JANUARY 1987 VOLUME 36 NUMBER 1

diabetes

A JOURNAL OF THE AMERICAN DIABETES ASSOCIATION®

ORIGINAL CONTRIBUTIONS

Increase in insulin antibodies during continuous subcutaneous insulin infusion and multiple-injection therapy in contrast to conventional treatment
KNUT DAHL-JØRGENSEN, PETER TORJESEN, KRISTIAN F. HANSSEN, LEIV SANDVIK, AND ØYSTEIN AAGENÆS 1

Effect of aldose reductase inhibitor ONO 2235 on reduced sympathetic nervous system activity and peripheral nerve disorders in STZ-induced diabetic rats TOSHIHIDE YOSHIDA, HITOSHI NISHIOKA, KEIJI YOSHIOKA, KOJI NAKANO, MOTOHARU KONDO, AND HIROSHI TERASHIMA 6

Protein sparing in skeletal muscle during prolonged starvation: dependence on lipid fuel availability BRADFORD B. LOWELL AND MICHAEL N. GOODMAN 14

Defective epinephrine and growth hormone responses in type I diabetes are stimulus specific BARBARA R. HIRSCH AND HARRY SHAMOON 20

Modulation of insulin action on 2-deoxyglucose uptake by chloroquine in chick embryo fibroblasts LUC CYNOBER, CHRISTIAN AUSSEL, MICHEL VAUBOURDOLLE, JEAN AGNERAY, AND OHVANESSE G. EKINDJIAN 27

Somatostatin does not increase insulin-stimulated glucose uptake in humans ALAIN D. BARON, PENNY WALLACE, GINGER BRECHTEL, AND RUDOLF PRAGER 33

Effects of fasting, feeding, and insulin on enhancing effect of GTP on cAMP binding in rat hepatic cytosol EDWARD M. ROSENBERG, A. DAVID GOODMAN, AND THOMAS I. LIPINSKI 37

Do upper-body and centralized adiposity measure different aspects of regional body-fat distribution? Relationship to non-insulin-dependent diabetes mellitus, lipids, and lipoproteins STEVEN M. HAFFNER, MICHAEL P. STERN, HELEN P. HAZUDA, JACQUELINE PUGH, AND JUDITH K. PATTERSON 43

Oral protein hydrolysate causes liver glycogen depletion in fasted rats pretreated with glucose MARY C. GANNON AND FRANK Q. NUTTALL 52

Interaction of cooling rate, warming rate, and extent of permeation of cryoprotectant in determining survival of isolated rat islets of Langerhans during cryopreservation
MICHAEL J. TAYLOR AND MARCUS J. BENTON 59

Differences in epitope restriction of autoantibodies to native human insulin (IAA) and antibodies to heterologous insulin (IA) JOSE-LUIS DIAZ AND TERENCE WILKIN 66

Effect on renal function of change from high to moderate protein intake in type I diabetic patients WARREN L. KUPIN, PEDRO CORTES, FRANCIS DUMLER, CAROLYN S. FELDKAMP, M. C. KILATES, AND NATHAN W. LEVIN 73

Relationship between renal function and metabolic alterations in early streptozocin-induced diabetes in rats PEDRO CORTES, FRANCIS DUMLER, JOSE GOLDMAN, AND NATHAN W. LEVIN 80

Influence of age on responsiveness to diabetogenic action of growth hormone
CHRISTOPHER M. CAMERON AND JACK L. KOSTYO 88

Age-corrected empirical genetic risk estimates for first-degree relatives of IDDM patients HAPTMUT TILLIL AND JOHANNES KÖBBERLING 93

Myofibrillar protein breakdown in skeletal muscle is diminished in rats with chronic streptozocin-induced diabetes MICHAEL N. GOODMAN 100

Apparent epidemic of insulin-dependent diabetes mellitus in midwestern Poland
MARIAN REWERS, RONALD E. LaPORTE, MIECZYSLAW WALCZAK, KRZYSZTOF DMOCHOWSKI, AND ELZBIETA BOGACZYNSKA 106

RAPID PUBLICATIONS

Transcomplementation of HLA genes in IDDM: HLA-DQ α- and β-chains produce hybrid molecules in DR3/4 heterozygotes BARBARA S. NEPOM, DAVID SCHWARZ, JERRY P. PALMER, AND GERALD T. NEPOM 114

Prior cholecystokinin exposure sensitizes islets of Langerhans to glucose stimulation
WALTER S. ZAWALICH AND VICTORIA A. DIAZ 118

Phosphorylation of purified insulin receptor by cAMP kinase RICHARD A. ROTH AND JACQUELINE BEAUDOIN 123

DIAEAZ 36(1) 1–126 (1987)
ISSN 0012-1797

When a type II diabetic patient needs more than diet, unique MICRONASE® Tablets (glyburide) are a logical first choice.

Choosing antidiabetic

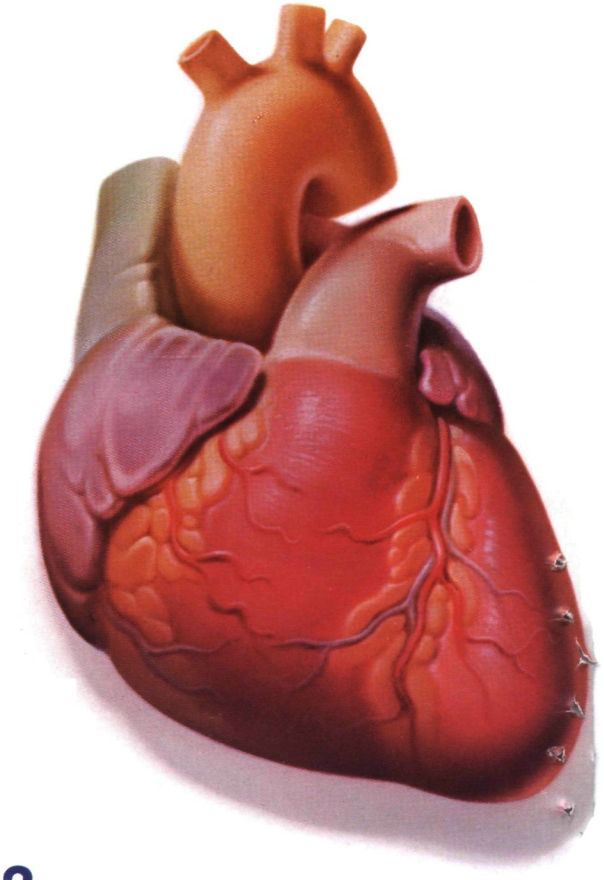
1. Micronase—a rational choice in type II diabetes

Insulin levels are normal or elevated in most patients with type II diabetes, although insulin action is markedly impaired. MICRONASE helps normalize the tissue response to endogenous insulin.

Initially, MICRONASE helps lower serum glucose in responsive patients by stimulating the release of additional insulin. As therapy continues, MICRONASE is believed to promote peripheral glucose metabolism by helping to correct defects at the cellular receptor and postreceptor levels.

2. Micronase—a single, daily dose provides 24-hour glycemic control

MICRONASE provides 24-hour control of blood glucose with a single, daily, low-milligram dose. MICRONASE may be taken with food, since food intake does not appear to affect its bioavailability.



3. Micronase—for the type II diabetic patient who is also hypertensive: Control without risk of water retention

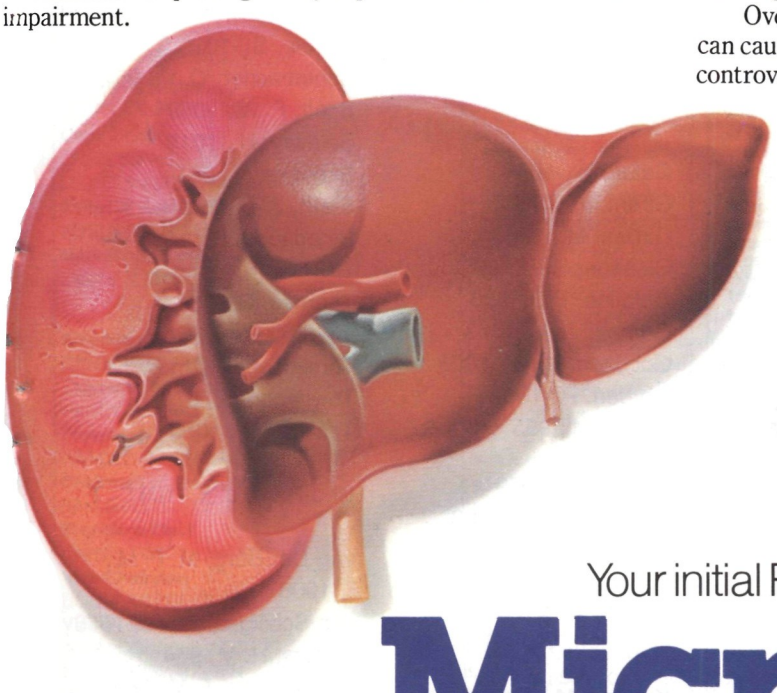
This may also be significant for the type II diabetic patier with congestive heart failure. MICRONASE actually causes mild diuresis.

© 1985 The Upjohn Company

therapy today

4. Micronase—an important consideration in the type II diabetic patient with renal impairment: Control plus unique dual excretion... 50% urine, 50% bile

Elimination of MICRONASE equally in bile and urine reduces the risk of drug accumulation, which may result in hypoglycemia. MICRONASE should be used with caution in patients with renal impairment; however, in a single-dose study, plasma clearance of MICRONASE was prolonged only in patients with severe renal impairment.



5. Micronase—for the patient who fails on other diabetic therapy: Potency and dosage flexibility

MICRONASE may prove effective when other drugs fail. Five mg of MICRONASE is approximately equivalent to 250 mg of chlorpropamide or 500 mg of acetohexamide in its ability to lower blood glucose. The dosage range of MICRONASE allows for greater dosage flexibility than other agents.

Overdosage of sulfonylureas, including MICRONASE, can cause hypoglycemia. Although the interpretations are controversial, the UGDP study reported in 1970 that the use of tolbutamide, an oral hypoglycemic drug, was associated with increased cardiovascular mortality.

Upjohn The Upjohn Company
Kalamazoo, MI 49001

Your initial Rx in type II diabetes

Micronase®

glyburide, 5 mg Tablets

For brief summary of prescribing information, please turn page.

Micronase® Tablets (glyburide)

Dosage Guide:* Although relatively rare, hypoglycemia may occur during the conversion to MICRONASE from other therapy.

Prior therapy or condition	Considerations before starting therapy	Initial MICRONASE dose (mg/day)
Dietary therapy ineffective	No priming necessary	1.25 to 5 mg
Oral therapy	Discontinue oral hypoglycemic†	2.5 to 5 mg
Insulin therapy (<40 units/day)	Completely discontinue insulin injections under medical supervision	2.5 to 5 mg
Insulin therapy (>40 units/day)	Gradually discontinue insulin injections under close medical observation or hospitalization	5 mg

*See complete prescribing information.
†See package insert for special precautions when transferring patients from chlorpropamide.

Micronase Tablets (brand of glyburide tablets)

CONTRAINDICATIONS: MICRONASE Tablets are contraindicated in patients with: 1. Known hypersensitivity or allergy to the drug. 2. Diabetic ketoacidosis, with or without coma. This condition should be treated with insulin. 3. Type I diabetes mellitus, as sole therapy.

SPECIAL WARNING ON INCREASED RISK OF CARDIOVASCULAR MORTALITY: The administration of oral hypoglycemic drugs has been reported to be associated with increased cardiovascular mortality as compared to treatment with diet alone or diet plus insulin. This warning is based on the study conducted by the University Group Diabetes Program (UGDP), a long-term prospective clinical trial designed to evaluate the effectiveness of glucose-lowering drugs in preventing or delaying vascular complications in patients with noninsulin-dependent diabetes. The study involved 823 patients who were randomly assigned to one of four treatment groups (Diabetes, 19 [Suppl 2]: 747-830, 1970).

UGDP reported that patients treated for 5 to 8 years with diet plus a fixed dose of tolbutamide (1.5 grams per day) had a rate of cardiovascular mortality approximately 2-1/2 times that of patients treated with diet alone. A significant increase in total mortality was not observed, but the use of tolbutamide was discontinued based on the increase in cardiovascular mortality, thus limiting the opportunity for the study to show an increase in overall mortality. Despite controversy regarding the interpretation of these results, the findings of the UGDP study provide an adequate basis for this warning. The patient should be informed of the potential risks and advantages of MICRONASE and of alternative modes of therapy.

Although only one drug in the sulfonylurea class (tolbutamide) was included in this study, it is prudent from a safety standpoint to consider that this warning may apply to other oral hypoglycemic drugs in this class, in view of their close similarities in mode of action and chemical structure.

PRECAUTIONS: General – *Hypoglycemia:* All sulfonylureas are capable of producing severe hypoglycemia. Proper patient selection and dosage and instructions are important to avoid hypoglycemic episodes. Renal or hepatic insufficiency may increase the risk of serious hypoglycemic reactions. Elderly, debilitated or malnourished patients, and those with adrenal or pituitary insufficiency, are particularly susceptible to the hypoglycemic action of glucose-lowering drugs. Hypoglycemia may be difficult to recognize in the elderly and in people who are taking *beta-adrenergic blocking drugs. Hypoglycemia is more likely to occur when caloric* intake is deficient, after severe or prolonged exercise, when alcohol is ingested, or when more than one glucose-lowering drug is used. *Loss of Control of Blood Glucose:* In diabetic patients exposed to stress such as fever, trauma, infection or surgery, a loss of control may occur. It may then be necessary to discontinue MICRONASE and administer insulin. Adequate adjustment of dose and adherence to diet should be assessed before classifying a patient as a secondary failure. *Information for Patients:* Patients should be informed of the potential risks and advantages of MICRONASE and of alternative modes of therapy. They also should be informed about the importance of adherence to dietary instructions, of a regular exercise program, and of regular testing of urine and/or blood glucose. The risks of hypoglycemia, its symptoms and treatment, and conditions that predispose to its development should be explained to patients and responsible family members. Primary and secondary failure should also be explained.

Laboratory Tests: Response to MICRONASE Tablets should be monitored by frequent urine glucose tests and periodic blood glucose tests. Measurement of glycosylated hemoglobin levels may be helpful in some patients. **Drug Interactions:** The hypoglycemic action of sulfonylureas may be potentiated by certain drugs including nonsteroidal anti-inflammatory agents and other drugs that are highly protein bound, salicylates, sulfonamides, chloramphenicol, probenecid, coumarins, monoamine oxidase inhibitors, and beta adrenergic blocking agents. Certain drugs tend to produce hyperglycemia and may lead to loss of control. These drugs include the thiazides and other diuretics, corticosteroids, phenothiazines, thyroid products, estrogens, oral contraceptives, phenytoin, nicotinic acid, sympathomimetics, calcium channel blocking drugs, and isoniazid. A potential interaction between oral miconazole and oral hypoglycemic agents leading to severe hypoglycemia has been reported. **Carcinogenesis, Mutagenesis, and Impairment of Fertility:** Studies in rats at doses up to 300 mg/kg/day for 18 months showed no carcinogenic effects. Glyburide is nonmutagenic when studied in the Salmonella microsome test (Ames test) and in the DNA damage/alkaline elution assay. **Pregnancy:** *Teratogenic Effects:* Pregnancy Category B. Reproduction studies in rats and rabbits have revealed no evidence of impaired fertility or harm to the fetus due to glyburide. There are no adequate and well controlled studies in pregnant women. This drug should be used during pregnancy only if clearly needed. Insulin should be used during pregnancy to maintain blood glucose as close to normal as possible. *Nonteratogenic Effects:* Prolonged severe hypoglycemia (4 to 10 days) has been reported in neonates born to mothers who were receiving a sulfonylurea drug at the time of delivery. MICRONASE should be discontinued at least two weeks before the expected delivery date. **Nursing Mothers:** Some sulfonylurea drugs are known to be excreted in human milk. Insulin therapy should be considered. **Pediatric Use:** Safety and effectiveness in children have not been established.

ADVERSE REACTIONS: Hypoglycemia: See Precautions and Overdosage sections. **Gastrointestinal Reactions:** Cholestatic jaundice may occur rarely; MICRONASE Tablets should be discontinued if this occurs. Gastrointestinal disturbances, e.g., nausea, epigastric fullness, and heartburn, are the most common reactions, having occurred in 1.8% of treated patients during clinical trials. They tend to be dose-related and may disappear when dosage is reduced. Liver function abnormalities, including isolated transaminase elevations, have been reported. **Dermatologic Reactions:** Allergic skin reactions, e.g., pruritis, erythema, urticaria, and morbilliform or maculopapular eruptions, occurred in 1.5% of treated patients during clinical trials. These may be transient and may disappear despite continued use of MICRONASE; if skin reactions persist, the drug should be discontinued. Porphyria cutanea tarda and photosensitivity reactions have been reported with sulfonylureas. **Hematologic Reactions:** Leukopenia, agranulocytosis, thrombocytopenia, hemolytic anemia, aplastic anemia, and pancytopenia have been reported with sulfonylureas. **Metabolic Reactions:** Hepatic porphyria and disulfiram-like reactions have been reported with sulfonylureas; however, hepatic porphyria has not been reported with MICRONASE and disulfiram-like reactions have been reported very rarely.

OVERDOSAGE: Overdosage of sulfonylureas, including MICRONASE Tablets, can produce hypoglycemia. If hypoglycemic coma is diagnosed or suspected, the patient should be given a rapid intravenous injection of concentrated (50%) glucose solution. This should be followed by a continuous infusion of a more dilute (10%) glucose solution at a rate which will maintain the blood glucose at a level above 100 mg/dL. Patients should be closely monitored for a minimum of 24 to 48 hours, since hypoglycemia may recur after apparent clinical recovery.

Caution: Federal law prohibits dispensing without prescription. Store at controlled room temperature 15°-30°C (59°-86°F). Dispensed in well closed containers with safety closures. Keep container tightly closed.

For additional product information see your Upjohn representative. B-3-S

Upjohn THE UPJOHN COMPANY
Kalamazoo, MI 49001, USA

J-7349
January 1987

JANUARY AUTHOR INDEX

(Volume 36, Number 1)

Aagenæs, O., 1
Agneray, J., 27
Aussel, C., 27

Baron, A. D., 33
Beaudoin, J., 123
Benton, M. J., 59
Bogaczynska, E., 106
Brechtel, G., 33

Cameron, C. M., 88
Cortes, P., 73, 80
Cynober, L., 27

Dahl-Jorgensen, K., 1
Diaz, J.-L., 66
Diaz, V. A., 118
Dmochowski, K., 106
Dumler, F., 73, 80

Ekindjian, O. G., 27

Feldkamp, C. S., 73

Gannon, M. C., 52
Goldman, J., 80
Goodman, A. D., 37
Goodman, M. N., 14, 100

Haffner, S. M., 43
Hanssen, K. F., 1
Hazuda, H. P., 43
Hirsch, B. R., 20

Kilates, M. C., 73
Köbberling, J., 93
Kondo, M., 6
Kostyo, J. L., 88
Kupin, W. L., 73

LaPorte, R. E., 106
Levin, N. W., 73, 80
Lipinski, T. I., 37
Lowell, B. B., 14

Nakano, K., 6
Nepom, B. S., 114
Nepom, G. T., 114
Nishioka, H., 6
Nuttall, F. Q., 52

Palmer, J. P., 114
Patterson, J. K., 43
Prager, R., 33
Pugh, J., 43

Rewers, M., 106
Rosenberg, E. M., 37
Roth, R. A., 123

Sandvik, L., 1
Schwarz, D., 114
Shamoon, H., 20
Stern, M. P., 43

Taylor, M. J., 59
Terashima, H., 6
Tillil, H., 93
Torjesen, P., 1

Vaubourdolle, M., 27

Walczak, M., 106
Wallace, P., 33
Wilkin, T., 66

Yoshida, T., 6
Yoshioka, K., 6

Zawalich, W. S., 118

Editor
R. PAUL ROBERTSON, MD
Associate Editors
FRITZ H. BACH, MD
ROBERT P. ELDE, PhD
FRANK Q. NUTTALL, MD, PhD
ROBERT L. SORENSON, PhD

EDITORIAL BOARD
RICHARD BERGMAN, MD
WILLIAM S. BRIMIJOIN, PhD
H. FRANKLIN BUNN, MD
WILLIAM CHICK, MD
JOSEPH M. DAVIE, MD, PhD
WILLIAM DUCKWORTH, MD
ROBERT P. ELDE, PhD
DARYL GRANNER, MD
GEROLD M. GRODSKY, MD
JEFFREY B. HALTER, MD
EDWARD HORTON, MD
LEONARD JARETT, MD
TETSURO KONO, PhD
AKE LERNMARK, MD
S. MICHAEL MAUER, MD
STEWART A. METZ, MD
DANIEL H. MINTZ, MD
BARRY I. POSNER, MD
ROBERT SHERWIN, MD
DONALD F. STEINER, MD
MICHAEL P. STERN, MD
DAVID SUTHERLAND, MD
GORDON WEIR, MD
ROSALYN S. YALOW, PhD

Publisher
CAROLINE STEVENS
Director of Professional Publications
BEVERLY BRITTAN COOK
Managing Editor
ORIT LOWY
Assistant Editors
CHRISTINE A. BUCKNER
JAN STANFORD BALLARD
Editorial Assistant
LUCILLE MARIE SHRADER

American Diabetes Association Officers 1986–87
Chairman of the Board
SAM GALLO
President
DANIEL PORTE, JR., MD
Chairman of the Board-Elect
S. DOUGLAS DODD
President-Elect
JOHN A. COLWELL, MD
Vice-Chairman
WILLIAM A. MAMRACK
Vice-Presidents
CHARLES M. CLARK, MD
LINDA HURWITZ, RN
Secretary
FRANK W. ROSENHOOVER
Treasurer
GORDON MARDIS
Past Chairman of the Board
HENRY RIVERA
Past President
HAROLD RIFKIN, MD
Executive Vice-President
ROBERT S. BOLAN

diabetes
A JOURNAL OF THE AMERICAN DIABETES ASSOCIATION®

Diabetes and *Diabetes Care* are scientific research journals published by the American Diabetes Association. Both publish original high-quality reports on biomedical research related to the broad field of diabetes mellitus. *Diabetes* provides a forum for animal and human research primarily directed toward expanding knowledge of physiology and pathophysiology of diabetes mellitus. *Diabetes Care* provides a forum for applied research primarily directed toward improving the welfare of people with diabetes mellitus and enhancing understanding of the disease for health professionals.

The Journal does not publish material that has been reported elsewhere. In submitting an article the author(s) must state in the covering letter that the material has not been published elsewhere and has not been submitted for publication elsewhere. Prior publication specifically includes symposia, proceedings, preliminary communications, books, and invited articles. It is assumed that all human investigation shall have been conducted according to the principles expressed in the Declaration of Helsinki. Accepted manuscripts incur a charge of $25 per printed page.

For studies involving experimental animals, state the species, strain, number used, and other pertinent descriptive characteristics. For human subjects or patients, describe their characteristics. When describing surgical procedures on animals, identify the preanesthetic and anesthetic agents used, and state the amount or concentration and the route and frequency of administration for each. The use of paralytic agents, such as curare or succinylcholine, is not an acceptable substitute for anesthetics. For other invasive procedures on animals, report the analgesic or tranquilizing drugs used; if none was used, provide justification for such exclusion. When reporting studies on unanesthetized animals or on humans, indicate that the procedures followed were in accordance with institutional guidelines.

In view of *The Copyright Revision Act of 1976*, all transmittal letters to the editor must contain the following language before manuscripts can be reviewed for possible publication: "In consideration of ADA's taking action in reviewing and editing my (our) submission, the author(s) undersigned hereby transfers, assigns, or otherwise conveys all copyright ownership to the ADA in the event that such work is published by the ADA." We regret that transmittal letters not containing the foregoing language signed by all authors of the manuscript will necessitate return of your manuscript.

Matter appearing in *Diabetes* is copyrighted by the American Diabetes Association, Inc. Permission to reproduce all or parts of papers appearing in it may be granted under appropriate conditions and if proper credit is given. Such requests should be addressed in writing to the Permissions Editor, accompanied by a letter of permission from the senior author.

All signed articles and editorials are the responsibility of the author(s) and not that of the American Diabetes Association. The Editors will be pleased to consider for publication papers presented at the Annual Meeting of the association.

Rapid Publications: Observations considered to be of unusual importance may be submitted as a Rapid Publication. Editorial decision will be made within 10 days after receipt of the manuscript. No written review or explanation of the decision will be provided. Rejected papers may be resubmitted as a regular manuscript and reviewed accordingly. Rapid Publications may not exceed 10 double-spaced typewritten pages (including figures, tables, and references). Accepted papers will be published in the earliest possible issue of the Journal.

Manuscripts should be typewritten, with double spacing, and submitted in triplicate together with three copies of figures and photomicrographs. Manuscripts prepared in accord with the requirements specified in the document "Uniform Requirements for Manuscripts Submitted to Biomedical Journals," *Annals of Internal Medicine* 96:766–71, 1982, will be considered for publication.

References should be presented in the style of the following examples and numbered in order of appearance in the text: For Periodicals—Banting FG, Best CH: The internal secretion of the pancreas. *J Lab Clin Med* 7:251–66, 1922. For Books—Allen M: *Studies Concerning Glycosuria and Diabetes*. Cambridge, MA, Harvard Univ. Press, 1913, p. 461.

A summary of the content of the paper of not more than 250 words should be provided. This should be self-contained and understandable without reference to the text.

Photographs, drawings, and figures should be suitable for reproduction. Photographs should be unmounted, untrimmed glossy prints. The names of authors should appear on the back. The tops of photographs and figures should be indicated.

Galley proofs are sent to the principal author with a price list and order blank for reprints.

All manuscripts and related correspondence should be addressed to R. Paul Robertson, M.D., University of Minnesota, P.O. Box 731, Minneapolis, MN 55440-0731. Editorial correspondence should be addressed to the Editorial Office, *Diabetes*, American Diabetes Association, Inc., National Service Center, 1660 Duke Street, Alexandria, Virginia 22314.

Diabetes (ISSN 0012-1797) is published monthly by the American Diabetes Association, Inc., 1660 Duke Street, Alexandria, Virginia 22314. Professional membership dues include $70 designated for *Diabetes*. Subscription rates for nonmembers: $70 for one year/$125 for two years. Foreign postage at $12.50 per year applies to all foreign countries, including Canada, Mexico, and other countries in the Postal Union of the Americas and Spain. Individual copies: $8. Second-class postage paid at Alexandria, Virginia 22314, and at additional mailing offices. POSTMASTER: Send change of address to *Diabetes*, American Diabetes Association, P.O. Box 2045, Mahopac, NY 10541.

Subscription correspondence should be addressed to *Diabetes*, Subscription Department, P.O. Box 2045, Mahopac, NY 10541. Checks, money orders, and drafts for subscriptions should be made payable to the American Diabetes Association, Inc., and must accompany subscription orders.

Advertising inquiries should be addressed to Peggy Donovan, Advertising Coordinator, American Diabetes Association, 1660 Duke St., Alexandria, VA 22314. Tel. (703) 549-1500.

Second Nature

sek´ənd nā´chər. *An acquired habit so deeply ingrained as to be automatic and part of a person's nature.*

Second nature comes from ease of use.

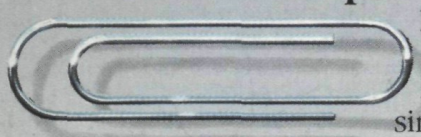
To become a second-nature tool, an object must possess certain qualities.

Simplicity. Functionality. Portability.

They are part and parcel of many tools that make our life easier and better.

Tools such as the GLUCOSCAN™ 3000 Personal Blood Glucose Meter.

Simple



Everything can be learned, but simple things are learned more easily. Almost everyone knows how to use a paper clip.

The GLUCOSCAN 3000 Meter has precisely the kind of simplicity that invites easy learning.

Like the simple procedure. The simple two-touch operation. Or the permanent factory calibration that does away with both unnecessary steps and operator errors.

The faster the learning, the easier your training job. And the greater the likelihood of continued use.

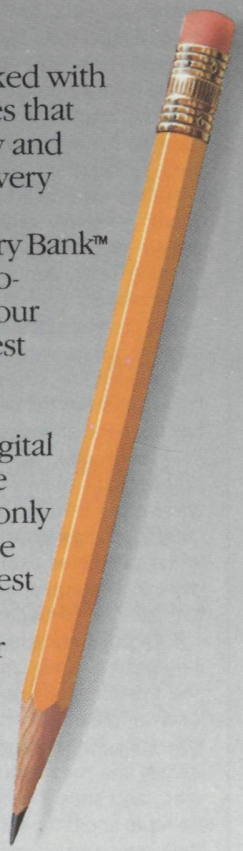
The GLUCOSCAN one-minute test and dry-blot procedure make compliance sure and simple.

And when your patients comply, you can feel confident with their treatment program.

Functional

Functional tools work small miracles every day. Using a pencil has become second nature to the degree that its brilliant, functional design is taken for granted.

The GLUCOSCAN 3000 Meter can become just such a tool for your patients. It is packed with functional features that make testing easy and appropriate for every lifestyle.



Like the Memory Bank™ Data Log that automatically stores your patient's last 29 test readings.

Or the largest, easiest-to-read digital display in glucose monitoring. The only adjustable volume control. The longest battery life. And the longest meter warranty—three full years—included free of extra charge.

Portable

Cumbersome objects stay home. Compact ones go places. When we wear a wristwatch, we always know the time no matter where we are.

Equally, with the GLUCOSCAN 3000 Meter, your patients can test their blood sugars virtually anywhere, because the GLUCOSCAN 3000 Meter is the smallest one available.

But of what use is a small meter if all the other testing supplies are not readily at hand? The unique, truly pocket-portable GLUCOSCAN case holds everything required for on-the-go monitoring: Individually foil-wrapped GLUCOSCAN Test Strips, PENLET™ Automatic Blood Sampling Pen, GLUCOSCAN Lancets, and, of course, the GLUCOSCAN Meter itself.

GLUCOSCAN 3000

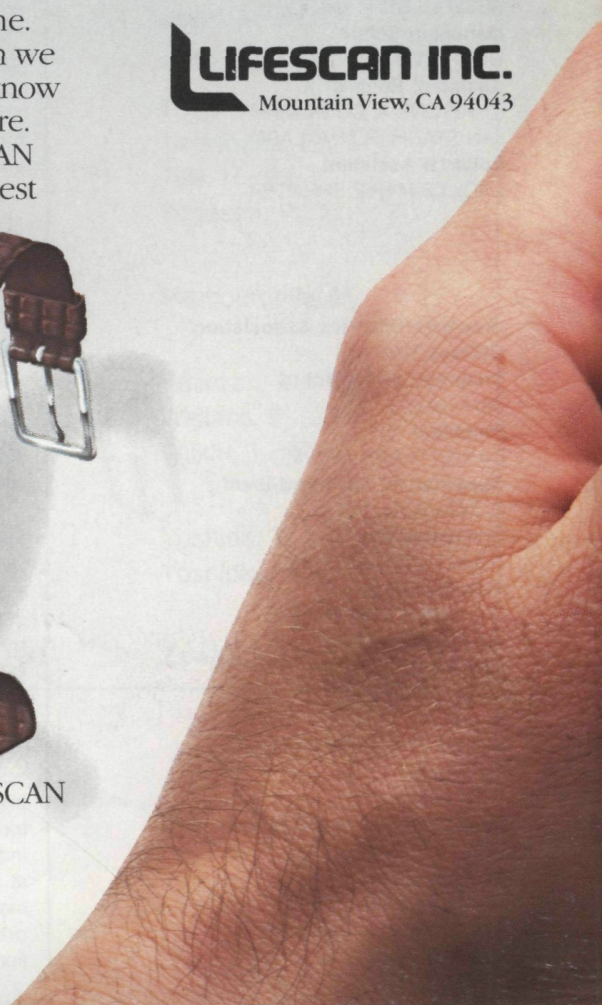
GLUCOSCAN 3000 is more than just another meter. It's an important part of life for many people.

Some say it's second nature.

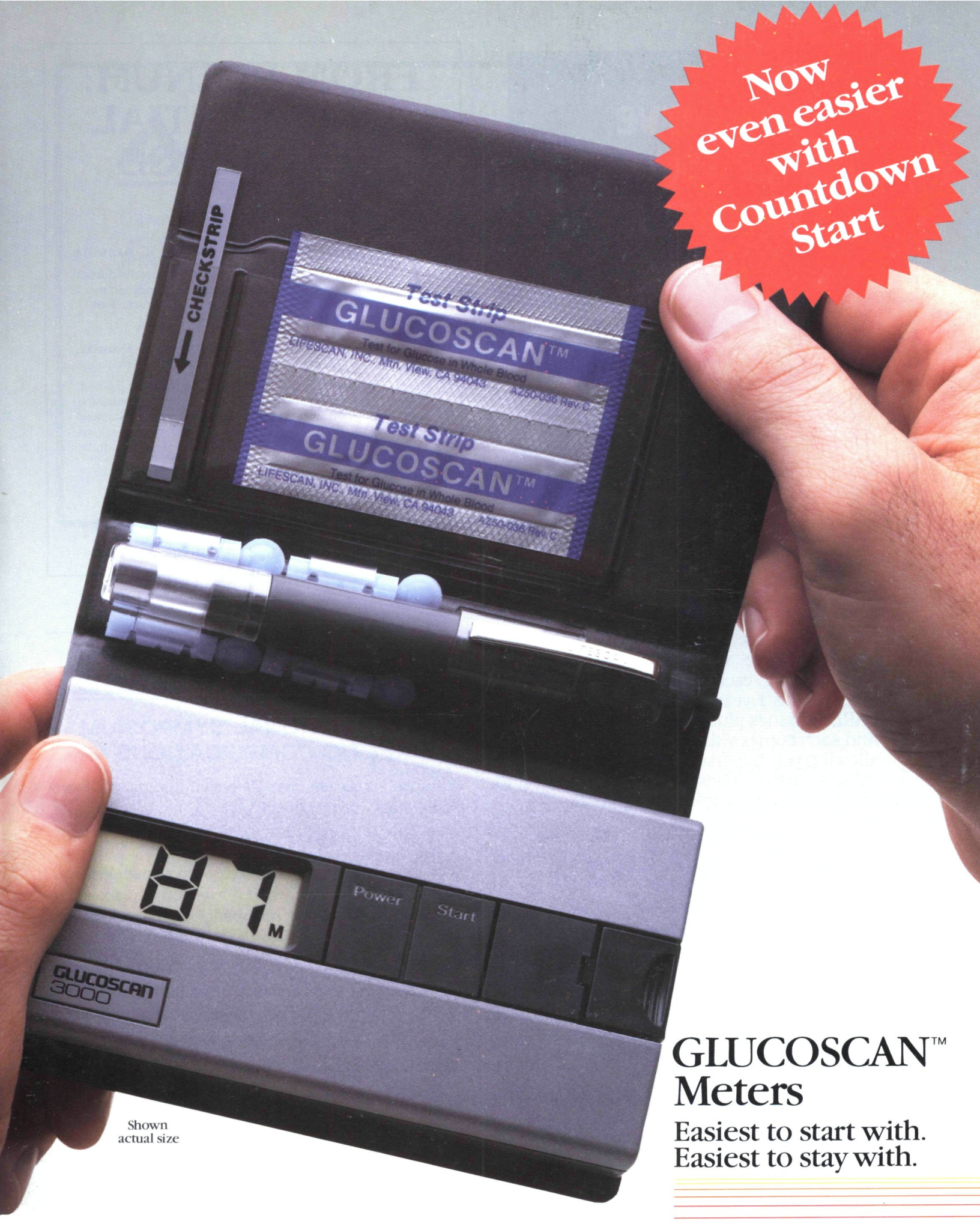
Discover how blood glucose testing can become second nature with the GLUCOSCAN 3000 Personal Blood Glucose Meter. Call us toll-free for the name of your nearest Authorized LifeScan Distributor: Nationwide (800) 227-8862; in California (800) 982-6132.

Also available in the economical GLUCOSCAN 2000 model (Memory Bank not included).

LIFESCAN INC.
Mountain View, CA 94043



© 1986 LifeScan Inc.

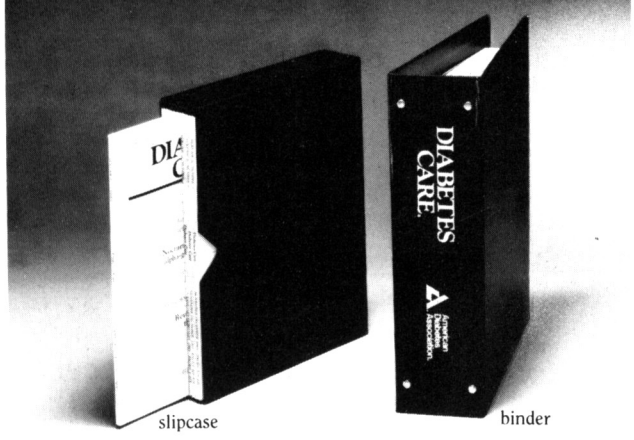


Shown actual size

GLUCOSCAN™ Meters

Easiest to start with. Easiest to stay with.

Preserve your copies of DIABETES CARE®



Custom-made for DIABETES CARE, these journal slipcases and binders turn back issues into a permanent reference source. Bound in attractive blue leatherette, and embossed with gold lettering, each slipcase and binder holds 1 year of DIABETES CARE (6 issues plus supplement). And each comes with gold transfers, allowing you to personalize your volume further. These durable, space saving cases make affordable gifts as well.

SLIPCASES: $7.95 each, three for $21.95, six for $39.95 (measures: 11½ × 8½ × 2⅛″)
BINDERS: $9.95 each, three for $27.95, six for $52.95 (measures: 12¾ × 9¼ × 3½″)

MAIL TO: Jesse Jones Industries, Dept. DIAB-C
499 East Erie Avenue, Philadelphia, PA 19134

Please send _____ cases; _____ binders.

Enclosed is $_____. Add $1 per item for Postage and Handling. Outside U.S.A. add $2.50 per item (U.S. funds only).

Print Name _____

Address _____
No P.O. Boxes Please

City/State/Zip _____

PA residents add 6% sales tax

We also accept American Express, Visa, MasterCard and Diners Club (for minimum orders of $15.00). Call TOLL FREE (charge orders only) 1-800-972-5858, 7 days, 24 hours.

NOTE: Satisfaction guaranteed. Slipcase and binders are also available for DIABETES & DIABETES FORECAST.
For information write:
American Diabetes Association,
1660 Duke St., Alexandria, VA 22314,
Attn: Circulation Dept.

American Diabetes Association

FROM PLENUM: AN ESSENTIAL REFERENCE

THE DIABETIC PANCREAS
Second Edition

edited by **Bruno W. Volk** and **Edward R. Arquilla**

"As someone interested in clinical diabetes, I received from this book some fascinating insights into the significant new body of knowledge of the structure and ultrastructure of the pancreatic islets gained over the past decade. . . . a useful reference book."

– David L. Horwitz,
Journal of the American Medical Association

An expanded and updated edition of the highly acclaimed original, this revised volume summarizes and integrates the latest findings on the complex role played by the pancreas in the various forms of primary and secondary diabetes, as well as its many effects on diverse aspects of carbohydrate metabolism.

0-306-41781-2/652 pp./ill./1985/$79.50

THE LANGUAGE OF SCIENCE
Plenum
PUBLISHING CORPORATION

Plenum Publishing Corporation
233 Spring Street
New York, N.Y. 10013-1578

INTERNATIONAL SYMPOSIUM DIABETIC COMPLICATIONS '87

Consiglio Nazionale delle Ricerche, Piazzale A. Moro, Rome, Italy

29–31 October 1987

Main topics will include the epidemiology, pathogenesis, clinical aspects, therapy and prevention of diabetic retinopathy, nephropathy, macroangiopathy and neuropathy.

Authors should send 3 copies of an abstract of about 400 words to the Scientific Secretariat to be received by 30 JUNE 1987. Details on presentation and publication will be sent after acceptance.

Further details are available from:

Diabetic Complications '87
% Istituto G. Mendel
Piazza Galeno 5
I-00162 ROMA—Italy
tel. (06) 868736

American Diabetes Association

Announcement

The American Diabetes Association is pleased to announce that R. Paul Robertson, MD, will become Editor of DIABETES in January 1987. The Associate Editors will be Fritz H. Bach, MD, Robert P. Elde, PhD, Frank Q. Nuttall, MD, PhD, and Robert L. Sorenson, PhD.

As of December 15, 1986, manuscripts submitted to DIABETES should be sent to:

First Class Mail
R. Paul Robertson, MD
Editor, DIABETES
University of Minnesota
P.O. Box 731
Minneapolis, MN 55440-0731

Express Mail (requiring street address)
R. Paul Robertson, MD
Editor, DIABETES
Phillips-Wangensteen Bldg., Rm. 6-124
516 Delaware St. SE
Minneapolis, MN 55455

DIABETES RESEARCH & EDUCATION FOUNDATION

The Diabetes Research and Education Foundation, Inc. is soliciting grant requests for promising initiatives in the field of diabetes research and education. The Foundation is an independent, non-profit organization with a Board of Trustees comprised of specialists in diabetes research, clinical practice, pharmacy and patient education. The Board meets twice per year to review grant requests and disburse awards. Individual grant awards are currently limited to $20,000.

To be considered at the next meeting, which is scheduled for April, grant applications must be received by March 2, 1987. Applications can be obtained by writing to:

Diabetes Research and Education Foundation, Inc.
P.O. Box 6168
Bridgewater, N.J. 08807-9998
ATTENTION: Herbert Rosenkilde, M.D., Executive Director

DO3003-1286

Human insulin for all.

Humulin®
human insulin
(recombinant DNA origin)

Identical to human insulin. Humulin is the only insulin not derived from animal pancreases.

Recombinant DNA technology makes the production of Humulin possible and virtually assures every insulin user of a *lifetime supply.*

From Lilly . . . a dependable source of insulin for generations. Since 1922, when we became the first company to manufacture insulin, we have led the search for the best diabetes care products and, at the same time, maintained a constant supply of insulin for all insulin users.

Our 24 formulations of insulin—including Humulin and all forms of Iletin® (insulin)—are available through the widest retail distribution of insulin in the United States.

Beyond that, we will continue to provide a wide range of diabetes service and educational materials for use by physicians, pharmacists, and diabetes educators.

© 1986. ELI LILLY AND COMPANY

Our Medical Division is on call. Our Medical Division staff is only a phone call away. Please contact them if you have any questions about our diabetes care products.

Any change of insulin should be made cautiously and only under medical supervision. Changes in refinement, purity, strength, brand (manufacturer), type (regular, NPH, Lente®, etc), and/or method of manufacture (recombinant DNA versus animal-source insulin) may result in the need for a change in dosage.

Lilly Leadership
IN DIABETES CARE

For information on insulin delivery systems, contact CPI: 1-(800)-227-3422.

Lilly

Eli Lilly and Company
Indianapolis, Indiana 46285

600318