Products

♦ Bioanalytical Systems, Inc. has just introduced a unique system, CHADS for Vials™, for labeling lab samples legibly, quickly and easily.

Chads are thin, flexible, pre-numbered tags, printed on waterproof and solvent-resistant material. They use no adhesive and are available in a variety of colors.

Chads adhere to the vials using friction. The hole in the Chad is slightly smaller than the diameter of the vial, so when the vial is inserted into the hole, the Chad is stretched tightly around the vial. When the vial is lifted, the Chad clings to its neck, whether the vial is capped, stopped, open or closed. The Chads come in sheets, so you can label one vial at a time, or label an entire rack of 192 vials (enough for two 96-well plates) in one motion. Load them into a fraction collector, a centrifuge, autosampler or freezer; when the vials are thawed, the Chads will be just as legible as the day they were applied. You will have no more tedious hand labeling or smudged, illegible labels with the Chads system.

For more information or to request a free sample and a copy of the company's 3-minute demonstration CD, go to ***www.culex.net***.

♦ Automated Serial Blood Sampler for Research Animals

Bioanalytical Systems, Inc. has introduced the Culex®Automated Blood Sampler (ABS). The system provides for robotic sampling of blood (10-250 µL per sample) from cannulated rats for research in pharmacokinetics, drug metabolism and drug safety assessment.

Four freely-moving animals are housed on a wheeled cart with refrigerated microfraction collectors, as well as collectors for urine and feces. Sterilized tubing sets maintain aseptic transfer of blood and replacement saline. A notebook computer enables the user to program independent collection protocols for each animal. Time and volume of blood draws are designated, along with the option to dilute the sample with specified volumes of heparinized saline. Food and water are provided *ad lib* and simultaneous drug infusions, microdialysis or implanted biosensors are feasible. Samples are collected in vials compatible with 96-well plates for centrifugation and sample preparation. Both serum and plasma can be managed. The blood sampling process does not stress the animals. For example, sleep is not disturbed. Animals can be maintained on the system for five days or more with excellent catheter patency. ***(www.culex.net)***

♦ Brain Microdialysis Probes for Transgenic Mice

New brain microdialysis probes with intracerebral cannulae have been developed by Bioanalytical Systems, Inc. (BAS) for use in transgenic mice, rats and other rodents. The MBR line of probes expands the offerings of microdialysis probes available from BAS for studies in brain, dermis, bile, blood vessels and other tissues.

These lightweight probes are secured in the guide by a low-insertion force elastomeric fit which accommodates the fragile skull of a mouse. Their small size makes them ideal for implanting multiple probes in a single animal. Guide cannulae can be implanted as close as 3.2 mm on center. Probes implanted without a guide can be placed within 2.4 mm of one another. Multiple MBR probes can be implanted in a rat, and depending upon the targets, two MBR probes may even be implanted in a single mouse.

MBR probes are available with 1 or 2 mm membrane lengths. The membrane offers a 38,000 MWCO (molecular weight cutoff) and is suitable for a broad range of neurotransmitters and drugs. A 24-karat gold coating on both the probe and guides provides an inert surface compatible with tissues and biological fluids.

In the LC Literature

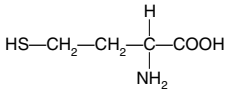
Compiled by:
Bruce P. Solomon, Ph.D.
Bioanalytical Systems, Inc.
West Lafayette, IN 47906

Email:
bp@bioanalytical.com

♦ Homocysteine by Capillary Electrophoresis

Detection of Homocysteine by Conventional and Microchip Capillary Electrophoresis / Electrochemistry

S.A. Pasas, N.A. Lacher, M.I. Davies and S.M. Lunte, Electrophoresis 23 (2002) 759-766.



Homocysteine

Homocysteine is an amino acid that has been linked to cardiovascular risk. There is little circulating homocysteine in plasma; it is generally found as the disulfide homocystine, as mixed disulfides, or bound to protein. Determinations must include a reduction step to break these bonds. These authors developed a capillary electrophoresis separation for homocysteine. A modified BAS LC-4B amperometric detector, and a custom BAS gold electrode were employed. The electrode was amalgamated with mercury and kept at a potential of +100 mV (vs. Ag/AgCl). When placed in the off-column detection position, the detection limit was 500 nM and the assay was linear from 1-100 µM. In the end-column position the assay was only half as sensitive. The authors went on to port this five-minute determination to a microchip, where the "column" is a 10 cm scratch on a glass plate. Separation time went down to 80 seconds. See the next review for more information about microchips.

♦ Microchip Capillary Electrophoresis

In-Channel Electrochemical Detection for Microchip Capillary Electrophoresis Using an Electrically Isolated Potentiostat

R.S. Martin, K.L. Ratzlaff, B.H. Huynh and S.M. Lunte, Anal. Chem. 74 (2002) 1136-1143.

Performing separations on a microchip has the advantages of rapid analysis (tens of seconds), low solvent and disposal costs, small space requirements, and portability. Laser-induced fluorescence detectors (LIF) are the most common because they provide good peak shape and high sensitivity. EC detectors in the commonly used end-channel configuration tend to provide poor peak shape and lower sensitivity, since they must be placed farther away to protect them from the separation field. These authors exploited a new electrically isolated potentiostat on a chip, which allowed them to place the EC detector directly in the channel. The result was remarkably better performance, similar to that of an LIF detector.

In the EC Literature

Adrian W. Bott and Jeff Turner
Bioanalytical Systems, Inc.
West Lafayette, IN 47906

Email:
awb@bioanalytical.com
jturner@bioanalytical.com

♦ Mediated Electrochemistry of Horseradish Peroxidase. Catalysis and Inhibition.

M. Dequaire, B. Limoges, J. Moiroux, and J.-M. Savéant, J. Am. Chem. Soc. 124 (2002) 240.

Horseradish peroxidase (HRP) is a heme peroxidase that catalyzes the oxidation of a broad range of substrates by hydrogen peroxide or organic peroxides. Its catalytic properties have been utilized in many biotechnological processes, including diagnostic assays and biosensors. Basically, the enzyme is oxidized by oxygen atom transfer to the ferric heme from the peroxide substrate. This forms an oxidized enzyme intermediate and water. The intermediate can then oxidize two equivalents of the co-substrate to product. When the product/co-substrate redox couple is reversible, amperometric biosensors can be developed which measure the catalytic current from the reduction of a reversible one-electron product back to substrate. In this case the product/co-substrate redox couple is the electrochemical mediator between HRP and the electrode.

In this paper the authors studied the details of the underlying mechanism of HRP using cyclic voltammetry, stopped flow kinetics and steady-state kinetics using spectrophotometry. Digital simulation (DigiSim®) of the voltammetric waves was done to aid in mechanistic analysis. The reversible $[Os(bpy)_2pyCl]^{2+/+}$ couple was used as the electrochemical mediator. The authors explain that the substrate peroxide inhibits catalysis at high concentrations. Therefore, the catalytic current increases with increasing peroxide concentration at low concentrations, but decreases with increasing peroxide concentration at high concentrations. Other complicated electrochemical behavior such as hysteresis and crossing of the anodic and cathodic traces was explained in terms of the proposed mechanism. This paper provides the mechanistic framework for the biotechnological applications of HRP.

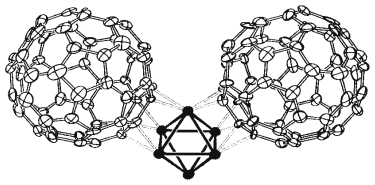
♦ Dependence of the Rate of an Interfacial Diels-Alder Reaction on the Steric Environment of the Immobilized Dienophile: An Example of Enthalpy-Entropy Compensation

Y. Kwon and M. Mrksich, J. Am. Chem. Soc. 124 (2002) 806.

This article examines the effects of the steric environment on the rate of an interfacial Diels-Alder reaction. The rate of the reaction was measured by cyclic voltammetry using a CV-50W, based on the rate of decay of the peak currents for the electron transfer reactions of the quinone dienophile. The steric environment around the quinone group was varied by preparing monolayers consisting of a) quinone-terminated alkanethiols of different lengths and b) an hydroxyl-terminated alkanethiol of constant length. The rate constants were found to vary with those for the monolayers with the hydroquinone group above the surrounding hydroxyl groups being about eight times larger than those with the more crowded hydroquinone group (below the hydroxyl groups). Analysis of the activation parameters indicated a larger enthalpy of activation for the more crowded quinone groups, but a lower entropy of activation.

♦ The First Fullerene-Metal Sandwich Complex: An Unusually Strong Electronic Communication Between Two C_{60} Cages

K. Lee, H. Song, B. Kim, J.T. Park, S. Park, and M.G. Choi, J. Am. Chem. Soc. 124 (2002) 2872.

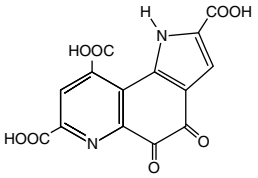


The chemistry of fullerenes has been an area of intense interest ever since synthesis of C_{60} over a decade ago. This article discusses the synthesis and electronic properties of a fullerene "sandwich" compound, based on an octahedral hexarhodium cage with C_{60} moieties coordinated to two triangular faces (other ligands omitted for clarity). The cyclic voltammogram of this compound, recorded using a BAS 100B, showed

three pairs of redox couples, indicating successive additions of electrons to each C_{60} fragment. The separations of the couples in each of these pairs ranges from 190 to 290 mV, which is indicative of strong coupling between the fullerene moieties. Since the large distance between suitable π-orbitals on the fullerene moieties preclude through-space electronic coupling, the electronic coupling must occur through the central rhodium cage.

♦ Determination of Thiols by Capillary Electrophoresis with Amperometric Detection at a Coenzyme Pyrroloquinoline Quinone Modified Electrode

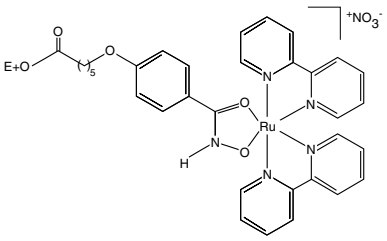
T. Inoue and J.R. Kirchhoff, Anal. Chem. 74 (2002) 1349.



One common method for the detection of thiols following LC separation is based on adsorption at gold/mercury amalgam electrodes. A different approach is used in this study, based on the mediated oxidation of thiols by pyrroloquinoline quinone (PQQ). One advantage of the latter approach is that the redox potential of PQQ is pH-dependent. The method is more sensitive using a higher pH due to the relative ease of oxidation of RS^- compared to RSH. For example, the detection limit for cysteine decreases from 1.42 μM at pH 3.45 to 63.7 nM at pH 8.42. In addition, the increase in pH shifts the oxidation potential of PQQ to more negative values, thereby allowing a less positive detection potential to be used, which decreases the possibility of interferants. A detection potential of +300 mV (vs. Ag/AgCl) was determined to be the optimum value, and an LC-4C modified for use with capillary electrophoresis was used as the amperometric detector. This method was used for the determination of cysteine in dietary supplements and in human urine.

♦ Redox-Active Metal-Containing Nucleotides: Synthesis, Tunability, and Enzymatic Incorporation into DNA

H. Weizman and Y. Tor, J. Am. Chem. Soc.124 (2002) 1568.



Efforts are currently being made to incorporate electrochemically-active modifications into oligonucleotides for the purpose of electrochemical detection of DNA. Toward this end, the authors have designed, synthesized and characterized redox-active tags that have similar structural and chemical features as well as tunable electrochemical potentials. These tags consist of bis-substituted bipyridine complexes of Ru^{2+} and Os^{2+} $[(R_2bpy)_2ML]^+$ where the redox behavior is metal-centered and reversible. Here, L is a negatively-charged bidentate O,O-donor ligand (acetylacetonate or hydroxamate, hydroxamate is shown in the figure) that contains a functionalized linker which tethers the redox active metal center to the nucleoside triphosphate. The authors demonstrate two important features about these complexes. First, the redox potentials are tunable over the range of +0.8 - -0.08 V vs SCE by varying the ligand substituents and the metal center (Ru or Os). Second, the complex in the figure (M=Ru, R=H) is shown to be efficiently incorporated into an oligonucleotide by DNA polymerase. These results demonstrate the potential of these redox-active tags for use in electrochemical-based DNA diagnostics.

DigiSim is a registered trademark of Bioanalytical Systems, Inc.

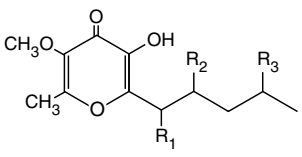
In the *In Vivo* Literature

Chandrani Gunaratna, Tianyi Zhang and Jean Zhou
Bioanalytical Systems, Inc.
West Lafayette, IN 47906

Email:
prema@bioanalytical.com
tzhang@bioanalytical.com
qinz@bioanalytical.com

♦ Pharmacokinetic Study of Allixin, a Phytoalexin Produced by Garlic

Y. Kodera, M. Ichikawa, J. Yoshida, N. Kashimoto, N Uda, I. Sumioka, N. Ide and K. Ono, Chem. Pharm. Bull. 50 (2002) 354-363.



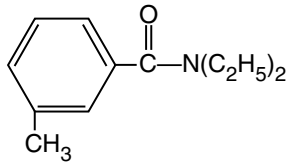
Allixin	R_1=R_2=R_3=H		
P-2	R_1=R_2=H	R_3=OH	
P-4	R_1=R_3=H	R_2=OH	
P-5	R_2=R_3=H	R_1=OH	

Allixin is a non-sulfur-containing defensive compound produced by garlic under continuous stress. Extremely high accumulation of allixin was found after long-term storage of garlic. It possesses interesting biological properties, including anti-tumor and anti-microbial effects. Therefore, its pharmacokinetic behavior was investigated in mice. Maltosyl-β-cyclodetrin (M-β-Cyd), a water-soluble derivative of cyclodextrin, was used to form an inclusion complex with allixin and improved its water solubility more than 50 times. Following the oral and intravenous administration of allixin at a dose of 50 mg/kg, the allixin content in mice serum and different organs was analyzed by LC/MS, where allixin-d_{11} was used as an internal standard. An RP C18 column was used under isocratic conditions, while the mass spectrometer detector was operated at selective positive-ion monitoring mode. Allixin was rapidly absorbed and reached maximium level at 5 minutes after oral administration, and disappeared after about 2 hours. Its bioavailability in mice was estimated to be 31% according to the calculation of the AUC. Allixin ap-

peared to have higher affinity for lung, liver, kidney and brain tissues, probably due to its high lipophilicity. Finally, the metabolism of allixin was studied using liver homogenate and the metabolic enzyme fraction of liver (S-9 Mix). Three metabolites, P2, P4 and P5, were identified through LC/MS and NMR analysis as allixin analogs having a hydroxylated pentyl side chain.

♦ *In Vitro* Human Metabolism and Interactions of Repellent N,N-Diethyl-*m*-Toluamide

K.A. Usmani, R.L. Rose, J.A. Goldstein, W.G. Taylor, A.A. Brimfield, and E. Hodgson, Drug Metabolism and Disposition, 2002, 30, 289-294.



N,N-Diethyl-*m*-Toluamide (DEET) is the principal active ingredient of insect repellants and is used widely worldwide in concentrations ranging from 10 to 100% in various forms as liquids, gels, lotions and sprays. Although benign in normal usage, excessive exposure to DEET can have toxic side effects. It has been shown that DEET in combination with pyridostigmine bromide or permethrin can cause significant neurobehavioral deficits in rats. In order to understand the mechanism of these chemical interactions, it is important to know how DEET is metabolized and, in humans, what isoforms of cytochrome P450 are responsible and how DEET interacts with the metabolism of other chemicals.

In this study the authors investigated the oxidative metabolism of DEET in human microsomes as well as in rat and mouse microsomes. To study enzyme induction properties of DEET, mice were dosed with DEET for three days and microsomes were prepared. The induced mice liver microsomes were used to study the metabolism of chlorpyrifos, a known pesticide to study the interaction of DEET with chlorpyrifos. Inhibition properties of DEET were also investigated by the authors.

The major metabolites of DEET are N,N-diethyl-*m*-hydroxybenzamide (BALC) and N-ethyl-*m*-toluamide (ET). Preliminary studies have shown that a pH of 8.3 was optimal for metabolite production. LC with UV detection at 230 nm was used for metabolite analysis. Kinetic parameters obtained for the ring methyl oxidation of DEET to produce BALC have shown that rat microsomes metabolize DEET more efficiently than human or mouse liver microsomes. Results from individual incubations of DEET with various P450 isoforms have suggested that CYP1A2 and 2B6 are the major enzymes for BALC production, whereas CYP3A4, 2C19 and 2A6 were responsible for the production of ET. Induction studies have shown that DEET mainly induced CYP2B6 suggesting that DEET induces its own metabolism. In summary, the authors have concluded that human liver microsomes show lower activity for DEET metabolism than the rodent liver microsomes.

♦ High-Throughput Cytochrome P450 (CYP) Inhibition Screening *via* a Cassette Probe-Dosing Strategy. VI. Simultaneous Evaluation of Inhibition Potential of Drugs on Human Hepatic Isozymes CYP2A6, 3A4, 2C9, 2D6 and 2E1.

H.Z. Bu, L. Magis, and K.K.P. Teitelbaum, Rapid Commun. Mass Spectrom. 15 (2001) 741-748.

Traditional investigation of the inhibition potential of drugs toward human hepatic cytochrome P450 (CYP) isozymes is performed for one single isozyme at a time. In this paper, a different approach based on cassette-probe dosing strategy was reported and was used to assess the inhibition potential of drugs toward five major human hepatic CYP isozymes (CYP2A6, 3A4, 2C9, 2D6, and 2E1). Five CYP probe substrates (coumarin, midazolam, tolbutamide, dextromethorphan and chlorzoxazone) were cassette-dosed in human liver microsomes using a 96-well plate format and the marker metabolites were simultaneously quantified using direct injection/on-line guard cartridge extraction/tandem mass spectrometry (DI-GCE/MS/MS). The inter-day accuracy of the method was 8.7 to 7.4% with a precision less than 8.3%. The inhibition assay for the five CYP isozymes was evaluated using known selective inhibitors *via* individual and cassette dosing of the probe substrates. The IC_{50} values measured *via* cassette dosing were consistent with those obtained *via* individual dosing and the literature. The validated assay was also used to evaluate the inhibitory potential of 23 generic drugs toward the five CYP isozymes. The data suggest the integration of the cassette dosing strategy and the DI-GCE/MS/MS method can provide a reliable *in vitro* approach to screening the inhibitory potential of new chemical entities, with maximal throughput and cost-effectiveness, in support of drug discovery and development.

Miscellany

♦ Third International Symposium on Microdialysis in Drug Research and Development

June 19-22, 2002
Minneapolis, Minnesota
Preceded by a course on Basic and Advanced Aspects of *In Vivo* Microdialysis, June 18-19, 2002

The application of microdialysis is rapidly expanding in the field of pharmacokinetic and drug disposition studies. Both the First and Second International Symposia on Microdialysis in Drug Research and Development (1998, Netherlands and 2000, Sweden) proved to be valuable to attendees, allowing opportunities for in-depth discussions of the microdialysis technique and providing an overview of recent advances involving microdialysis.

The Third International Symposium will be held in Minneapolis, Minnesota, USA. The general topics to be addressed are listed below. Poster and podium sessions will be held in which participants may present their research. The symposium will be preceded by a Microdialysis course planned for June 18 and 19, 2002.

Proposed Sessions

Analytical and methodological aspects of microdialysis • Clinical microdialysis • Microdialysis in the skin and subcutis • Microdialysis in ADME research • Applications in preclinical drug development

Further Information

Amy L. Olson
College of Pharmacy
University of Minnesota
5-130 Weaver-Densford Hall
308 Harvard St. SE
Minneapolis, MN 55455 USA
Phone: 612-624-4671
Fax: 612-624-2974
Email: olson017@tc.umn.edu
www.pharmacy.umn.edu/resgrad/pceutics/thirdintsymp/index.html

♦ INTERACT 2002

July 21-25, 2002
University of Technology (UTS)
Sydney, Australia

The Analytical Chemistry Division of the Royal Australian Chemical Institute (equivalent to the American Chemical Society in US) holds its conference once every two years. The next conference (16th Analytical Chemistry Conference) will be conducted jointly with the Environment Division, the Pharmaceutical Science Group of New South Wales of RACI, as well as the Australasian Ecotoxicology Society, and the International Chemometric Society. The primary goal is to bring together scientists working in these fields and to maximize the interaction between them. The structure of the conference will facilitate this through thematic sessions, the presence of international plenary speakers known for their multi-disciplinary interests, a comprehensive trade exhibition and a venue that will promote a high flow of information and interaction. Student and young scientist participation is also a major focus of Interact 2002. Workshops, poster sessions and special sessions for younger researchers will achieve an unprecedented level of debate and cohesiveness among attendees.

A four-day exhibition will be part of the conference. You can get more information here:
www.pco.com.au/interact2002

♦ Second North American Bioanalytical Forum: NABF 2002

September 29-October 2, 2002
Kansas City, MO

The objective is to bring together bioanalytical chemists from the pharmaceutical and biotechnology industries, contract research organizations, government laboratories and academic scientists in an atmosphere that encourages the exchange of information and informal discussion on the latest scientific advances in drug bioanalysis and related areas.

To foster and maximize scientific interchange while maintaining the informal nature of the meeting, registration will be limited to 130 individuals. The meeting will feature single-stream presentations, poster presentations, discussion sessions and several evening social events. Short courses will precede or possibly follow the scientific sessions, and a tabletop exhibition will provide information on recent developments in analytical instrumentation, products and services.

Members of the Scientific Organizing Committee for the forum are being named at this time. For information about the preliminary program, registration and travel arrangements, visit *www.ku.edu/~pbasymp* or contact Forum Chairman, John F. Stobaugh, Ph.D., 2095 Constant Avenue, Lawrence KS, 66047 USA, *stobaugh@ku.edu*.

♦ The 19th (Montreux) LC/MS Symposium on LC/MS, SFC/MS, CE/MS / MS/MS

Short Courses: Nov. 4-5, 2002
Symposium: Nov. 6-8, 2002
Montreux Convention and Exhibition Center
Montreux, Switzerland

The organizers are delighted to welcome you to the 19th (Montreux) Symposium on LC/MS, SFC/MS, CE/MS and MS/MS, which will treat all areas in the field of liquid chromatography/mass spectrometry, including capillary electrophoresis, combinatorial technologies, miniaturization, quantitation, biomolecules, sample preparation, quality issues (GLP, validation, etc.), technical developments (particularly in online media), theoretical considerations, and applications of techniques in environmental, clinical and pharmaceutical analysis, as well as in analysis in other fields.

There will be a full program of plenary lectures, invited lectures, short oral communications and poster sessions.

There is also a sizable commercial exhibition open for the duration of the Symposium, which you are invited to explore in your off-time and during the scheduled breaks.

Before the general sessions of the Symposium (November 6-8), there is one two-day short course A (November 4-5) on LC/MS, SFC/MS and CE/MS and one one-day course B (November 5) on interpretation of MS/MS spectra.
www.iaeac.ch/lcmsbegin.htm

♦ Goodbye, Martine!

BAS recently lost a wonderful colleague after a heroic four-year battle against breast cancer. Martine Brettnacher joined us in 1986, working first as an inventory clerk. For many years, we described such folks as "cage people" because they worked in a metal cage to and from which inventory parts would flow under computer control. Soon, however, Martine's cheerful disposition and excellent telephone voice suggested she interface with the public, our customers. She thus became our primary order entry representative for years, until late in 2001 when her medical challenges made it impossible to continue on a regular schedule. Martine was with us for about 60% of our life as a company, but she entered and nurtured the orders for over 85% of our revenue.

To many people, Martine *was* BAS, and we received many very positive comments over the years about her cheerfulness, and her caring attitude that things be done properly and on schedule. She knew the personal situations of many of her customers, only a few of whom she had met in person. She had a way of putting people at ease and helping them work through complex problems, whether they were items lost in shipping or arguments about whether a technical problem was a service issue or a technical application problem. Martine also had a knack for collecting receivables from the obstinate. At the same time, she could be very tough when she detected that something "smelled rotten" and required action from higher authority.

Martine was not a chemist, a biologist, a veterinarian or a MD, but she worked closely with many life science researchers and chemists who make an effort each day to improve the human condition. This reminds me again how important all the professions are in the process and why no one should feel he or she has an exclusive franchise. Martine Brettnacher played an important role in advances against depression, schizophrenia, diabetes, AIDS, infectious disease and yes, even the cancer that took her from us. I look at this as war and just as for any other war, the paperwork must be done, the bills must be paid and the goods must be delivered.

Martine used her beautiful voice to sing at BAS weddings, and she used it to calm our CEO who often would have "bad Mondays" and could get a little excited during one crisis or another. She could genuinely make us believe tomorrow would be better and amazingly enough, she was always right. Martine fought a very tough war. There were battles won, hopes gained and then set-backs encountered. She fought courageously. She made those around her better. It is sad for us to lose someone so young, but on the other hand, she used her 42 years very well and we are honored to have been blessed with having her on our team. *(PTK)*

♦ Professor M. J. Weaver, 1947-2002

Professor Michael J. Weaver was born March 30, 1947 in London, England. He completed his B.Sc. degree from Birkbeck College, London University in 1968 and his Ph.D. degree from Imperial College, London, in 1972. Following a postdoctoral research fellowship at the California Institute of Technology from 1972-1975, he began his academic career as an assistant professor at Michigan State University in 1975. He came to Purdue University as an associate professor in 1982 and was promoted to full professor in 1985.

Professor Weaver contributed pivotally to the inception and development of a number of diverse fundamental aspects of surface electrochemistry, spectroelectrochemical techniques, and electron transfer chemistry. The overall impact of his research work is clearly reflected in his record of citations, for which he was named as a Highly Cited Researcher by the Institute for Scientific Information, based on literature citation data over the last 20 years. He received numerous honors for his research work, including the David Grahame Award (1989) and the Carl Wagner Medal (1997) from the Electrochemical Society, the Faraday Electrochemistry Medal from the Royal Society of Chemistry (1995), and the Electrochemistry Award from the American Chemical Society (1999).

Memorial contributions may be sent to Purdue University, Michael J. Weaver Memorial Fund, Department of Chemistry, 1393 Brown Laboratories, West Lafayette, IN 47907 USA

♦ Sheela Das

Dr. Sheela Das, Senior Scientist/ Team Leader in the analytical services group, has been with BAS for four years. She heads a group made up of Senior Scientists and Project Managers and has overall responsibility for projects involving NCEs, including bioanalytical methods development, validation, troubleshooting, coaching other team members, and coordinating projects between and among teams. Projects extend over many months, and a great deal of client interaction takes place along the way.

Sheela believes the key to success in contract analysis is good communication. As she puts it, "The relationship with a client is a little like a blind date. In the beginning, a lot of time and effort is devoted to learning about one another. As more and more information is exchanged, trust begins to develop and grow, the comfort level increases and the working relationship becomes more and more effective." As you might expect from this observation, Sheela's customer relations skills are very strong.

Born in Bombay, India, Sheela received her undergraduate degree in pharmacy from the University of Bombay, and came to the U.S. where she earned her Ph.D. in medicinal and biological chemistry at the University of Toledo. She and her husband Sudeep, who is Service Delivery Manager for an IT consulting firm, are avid golfers who take every opportunity to be on the course. It is not unusual for them to play several rounds in a single weekend. On the days this energetic and personable woman can't head for the golf course right after work, she can be found engaged in a strenuous aerobics session in the BAS exercise room, or in her kitchen, effortlessly whipping up a gourmet meal.

Sheela regards the best parts of her job as troubleshooting and customer contact. "After all," she says, "client interaction is important for our company, and finding solutions to unexpected problems brings real satisfaction and sense of accomplishment."

♦ Andy Brown

Andy Brown is the Business Development Manager of BAS in Warwickshire, UK. He is responsible for sales and marketing the company's products and analytical services to pharmaceutical companies throughout Europe. At the same time, he is always on the lookout for new partners and acquisition opportunities.

Before joining BAS 2½ years ago, Andy spent 25 years at Roche, first in drug metabolism, then running a bioanalytical section and finally, he moved into contract management where he and BAS became acquainted with one another. Andy holds a M.Phil. from the University of Hertfordshire.

He is particularly fond of collecting Victorian books, notably those about engineering and science. As of this writing, Andy estimates the size of his book collection at between 2000 and 3000 volumes. All are over 100 years old, and the oldest is 180 years. Andy continues to attend auctions around the UK, adding to his burgeoning collection.

There is no telly in the Brown household and hasn't been for 24 years. Andy reads a lot (no surprise there), listens to music and attends the cinema often. He does have a DVD player that allows him to indulge his fondness for 1930s movies. And, of course, he dotes on his 8-month-old son Jamie.

Andy is quick to point out the advantages of working for a smaller firm, where everyone's contribution must be meaningful and where everyone's views are heard. "At BAS, I can e-mail the CEO and President and receive a reply," notes Andy, "and if there is any disagreement, it leads to a useful discussion. I enjoy the freedom I have to act and, of course, that leads to challenges." Andy views his most significant challenges as identifying, and keeping, good business partners for BAS, and finding good clients and then making sure they remain happy with BAS products and services.