

clinical chemistry



Journal of the American Association for Clinical Chemistry, Inc.

Executive Editor
J. Stanton King

Associate Editor
Virginia Shires Marcum

Editorial Assistant
Jean Dean

Editorial Office
Tel (919) 725-0208
FAX (919) 724-9456
Box 5218
(street address
2110 Cloverdale)
Winston-Salem, NC
27113-5218

Business Office
Tel (800) 892-1400
TELEX 251925 AACC UR
FAX (202) 887-5093
2029 K St., NW
Washington, DC 20006

Clinical Chemistry (ISSN 0009-9147) is published monthly by the American Association for Clinical Chemistry, Inc., 2029 K Street, NW, Washington, DC, 20006.

Individuals subscribe to *Clinical Chemistry*; rates per year: \$60 in US; \$70 in North America outside US; \$85 elsewhere. **Institutions** subscribe to *Clinical Chemistry Reference Edition*; rates per year: \$150 in US; \$165 in North America outside US; \$185 elsewhere. Members domestic and foreign, \$55 (included in dues). Second class postage paid at Washington, DC 20006 and additional mailing offices. Printed at 20th and Northampton Sts., Easton, PA 18042. POSTMASTER: send address changes to American Association for Clinical Chemistry, 2029 K St., NW, Washington, DC 20006.

Third San Diego Conference on Nucleic Acid Probes October 26-28, 1988 Practical Aspects of Molecular Probes

Introduction	Jonathan S. Rosenberg	1571
Application of a Rapid Non-Radioisotopic Nucleic Acid Analysis System to the Detection of Sexually Transmitted Disease-Causing Organisms and Their Associated Antimicrobial Resistances	Mickey S. Urdea, Janice Kolberg, Jennifer Clyne, Joyce A. Running, Diana Besemer, Brian Warner, and Ray Sanchez-Pescador	1571
Tumor-Derived Activated Cells: Preliminary Laboratory and Clinical Results	Robert K. Oldham, James R. Maleckar, Colleen S. Friddell, Walter M. Lewko, William H. West, and John R. Yannelli	1576
Use of Molecular Probes to Detect Human Cytomegalovirus and Human Immunodeficiency Virus	Stephen A. Spector, Karen Hsia, Frank Denaro, and Deborah H. Spector	1581
Assay Formats Involving Acridinium-Ester-Labeled DNA Probes	Lyle J. Arnold Jr., Philip W. Hammond, Wendy A. Wiese, and Norman C. Nelson	1588

OVERVIEW

The Application of Expert Systems in the Clinical Laboratory	Per Winkel	1595
---	------------	------

ARTICLES

Investigation of Protoporphyrin IX Standard Materials Used in Acid-Extraction Methods, and a Proposed Correction for the Millimolar Absorptivity of Protoporphyrin IX	Elaine W. Gunter, Wayman E. Turner, and Dan L. Huff	1601
Radioimmunoassay of Testosterone Not Bound to Sex-Steroid-Binding Protein in Plasma	H. Déchaud, H. Lejeune, M. Garoscio-Cholet, R. Mallein, and M. Pugeat	1609
Simultaneous Liquid-Chromatographic Determination of Some Bronchodilators, Anticonvulsants, Chloramphenicol, and Hypnotic Agents, with Chromosorb P Columns Used for Sample Preparation	Dobrin A. Svinarov and Dotcho C. Dotchev	1615
Quantification of Urinary Porphyrins by Liquid Chromatography after Oxidation of Porphyrinogens	Kenji Abe and Ryusei Konaka	1619
Practical Automation and Interpretation of Quantitative Assays of Antibodies to Therapeutic Proteins, Illustrated with Human Growth Hormone	J. Richard Sportsman, Wendell C. Smith, and Carl L. Winely	1623
Rapid Radioimmunoassay of Circulating Chromogranin A: In Vitro Stability, Exploration of the Neuroendocrine Character of Neoplasia, and Assessment of the Effects of Organ Failure	Daniel T. O'Connor, M. R. Pandian, Esther Carlton, Justine H. Cervenka, and Ray J. Hsiao	1631
Aberrant Lectin-Binding Activity of Immunoglobulin G in Serum from Rheumatoid Arthritis Patients	Jaakko Parkkinen	1638
Functional Activity of Protein S Determined with Use of Protein C Activated by Venom Activator	Isao Kobayashi, Norihiko Amemiya, Takeshi Endo, Kohji Okuyama, Kohji Tamura, and Shoji Kume	1644

continued on next page

Board of Editors

Executive Committee:

Jack H. Ladenson
Chairman

Washington Univ. Sch. of Med.
St. Louis, MO

David E. Bruns
Univ. of Va. Med. Center
Charlottesville, VA

Laurence M. Demers
Milton S. Hershey Med. Ctr.
Hershey, PA

Basil T. Dumas
Medical College of Wisconsin
Milwaukee, WI

Robert Rej
Wadsworth Center for Labs.
and Res.

New York State Dept. of
Health
Albany, NY

Members:

Nicholas M. Alexander
UCSD School of Med.
San Diego, CA

David N. Bailey
University of Calif.
San Diego, CA

Roger L. Boeckx
Abbott Labs.
Abbott Park, IL

George N. Bowers, Jr.
Hartford Hospital
Hartford, CT

Larry D. Bowers
Univ. of Minnesota
Minneapolis, MN

Leila Edwards
Erie County Lab
Buffalo, NY

Ronald J. Elin
Clinical Center, NIH
Bethesda, MD

Richard H. Gadsden
Medical Univ. of South
Carolina
Charleston, SC

Eugene K. Harris
Madison, VA

Lawrence A. Kaplan
University Hosp.
Cincinnati, OH

Thomas R. Koch
Univ. of Maryland Hosp.
Baltimore, MD

Herbert K. Naito
Cleveland Clinic Found.
Cleveland, OH

Robert F. Ritchie
Found. for Blood Research
Scarborough, ME

Leslie M. Shaw
Hosp. of the Univ. of Penn.
Philadelphia, PA

Raymond E. Vanderlinde
Hahnemann Univ.
Philadelphia, PA

Unusually High Concentrations of Zn α_2 -Glycoprotein and the Lack of α_2 HS-Glycoprotein in Human Ejaculates

Willy Bürgi, Sirkka Simonen, Siegfried Baudner, and Karl Schmid 1640

Interaction of Immobilized Anti-Salivary Amylase Antibody with Human Macroamylases: Implications for Use in a Pancreatic Amylase Assay to Distinguish Macroamylasemia from Acute Pancreatitis

Theodore E. Mifflin, Rodney W. Forsman, and David E. Bruns 1651

Direct and Indirect Techniques for Free Thyroxin Compared in Patients with Nonthyroidal Illness. II. Effect of Prealbumin, Albumin, and Thyroxin-Binding Globulin

Gyorgy Csako, Mark H. Zweig, Janice Glickman, Mark Ruddel, and Jane Kestner 1655

Implications of Probability Analysis for Interpreting Results of Leukocyte Esterase and Nitrite Test Strips

Bjørn J. Bolann, Sverre Sandberg, and Asbjørn Digranes 1663

Oligoclonal Immunoglobulins in HIV Infection

David Sinclair, Eric Galloway, Sheila McKenzie, Edward A. C. Follett, and Lesley Wallace 1669

Urinary Excretion of Transferrin by Non-Insulin-Dependent Diabetics: a Marker for Early Complications?

C. K. Cheung, C. S. Cockram, V. T. F. Yeung, and R. Swaminathan 1672

Decreased Immunoreactivity and Binding Activity of Corticosteroid-Binding Globulin in Serum in Septic Shock

Michel Pugeat, Agnès Bonneton, Daniel Perrot, Brigitte Rocle-Nicolas, Hervé Lejeune, Catherine Grenot, Henri Déchaud, Chantal Bréabant, Jean Motin, and Claude-Yves Cuilleron 1675

Estimation of True Values in Radioimmunoassays

Oscar F. Riesco, Selma Hajri-Mezghani, and Sten Z. Cekan 1680

Biliary Alkaline Phosphatase Measured by Mini-Column Chromatography on DEAE-Cellulose: Application to Detection of Hepatobiliary Diseases

Chau-Ting Yeh, Jeng S. Wei, and Yun-Fan Liaw 1684

Lipase Activity Measured in Serum by a Continuous-Monitoring pH-Stat Technique—an Update

Norbert W. Tietz, J. Rex Astles, and Denise F. Shuey 1688

Simple, Sensitive Assay of Polyamines by High-Performance Liquid Chromatography with Electrochemical Detection after Post-Column Reaction with Immobilized Polyamine Oxidase

Kazuhiro Maruta, Ryo Teradaira, Noriyuki Watanabe, Toshiharu Nagatsu, Masao Asano, Katsunobu Yamamoto, Takatoshi Matsumoto, Yoshihiko Shionoya, and Kelsuke Fujita 1694

Calculated Bicarbonate or Total Carbon Dioxide?

Thomas Denis O'Leary and Simon R. Langton 1697

Sources of Imprecision in Laboratories Screening for Congenital Hypothyroidism: Analysis of Nine Years of Performance Data

Sandra E. Jewell, William J. Slazyk, S. Jay Smith, and W. Harry Hannon 1701

A ¹²⁵I-Radioimmunoassay for Measuring Androstenedione in Serum and in Blood-Spot Samples from Neonates

S. Thomson, A. M. Wallace, and B. Cook 1706

CASE CONFERENCE

Myoglobinuria, Hemoglobinuria, and Acute Renal Failure

Robert W. Hamilton, Marbry B. Hopkins, III, and Z. K. Shihabi 1713

SCIENTIFIC NOTES

Quantification of Biotin in Serum by Competition with Solid-Phase Biotin for Binding to Peroxidase-Avidin Conjugate

S.I. Hansen and J. Holm 1721

Variations in Protein Binding of Drugs in Plasma and Serum

Taeyuki Ohshima, Takaaki Hasegawa, Ikuo Johno, and Shikifumi Kitazawa 1722

Measurement of Cyclosporine in Plasma from Patients with Various Transplants: HPLC and Radioimmunoassay with a Specific Monoclonal Antibody Compared

James H. McBride, Denis O. Rodgerson, Sue S. Park, and Ana F. Reyes 1726

continued on next page

Subscriptions

Clinical Chemistry and Clinical Chemistry Reference Edition (CCRE) are issued monthly. Subscriptions are to be prepaid; payment should accompany the order. Japanese yen price is available from our exclusive agent in Japan: USACO CORPORATION, 13-12, Shimbashi 1-chome, Minato-ku, Tokyo, 105 Japan. All subscriptions before Oct. 1 start with first issue of the current volume. Single copies of current and back-volume issues, \$8.00 (\$10.00 CCRE); ask for current prices on Special Issues. Microfilm/microfiche versions available by volume from University Microfilms International, 300 Veeb Rd., Ann Arbor, MI 48106; Contact UMI directly for prices. **Missing Copy** claims will not be allowed (a) unless we are notified no later than three months after the issue date for domestic and Canadian subscribers, six months after the issue date for foreign subscribers; (b) if notice of a recent change of address has not been received; or (c) if the reason for claim is "missing from files." To process claims, subscriber number and exact name and address of subscriber as they appear on mailing list must be referenced in correspondence.

Advertising Inquiries should be sent to Scherago Associates, Inc., 1515 Broadway, 10th Fl., New York, NY 10036. TEL 212-730-1050. TELEX WU 968082 SCHERAGO. FAX (212) 382-3275

The contents of advertisements or articles in *Clinical Chemistry* (ISSN 0009-9147) are not to be construed as official statements, evaluations, or endorsements by the Board of Editors or the American Association for Clinical Chemistry, Inc. Copyright © 1989 The American Association for Clinical Chemistry, Inc.

General Information

Manuscripts, editorial inquiries, and books for review should be addressed to the Editorial Office (address on page 3A). All subscriptions and circulation inquiries should be sent to the Business Office (see page 3A). **Information for Authors** appears in the January issue.

A Micro-Method for Measuring Total Protein in Cerebrospinal Fluid by Using Benzethonium Chloride in Microtiter Plate Wells	Richard W. Luxton, Pragna Patel, Geoffrey Keir, and Edward J. Thompson	1731
Accuracy and Precision of Analyses for Total Cholesterol as Measured with the Reflotron Cholesterol Method	Paul S. Bachorik, Reagan H. Bradford, Thomas Cole, Ivan Frantz, Antonio M. Gotto, Jr., Karen Roberts, G. Russell Warnick, and O. Dale Williams	1734
"Stat" Measurements of L-Lactate in Whole Blood and Cerebrospinal Fluid Assessed	Jesper Wandrup, K. Tvede, J. Grinsted, and H. Jordening	1740
Murine Monoclonal Antibody Adsorbed onto Vinylidene Fluoride Floccules Used to Eliminate Antibody Interference in "Sandwich"-Type Immunoassays	Edward S. Newman, Laura A. Moskie, Rita N. Duggal, David M. Goldenberg, and Hans J. Hansen	1743
Neopterin as a Predictive Marker for Disease Progression in Human Immunodeficiency Virus Type 1 Infection	Dietmar Fuchs, Thomas J. Spira, Arno Hausen, Gilbert Reibnegger, Ernst R. Werner, Gabriele Werner Felmayer, and Helmut Wachter	1746
Radioimmunoassay of 5-Methoxytryptophol in Plasma	Debra J. Skene, Alison Churchill, Florence Raynaud, Paul Pevet, and Josephine Arendt	1749
Role of Rapid Immunoassays for Urgent ("Stat") Determinations of Creatine Kinase Isoenzyme MB	Alan H. B. Wu, Terrie G. Gornet, Carol C. Harker, and Hui-Li Chen	1752
Monoclonal Antibodies Evaluated for Use in a Screening Assay for Conjugates of Human Serum Albumin and Pyridoxal 5'-Phosphate	Barbara B. Miller and Wayman E. Turner	1756
Characterization of Sulfasalazine's Interference in the Measurement of Conjugated Bilirubin by the Ektachem Slide Method	Douglas W. Franquemont, James L. Sutphen, David A. Herold, and David E. Bruns	1760
Alterations in Lactate Dehydrogenase Isoenzyme Patterns after Therapy with Streptokinase or Streptococcal Infection	Stanley J. Podlasek, D. Robert Dufour, and Richard A. McPherson	1763
Estimation of Reference Intervals for Total Protein in Cerebrospinal Fluid	John A. Lott and Patricia Warren	1766
Enzyme-Linked Immunosorbent Assay for Free Thyroxin in Human Serum	Shiu Hon Chui, Koon Ching Wan, Christopher Wai Kei Lam, and W. H. P. Lewis	1770
Nitromethane Interferes in Assay of Creatinine by the Jaffé Reaction	Eric A. De Leacy, Nigel N. Brown, and Alan E. Clague	1772
Use of Purified Lyophilized Human Lactate Dehydrogenase Isoenzyme 5 in a Study of Measuring Lactate Dehydrogenase Activity	Deborah A. Smith, Godfrey C. Moses, and A. Ralph Henderson	1774
Normal Biochemical and Hematological Values in New Zealand White Rabbits	C. D. Hewitt, D. J. Innes, J. Savory, and M. R. Wills	1777
An Interlaboratory Study of Blood-Gas Analysis: Dependence of p_{O_2} and p_{CO_2} Results on Atmospheric Pressure	Robert W. Burnett and Masashi Itano	1779
Cost-Effective Assays for Use in Monitoring Carbamazepine, Phenobarbital, and Phenytoin in Serum	F. M. L. Moore and D. Simpson	1782
Four Sensitive Thyrotropin Assays Critically Evaluated and Compared	Demetrios S. Sgoutas, Earl G. Barton, Margareta Hammarstrom, Philomena M. Pete, and Sandra A. Sgoutas	1785

TECHNICAL BRIEFS

Serum Apo-Aminotransferases Reassociate Equally Well with Pyridoxal 5'-Phosphate in Water or Buffer	J. C. M. Hafkenscheld, H. T. R. van den Berg-Boesman, and M. Hessels	1790
Evaluation of Cholesterol Measurement with the Beckman System 700 Analyzer in the Centers for Disease Control-National Heart, Lung and Blood Institute Lipid Standardization Program	W. H. Karge, E. J. Weiner, E. J. Rogers, and R. J. Nicolosi	1790

continued on next page

Volume 35 Number 8
August 1989

**American Association for
Clinical Chemistry, Inc.**

1989 Officers

Carl Burtis, President
Helen M. Free, President-Elect
Theodore Peters, Jr., Past
President

Karen L. Nickel, Secretary
Thomas C. Stewart, Treasurer

1989 Board of Directors

Roger Boeckx

Larry D. Bowers

Lemuel Bowie

Jesse F. Goodwin

Cecilia Haberzettl

Lawrence Killingsworth

Commission on Publications

H. Peter Lehmann, Chairman

AACC National Office

Ronald E. Whorton, Executive Vice
President

Joanne M. Thyken, Vice President/
General Manager

Lenne Miller, Circulation Director

Lisa Isaac, Circulation Assistant

Quantification of Choriongonadotropin: Differential Cross-Reactivities of the Free hCG β -Subunit with Eight Different Monoclonal Antibody-Based hCG and (hCG + β) "Sandwich"-Type Assays

C. M. G. Thomas and M. F. G. Segers 1791

Response of Allergic and Normal Persons to Sulfiting Agents in Wine: Determination of Thiosulfate Excretion in Urine

Meral Torun, Aysel Bayhan, and Gülderen Yentür 1792

Hyperamylasemia and α -Amylase Isoenzymes in Acute Liver Congestion due to Cardiac Circulatory Failure

László Góth, István Mészáros, and György Scheller 1793

Evaluation of the TDx and ADx Methadone Immunoassays

Yale H. Caplan and Barry Levine 1794

Unusual Band on Hemoglobin Electrophoresis Produced by a Monoclonal Immunoglobulin in Serum

Maher A. Sughayer and Charles F. Arkin 1794

CASE REPORTS

Oligoclonal Banding Detected by Urinary Protein Electrophoresis and Immunofixation in Two Patients with the Acquired Immune Deficiency Syndrome and Proteinuria

Carol Ann Filomena 1795

β -hCG vs Intact hCG Assays in the Detection of Trophoblastic Disease

Alan D. Rinker and Norbert W. Tietz 1799

LETTERS

Clinically Significant Decision Levels of hCG

Trefor Higgins 1801

Reducing Misdiagnosis of Myocardial Infarction

Vipin D. Shah 1801

Normal Reference Values for Creatine, Creatinine, and Carnitine Are Lower in Vegetarians

Joris Delanghe, Jean-Paul De Slypere, Marc De Buyzere, Johan Robbrecht, Roger Wieme, and Alex Vermeulen 1802

Detergent Enhances Interference of Urate in Determinations of Fructosamine

Anders Kallner 1803

Underestimation of Urinary Glucose by an Automated Urine Dipstick Analyzer Based on Glucose Oxidase with Iodine as Indicator Chromogen

John H. Eckfeldt, Chris Senn, Priscilla Bormann, and G. Mary Bradley 1804

Minimum Detection Limits for Thyrotropin Assays

Kristian Linnet
(Response)
M. G. McConway, R. S. Chapman, and
G. H. Beattall 1805

Improved Urinary Oxalate Method for a Centrifugal Analyzer

P. Coyle, A. M. Rofe, and F. Renfeng 1806

Analysis for Homogentisic Acid by NMR Spectrometry, to Aid Diagnosis of Alkaptonuria

Shuichi Yamaguchi, Naoya Koda, and Hideaki Yamamoto 1806

Methadone and Thyroid-Function Tests

David M. Novick, Leonid Poretsky, and
Marcia F. Kalin
(Response)
Trevor N. English, David Ruxton, and
Creswell J. Eastman 1807

Melanin and Other Indole Compounds Do Not Cause False-Positive Cannabinoid Assay Results

Mary Jo Ricci, Cheryl A. Benoit, Juan J. L. Lertora, and William J. George 1809

BOOK REVIEWS

F. William Sunderman, Jr., and Louis Rosenfeld 1810

THE CLINICAL CHEMIST

J. Stanton King 1812