.

- An "open-label" study means that the patients and the researchers know who took which of the treatments (ipragliflozin 12.5 mg or 100 mg).
- In a "crossover" study patients are given both treatments during the study. In this case, patients were given both ipragliflozin at a dose of 12.5 mg and at a dose of 100 mg.

Patients were picked for each treatment group by chance alone. Men and women with type 2 diabetes between 35 and 65 years old were enrolled in the study. Study volunteers were placed in 1 of 2 treatment groups:

- Ipragliflozin 12.5 mg taken once daily for 6 days in Period 1, followed by 2 weeks of no study medicine, followed by ipragliflozin 100 mg taken once daily for 6 days in Period 2.
- Ipragliflozin 100 mg taken once daily for 6 days in Period 1, followed by 2 weeks of no study medicine, followed by ipragliflozin 12.5 mg taken once daily for 6 days in Period 2.

Seven to 14 days after the last dose of study medicine, all patients returned to the clinic for a final study visit.

A total of 20 men and women with type 2 diabetes were enrolled in Part B of the study.

	Part B Number of Patients
Age Group Aged between 35 and 65 years	 20
Men Women	14 6
EU Countries Outside EU	20 0

What Were the Study Results?

Part A: Overall, ipragliflozin goes through the body in a similar way for patients with type 2 diabetes and healthy volunteers.

Part B: Oral dosing of 100 mg of ipragliflozin resulted in approximately 8 times more ipragliflozin in the blood compared to 12.5 mg of ipragliflozin. This shows that ipragliflozin goes through the body in a dose-proportional way in patients with type 2 diabetes. In this case, dose-proportionality means that increases in the dose of ipragliflozin resulted in a similar increase in the amount of ipragliflozin measured in the blood.

Results from the study showed that ipragliflozin was effective in lowering blood sugar levels in in patients with type 2 diabetes. Ipragliflozin was also safe and well tolerated at all doses given to patients. No safety concerns were noticed at the higher ipragliflozin doses.

What Adverse Reactions did Patients Have?

A lot of research is needed to know whether a medicine causes a medical problem. So when new medicines are being studied researchers keep track of all medical problems that patients have while they are in the study. These medical problems are called "adverse events" and are recorded whether or not they might be caused by the treatment taken. An "adverse reaction" is any medical problem or "adverse event" that is judged by the study doctor to be possibly caused by a medicine or treatment used in the study.

Part A: The table below shows the most common adverse reactions experienced by the 24 patients and healthy subjects while participating in Part A of the study.

	Healthy Subjects		**Patients with Type 2 Diabetes**	
Adverse Reaction	**Ipragliflozin 100 mg (out of 12)**	**Placebo (out of 12)**	**Ipragliflozin 100 mg (out of 12)**	**Placebo (out of 12)**
Back pain	0	1	0	1
Diarrhea	0	1	0	0
Headache or head pain	1	2	0	0
Not aware of decreased blood sugar level	9	8	0	0

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Adverse Reaction	Healthy Subjects		Patients with Type 2 Diabetes	
	Ipragliflozin 100 mg (out of 12)	Placebo (out of 12)	Ipragliflozin 100 mg (out of 12)	Placebo (out of 12)
Decreased blood sugar level	1	0	0	0
Rash	0	0	1	0
Heartburn	0	0	0	1
Excessive passing of gas	0	1	0	0
Muscle pain	0	1	0	1
Feeling hot for a brief moment	0	1	0	0

Part B: The table below shows the most common adverse reactions experienced by the 20 patients while participating in Part B of the study.

Adverse Reaction	Patients with Type 2 Diabetes	
	Ipragliflozin 12.5 mg (out of 20 patients)	Ipragliflozin 100 mg (out of 20 patients)
Diarrhea	1	0
Decreased blood sugar level	0	1
Excessive passing of gas	1	1
Muscle spasms	0	1

An adverse reaction is considered "serious" when it is life threatening, causes lasting problems, or needs hospital care. There were no serious adverse reactions reported in Part A or B of this study. There were no deaths reported in Part A or B of this study.

Where Can I Learn More About This Study?

Astellas may perform additional studies to better understand ipragliflozin.

This summary of the clinical study results is available online at http://www.astellasclinicalstudyresults.com. Please remember that researchers look at the results of many studies to find out how well medicines work and which adverse reactions they might cause. If you have questions about ipragliflozin, please discuss these with your doctor.

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