

## Insulin Resistance Raises Teens' Future HT Risk

BY PATRICE WENDLING

Chicago Bureau

CHICAGO — Insulin resistance in teens increases their risk of high blood pressure during adulthood, according to a large, longitudinal study reported at a conference of the Council for High Blood Pressure Research.

Insulin resistance was assessed in teens

from age 13 to 19 years and was found to be associated with higher systolic blood pressure independent of body mass index, said Alan Sinaiko, M.D., professor of pediatrics at the University of Minnesota in Minneapolis.

It is well known that obesity in some people is significantly related to insulin resistance, which occurs when the body begins to lose its ability to regulate glucose. Little is known about how the syndrome develops. But this study shows that it can be present at a very young age, Dr. Sinaiko said at the meeting, which was sponsored by the American Heart Association.

"Strategies designed to reduce childhood obesity to prevent atherosclerotic cardiovascular disease and type 2 diabetes may need to be complemented by treatment of insulin resistance," Dr. Sinaiko

Dr. Sinaiko and his colleagues randomly recruited 357 Minneapolis grade

In this study of teenagers, the effects of insulin resistance on systolic blood pressure were independent of those related to BMI and triglyceride levels.

school dents. Over the next 6 years, the children were tested using a euglycemic hyperinsulinemic clamp at age 13 years (n=357), at age 15 years (n=309), and at age 19 years (n=206). The test involves infusing a small

amount of insulin into the blood for 3 hours, and simultaneously infusing glucose through another vein. It is designed to maintain blood sugar at a fairly normal level of 100 mg/dL.

Glucose uptake in mg/kg lean body mass during the final 40 minutes of the clamp was used to define the level of insulin resistance.

At age 13, none of the children were hypertensive, and the average blood pressure was 109/55 mm Hg in 198 boys and 106/58 mm Hg in 159 girls. The average body mass index (BMI) was  $21.6 \text{ kg/m}^2$  in boys and 22.3 kg/m<sup>2</sup> in girls, Dr. Sinaiko reported.

At age 19, systolic blood pressure increased by 0.42 mm Hg for each unit increase of insulin resistance from age 13, and it increased by 0.23 mm Hg for each unit increase in BMI from age 13.

Triglycerides increased by 1.6 mg/dL for each unit increase in insulin resistance, and by 3.1 mg/dL per each unit increase of BMI from age 13.

HDL cholesterol, on the other hand, decreased by 0.30 mg/dL for each unit increase in insulin resistance, and decreased by 0.28 mg/dL for each unit increase in BMI, he said.

The effects of insulin resistance on systolic blood pressure were independent of those related to BMI and triglyceride levels. All of the variables were significantly correlated between the studied ages of 13 and 19 years, Dr. Sinaiko said.

## **ENABLEX®**

Extended-release tablets

BRIEF SUMMARY: Please see package insert for full prescribing information

INDICATIONS AND USAGE ENABLEX® (darifenacin) ext INDICALIVEN AND USAGE

FRABLEX® (Gardienacin) extended-release tablets are indicated for the treatment of overactive bladder with symptoms of urge urinary incontinence, urgency and frequency. CONTRAINDICATIONS

EUNI IMMULATIONS

PURBLEX® (darifenacin) extended-release tablets are contraindicated in patients with urinary retention, gastric retention or uncontrolled narrow-angle glaucoma and in patients who are at risk for these conditions. ENABLEX is also contraindicated in patients with known hypersensitivity to the drug or its ingredients.

General
Risk of Urinary Retention
ENABLEX® (darifenacin) extended-release tablets should be administered with caution to patients with clinically significant bladder outflow obstruction because of the risk of urinary retention.

Decreased Gastroinlestinal Motility

BURNELS Rould be administered with caution to patients with gastrointestinal obstructive disorders because of the risk of gastric retention. ENABLEX, like other anticholinergic drugs, may decrease gastrointestinal motility and should be used with caution in patients with conditions such as severe constipation, ulcerative colitis, and myasthenia gravis.

myasthema gravis.

Controlled Narrow-Angle Glaucoma

ENABLEX should be used with caution in patients being treated for narrow-angle glaucoma and only where the potential benefits outweigh the risks.

Patients with Hepatic Impairment

There are no dosing adjustments for patients with mild hepatic impairment. The daily dose of ENABLEX should not exceed 7.5 m got pratients with moderate hepatic impairment. ENABLEX has not been studied in patients with severe hepatic impairment and therefore is not recommended for use in this patient population (see CLINI-CAL PHARMACOLOGY Pharmacokinetics in Special Populations and DOSAGE AND ADMINISTRATION in the full nesscribino information)

prescribing information).

Information for Patients

Patients should be informed that anticholinergic agents, such as ENABLEX, may produce clinically significant adverse effects related to anticholinergic pharmacological activity including constipation, unriary retentionablurred vision. Heat prostration (due to decreased sweating) can occur when anticholinergics such as ENABLEX are used in a hot environment. Because anticholinergics, such as ENABLEX, may produce dizziness or blurred vision, patients should be advised to exercise caution in decisions to engage in potentially dangerous activities until the drug's effects have been determined. Patients should read the patient information leaflet before starting therapy with ENABLEX.

ENABLEX extended-release tablets should be taken once daily with liquid. They may be taken with or without food, and should be swallowed whole and not chewed, divided or crushed.

Drug Interactions
The daily dose of ENABLEX should not exceed 7.5 mg when coadministered with potent CYP3A4 inhibitors (e.g., ketoconazole, traconazole, ritonavir, nelfinavir, clarithromycin and nefazadone) (see CLINICAL PHARMACOLOGY and DOSAGE AND ADMINISTRATION in the full prescribing information).

Caution should be taken when ENABLEX is used concomitantly with medications that are predominantly metabo lized by CYP2D6 and which have a narrow therapeutic window, such as flecainide, thioridazine and tricyclic anti-depressants (see CLINICAL PHARMACOLOGY in the full prescribing information).

The concomitant use of ENABLEX with other anticholinergic agents may increase the frequency and/or severity of dry mouth, constipation, blurred vision and other anticholinergic pharmacological effects. Anticholinergic agents may potentially alter the absorption of some concomitantly administered drugs due to effects on gastro-intestinal motility.

**Drug Laboratory Test Interactions** Interactions between darifenacin and laboratory tests have not been studied

Interactions between darrienacin and aboratory wass have not been source.

Carcinogenesis/Mutagenesis/Impairment of Fertility
Carcinogenicity studies with darrienacin were conducted in mice and rats. No evidence of drug-related carcinogenicity was revealed in a 24-month study in mice at dietary doses up to 100 mg/kg/day or approximately 32 times the estimated human-free AUG-care neached with 15 mg, the maximum recommended human dose (AUC at MRHD) and in a 24-month study in rats at doses up to 15 mg/kg/day or up to approximately 12 times the AUC at MRHD in media rats.

AUC at MRHD in female rats and approximately eight times the AUC at MRHD in media rats.

Darifenacin was not mutagenic in the bacterial mutation assays (Ames test) and the Chinese hamster ovary assay, and not clastogenic in the human lymphocyte assay, and the *in vivo* mouse bone marrow cytogenetics

There was no evidence for effects on fertility in male or female rats treated at oral doses up to 50 mg/kg/day. Exposures in this study correspond to approximately 78 times the AUC at MRHD.

Pregnancy Category C
Darifenacin was not teratogenic in rats and rabbits at doses up to 50 and 30 mg/kg/day, respectively. At the dose Darfienacin was not feratogenic in rats and rabbits at doses up to 50 and 30 mg/kg/day, respectively. At the dose of 50 mg/kg in rats, there was a delay in the ossification of the sacral and caudal vertebrae which was not observed at 10 mg/kg (approximately 13 times the AUC of free plasma concentration at MRHD). Exposure in this study at 50 mg/kg (corresponds to approximately 95 times the AUC of free plasma concentration at MRHD). Stylotical was observed in dams at 10 mg/kg/day (17 times the AUC of free plasma concentration at MRHD). Slight developmental delays were observed in pups at this dose. At 3 mg/kg/day (five times the AUC of free plasma concentration at MRHD) there were no effects on dams or pups. At the dose of 30 mg/kg/day (in rabbits, darifenacin was shown to increase post-implantation loss but not at 10 mg/kg/day (inie times the AUC of free plasma concentration at MRHD). Exposure to unbound drug at 30 mg/kg/ this study corresponds to approximately 28 times the AUC at MRHD. In rabbits, dilated ureter and/or kidney pelvis was observed in offspring at 30 mg/kg/day and one case was observed at 10 mg/kg/day and one sidder dilation consistent with pharmacological action of darifenacin. No effect was observed at 3 mg/kg/day (2.8 times the AUC of free plasma concentration at MRHD). There are no studies of darifenacin in pregnant women. Because animal reproduction studies are not always predictive of human response, ENABLEX should be used during pregnancy only if the benefit to the mother outweighs the potential risk to the fetus.

Nursing Mothers

Darifenacin is excreted into the milk of rats. It is not known whether darifenacin is excreted into human milk and therefore caution should be exercised before ENABLEX is administered to a nursing woman.

Pediatric Use
The safety and effectiveness of ENABLEX in pediatric patients have not been established

Geriatric Use
In the Phase III fixed-dose, placebo-controlled, clinical studies, 30% of patients treated with ENABLEX were over 65 years of age. No overall differences in safety or efficacy were observed between these patients (in-207) and younger patients <65 years (in-464). No lose adjustment is recommended for elderly patients (see CLIMICAL PHARMACOLOGY, Pharmacokinetics in Special Populations and CLIMICAL STUDIES in the full prescribing

ADVERSE REACTIONS

During the clinical development of ENABLEX® (darifenacin) extended-release tablets, a total of 7,363 patients and volunteers were treated with doses of darifenacin from 3.75 mg to 75 mg once daily.

The safety of ENABLEX was evaluated in Phase II and III controlled clinical trials in a total of 8,830 patients, 6,001 of whom were treated with ENABLEX. Of this total, 1,069 patients participated in three, 12-week, Phase fixed-dose efficacy and safety studies. Of this total, 373 and 334 patients received ENABLEX 7.5 mg daily and 15 mg daily, respectively. In all long-term trials combined, 1,216 and 672 patients received treatment with ENABLEX for at least 24 and 52 weeks, respectively.

In all placebo-controlled trials combined, the incidence of serious adverse events for 7.5 mg, 15 mg and placebo

was similar.

In all fixed-lose Phase III studies combined, 3.3% of patients treated with ENABLEX discontinued due to all adverse events versus 2.6% in placebo. Dry mouth leading to study discontinuation occurred in 0%, 0.9%, and 0% of patients treated with ENABLEX 7.5 mg daily, ENABLEX 15 mg daily and placebo, respectively. Constituation leading to study discontinuation occurred in 0.6%, 1.2%, and 0.3% of patients treated with ENABLEX 7.5 mg daily, ENABLEX 15 mg daily and placebo, respectively.

Table 4 lists the adverse events reported (regardless of causality) in 2% or more of patients treated with 7.5-mg CNABLEX extended-release tablets and greater than placebo in the three, fixed-dose, placebo-cntrolled Phase III studies (Studies 1, 2 and 3). Adverse events were reported by 54% and 65% of patients receiving 7.5 mg and 15 mg once-daily ENABLEX extended-release tablets, respectively, and by 49% of patients receiving placebo. In these studies, the most frequently reported adverse events were dry mouth and constipation. The majority of adverse events in ENABLEX-treated subjects were mild or moderate in severity and most occurred during the first two weeks of treatment.

Table 4
Incidence of Adverse Events\* Reported in 2.0% of Patients Treated with ENABLEX®
Extended-Release Tablets and More Frequent with ENABLEX® than with Placebo in Three, Fib
Placebo-Controlled, Phase III Studies (Studies 1, 2, and 3)

Body System	Adverse Event	Percentage of Subjects with Adverse Event (%)		
		ENABLEX® 7.5 mg N = 337	ENABLEX® 15 mg N = 334	Placebo N = 388
Digestive	Dry Mouth	20.2	35.3	8.2
	Constipation	14.8	21.3	6.2
	Dyspepsia	2.7	8.4	2.6
	Abdominal Pain	2.4	3.9	0.5
	Nausea	2.7	1.5	1.5
	Diarrhea	2.1	0.9	1.8
Urogenital	Urinary Tract Infection	4.7	4.5	2.6
Nervous	Dizziness	0.9	2.1	1.3
Body as a Whole	Asthenia	1.5	2.7	1.3
Eye	Dry Eyes	1.5	2.1	0.5

Other adverse events reported, regardless of causality, by ≥1% of ENABLEX patients in either the 7.5 mg or 15 mg once-daily darifenacin-dose groups in these fixed-dose, placebo-controlled Phase III studies include: ahonmal vision, accidental injury, back pain, dry skin, flu syndrome, pain, hypertension, vomiting, periphera edema, weight gain, arthralgia, bronchitis, phanyngitis, rhinitis, sinusitis, rash, pruritus, urinary tract disorder advancing the production of the produ

Study 4 was a 12-week, placebo-controlled, dose-titration regimen study in which ENABLEX was administered in accordance with dosing recommendations (see DOSAGE AND ADMINISTRATION in the full prescribing information). All patients initially received placebo or ENABLEX 7.5 mg daily, and after two weeks, patients and physicians were allowed to adjust upward to ENABLEX 15 mg if needed. In this study, the most commonly reported adverse events were also constipation and dry mouth. The incidence of discontinuation due to all adverse events was 3.1% and 6.7% for placebo and for ENABLEX, respectively. Table 5 lists the adverse events (regardless of causality) reported in >3% of patients treated with ENABLEX extended-release tablets and greater than placebo.

Table 5 Number (%) of Adverse Events\* Reported in >3% of Patients Treated with ENABLEX®
Extended-Release Tablets, and More Frequent with ENABLEX® than Placebo, in the Placebo-Controlled,

Adverse Event	ENABLEX® 7.5 mg/15 mg N = 268	Placebo N = 127
Constipation	56 (20.9%)	10 (7.9%)
Dry Mouth	50 (18.7%)	11 (8.7%)
Headache	18 (6.7%)	7 (5.5%)
Dyspepsia	12 (4.5%)	2 (1.6%)
Nausea	11 (4.1%)	2 (1.6%)
Urinary Tract Infection	10 (3.7%)	4 (3.1%)
Accidental Injury	8 (3.0%)	3 (2.4%)
Flu Syndrome	8 (3.0%)	3 (2.4%)

Acute urinary retention (AUR) requiring treatment was reported in a total of 16 patients in the ENABLEX Acute urinary retention (AUR) requiring treatment was reported in a total of 16 patients in the ENABLEX Phase I-III clinical trials. Of these 16 cases, seven were reported as serious adverse events, including one patient with detrusor hyperreflexia secondary to a stroke, one patient with benign prostatic hypertrophy (BPH), one patient with irritable howel syndrome (IBS) and four OAB patients taking dariferacin 30 mg daily, Of the remaining nine cases, none were reported as serious adverse events. Three occurred in OAB patients taking the recommended doses, and two of these required bladder catheterization for 1-2 days.

Constipation was reported as a serious adverse event in six patients in the ENABLEX Phase I-III clinical trials, including one patient with benign prostatic hypertrophy (BPH), one OAB patient taking darifenacin 30 mg daily, and only one OAB patient taking the recommended doses. The latter patient was hospitalized for investigation with colonoscopy after reporting nine months of chronic constipation that was reported as being moderate in severity.

Storage
Storage Storage (77°F); excursions permitted to 15-30°C (59-86°F) [see USP Controlled Room Temperature].
Protect from light.

Manufactured by Brooklyn, New York 11206

Novartis Pharmaceuticals Corporation East Hanover, New Jersey 07936 @Novartis

References: 1. Chapple CR, Yamanishi T, Chess-Williams R. Muscarinic receptor subtypes and management of the overactive bladder. *Urology.* 2002;60(suppl 5A):82-89.

2. Federal Interagency Forum on Aging-Related Statistics. Older Americans 2000: key indicators of well-being. August 2000. Available at: http://www.agingstats.gov/chartbook/2000/healthstatus.html#Indicator%2014. Accessed November 4, 2004. 3. Feinberg M. The problems of anticholinergic adverse effects in older patients. *Drugs Aging* 1993;3:335-348.



East Hanover, New Jersey 07936-1080

©2005 Novartis

3/05

C-ENA-1012