

PART I: General Information

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Place of Birth: Louisville, Kentucky

Education:

- 1964 B.A. University of Louisville (Chemistry, with highest honors)
- 1968 M.D. University of Louisville School of Medicine (with highest honors)
- 1984 M.S. University of Louisville (Chemistry)
- 1984 M.A. Harvard University (Honorary)
- 1984 D.Sc. University of Louisville (Honoris Causa)
- 1990 D.Sc. Universite de Paris Pierre et Marie Curie (Honoris Causa)
- 2000 D.Sc. University of Geneva (Honoris Causa)

Postdoctoral Training:

Internship/Residencies:

1968-1970 Intern and Resident, Ward Medicine, Barnes Hospital, St. Louis, MO

Research Fellowships:

1970-1973 Clinical Associate and Senior Clinical Associate, Clinical Endocrinology Branch, National Institutes of Arthritis, Metabolism and Digestive Diseases, NIH, Bethesda, MD

Licensure and Certification:

- 1968 Kentucky State Board of Medical Examiners, No. 15141
- 1973 American Board of Internal Medicine, No. 44765
- 1973 American Board of Internal Medicine, Subspecialty in Endocrinology and Metabolism, No. 44765
- 1981 Massachusetts State Medical Registration, No. 48036

Academic Appointments:

- 1980-1981 Adjunct Professor of Genetics, George Washington University, Washington, DC
- 1981-1984 Associate Professor of Medicine, Harvard Medical School, Boston, MA
- 1984- Professor of Medicine, Harvard Medical School, Boston, MA
- 1986- Mary K. Iacocca Professor of Medicine, Harvard Medical School, Boston, MA

Hospital or Affiliated Institution Appointments:

- 1972-1981 Admitting & Attending physician, National Institutes of Health, Clinical Center
- 1981-1991 Physician, Brigham and Women's Hospital, Boston, MA
- 1981-1992 Chief, Division of Diabetes and Metabolism, Department of Medicine, Brigham and Women's Hospital, Boston, MA
- 1985- Senior Staff, Joslin Clinic, Joslin Diabetes Center, Boston, MA
- 1981-1985 Associate Staff, Endocrinology/Internal Medicine, New England Deaconess Hospital, Boston, MA
- 1986-1995 Active Staff, Department of Medicine, Internal Medicine and Endocrinology, New England Deaconess Hospital, Boston, MA
- 1986-1992 Senior Physician, Brigham and Women's Hospital, Boston, MA
- 1993- Senior Consultant in Diabetes and Metabolism, Brigham and Women's Hospital, Boston, MA
- 1995- Active Staff, Department of Medicine, Beth Israel Deaconess Hospital, Boston, MA

Other Professional Positions and Major Visiting Appointments:

- 1973-1978 Senior Investigator, Diabetes Branch, National Institute of Arthritis, Metabolism and Digestive Diseases, NIH, Bethesda, MD
- 1979-1980 Visiting Scientist, Centre de Moleculaire, Centre National de la Recherche Scientifique, Gif-sur-Yvette, France
- 1979-1981 Chief, Section on Cellular and Molecular Physiology, Diabetes Branch, National Institute of Arthritis, Metabolism, and Digestive Disease, NIH, Bethesda, MD
- 1981 Clinical Associate Professor of Medicine, Uniformed Services University of Health Sciences, Bethesda, MD
- 1985 Overseas Visiting Professor, Royal Melbourne Hospital, Melbourne, Australia
- 1985 Visiting Professor, Royal Postgraduate Hospital, London, England
- 1985 Rosemary Sarver Visiting Professor in Endocrinology and Metabolism, The Hospital of the Good Samaritan, Los Angeles, CA
- 1990 Roerig Visiting Professorship in Diabetes, University of Colorado Health Sciences Center, Denver, CO
- 1990-1991 Visiting Scientist, Department of Cellular and Molecular Biology, Dana Farber Cancer Institute, Boston, MA
- 1998-1999 Visiting Research Scientist, Brandeis University, Waltham, MA
- 2005 Honorary Director and Professor of the Diabetes Center of Beijing University, Beijing, China

Major Administrative Responsibilities:

- 1981- Director, Elliott P. Joslin Research Laboratory, Joslin Diabetes Center
- 1997-2000 Executive Vice President and Director, Joslin Diabetes Center
- 2000- President and Director, Joslin Diabetes Center
- 2000-2003 Member, Board of Directors Care Group, Health Care System

Major Committee Assignments:**Medical School:**

- 1985-1988 Member, Committee on Promotions and Appointments, Harvard Medical School
- 1987-1990 Member, Standing Committee on Faculty Fellowships, Harvard Medical School
- 1989-1994 Member, Appeals Board, Student Promotion Board, Faculty of Medicine, Harvard Medical School
- 1997-1998 Member, Faculty Council, Harvard Medical School
- 2005- Member, Glenn Laboratories on Aging Research, Scientific Advisory Board

Affiliated Institutions:

- 1996- Member, Scientific Advisory Committee, Boston Obesity Center, New England Medical Center, Boston, MA

Regional, National and International:

- 1977-1981 Quality Assurance Committee, National Institute of Health
- 1978 Co-Chairman, Organizing Committee, Fogarty International Conference on Hormones and Cancer, Bethesda, MD, (March 29-31)
- 1978-1980 Postgraduate Committee, Endocrine Society
- 1979-1982 Medical Science Advisory Board, Juvenile Diabetes Foundation
- 1981-1984 Nominating Committee, Endocrine Society
- 1982-1985 Research Committee, American Diabetes Association
- 1983 Vice Chairman, Organizing Committee, Hormone Action, Gordon Conference, Meriden, NH (August 7-12)
- 1983 Scientific Committee, Second International Symposium on Insulin Receptors and Insulin Action, Rome, Italy (August 31-September 3)
- 1983-1986 Medical Science Advisory Committee, Juvenile Diabetes Foundation
- 1984 Co-Chairman, Organizing Committee, UCLA Symposia on Molecular and Cellular Biology Membrane Receptors and Cellular Recognition, Park City, UT (March 25-30)
- 1984 Chairman, Organizing Committee, Gordon Conference on Hormone Action, Meriden, NH (August 5-10)
- 1985 Scientific Committee, Third International Symposium on Insulin Receptors and Insulin Action
- 1985 Chairman, Organizing Committee, Gordon Conference on Hormone Action, Meriden, NH (August 4-9)
- 1985 Organizing Committee, JDFI World Conference on Diabetes Research - Current Status and Future Directions, Monaco (November 4-6)
- 1986 Organizing Committee, Immunology of Diabetes - Immunity to Insulin and the Insulin Receptor, Edmonton, Canada (June 26-28)

- 1987-1988 Countdown Editorial Advisory Board, Juvenile Diabetes Foundation
 Chairman, Organizing Committee, Insulin and The Cell Membrane, Smolenine Castle, Czechoslovakia (June 27-30)
- 1988 Chairman, Organizing Committee, The Action of Insulin and Related Growth Factors in Diabetes Mellitus, Joslin Diabetes Center's 90th Anniversary Symposium, Boston, MA (October 10-13)
- 1988-1990 Medical Science Advisory Committee, Juvenile Diabetes Foundation
 1990-1993 Council Member, Endocrine Society
- 1991 Organizing Committee, Keystone Symposia on Diabetes and Insulin Action, Park City, UT (January 18-24)
- 1992 Organizing Committee, FASEB Summer Conference on Receptors and Signal Transduction, Copper Mountain, CO (July 12-17)
- 1992-2000 Central Committee of International Society of Endocrinology
 1992-1996 National Institutes of Health Reviewer's Reserve
- 1993-1994 Chair, Council on Molecular, Cellular and Biochemical Aspects of Diabetes, American Diabetes Association
- 1996 Organizing Committee, VIth International Symposium on Insulin Receptors and Insulin Action, Copenhagen, Denmark (May 6-10)
- 1996 Organizing Committee, 75th Anniversary of the Discovery of Insulin, Toronto, Canada (October 6-9)
- 1997 Member, Cardiovascular Advisory Board, Monsanto/Searle
 1997 Organizing Committee, 16th International Diabetes Federation Congress, Helsinki, Finland (July 20-25)
- 1997-2000 Member, International Endocrine Society Steering Committee
 1998 Co-Chair, Organizing Committee, Diabetes Mellitus: From Patients to Genes and Back, A symposium on the 100th Anniversary of the Joslin Diabetes Center, Boston, MA (October 21-23)
- 1998- Member, External Advisory Committee, JDFI Program Project, Mount Sinai School of Medicine, New York, NY
- 1998- Advisory Board, NRSA Training Grant, State University New York at Stony Brook
- 2000 Co-Chair, Organizer of Keystone Symposium on Diabetes, Taos, NM (February 16-22)
- 2003 Co-Chair, Proteomics in Diabetes Meeting, Bethesda, MD (April 24-25)
- 2003 Fellow, American Academy of Microbiology, Recognizing Scientific Excellence

Assignments on National Commissions:

- 1981-1985 National Diabetes Advisory Board
 1982-1985 Co-Chairman, Research Committee, National Diabetes Advisory Board
 1995-1998 Member on the Endocrinology Study Section, Division of Research Grants, National Institutes of Health
- 1998 NIDDK Board of Scientific Counselors
 1998 Co-Chair, Workshop on Diabetes Research: Challenges and Opportunities, National Institutes of Health
- 1998-1999 Chair, Congressionally Mandated diabetes research working group
 1998-2002 Member, National Diabetes and Digestive and Kidney Diseases Advisory Council, National Institutes of Health

2002- Awards Committee, Endocrine Society, Bethesda, Maryland

Professional Societies:

1963- Member, Alpha Epsilon Delta
1964- Member, Phi Kappa Phi
1965- Member, Alpha Omega Alpha
1966- Member, Sigma Xi
1972- Member, American Federation for Clinical Research
1975- Member, The Endocrine Society
1976- Member, American Diabetes Association
1979- Member, American Society for Clinical Investigation
1982- Member, American Society of Biological Chemistry
1983- Member, Association of American Physicians
1986- Member, National Council, American Society of Clinical Investigation
1987-1988 President-Elect, American Society of Clinical Investigation
1988-1989 President, American Society of Clinical Investigation
1991- Member, American Academy of Arts and Sciences
1994- Fellow, American Association for the Advancement of Science
1999- Member, National Academy of Science
1999- Member, Institute of Medicine

Editorial Boards:

1977-1980 Journal of Clinical Endocrinology and Metabolism
1977-1984 Diabetes
1979-1984 American Journal of Medicine
1979-1984 The Journal of Clinical Investigation
1980-1983 Journal Receptor Research
1980-1983 Hormone and Metabolic Research
1981-1985 Endocrinology
1983-1988 Journal of Biological Chemistry
1984- Diabetes and Metabolism Reviews
1987-1990 ISI Atlas of Science Editorial Advisory Board
1989- Receptor
1989-1990 Executive Editor, Trends in Endocrinology and Metabolism
1991-1996 Editorial Advisory Council, Journal of Endocrinological Investigation
1991- Trends in Endocrinology and Metabolism
1992-1996 Consulting Editor, The Journal of Clinical Investigation
1992- Journal of Receptor Research
1993-1994 Member, Board of Editors, Endocrine
1996-2001 Associate Editor, Diabetes
1996-1997 Member, Endocrine Reviews Advisory Board
1997- Member, Editorial Board, Proceedings of the Association of American Physicians
1998- Consulting Editor, The Journal of Clinical Investigation
1998- Member, Editorial Board, American Journal of Medicine
2000- Associate Editor, Endocrine Reviews
2001- Editorial Board, American Journal of Physiology
2004- Associate Editor, Cell Metabolism

Awards and Honors:

- Undergraduate: Woodcock Honor Society; Phi Lambda Upsilon; Alpha Epsilon Delta; Phi Kappa Phi Honor Society; Graduate with Highest Honors
- Medical School: Saunder's Award for Biochemistry; Mosby Award; Upjohn Award for Medicine; Alpha Omega Alpha; Sigma Xi; Vice President, Junior Class; President Senior Class; Graduate with Highest Honors
- Professional:
- 1977 David Rumbough Memorial Award for Scientific Achievement, Juvenile Diabetes Foundation
 - 1979 Laurentian Hormone Conference
 - 1981 Eli Lilly Award for Research, American Diabetes Association
 - 1981 CIBA-Geigy Drew Award for Biochemical Research
 - 1982 Mary Jane Kugel Award, Juvenile Diabetes Foundation
 - 1983 American Federation for Clinical Research (AFCR) Award for Outstanding Clinical Research Under Age 40
 - 1983 Sol Berson Memorial Lectureship, National Institutes of Health
 - 1984 Hahnemann Lecture in Pharmacology, University of California, San Francisco
 - 1984 Artium Magistrum (Honorary), Harvard University
 - 1984 Doctor of Science (Honoris Causa), University of Louisville
 - 1984 Rachmiel Levine Lectureship, New York Medical College
 - 1985 Carl V. Moore Memorial Lecture, Washington University School of Medicine
 - 1986 Kelly West Lecture, University of Oklahoma School of Medicine
 - 1986- Mary K. Iacocca Professor of Medicine, Harvard Medical School
 - 1986 Pfizer Biomedical Research Award, Pfizer, Inc., Groton, Connecticut
 - 1987 Sixty-Eighth Mellon Lecture, University of Pittsburgh School of Medicine, Pittsburgh, Pennsylvania
 - 1987 Ninth Annual Steve Brody Lectureship in Diabetes, Cedars-Sinai Medical Center, Los Angeles, California
 - 1987 Edwin B. Astwood Lecturer, The Endocrine Society
 - 1987 McGill Novo Nordisk Lecturer, McGill University, Montreal, Canada
 - 1988 Gifford Lectureship, Southwestern Medical Center, Dallas, Texas
 - 1988 Cristobal Diaz Award, International Diabetes Federation
 - 1989 Otto Brandman Award, American Diabetes Association New Jersey Affiliate
 - 1989 Elliott P. Joslin Medal, American Diabetes Association, Massachusetts Affiliate
 - 1990 Doctor of Science (Honoris Causa), Universite de Paris Pierre et Marie Curie, Paris, France
 - 1990 Top 100 Most-Cited Scientists for 1973-1984 and 1981-1988, The Scientist, March 19 and October 1, 1990
 - 1991- Fellow, American Academy of Arts and Sciences
 - 1993- Alumni Fellow, University of Louisville
 - 1993 Banting Medal for Distinguished Scientific Achievement, American Diabetes Association
 - 1994 Edwin Krebs Lecture, University of Washington
 - 1994 Pincus Taft Lecturer in Clinical Endocrinology, Australian Endocrine

Society

1995 Fellow, American Association for the Advancement of Science

1995 Kroc Lecturer, University of California, Irvine

1995 Bates Lecturer, State University of New York, Syracuse

1996 Invited Lecturer, Symposium in Honor of the 100th Birthday of Carl Cori and Gerty Cori, Harvard Medical School, Boston, MA

1997 Distinguished Scientist Award, Clinical Ligand Assay Society

1997 Solomon Berson Distinguished Lecture, American Physiological Society

1998 Albert Renold Award, American Diabetes Association

1998 Lewis Memorial Lecture, Mount Sinai School of Medicine

1998 209th Eli Lilly Lecturer, Eli Lilly Company

1999 Dorothy Hodgkin Award, British Diabetes Association

1999- Elected Member, National Academy of Sciences

1999- Elected Member, Institutes of Medicine, National Academy of Sciences

1999 Nelson Medical Lectureship, University of California Davis School of Medicine

2000 Fred Conrad Koch Award for Distinguished Contributions to Endocrinology, Endocrine Society

2000 Hamden Award for Medical Research, United Arab Emirates

2001 Lawson Wilkins Lecture, Pediatric Endocrine Society and International Pediatric Endocrine Society, Toronto, Canada

2001 Donald W. Seldin Lecture, American Society of Nephrology and International Society of Nephrology, San Francisco, CA

2001 Rolf Luft Award Lecture, Karolinska Institute, Stockholm, Sweden

2001 Naomi Berrie Award for Outstanding Achievement in Diabetes Research, Columbia University, New York, NY

2002 Societa' Italiana Di Diabetologia Mentor Award, Italy

2002 Steven C. Beering Award for Advancement of Biomedical Science

2002 J. Allyn Taylor International Prize in Medicine for Diabetes

2002 Dean's Distinguished Lecture, University of Colorado School of Medicine

2002 Fellow American Academy of Microbiology

2002 Fast Breaking Paper in the field of Multidisciplinary as determined by the Thompson-ISI Web of Science database

2003 Gordon Wilson Lecture, Transactions of the American Clinical and Climatological Association

2003 Stapleton Lecture, University of Colorado School of Medicine

2004 9th Annual Dundee Signaling Lecture, Scotland

2004 Claude Bernard Medal awarded by the European Association for the Study of Diabetes (EASD), Munich, Germany

2004 Bristol Myers Squibb Award for Distinguished Achievement in Metabolic Research

2005 Dale Medal of the British Society for Endocrinology

2005 Honorary Director and Professor of the Diabetes Center of Beijing University, Beijing, China

2006 Heskett Lecture, Northwestern University School of Medicine

2006 Banting Memorial Lecture, British Diabetic Association, Birmingham, UK

PART II: Research, Teaching and Clinical Contributions

A. Narrative report of Research, Teaching and Clinical Contributions.

Since our discovery that the insulin receptor is an insulin-stimulated membrane tyrosine kinase activity, my laboratory has focused its attention on how this early signal is converted to the final effects of insulin on metabolism and growth, how insulin signaling is altered in insulin resistant states such as type 2 diabetes and obesity, and what the impact of genetics is on these functions.

We have shown that following the activation of the receptor kinase, several intracellular substrates become tyrosine phosphorylated. The best studied of these are a family of high molecular weight proteins termed insulin receptor substrates-1, 2, 3 and 4 (IRS-1 thru -4). These phosphorylated IRS proteins serve as intracellular messengers by docking to other intracellular signaling proteins that contain SH2 domains. This links insulin to two major intracellular cascades - one mediated by the enzyme phosphatidylinositol 3-kinase (PI 3-kinase) and the other mediated by the Ras-MAP kinase pathway. These form an important point of diversion in insulin signaling and several potential points of regulation in disease.

Using a wide range of genetic, biochemical, and approaches, as well as cellular, animal and human systems, my laboratory is attempting to define the specific pathways that lead to specific insulin actions and how they are modified in insulin resistant states. We are also attempting to identify genetic alterations that might contribute to the development of type 2 diabetes in humans and rodents by gene expression using Affymetrix microarray analysis, proteomics and other techniques.

Current projects in the laboratory fall into five areas: 1) Defining the roles of each of the IRS-proteins and isoforms of PI 3-kinase in insulin signaling and insulin resistance through the creation of cell lines and animal models in which these proteins are either eliminated by a genetic "knock-out" or increased by overexpression. This also includes studies utilizing the technique of tissue specific gene inactivation to determine the role of insulin in various tissues of the body, including classical target tissues for insulin action such as liver, muscle and fat, as well as non-classical targets such as the brain, endothelial cell and beta cell. 2) Mechanisms of insulin resistance, including the role of regulation of insulin receptor, IRS proteins, p85 subunit of PI 3-kinase, SOCS proteins, various adipokines, as well as other molecules that can act directly or indirectly as inhibitors of insulin action. 3) The role of insulin signaling in control of gene expression. In these studies we have made extensive use of microarrays and realtime PCR coupled with the genetic models we have created to answer questions about which components of the insulin signaling cascade are involved in which insulin actions and to dissect insulin vs. diabetes regulated events. 4) The biology of adipocytes and their special role in insulin resistance. Here we are focused on understanding not only the role of various fat depots in insulin resistance, but also what determines fat distribution and the nature of adipocyte lineages. 5) Finally, we are also interested in the problem of aging and the relationship between insulin action, obesity and lifespan. Again we have taken advantage of some of our genetic models to define better the physiological connections between these events. We are now studying several pathways involved in the connection between aging and metabolism at the molecular level.

B. Funding Information (present and recent)

Present:

1980-pres	National Institutes of Health	Prin. Invest.	Insulin Receptor Structure and Turnover
1988-pres	National Institutes of Health	Prin. Invest.	Insulin Receptor Phosphorylation and Insulin Action
1999-pres	National Institutes of Health	Prin. Invest.	Role of PI 3-kinase Isoforms in Insulin Action
2002-pres	National Institutes of Health	Prin. Invest.	Diabetes Genome Anatomy Project (DGAP)
1992-pres	American Diabetes Association	Prog. Dir.	ADA Mentor-based Grant
1996-2001	National Institutes of Health	Prog. Dir.	Diabetes and Endocrinology Research Center
1981-2001	National Institutes of Health	Prog. Dir.	Training in Diabetes and Metabolism
1998-2003	Juvenile Diabetes Foundation (JDF Center for Islet Transplantation at HMS)	Investigator	Search for Islet Growth Factors in Animal Models of Insulin Resistance

C. Report of Teaching Experience:

1976-1978	Course director, "Correlations between the basic sciences and internal medicine," Foundation for Advanced Education in the Sciences, NIH.
1967-1981	Lecturer, Courses in Internal Medicine and Endocrinology, Foundation for Advanced Education in Sciences, NIH.
1977-1979	Course developer and coordinator, "Endocrinology Board Review Course," Foundation for Advanced Education in the Sciences, NIH.
1978-1981	Thesis supervisor for Ph.D. in genetics for J.M. Podskalny, George Washington University
1974	Participation in a variety of CME courses throughout the U.S.
1984	Research Supervisor, Cell and Developmental Biology Program, Harvard Medical School
1987	Thesis Committee for Ph.D. in Cell Biology, Laird D. Madison, Yale University
1981-present	Physiology, Cell Biology and Human Systems Courses at Harvard Medical School and MIT.
1985-present	HST-060/061 Endocrinology Course, Massachusetts Institute of Technology
1986-present	HST-140/141 Molecular Medicine Course
1989-1994	Thesis supervisor, Harvard Cell and Developmental Biology Program
1989-1992	Appeals Board, Student Promotions Board, Faculty of Medicine, Harvard Medical School
1994- present	Graduate Faculty of BBS, Harvard Medical School
2002-2006	Thesis supervisor for Ph.D. in Cell Biology C. Taniguchi, Harvard Medical School

D. Report of Clinical Activities:

1981-1990 Chief, Division of Diabetes and Metabolism, Brigham and Women's
Hospital, Boston, MA
-one month per year attending on Endocrine service
1987- Active Staff, Beth Israel Deaconess Medical Center, Boston, MA

PART III: Bibliography

Original Reports:

1. Kahn CR, Huseby RM, Murray M. The use of infrared dichronic absorption spectra in the study of the structure of bovine fibrinogen and fibrin. *Life Sci.* 1970; 9:1125-1132.
2. Freychet P, Kahn CR, Roth J, Neville DM, Jr. Insulin interactions with liver plasma membranes: Independence of binding and degradation. *J Biol Chem.* 1972; 247:3953-3961.
3. Kahn CR, Neville DM, Jr., Gorden P, Freychet P, Roth J. Insulin receptor defect in insulin resistance: Studies in the obese hyperglycemic mouse. *Biophys Biochem Res Commun.* 1972; 48:135-142.
4. Freychet P, Laudat MH, Laudat P, Rosselin G, Kahn CR, Gorden P, Roth J. Impairment of insulin binding to the fat cell membrane in the obese hyperglycemic mouse. *FEBS Lett.* 1972; 25:339-342.
5. Kahn CR, Neville DM, Jr., Roth J. Insulin-receptor interactions in the obese-hyperglycemic mouse: A model for insulin resistance. *J Biol Chem.* 1973; 248:244-250.
6. Freychet P, Kahn CR, Roth J, Neville DM, Jr. Insulin receptor in liver cell plasma membranes. In: Scow R, ed. *Endocrinology: Proceedings of the IV International Congress of Endocrinology.* New York: Excerpta Medica (ICS #273). NY, 1973:335-340.
7. Schein P, Kahn CR, Gorden P, Wells S, DeVita V. Streptozotocin therapy of malignant insulinoma and carcinoid tumor. *Arch Intern Med.* 1973; 132:555-561.
8. Pilch B, Kahn CR, Ketcham A, Henson D. Thyroid cancer after radioactive iodine diagnostic procedures in childhood. *Pediatrics.* 1973; 51:898-902.
9. Schein PS, DeLellis RA, Kahn CR, Gorden P, Kraft AR. Islet cell tumors: Current concepts and management. *Ann Intern Med.* 1973; 79:239-257.
10. Goldfine ID, Kahn CR, Neville DM, Jr., Roth J, Garrison MM, Bates RW. Decreased binding of insulin to its receptors in rats with hormone induced insulin resistance. *Biochem Biophys Res Commun.* 1973; 53:852-857.
11. Butcher RW, Crofford OB, Gammeltoft S, Gliemann J, Gavin JR III, Goldfine ID, Kahn CR, Rodbell M, Roth J. Insulin activity: The solid matrix. *Science.* 1973; 182:396-397.
12. Kahn CR, Freychet P, Neville DM, Jr., Roth J. Quantitative aspects of the insulin-receptor interaction in liver plasma membranes. *J Biol Chem.* 1974; 249:2249-2257.
13. Gorden P, Roth J, Hendricks CM, Kahn CR. The plasma proinsulin-like components. *Isr J Med Sci.* 1974; 10:1212-1221.

14. Megyesi K, Kahn CR, Roth J, Froesch ER, Humbel RE, Zapf J, Neville DM, Jr. Insulin and non-suppressible insulin-like activity (NSILA-s): Evidence for separate plasma membrane receptor sites. *Biochem Biophys Res Commun.* 1974; 57:307-315.
15. Megyesi I, Kahn CR, Roth J, Gorden P. Hypoglycemia in association with extrapancreatic tumors: Demonstration of elevated plasma NSILA-s by a new radio-receptor assay. *J Clin Endocrinol Metab.* 1974; 38:931-934.
16. McGuffin WL, Jr., Sherman BM, Roth J, Gorden P, Kahn CR, Roberts WC, Frommer PL. Acromegaly and cardiovascular disorders: A prospective study. *Ann Intern Med.* 1974; 81:11-18.
17. Soll AH, Goldfine ID, Roth J, Kahn CR, Neville DM, Jr. Thymic lymphocytes in obese (ob/ob) mice: Mirror of the insulin receptor defect in liver and fat. *J Biol Chem.* 1974; 249:4127-4131.
18. Thomas DW, Rosen SW, Kahn CR, Temple R, Papadopoulos NM. Macromolecular lactic acid dehydrogenase: A cause of increased serum lactate dehydrogenase activity. *Ann Intern Med.* 1974; 81:434-439.
19. Soll AH, Kahn CR, Neville DM, Jr. Insulin binding to liver plasma membranes in the obese hyperglycemic (ob/ob) mouse: Demonstration of a decreased number of functionally normal receptors. *J Biol Chem.* 1975; 250:7402-7407.
20. Kahn CR, Levy AG, Gardner JD, Miller JV, Gorden P, Schein P. Pancreatic cholera: Beneficial effects of treatment with streptozotocin. *N Engl J Med.* 1975; 292:941-945.
21. Megyesi K, Kahn CR, Roth J, Gorden P. Circulating NSILA-s in man: Preliminary studies of stimuli in vivo and of binding to plasma components. *J Clin Endocrinol Metab.* 1975; 41:475-484.
22. Schwartz RH, Bianco AR, Handwerger BS, Kahn CR. Demonstration that monocytes rather than lymphocytes are the insulin-binding cells in preparations of human peripheral mononuclear leukocytes: Implications for studies of insulin resistant states in man. *Proc Natl Acad Sci. USA* 1975; 72:474-478.
23. Gavin JR, III, Kahn CR, Gorden P, Roth J, Neville DM, Jr., Radioreceptor assay of insulin: Comparison of plasma and pancreatic insulins and proinsulins. *J Clin Endocrinol Metab.* 1975; 41:438-445.
24. Soll AH, Kahn CR, Neville DM, Jr., Roth J. Insulin receptor deficiency in genetic and acquired obesity. *J Clin Invest.* 1975; 56:769-780.
25. Megyesi K, Kahn CR, Roth J, Neville DM, Jr., Nissley SP, Humbel RE, Froesch ER. The NSILA-s receptor in liver plasma membranes: Characterization and comparison with the insulin receptor. *J Biol Chem.* 1975; 250:8990-8996

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36. Jarrett DB, Roth J, Kahn CR, Flier JS. A new direct method for detection and characterization of cell surface receptors for insulin using ¹²⁵I-anti-receptor autoantibodies. *Proc Natl Acad Sci USA* 1976; 73:4115-4119.
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41. Eastman RC, Come SE, Strewler GJ, Gorden P, Kahn CR. Adriamycin therapy for advanced insulinoma. *J Clin Endocrinol Metab*. 1977; 44:142-148.
42. Bar BS, Koren HS, Kahn CR. Insulin inhibition of antibody-dependent cytotoxicity and insulin receptors in macrophages. *Nature*. 1977; 265:632-635.
43. Hyodo T, Megyesi K, Kahn CR, McLean JP, Friesen HG. Adrenocortical carcinoma and hypoglycemia: Evidence for production of non-suppressible insulin-like activity by the tumor. *J Clin Endocrinol Metab*. 1977; 44:1175-1184.
44. Megyesi K, Gorden P, Kahn CR. Lack of a simple relationship between endogenous growth hormone and NSILA-s related peptides. *J Clin Endocrinol Metab*. 1977; 45:330-338.
45. Flier JS, Kahn CR, Jarrett DB, Roth J. Autoantibodies to the insulin receptor: Effect of the insulin-receptor interaction in IM-9 lymphocytes. *J Clin Invest*. 1977; 60:784-794.
46. Kahn CR, Rosen SW, Weintraub BD, Fajans SS, Gorden P. Ectopic production of chorionic gonadotropin and its subunits by islet cell tumors: A specific marker for malignancy. *N Engl J Med*. 1977; 297:565-569.
47. Kahn CR, Baird KL, Flier JS, Jarrett DB. Effect of autoantibodies to the insulin receptor on isolated adipocytes: Studies of insulin binding and insulin action. *J Clin Invest*. 1977; 60:1094-1106.
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REVIEWS, CHAPTERS, EDITORIALS

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