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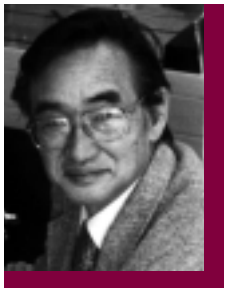
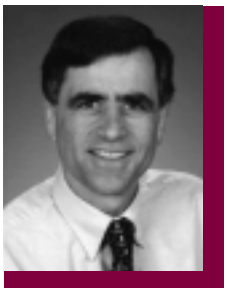
Sato and Schuster: Distinguished Plenary Speakers in Orlando

Attendees to the 2002 Congress on In Vitro Biology will have an exceptional opportunity to hear two outstanding international speakers at the opening Plenary Session at 3:30 pm on Wednesday, June 26. The two speakers will be Dr. Gordon Sato and Dr. Sheldon Schuster.



Dr. Gordon Sato

Gordon Sato, Ph.D., is the administrator of the Manzanar Project, Department of Fisheries, Asmara, Eritrea. The project is a global action project offering simple, practical, and effective solutions to the planet's most critical problems: reduction of poverty, hunger, environmental pollution, and global warming through seawater aquaculture and silvaculture in deserts. Its working prototype and base is located in the Republic of Eritrea. He was named an Honorary Admiral in the Navy of the Republic. Dr. Sato conceived the project while he was Professor at the University of California-San Diego, and pilot experiments in waste-algae-brine shrimp culture and the food chain were begun on the Manzanar Project at a test site in the Salton Sea. The Project was further developed under the administration of Dr. Sato and Dr. Wallace McKeehan at the W. Alton Jones Cell Science Center, where the Eritrean test project began during Eritrea's war of independence from Ethiopia. The Manzanar Project has been described as "low-tech, biotech." While administering the project, Dr. Sato has continued to publish research based on this, and has most recently established an international school so other countries of the world might benefit from on-site training in the Eritrea. *Continued on page 2*



Dr. Sheldon Schuster

Sheldon Marc Schuster, Ph.D., is the Director of The Biotechnology Program at the University of Florida and Professor of Biochemistry and Molecular Biology in the College of Medicine. His research focuses on the mechanism of tumor drug resistance, and the rational design of potential anti-tumor therapies based on studies of specific enzyme structures. He has also initiated a research program attempting to use novel gene analysis tools to attempt to determine the microbial etiology of numerous chronic human diseases.

Dr. Schuster joined the faculty of the University of Florida in 1989. His research work is funded by the National Cancer Institute and the American Cancer Society, and has resulted in over 130 peer-reviewed publications and ten patents. He is a well-known speaker and has participated in more than 90 invited seminars.

Dr. Schuster is a Californian by birth. He is a graduate of the University of California at Davis and earned his Ph.D. from the University of Arizona. He has worked at the Institute for Enzyme Research at the University of Wisconsin and was on the faculty at the University of Nebraska as Professor of Chemistry and Biological Sciences.

Sheldon is active in the development of start-up companies resulting from University of Florida technologies. He has also started a not-for-profit venture capital firm that helps fund early-stage Florida-based high technology companies. Dr. Schuster is one of the founders of Restoragen, Inc. (formerly BioNebraska Inc.), a biotechnology company that produces recombinant peptide therapeutics for the cure of diabetes and osteoporosis. In addition he is a founder of AquaGene, a company developing technologies to produce biopharmaceuticals using fish as the bioreactor.

Currently Dr. Schuster is working on the application of high-throughput technologies and novel approaches to data analysis to enhance the research capabilities and problem-solving opportunities in the molecular life sciences.

This Issue

Continued from cover

His ideas and methods have enormous worldwide potential to impact the use of deserts, seawater, and reforestation.

Dr. Sato received his undergraduate degree in biochemistry at the University of Southern California and his PhD degree at the California Institute of Technology under Nobel Prize winner, Max Delbruek. His post-doctoral training was at the University of California-Berkeley and the University of Colorado Medical School. He was a professor of Biochemistry at Brandeis University from 1958 - 1969 and later joined the Department of Biology at the University of California – San Diego as professor from 1970 - 1983.

Dr. Sato is best known for his contribution to the understanding of the multiple factors required for the culture and husbandry of mammalian cells outside the body. He also pioneered the field of serum-free defined culture of differentiated cells, discovered the role of local-acting hormones and polypeptide regulators in the process, and was the first to pioneer the concept of the for-profit company. The ultimate in this concept is Upstate Biotechnology, Inc., a foundation that was designed to provide products from the efforts of basic researchers to others, while also building profits for endowment to a unique non-profit graduate research institute in NY, the W. Alton Jones Cell Science Center.

As the Center's Director, Dr. Sato was the first to apply modern protein chemistry and molecular biology to cell culture biology problems, and he also established a PhD program with Clarkson University with 30 students in residence at the peak. In addition, he continued the advanced educational mission of the Center and increased its visibility by establishing the Cell Center-sponsored International Symposium on Cellular Endocrinology.

Dr. Sato was President of the Tissue Culture Association (now SIVB) from 1984 to 1986 and was Editor-in-Chief of In Vitro Cellular and Developmental Biology from 1987 to 1991. He is a member of the National Academy of Sciences and Adjunct and Honorary Professor at many universities throughout the world. He is the author or co-author of over 150 publications in cell and molecular biology.

ExPlants

Melissa Hinga has been promoted to Scientist I at RiceTec, Inc. reporting to the Executive VP for Research and Technology. Her new responsibilities include an expanded research effort in the application of anther culture to the breeding program. Melissa will continue to manage the tissue culture laboratory and it's staff of four that have produced over 5000 double haploids over the last year. RiceTec, Inc. is the only hybrid rice breeding company in the United States. The seed division of RiceTec has two hybrids well suited for Southern US rice farming on the market in 2002. Congratulations, Melissa!

Janet Reed, Syngenta, has been promoted to Staff Scientist. Janet was trained in **Bob Conger**'s lab at the University of Tennessee and joined Syngenta, fka Ciba Geigy, in 1989. She also was employed by Allied Corporation in Syracuse and then Texas A&M AES in Weslaco. Congratulations, Janet!

Bobby Smith, Texas A&M, reports that she will be retiring from teaching and research in September, 2002. She plans to concentrate her time and efforts on establishing their eco-tourism ranch on the Red River. Go Bobby!

Carol Stiff, chairman of the Phillip White Memorial Award committee, is pleased to announce that this years' recipient is Allison Wiseman of NSW, Australia. She will be working with embryonic cell cultures and bioreactors and will receive training in the lab of John Lunghusen at Ausratec in Melbourne. Carol thanks all seven applicants this year for their efforts and the and the members of the Philip White committee for their dedication.

Author Citation Website

The Institute for Scientific Information (ISI), which publishes the Current Contents and the Citation Index, has recently identified the world's most cited authors - comprising less than one half of one percent of all publishing researchers - in various disciplines of science. They have created a website (www.isihighlycited.com) which profiles each scientist, and provides details of their background, professional experience, honors, and their list of publications. One can see each publication, and how many times it has been cited, by a simple click. Indra K. Vasil is included in this elite group and you can view his profile under his name at the above website.

Well-known International Plant Scientists Featured at IAPTC&B

For our members working in plant cell science, the IAPTC&B in Orlando presents a unique opportunity to interact with many of the leaders and innovators of our profession. The international program features multiple plenary speakers including Jonathan Jones, Steven Briggs, Martin Yanofsky, Dirk Inze, Kazu Shinozaki, Anna Koltunow, David Baulcombe, Robert Fraley, Mich Hein, Maurice Moloney, Ronald Sederoff, Lothan Willmitzer, Ilya Raskin and Owen White.

Northeast Branch Co-sponsors Bioethics Forum VI

The Northeast Branch, along with the Pace chapter of Sigma Xi, served as co-sponsor of the "Bioethics Forum VI" which was held on November 9, 2001 at Pace University in Pleasantville, NY. The title of this forum was "Society and The New Genetics". Among the panelists were Catherine Concert, RN, FNP representing the Bioethics Committee, Wyckofff Hts. Med. Center, Erik Parens, Ph.D. Associate for Philosophical Studies, The Hastings Center, and Michael Swift, M.D. Director, Human Molecular Genetics Institute, NYMC. Plans are underway for the next forum, Bioethics Forum VII, which will be held in the fall of 2002 on the Pace University NYC campus. The title and details are not yet available. Anyone interested in attending or participating in the next forum can contact Dr. Carl Candiloro at ccandiloro@pace.edu.
Carl would also be interested in hearing from any former branch members who might have ideas on how to revitalize the Northeast Branch.

Janis Demetrulias passes the following information to SIVB members: NIH has published Program Announcement No. PA-02-075: Innovative Toxicology Models: SBIR/STTR

This PA encourages the development, standardization, and validation of new and innovative assays that determine or predict specific organ toxicities (e.g., hematotoxicity, cardiotoxicity, gastrointestinal toxicity, hepatotoxicity, nephrotoxicity, ototoxicity, bladder toxicity, neurotoxicity, pulmonary toxicity, and endocrine toxicity, including pancreatic beta cell toxicity) as well as new methodology for high throughput toxicity screening that involves the use of molecular endpoints, computer modeling, proteomics and genomics. The development of these toxicity assays and their incorporation early in the development process would assist in the evaluation and prediction of human sensitivity and allow for more cost efficient evaluations of numerous analogs prior to the selection of the ultimate drug development candidate. The full announcement is available at: http:// grants1.nih.gov/grants/guide/pa-files/PA-02-075.html.

The 2002 Mechanisms of Toxicity Gordon Research Conference is being held Sunday, July 21-Friday, July 26, 2002 at Bates College, Lewiston, Maine. Over the past several years, this meeting has evolved into the premier small meeting focused on the molecular mechanisms underlying toxicant response. This year's program continues this tradition with sessions on: Applications of Genomics and Proteomics to Toxicology, Redox-Regulated Transcriptional Control, Receptor-Mediated Toxicity, Molecular Mechanisms of Developmental Toxicity, Genetic Susceptibility to Toxicants, and others. In addition, there will be a keynote address by Dr. Bruce Hammock and Late Breaking Research Presentations chosen from submitted poster abstracts. Complete program information and registration information can be obtained at: http://www.grc.uri.edu/

Len Schiff, Ph.D. and W. Alan Moore, scientists with the Charles River Laboratories Biopharmaceutical Services recently co-authored an article "The Mechanics of Infectious Agent Risk Reduction for Biologicals Produced from Mammalian Cells and Tissues," which was published in the March issue of Regulatory Affairs Focus (monthly magazine of the Regulatory Affairs Professionals Society). The article presented an overview of the steps needed to reduce the risk of infection in cell lines critical to the production of biological products. Issues emphasized were proper characterization and testing of cell line substrates as well as biological raw materials that can aid in prompt regulatory review.

Alert for Invertebrate Members: Sardar S. Sohi to be awarded SIVB Lifetime Achievement Award in Orlando

Of special interest to Invertebrate members will be the awarding of the 2002 Society for In Vitro Biology Lifetime Achievement Award to our friend and colleague, Dr. Sardar S. Sohi. On Dec. 23, 1999, Dr. Sohi officially retired after more than 34 years in the public service with the Canadian Forest Service, Great Lakes Forestry Centre in Sault Ste. Marie, Ontario, Canada.

Dr. Sohi was successful in showing the scientific community that insect tissue culture was both a viable tool as well as a practical method for pathogen propagation. His work on developing insect cell lines, in all 79 from seven different species, has been an extremely important contribution to the science of baculovirology, a field where significant strides are being made using cell culture systems. His vast collection of cell lines made it possible to characterize many nuclear polyhedrosis viruses of forest defoliating insects.

Today, cell lines from Dr. Sohi's lab are used by many researchers around the world in countries such as Australia, Belgium, Canada, France, Germany, Japan, Mexico, New Zealand, Sweden, Switzerland, The Netherlands, United Kingdom and USA. These cell lines are used for the bioassay and strain selection of viruses and *Bacillus thuringiensis* (Bt) toxins; for the mass production of insect pathogenic viruses for use as part of an integrated pest management program; and for producing foreign gene products using baculovirus and entomopoxvirus expression vectors. Dr. Sohi's long career in insect pathology, especially to the initiation and propagation of insect cell lines has contributed in a major way to the many new discoveries that are currently being made.

Many of us who routinely use insect tissue culture do so on the strong foundation of Dr. Sohi's pioneering research and many of his discoveries will continue to play a significant role in many aspects of our work in years to come. Dr. Sohi has authored or co-authored over 70 journal articles; written numerous book chapters on insect tissue culture, peer reviewed numerous manuscripts from scientists around the world and has presented over 100 papers at national and international scientific conferences. He has been a long time member of the Society for In Vitro Biology and of its predecessor, the Tissue Culture Association, as well as other scientific societies, and has served in various official capacities in many of the organizations.

If you have not made plans to attend, I would hope you would consider supporting your Society with your presence. I look forward to seeing as many of our members as possible in Orlando.

Guido Caputo, Secretary, Invertebrate Section

Journal Highlights

Mycoplasma Eradication from Continuous Cell Lines

Cord C. Uphoff

Hans. G. Drexler

Accumulating data implicate mycoplasma contamination as the single biggest problem in the culture of continuous cell lines. Mycoplasma infection can affect virtually every parameter and functional activity of the eukaryotic cells. A successfull alternative to discarding infected cultures is an attempt to eliminate the contaminants by treatment with specific and efficient anti-mycoplasma antibiotics. The addition of antibiotics to the culture medium during a limited period of time (1-3 weeks) is a simple, inexpensive and very practical approach for decontaminating continuous cell lines. Here, we examined the effectiveness of several antibiotic treatment protocols which we have employed routinely in our cell lines bank. On aggregate, 673 cultures from 236 chronically mycoplasma-positive cell lines were exposed to one of the following five antibiotic regimens: Mycoplasma Removal Agent (a quinolone; a 1-week-treatment), enrofloxacin (quinolone; 1 week), sparfloxacin (quinolone; 1 week), ciprofloxacin (quinolone; 2 weeks), and BM-Cyclin (alternating tiamulin and minocycline; 3 weeks). The mycoplasma infection was permanently (as determined by three solid mycoplasma detection assays) eliminated by the various antibiotics in 66-85% of the cultures treated. Mycoplasma resistance was seen in 7-21%, and loss of the culture due to cytotoxically caused cell death in 3-11% of the cultures treated. Overall, 223 of the 236 mycoplasma-positive cell lines could be cured in a first round of antibiotic treatment with at least one regimen. Taken together, 95% of the mycoplasma-infected cell lines were permanently cleansed of the contaminants by antibiotic treatment which validates this approach as an efficient and technically simple mycoplasma eradication method. ***Cord C. Uphoff*** *and Hans.* ***G. Drexler****, Comparative PCR Analysis for Detection of Mycoplasma Infections in Continuous Cell Lines, In Vitro Cellular and Developmental Biology – Animal, 79 – 85, 2002.*

PCR Detection of Mycoplasma

Mycoplasma contamination of cell lines is one of the major problems in cell culturing. About 15 - 35% of all cell lines are infected with a limited number of mycoplasma species of predominantly human, swine, or bovine origin. We examined the mycoplasma contamination status in 495 cell cultures by polymerase chain reaction (PCR) assay, microbiological culture method, and DNA-RNA hybridization, and in 103 cell cultures by PCR and DNA-RNA hybridization, in order to determine the sensitivity and specificity of the PCR assay in routine cell culture. For those two cohorts, results for the three or two assays were concordant in 92% and 91% of the cases, respectively. The sensitivity (detection of true positives) of this PCR detection assay was 86% and the specificity (detection of true negatives) was 93% with positive and negative predictive values (probability of correct results) of 73% and 97%, respectively. PCR defined the mycoplasma status with 92% accuracy (detection of true positives and true negatives). The mycoplasma contaminants were speciated by analyzing the PCR amplification fragment using several restriction enzymes. Most of the cultures (47%) were infected with M. fermentans, followed by M. hyorhinis (19%), M. orale (10%), M. arginini (9%), A. laidlawii (6%), and M. hominis (3%). In summary, PCR represents a sensitive, specific, accurate, inexpensive, and quick mycoplasma detection assay which is suitable for the routine screening of cell cultures. ***Cord C. Uphoff*** *and* ***Hans. G. Drexler****, Comparative Antibiotic Eradication of Mycoplasma Infections from Continuous Cell Lines, In Vitro Cellular and Developmental Biology – Animal, 86 – 89, 2002.*

Signal Transduction in Lymphocyte Locomotion

Alamelu Sundaresan, Neal Pellis, and Diana Risin

Inflammatory adherence to, and locomotion through the interstitium is an important component of the immune response. Conditions such as microgravity, and modeled microgravity (MMG) severely inhibit lymphocyte locomotion in vitro through gelled Type I collagen (Pellis et al., 1994, 1997). We used the NASA rotating-wall vessel bioreactor or slow turning lateral vessel (RWV/STLV) as a prototype for MMG in ground based experiments. Previous experiments from our laboratory revealed that when lymphocytes (human peripheral blood mononuclear cells (PBMCs) were first activated with phytohemaglutinin (PHA) followed by exposure to MMG, locomotory capacity was not affected. In the present study, MMG inhibits lymphocyte locomotion similar to that observed in microgravity. Phorbol Myristate Acetate (PMA) treatment of PBMCs restored lost locomotory capacity by a maximum of 87%. Augmentation of cellular calcium flux with ionomycin had no restorative effect. Treatment of lymphocytes with mitomycin C prior to exposure to MMG, followed by PMA, restored locomotion to the same extent as non mitomycin C-treated lymphocytes exposed to MMG (80-87%), suggesting that DNA replication is not essential for the restoration of locomotion. Direct activation of Protein Kinase C (PKC) with PMA thus was effective in restoring locomotion in MMG almost comparable to normal levels seen in 1g cultures. Thus in MMG, lymphocyte calcium signaling pathways were functional with defects occurring at the level of or upstream of PKC. ***Alamelu Sundaresan***, ***Diana Risin*** *and* ***Neal R. Pellis****, Loss of Signal Transduction and Inhibition of Lymphocyte Locomotion in a Ground-based Model of Microgravity, In Vitro Cellular and Developmental Biology – Animal 118 –122, 2002.*

Model Functional Food Ingredient

R. Hontecillas, J. Bassaganya-Riera, M. J. Wannemuehler

Many lipid molecules provide health benefits beyond their nutritional values and are included under the classification of polyunsaturated fatty acids (PUFA). Because of their immunomodulatory and anti-inflammatory properties, conjugated linoleic acid (CLA) and w-3 PUFA can be defined as nutraceuticals. CLA is a mixture of positional (i.e., 9, 11; 10, 12; or 11, 13) and geometric (i.e., cis or trans) isomers of conjugated octadecadienoic acid. The CLA mixture has been shown to have anticarcinogenic, antiatherosclerotic, and immunomodulatory properties, but there is little or no evidence as to which of the individual isomers is the most important in mediating these health benefits. The mechanism by which dietary CLA influences immune function could involve regulation of lipid mediator synthesis, and/or transcriptional regulation of gene expression by peroxisome proliferator activated receptor-g. However, these explanations have not been completely accepted in terms of defining the mechanism(s) regulating functional activity because of the lack of molecular evidence in vivo. Other PUFA within the category of nutrients that modulate health (e.g., a-linolenic or eicosapentanoic acid) are immunosuppressive. Conversely, dietary CLA expanded CD8+ lymphocytes and thymocytes (i.e., CD8+ and double negative) in vivo, and enhanced proliferation of CD8+ lymphocytes ex vivo. In addition, CLA decreased the tissue damage caused by bacterial-induced colitis. All these properties make dietary CLA a substance that provides medical or health benefits including the prevention or treatment of diseases (e.g., nutraceutical). ***J. Bassaganya-Riera, R. Hontecillas,*** *and* ***M. J. Wannemuehler,*** *2001 Congress Symposium on Nutraceuticals/Edible Vaccines: Nutritional Impact of Conjugated Linoleic Acid: A Model Functional Food Ingredient, In Vitro Cellular and Developmental Biology – Plant, 241 – 246, 2002.*

Genetic Variability of Micropropagated Papaver bracteatum

From L to R, Trevor Hodkinson, Ingrid Hook, and Jim Carolan

Amplified fragment length polymorphism (AFLP) markers were employed to detect genetic variation among species of Papaver (section Oxytona) and assess genetic fidelity between in vitro cell lines of Papaver bracteatum and mature plants derived from the propagation of their callus cultures. Regenerated plants exhibited morphological and phytochemical characteristics dissimilar to those of their source material. Thebaine, the dominant alkaloid produced by Papaver bracteatum was not detected in capsules from mature regenerated accessions indicating that there may have been a loss of genetic uniformity. Instead, the dominant alkaloid produced by the regenerated plant was shown to be isothebaine (by TLC and GC/MS), a metabolic characteristic of P. pseudo-orientale. A neighbor joining tree constructed from AFLP fingerprints, distinctly separates the three species of Oxytona while firmly grouping the in vitro cultured plants with P. pseudo-orientale. Additionally, phytochemical data and chromosome counts indicate that the seed used to initiate cultures was of hybrid origin and that the loss in genetic uniformity was not due to somaclonal variation occurring during the in vitro culture process. AFLP fingerprinting was therefore able to differentiate Oxytona species and investigate allopolyploidy in closely related Papaver species. ***J. C. Carolan, I. L. I. Hook,*** *J. J. Walsh, and* ***T. R. Hodkinsonm,*** *Using AFLP Markers for Species Differntiation and Assessment of Genetic Variability of In Vitro-cultured Papaver bracteatum (Section Oxytona), In Vitro Cellular and Devleopmental Biology – Plant, 300 – 307, 2002.*

B. Steinitz and Y. Gafni

A Cry1a(C) Transgene In Regeneration-recalcitrant Cotton (Gossypium Hirsutum L.)

The insecticidal effectiveness of an d-endotoxin Cry protein from Bacillus thuringiensis in non-regenerable callus of a commercial Gossypium hirsutum L. variety was investigated. Two transgenic callus types were generated. The first callus type harbored the cry1A(c) gene and the hygromycin B phosphotransferase hpt selectable marker gene. The second callus type – the transgenic control - carried the marker genes b-glucuronidase (GUS) and hpt. Growth and survival rates of three major cotton moth species - Pectinophora gossypiella, Helicoverpa armigera, and Spodoptera littoralis - were examined with aseptic neonates reared on callus. Normal larval development occurred in all species supplied with non-transgenic callus, but insects died, or their growth was severely restricted, when reared on transgenic callus harvested from hygromycin B-supplemented medium. Development of larvae on transgenic control and on non-transgenic callus became very much alike after the transgenic control tissue has been subcultured on a hygromycin B-free medium for about 100 d prior to the insect-callus bioassay. Accordingly, for detection of Bt toxin activity without the interference of the influence of hygromycin B on insects, cry1A(c) callus was infested with insects after it has been propagated more than 100 d on a medium free of the antibiotic. Under these experimental conditions all P. gossypiella and H. armigera, and most S. littoralis neonates died, and the growth (e.g., weight increment) of S. littoralis survivors was markedly impeded by cry1A(c) callus. Three new findings immerge from this study: First, P. gossypiella, a pest feeding in the field on bolls only, can be grown in vitro on cotton callus. Second, in a host which is recalcitrant in terms of plant regeneration, the biological potency of an insect-detrimental transgene can nevertheless be evaluated by generating a transgenic host callus and conducting in vitro transgenic callus-insect assays. Third, our results suggest that hygromycin B is toxic to lepidopteran larvae. ***Benjamin Steinitz, Yedidya Gafni,*** *Yael Cohen, Josefina Perea Diaz, Yona Tabib, Shlomit Levski, and Amos Navon, Insecticidal Activity of a CRY1A(c Transgene in Callus Derived from Regeneration-recalcitrant Cotton (Gossypium hirstum L.), In Vitro Cellular and Developmental Biology – Plant, 247 – 251, 2002.*

Targeting and Expression of Edible Oral Vaccines

Schuyler S. Korban

Exploiting plants as biological bioreactors for production and delivery of edible oral subunit vaccines is a promising application of biotechnology. Efforts to enhance expression levels of transgenes coding for antigenic proteins by exploiting promoters, targeting sequences, and enhancer elements have produced rather low quantities of the antigen in the plant tissue, but enough to induce immune responses in feeding studies. This review will cover components of various gene constructs used in developing plant-based vaccines against myriad viral and bacterial diseases. Specifically, it will focus on sequences that are involved in targeting the antigen to mucosal tissues of the intestinal tract, thus enhancing the immunogenicity of the plant-based vaccine as well as those components that result in higher accumulation of the protein within the plant. ***Schuyler S. Korban**, Targeting and Expression of Antigenic Proteins in Transgenic Plants for Production of Edible Oral Vaccines, In Vitro Cellular and Developmental Biology – Plant, 231 – 236, 2002.*

Points To Ponder

The Amazing Mexican Maize Mess

Wayne Parrott, Department of Crop & Soil Sciences, University of Georgia, Athens, GA 30602

Seldom in the history of science have intrigue, incompetence, and vested interests clashed to result in a story that grabbed headlines around the world, and which will likely dominate the biotech news for the rest of year. While no data clearly showing transgenes has been made public at the time of this writing, it is inevitable that transgenic maize will be found alive and well in Mexico. Lost amid the current rhetoric on data quality are more serious questions. What, if any, are the consequences of transgenic maize in Mexico? Can a transgene in maize ever be expected to keep from outcrossing? Is more research needed on biological containment mechanisms? Will pending legislation to ban transgenic maize be implemented in Mexico?

Perhaps by the time this newsletter is published, the Mexican government will have already released official findings documenting the presence of transgenes in Mexico. If not, it will only be a short time before it does. However, that announcement will be for Chapter 3. Chapter 2 started on April 4th, when the Editors of *Nature* disavowed the publication which started the whole mess, "In light of these discussions and the diverse advice received, *Nature* has concluded that the evidence available is not sufficient to justify the publication of the original paper." Nevertheless, the *Nature* editors lacked the courage of their convictions, and stopped short of a full retraction. "As the authors wish to stand by the available evidence for their conclusions, we feel it best simply to make these circumstances clear, to publish the criticisms, the authors' response and new data, and to allow our readers to judge the science for themselves." Chapter 2 is just now starting to unfold. Already, the 5 April edition of The Herald (Glasgow) quotes Dr Doug Parr, Greenpeace UK, as saying, "What is happening is very similar to the Pusztai story," while Anthony Jackson from Munlochy Vigil said, "Once again as soon as critical evidence emerges of environmental damage from GM crops a backlash from pro-GM scientists inevitably follows." Brace for more charges and counter charges on the topic.

How did events get this far? Chapter 1 started on Thursday, 28 November, 2001, when Greenpeace issued a communique that transgenic "contamination" had been discovered among Mexican land races. Along with the Greenpeace press release was a petition- already signed by 80 scientists, calling on "all governments to employ all means possible to prevent the contamination of Mexican maize and its wild relatives by genetically engineered corn varieties. The petition is available at www.greenpeaceusa.org. What made the press release of 28 November different from previous press releases on the same topic is that an article scheduled to appear in the following day's issue of Nature would add gravity to the matter.

The *Nature* article itself, written by graduate student David Quist and mycologist Ignacio Chapela from Berkeley immediately had the hallmarks of dubious data. Four out of 6 cobs collected in two fields in Oaxaca tested positive for the presence of the 35S promoter. The claims were based on the straight use of PCR, notoriously unreliable under many circumstances, and of the even more fickle inverse PCR. Furthermore, the authors extrapolated from the PCR results to determine that the transgenes were already introgressed into the maize genome. In case more drama was necessary, the transgenes were said to be reshuffling and spreading in the maize genome. The extent of gene flow was said to be "high,"and the authors concluded with implicit threats to food security. Greenpeace was not so circumspect, "Contamination from genetically engineered corn to local corn varieties in Mexico could cause their extinction. If this diversity is lost, future food security is at risk," read its November 28 press release.

The data presented stretched the credibility of many plant geneticists, and the Internet immediately began to buzz as various colleagues compared their assessments of the information. The buzz became a roar on Wednesday, December 5th, when the authors finally released the sequences obtained from their iPCR. There was no longer any doubt: the data were clearly artifacts of iPCR, the result, among other things, of poor primer design and a bad choice of restriction enzyme.

Rebuttals began to reach *Nature*. The first letter was written by Nicholas Kaplinsky and colleagues, including Michael Freeling and Sarah Hake. Matthew Metz, from Washington State University, and Johannes Fütterer from the Federal School of Technology Zurich sent theirs in December 21. Wojtek Pawlowski, also from Berkeley, wrote in to state that his previous work had been misquoted by Quist & Chapela in an attempt to explain their results. *Nature*, in keeping with its editorial policy, immediately imposed a press embargo on the letter writers, notifying all authors right before Christmas that the decision process would take about 6 weeks. At this point, the authors could only grit their teeth and wait until *Nature* reached its decision in mid February.

The popular press faced no embargo. *Newsweek* repeated the misinformation on its pages in its issue of January 28. Fueled by reports from an NGO-sponsored conference titled 'In Defense of Maize,' the Mexican press elaborated on the topic, sowing panic in the countryside. A peasant from San Andrés Sacamch'en summed up the issue as, "We have come to find that the agrochemical industries have patented our maize, and they are introducing into it genes from other living beings and lots of chemical substances so they can completely do away with our natural corn, so that then we have to buy completely transgenic maize," in *La Jornada* on 18 February. Prior to that, *El Universal Gráfico* reported on "the worst farmer, environmental, and cultural crisis ever suffered," on January 23. The same day, *Últimas Noticias* reported, "that scientific studies have shown that transgenic maize causes allergies, besides endangering the national production." On the 24th, *Novedades* reported that, "Farmer and environmental groups foresee the possible disappearance of Mexican maize due to the introduction of transgenics from the United States." A day later, *Cuestión* claimed that the maize was, "endangering the economic well being of hundreds of thousands of peasants and the health of millions of Mexicans," while *El Sol de México* explained that, "The damage to agriculture could be if those grains are in production, as it has been proven that the soil becomes sterilized upon growing transgenic maize, and no type of vegetation can grow on that piece of land again."

In the meantime, the editorial board of *Transgenic Research* took the

matter into its own hands, and on February 11 published an editorial on the data's flaws, while questioning the peer review process at *Nature* which permitted such a flawed paper to be published. On February 18, Food First, and NGO, responded to the *Transgenic Research* editorial with a joint statement of its own, endorsed by a multitude of groups, ranging from the Organic Agriculture Association from Albania to the Eurodusnie Anarchist Collective -Political Centre to the Adrian Dominican Sisters. The joint statement accused "Pro-industry academics" of "engaging in a highly unethical mud-slinging campaign against the Berkeley researchers" and called "upon Academia and the Private Industry to: Renounce immediately the use of intimidatory tactics to silence potentially 'dissident' scientists. We call upon the scientific community to publicly support the academic freedom of scientists whose studies conflict with the interests of industry and to censor those academics and institutions that slander the competence or integrity of those who publish peer-reviewed studies."

The long-awaited decision from *Nature* arrived right on schedule on February 15. *Nature* sent the authors of the rebuttals the response from Ignacio Chapela (which was not the response *Nature* would eventually end up publishing) and the comments from the peer reviewers who reviewed both the rebuttal letters. Chapela stood by his original data and all his original interpretations, while the reviewers recommended publication of the all or at least one of the rebuttal letters. Nevertheless, no decision was made whether or not to publish the rebuttal letters. Effectively extending the press embargo, *Nature* indicated they were waiting for Quist and Chapela to answer the points raised by the first reviewer and that could take an additional 4 weeks. David Quist was to elaborate on this latter point, in a statement he made to *Science* magazine, published on March 1, saying, "we're discussing with *Nature* the possibility of publishing [in a reply] some new information that substantiates our findings." Thus *Nature* ushered in a new era of publishing, whereby authors may publish first, and find the data at some later date.

To add fuel to the fire, someone, perhaps at *Nature* itself, leaked the comments of the first reviewer, which got posted on the Internet at the end of February, and are available at www.lifesciencesnetwork.com/news-detail.asp?newsID=676. *Nature* remained completely aloof to the controversy publication of the paper was having, and determined that its editorial policy was far more important than setting the record straight. In March, 2002, *Nature* replied that the publicity against the press embargo caused them to disqualify some of the comments.

By the time this column appears in print, there is no telling what twists and turns this issue will have taken. The impact of the *Nature* article has sent shock waves around the world. A news article in the February issue of *Nature Biotechnology* described possible effects on pending European Union policy. The Italian government is considering legislation banning genetically engineered crops in Italy, while the Mexican senate voted unanimously to ask the Mexican president to ban the importation of maize from the United States, an action that would violate Mexico's obligations under NAFTA.

Nevertheless, while the shock waves reverberated around the world, those who wrote the original rebuttals to *Nature* were forced to honor the press embargo imposed by *Nature* and sit on information which could have stopped all the misinformation circulating at the time. Under the circumstances, is it ethical or moral for scientists to stand quietly aside, honoring a gag rule imposed to protect the prestige of a journal, while ignoring the side effects to society as a whole? The time has come for the scientific community to discuss the issue.

The views expressed in this editorial are the views of the author and do not reflect the views of all of the Society for In Vitro Biology or its members.

Classifieds

Postdoctoral Research Associate
Postdoctoral Research Associate with expertise in phytochemistry (in particular, extraction and fractionation of plant flavonoids), and interest in manipulating flavonoid-rich plant cell cultures to label and modify profiles of accumulating proanthocyanidins and anthocyanidins. Project is concerned with qualitative and quantitative analysis of cell culture-derived flavonoids, and bioactivity testing for anticancer and neuroprotective properties. Seeking candidates for spring and summer semester start dates. Please send inquiries and vitae/references to M.A.L. Smith via email initially, at imagemal @uiuc.edu.

Assistant Professor
Salem, WV

As part of an aggressive building program in Bioscience, Salem International University is searching for an Assistant Professor in the area of plant molecular biology and molecular genetics. The faculty will teach undergraduates and participate in the Master degree graduate program in molecular biology and biotechnology. The academicenvironment and the newly renovated research facilities, including a biocontainment level 3 facility, are excellent. Successful applicants will engage in scholarly work related to their research interest, and are expected to interact with bioscience faculty.

Applicants should send resume, accompanied by his/her official transcripts, 3 letters of references, up to 3 reprints, and a statement of research and teaching interests to: Molecular Biology Search Committee Department of Bioscience Salem International University 223 West Main Street P.O. Box 500, Salem, WV 26426-0500

Scholarships and Stipends, MS Graduate Program Salem International University, Salem, WV

Scholarship and stipends are available in the Department of Bioscience, Salem International University, Salem WV for the MS Graduate Program in Molecular Biology and Biotechnology. A position is available to work on the genetic transformation of wetland monocots with novel genes with activity against specific metals and to develop a plant model for the study of metal remediation.

Interested individuals should submit official transcripts, cv and three letters of reference to:Dr. S Rogers, Department of Bioscience, Salem International University, Salem, WV 26426-0500 Telephone 304-782-5585 FAX 304-782-5579 Make e-mail inquiries to Rogers@Salemiu.edu EOE/AA.

Future Meetings

SIVB MEETINGS

2002 – June 23-28, International Association for Plant Tissue Culture and Biotechnology (IAPTC&B), Orlando, FL. Contact the IAPTC&B Congress Secretariat, Society for In Vitro Biology, 9315 Largo Drive W, Suite 255, Largo, MD 20774, (301) 324-5054, fax (301) 324-5057, email: sivb@sivb.org

2002 – June 25-29, Congress on In Vitro Biology, Orlando, FL

2003 – May 31-June 5, Congress on In Vitro Biology, Portland, OR

OTHER MEETINGS

2002 – June 24 – 26, AAPS National Biotechnology Conference, San Diego, CA. Contact (703) 243-2800, Email: meetings@aaps.org

2002 – September 1-5, 4th International Symposium on Aquatic Animal Health, New Orleans, LA, Contact Ron Thune, Department of Pathobiological Sciences, School of Veterinary Medicine, Lousiana State University, Baton Rogue, LA 70803, (225) 578-9680, www.vetmed.lsu.edu/ isaah2002.htm

2002 – November 10-13, American College of Toxicology Annual Meeting, Hershey, PA. Contact (301) 571-1840, email:ekagan@actox.org or www.actox.org

2002 – November 10-14, 2002 AAPS Annual Meeting and Exposition, Toronto, Ontario, Canada. Contact (703) 243-2800, Email: meetings@aaps.org

PENN STATE BIOTECHNOLOGY COURSES

2002 – June 3-7, Animal Cell Culture Methods and Scale-up Strategies

2002 – June 18-21, Fermentation Methods and Scale-up Strategies

2002 – October 22-25, Separation and Purification Strategies for Biotech Products

In Vitro Report

Submissions

The ***In Vitro Report*** accepts submissions from members or interested scientists, including: feature articles, letters, forum articles, reviews, photographs or artwork related to the educational goals of he Society. Submissions to ***In Vitro Report*** are subject to editing. Submissions must include author's name, address, phone, or other number where you can be reached. For additional information regarding submissions to ***In Vitro Repor***t, contact the Editor-in-Chief by phone or email or contact the SIVB office at sivb@sivb.org.

Features (2500 words) are on topics or scientists of general interest to the SIVB membership. Features should be written in an informative style for an audience that ranges from laboratory technicians to senior scientists. Photographs may be submitted with a feature article. Features may be subject to substantial editing.

Letters (500 words) are published based on the decision of the Editor-in-Chief. Publication of letters will be considered if the information concerns SIVB activities, or information is of significant interest to the membership.

Forum (1,000 words) articles reflect the point of view of the author, and do not necessarily reflect the opinion of the SIVB. Authors should be knowledgeable in the subject, as evidenced by previous published works or presentations.

Reviews (250 words) on journal articles, books, educational or software material of interest to SIVB members will be considered by the Editor. The review should be written as a scholarly and critical analysis of the material reviewed.

Membership News (250 words) includes brief articles on section or branch information, award s, position changes, and other information related to SIVB members. Obituary notices for SIVB members should include name, date of birth, major research interests, and contributions to the field in vitro biology.

Photographs or Other Artwork will be considered dependent on space in the issue. Submitted photographs become property of SIVB and cannot be returned unless special arrangements are made beforehand. Digital photographs are accepted on pc compatible disk in the following format only: **300 dpi grayscale tif**. GIF and JPG images are not acceptable and will not be used! Contact the Managing Editor at the SIVB Business Office (301) 324-5054 or email sivb@sivb.org for photographs or artwork considerations.

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