# In Vitro Report

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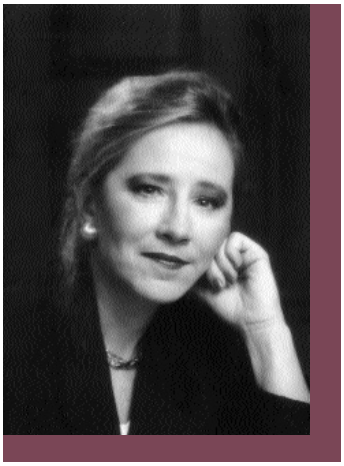
## President's Report



*Sandra L. Schneider, DrPH*

*"Galileo had a telescope, Mendel had a garden" and SIVB has …?*

The current state of the Society for In Vitro Biology (SIVB) is fairly evident when one reads the financial and membership sections of the Society's Annual Report. Yet, the financial status of the SIVB is not unlike that of many other "not-for-profits" or scientific societies that depend on yearly revenues from membership fees, programs and workshop registrations and sponsors. The loss of revenues from memberships, journal subscriptions, program sponsors and exhibitors did not happen over the past year. This trend has been evident and on going for at least the last 4-6 years. In response to the growing deficits, past Boards frantically cut management costs, raised membership dues, made drastic changes to the Constitution and Bylaws to include more voices on the Board of Directors, again raised member dues and still the financial and membership lines point to the "left," or a downward slope. I can recall conversations with past-presidents, Rob Hay and Delia Bethel, concerning their goals to keep the Society solvent, at least through their term. It is now my turn to be in the President's chair and the deficit is greater than in prior years.

The SIVB appears strategically sound. A 59 year-old Society built on the ideas and wisdom of still active and scientifically credible international *in vitro* pioneers with a strong educational strategic vision and mission statement, leadership that reads like a "who's who" in biotechnology, two journals that hold their own in a very competitive publications market, symposium and program venues presented by Nobel laureates and top scientists that have attracted Congress attendance. As with any business in a highly competitive media market, successful scientific societies capitalize on the "experience economy." These societies understand how to use their program and publication products as the props and services to set a stage to create experiences that engage customers in an inherently personal way. They also understand changes in scientific trends and demographics and position their resources to identify and respond to the needs of the customer. The key to understanding the value any experience holds for the individual is what determines the worth of the program and the work of the organization.

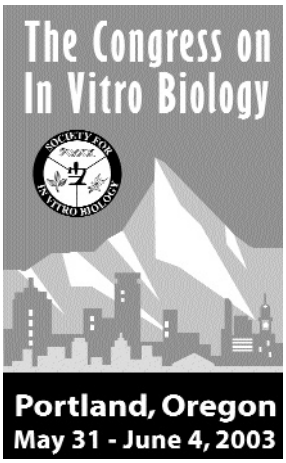
It is time for the SIVB to re-determine whether the trust, experiences and resources embedded in the Society are shared values and assumptions across all Sections. What is the Society for and for whom? What are the core competencies of the Society that will retain and attract members and provide increased attendance at Congress symposia?

The 2004 World Congress, sponsored jointly by the SIVB and the Japanese and European tissue culture societies, will be held May 22-26 in San Francisco and is the next hurdle that will impact the viability of the Society. Held every four years, the World Congress, in conjunction with the International Congress on Invertebrate Cell and Tissue Culture, is a venue for scientist from many countries to interact and present data of global significance to both human, insect and plant *in vitro* biology. Membership is down in every Section and the Society's deficit budget is strained as we prepare for the World Congress. As a major commitment, I have asked each of the Section Chairs to facilitate and promote, within their sections, membership and excellence in Congress funded programs. I also extend a request for this commitment to all Society members to support the World Congress symposium and educational workshops in whatever way you can contribute. Your attendance, scientific presentations and posters, company sponsorships, exhibits or simply renewal of membership can make contributions that will impact the success of the 2004 World Congress and the continued success of the Society for In Vitro Biology.

Sandra L. Schneider, DrPH
SIVB President

## This Issue

# The City of Roses Awaits the 2003 Congress




The 2003 Congress on In Vitro Biology will be held in the "City of Roses," Portland, Oregon, May 31-June 4. The Program Committee has assembled an excellent scientific program across the disciplines of Vertebrate, Cellular Toxicology, Invertebrate, and Plant Biotechnology with presentations from speakers in the forefront of scientific discovery and technology advances. Interactive poster sessions, clustered by topic, will provide a lively forum for discussion to facilitate the exchange of information between presenter and audience. The keynote speaker for the Plenary Symposium is Dr. Richard Stouffer, Head of the Reproductive Sciences Division, Oregon Regional Primate Research Center.

The Plenary Reception will be held at the scenic Pittock Mansion and followed by dinner at the secluded Forestry Center with its Memorial Fountain rock waterfall. Congress events include the ever-popular Silent Auction and opportunities for side trips to the Regional Primate Research Center and a local winery tour.

Portland is a beautiful and exciting city to visit. The Congress will be held in the Doubletree Hotels complex just minutes away, by complementary shuttle, from the airport. The hotel property is located on the Willamette River in the shadow of the inspiring snow capped Mount Hood. Portland is famous for its roses and SIVB will there in the height of the Rose Festival season. For a serene afternoon, visit the Rose Garden or see the public art in Portlandia. For a more exciting trip into Portland, visit a few microbreweries or walk on the wild side with a jet boat excursion on the Willamette River. There is something for everyone! Portland awaits!

William J. Smith, PhD
2003 Congress Chair

## A Note From the Editor

After three very full years, I am stepping down as Editor-in-Chief of In Vitro Report. I've thoroughly enjoyed my tenure and hope that you have enjoyed reading The Report as much as I have enjoyed the editing. It kept me in touch with so many of you after I retired from Syngenta in April, 2001. It has also helped me to stay abreast of our science. Lately, I have begun to feel, however, that as time moves me further and further away and you make more and more astounding discoveries and do more sophisticated research that I need to step down. You deserve fresh insights. I think it only fitting that a professional with a career ahead becomes the Editor-in-Chief.

The SIVB meant so much to me during my career. Mainly, it helped me to meet and interact with outstanding scientists in our field. You are the "outstanding scientists." Many of you became my personal friends over the years. I knew I could count on you and indeed, I did call on some of you from time to time. The Society also helped me to form opinions about important scientific policies facing the public. I initiated Wayne Parrott's column, *Points to Ponder*, to address some of these issues. I hope you enjoyed the articles and they were helpful to you as well. Don't miss reading Wayne's final column in this issue. Like him, I believe it is our duty as scientists to guide the public in the newer areas of science. The SIVB is the only association devoted exclusively to studying the cell, be it plant or animal, at the cellular level. I shall miss the effort to get the material together 4 times a year, the wonderful interaction with "Miss Efficiency", Michele Schultz, in the SIVB office, and the adrenalin rush of seeing the final product. It has been wonderful to work with Wally McKeehan, Greg Phillips, Wayne Parrott, Melissa Hinga, Mike Horn and so many other contributors. Kim Rayford will do an outstanding job, I know. Please, each of you, keep sending in the articles and news. Just think about the pleasure – and the knowledge - you receive when you get your issue. Finally, please stay in touch. I'm still interested in the science and you. And now, thank you for this grand opportunity.

Martha S. Wright

## Welcome to the New Editor

*Kimberly A. Rayford*

The Society for In Vitro Biology is pleased to welcome our newly appointed Editor-in-Chief for the *In Vitro Report*, Kimberly A. Rayford. Kimberly was born in St. Louis, MO. She graduated from Villa Duchesne Academy of the Sacred Heart and received her Bachelor of Science in Biology from Lindenwood University. She is curently completing a Master's Degree at St. Louis University. Kimberly was employed at Monsanto where she was a plant transformation biologist on the NatureMark® potato research team as well as a member of the Bollgard® cotton team. She is currently employed at the St. Louis Science Center as the Modern Life Science Project Coordinator and oversees in-house educational programs and program development as well research collaborations with life science institutions in and around the St. Louis area.

## *In Memoriam*

### Donald J. Merchant Dies, TCA President 1964-1968

Donald J. Merchant, 80, Professor Emeritus of Eastern Virginia Medical School, died 9 August 2002. Born in Biltmore, N.C., Merchant was a graduate of Berea College and the University of Michigan. He served on the faculty of the Medical School of the University of Michigan from 1948-1969. He also served as Director of the W. Alton Jones Cell Science Center, Lake Placid, N.Y., 1969-1972, and as chairman of the Department of Microbiology and Immunology at Eastern Virginia Medical School, 1973-1986. He was active in national professional associations and task forces, serving as president of the Tissue Culture Association, 1964-1968, member of the National Prostatic Cancer Task Force of the National Cancer Institute, 1972-1979, and director of tidewater regional Cancer Network, 1974-1988. He was listed in Who's Who in America. He was an Elder at Bayside Presbyterian Church, Virginia Beach, where he was active in the mission work of the Presbyterian Church, U.S.A. He received a Diploma of Merit from the General Assembly of the Presbyterian Church of Kinshasa, Republic of the Congo, in 2000. Survivors include his wife, Marian A. Merchant; a daughter, Karen Boecker of Baltimore, Md.; a son, Barry Merchant of Richmond, Va.; four grandchildren; and four cousins, Graham Price of St. Cloud, Fla., the Rev. A. G. Price of Lavonia, Ga., Ray Clark Price of Selma, N.C. and Garland Price of Wendell, N.C. He was predeceased by a daughter, Nancy Drake.

Warren I. Schaeffer

### ARDF Announces Grant Program

As part of its continuing efforts to encourage the utilization of alternatives to traditional uses of laboratory animals in basic research, testing and education, the Alternatives Research & Development Foundation solicited research proposals to develop such methods. Funding of up to $40,000 each is available to support individual projects at U.S. universities and research institutions. Applications from non-U.S. institutions or investigators are to be considered on a case-by-case basis. Deadline for applications was 30 April 2003 and recipients will be announced on 15 July 2003.

For further information contact:
ALTERNATIVES RESEARCH & DEVELOPMENT FOUNDATION
801 Old York Road, #204, Jenkintown, PA 19046
FAX: (215)887-2088 E-MAIL: ardfinfo@aol.com
www.ardf-online.org

## Invertebrate News

### Invertebrate Section Prepares for 2003 Congress

Currently the Invertebrate Section is focusing its efforts on preparing for the 2003 Congress on In Vitro Biology in Portland, Oregon, May 31 to June 4, 2003. The Invertebrate Section will host an intensive symposium with six invited speakers on "Growth Factors in Growth Regeneration and Differentiation of Invertebrate Cells", and a joint session with the Vertebrate Section entitled "Delivery of Genes to Mammalian Cells with Baculoviruses". The Invertebrate Section will also have two interactive poster sessions at the 2003 Congress entitled: "Insect Cell Lines for BioControl" and "Insect Midgut Stem Cells". The fund-raising team is working very hard to raise funding from numerous sources, including government and industry. We will also have an important Section Business Meeting to finalize the topics for the 2004 World Congress on In Vitro Biology and to discuss future plans for our Section.

During the 2003 Congress, Dr. Marcia Loeb will be the recipient of the "Invertebrate Fellow Award". She will be the first winner of this award from Invertebrate Section. This will be an important event for our Section. We are looking forward to seeing as many of you as possible in Portland in 2003.

Guido F. Caputo and Amy Wang

## Future Meetings

SIVB MEETINGS

2003 – May 31 – June 4, Congress on In Vitro Biology, Portland, OR

2004 – May 22 – 26, World Congress on In Vitro Biology, San Francisco, CA

2005 – TBA, Congress on In Vitro Biology

2006 – June 3 – 7, Congress on In Vitro Biology, Minneapolis, MN

OTHER MEETINGS

2003 –June 8-13, AAPS Pharmaceutical Profiling in Drug Discover for Lead Selection, Whippany, NJ, www.aapspharmaceutica.com

2003 – June 19-20, AAPS Pharmaceutical Technologies Conference: Advances in Pharmaceutical Processing, Parsippany, NJ, www.aapspharmaceutica.com

2003 – October 26-30, 2003 AAPS Annual Meeting and Exposition, Salt Lake City, UT, www.aapspharmaceutica.com

2003 – November 2-5, 2003, American College of Toxicology 24th Annual Meeting, Washington, DC, Contact: (301) 571-1840, Fax: (301) 571-1852, email: ekagan@actox.org

PENN STATE BIOTECHNOLOGY COURSES

www.biotech.psu.edu/registration.htm

2003 – June 2-6, September 8-12, Animal Cell Culture Methods and Scale-up Strategies

2003 – June 17-20, October 7-10, Fermentation Methods and Scale-up Strategies

2003 – September 22-26, October 20-24, Separation and Purification Strategies for Biotechnology Products

UTAH STATE BIOTECHNOLOGY AND BIOPROCESSING COURSES

www.usu.edu/biotech

2003 – June 24-27, Techniques in Animal Cell Culture and Scale-up Strategies

2003 – September 16-19, Protein Purification: Isolation and Characterization

2003 – October 21-24, Microbial Fermentation: Development and Scale-up

# ExPlants

Ray Shillito has a new position, but the same desk and phone number. For the last 5 years he was responsible for regulatory studies. His new position as Manager, External Technical Support, Americas (a bit of a mouthful) involves coordinating relations with outside testing laboratories and test kit manufacturers involved in testing for Bayer CropScience Crop Biotechnology products. This will include much more travel, but he will still be at the same phone number (919-549-2210). On the SIVB society side, Ray has resigned from his responsibility as chair of the 2004 SIVB meeting and this task has been taken over by the excellently qualified and enthusiastic Wayne Parrott. Ray's new email address is ray.shillito@bayercropscience.com. If you are wondering about the changed email address, Aventis CropScience was acquired in 2002 by Bayer and merged with their Crop Protection unit to form Bayer CropScience.

Dave Songstad, Vice-Pres of SIVB and Corn Transformation Production lead at Monsanto in St. Louis, recently completed a 17 mile 3-day hike through the Grand Canyon with daughters, Nicole and Allison. Dave said the purpose was to give his teenage daughters a spring break to remember. Apparently, the hike had some treacherous moments including a spot where the trail narrowed to about 3 feet wide with a 1000 foot drop off. Dave says he would recommend the trek to anyone because it was worth the risk. The smiles on all three faces in the accompanying photo indicate they had a great time seeing the wonders of nature.

As seen on the Raleigh, NC News and Observer web site http://newsobserver.com/business/rtp_nc/story/2373643p-2212711c.html

Syngenta transferred 19 employees, primarily scientists, from its now closed plant genomics research program in La Jolla, CA to their Research Triangle Park, NC facility. The company spokesperson said the move "basically consolidates biotech research in the U.S. and demonstrates Syngenta's commitment to RTP." Syngenta's RTP site now employs 229 people, still down from the 250 it employed last year before the lay off of 40 employees devoted to herbicide research. Syngenta has partnered with Diversa Corp. of San Diego to continue research in plant genomics.

*The Songstads (left to right) Allison, Dave, and Nicole are all smiles as they approach the bottom of the Grand Canyon on their 17 mile hike.*

## Plant Tissue Culture Workshop at University of Florida in July

The overall objective of the workshop is to provide instructional resources, conceptual background information and hands-on laboratory experiences to facilitate the incorporation of plant tissue culture (micropropagation) into classroom curricula in the most cost efficient manner. Participants will include grade school science and vocational agriculture faculty as well as college faculty.

Upon completion the participants will:

- Understand the principles and concepts of plant tissue culture, specifically micropropagation.
- Be familiar with the laboratory and greenhouse procedures and equipment used to propagate plants using micropropagation.
- Have instructional materials including PowerPoint lectures, laboratory exercises and other informational resources that can be used in the classroom.
- Know where to obtain supplies to economically and successfully teach plant tissue culture in the classroom.
- Receive specialized, hands-on training completing several reliable laboratory exercises.
- Observe the commercial application of the technology by visiting a commercial plant micropropagation laboratory.

For additional information, contact
Dr. Michael Kane, Professor
Environmental Horticulture Department
P.O. Box 110670
University of Florida
Gainesville, FL 32611-0670
Tel: 352-222-7724
Fax: 352-392-3870
E-mail: mkane@mail.ifas.ufl.edu

## Classifieds

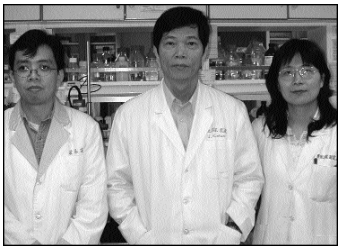
**Scholarships and Stipends, MS Graduate Program**
Salem International University, Salem, WV

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. One 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. A second position is available to develop suitable plant models expressing foreign genes for the production of immunotheraputics for human/animal use.

Interested individuals should submit official transcripts, cv and three letters of reference to:

Dr. S Rogers, Associate Professor
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

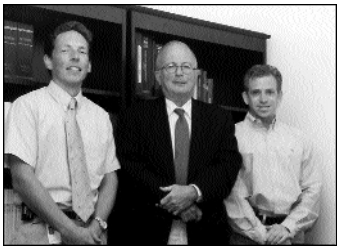
# Journal Highlights



*From left to right: Wing-Keung Chu, Jan-Kan Chen, and Shu-Er Chow*

## Exposure to Oxidized LDL

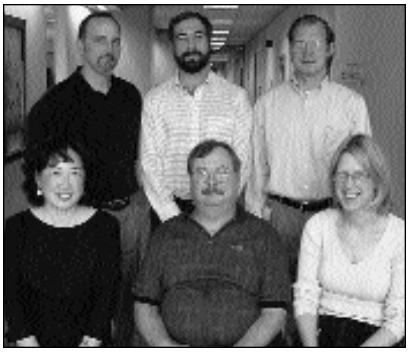
Oxidized low density lipoprotein (ox-LDL) has been shown to alter the migratory and proliferative activities of the vascular endothelial cells (EC) in response to serum and growth factors. The mechanism underlying the antiproliferative effect of ox-LDL on vascular EC has not been fully elucidated. In this report, we show that exposure of vascular EC to ox-LDL results in a marked reduction of the membrane-associated Ras protein. Further study show that in ox-LDL treated EC, reduction of the membrane-associated Ras protein is correlated with a reduced amount of active Ras (Ras-guanosine triphosphate), indicating that the Ras signaling pathway is attenuated. The attenuation of the Ras signaling pathway in ox-LDL-treated EC may thus be responsible for the retarded response to the mitogenic stimulation of serum and growth factors. *Shu-Er Chow, Wing-Keung Chu, Stephen H. Shih, and Jan-Kan Chen, Exposure to Oxidized Low-density Lipoprotein Reduces Activable Ras Protein in Vascular Endothelial Cells, In Vitro Cellular and Developmental Biology – Animal, 38: 320-325, 2002.*



*From left to right: Jean-François Lambert, Peter J. Quesenberry and Gerald A. Colvin*

## Rhythmicity of Engraftment and Altered Cell Cycle Kinetics of Cytokine

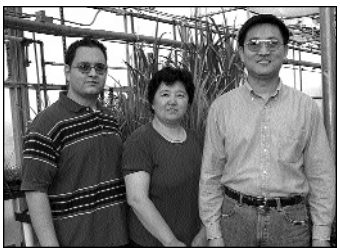
Space flight with associated microgravity is complicated by "astronaut's anemia" and other hematologic abnormalities. Altered erythroid differentiation, red cell survival, plasma volume and progenitor numbers have been reported. We studied the impact of microgravity on engraftable stem cells, culturing marrow cells in Rotary Wall Vessel (RWV) culture chambers mimicking microgravity and in normal gravity non-adherent Teflon bottles. A quantitative competitive engraftment technique was assessed in both conditions in lethally irradiated hosts. We assessed 8 week engraftable stem cells over a period spanning at least one cell cycle for cytokine (FLT-3L, TPO, steel factor) activated marrow stem cells. Engraftable stem cells were supported out to 56 hours under microgravity conditions and this support was superior to that seen in normal gravity Teflon bottle cultures out to 40 hours, with Teflon bottle culture support superior to RWV from 40 to 56 hours. A nadir of stem cell number was seen at 40 hours in Teflon and 48 hours in RWV, suggesting altered marrow stem cell cycle kinetics in microgravity. This is the first study of engraftable stem cells under microgravity conditions and the differences between microgravity and normal gravity cultures may present opportunities for unique future stem cell expansion strategies. *Gerald A. Colvin, Jean-François Lambert, Jane E. Carlson, Christina I. McAuliffe, Mehrdad Abedi, and Peter J. Quesenberry, Rythmicity ofEngraftment and Altered Cell Cycle Kinetics of Cytokine-cultured Murine Marrow in Simulated Microgravity Compared with Static Cultures, In Vitro Cellular and Developmental Biology – Animal, 38: 343-351, 2002.*



*Seated left to right: Xialong Xia, Jack Houchins, Susan Pratt Standing let to right: Jeffery Horn, Dennis Laska, Terry Lindstrom*

## Vinblastine Selected Caco-2 Cell Line for Evaluation of P-glycoprotein

The role of the ATP Binding Cassette (ABC) superfamily of membrane transporters is well-documented in tumor cell multi-drug resistance. More recently growing evidence of their influence on oral bioavailability, drug excretion rates, and drug-drug interaction potential at the intestinal level has stimulated much investigation. Our laboratory is interested in evaluating the apical ABC transporter P-glycoprotein (Pgp [MDR-1]) for its role in xenobiotic efflux at the intestinal level. We propagated Caco-2 cells in the presence of vinblastine (a cytotoxic, Pgp substrate) to promote transporter expression though selection. That is, the cell population expressing Pgp or with the capacity to up-regulate Pgp expression, survived and expanded in the presence of vinblastine. We have used this selected cell line (Caco-2 VinB) to develop a fluorescent-based assay to study chemical modulators of Pgp activity. Using the Caco-2 VinB cells we have successfully demonstrated the differential potency of previously characterized Pgp inhibitors. In addition we conducted a morphological evaluation of the two cell lines using transmission, scanning, and confocal microscopy. Both cell strains differentiated into highly functional, polarized columnar epithelium, although the vinblastine-selected cell line had lost the phenotypic diversity observed in native Caco-2 populations. Increased Pgp expression was noted in Caco-2 VinB cells versus the native cell line on Western blot analysis, localized to the apical surface using confocal microscopy, as well as functionally demonstrated using transport assays. We feel the Caco2 VinB cell line is a versatile tool for application in pharmaceutical drug development *Dennis A. Laska, Jack O. Houchins, Susan E. Pratt, Jeffery Horn, Xialong Xia, Brenda R. Hanssen, Daniel C. Williams, Anne H. Dantzig and Terry Lindstrom, Characterization and Application of a Vinblastine-selected Caco-2 Cell Line for Evaluation of P-Glycoprotein, In Vitro Cellular and Developmental Biology – Animal, 38: 401-410, 2002.*



*From left to right: Jeremey Bell, Yaxin Ge, and Zengyu Wang*

## Inheritance of Transgenes in Transgenic Tall Fescue

Tall Fescue (*Festuca arundinacea* Schreb.) is the most important forage species worldwide of the *Festuca* genus. Single genotype-derived embryogenic suspension cultures were established from tall fescue cultivar Kentucky-31, and were used as target cells for biolistic transformation. A chimeric hygromycin phosphotransferase gene (*hph*) was used as the selectable marker, and a chimeric b-glucuronidase (*gusA*) gene was co-transformed with *hph*. Transgenic plants were recovered after microprojectile bombardment of suspension cells and subsequent selection in the presence of high concentration of hygromycin. Fertile transgenic plants were obtained after vernalization under field conditions. T1 and T2 progenies were obtained after recipro-

cal crosses between transgenic and untransformed control plants. PCR and Southern hybridization analyses revealed a 1:1 segregation ratio for both transgenes in the T1 and T2 generations. Southern hybridization patterns were identical for T0, T1, and T2 plants. The results demonstrated for the first time the stable meiotic transmission of transgenes following Mendelian rules in transgenic tall fescue. *Zengyu Wang, Jeremey Bell, Yaxin Ge, and Deane Lehmann, Inheritance of Transgenes in Transgenic Tall Fescue (*Festuca arundinacea *Schreb), In Vitro Cellular and Developmental Biology – Plant, 39: 277-282, 2003.*

*Duong Tan Nhut*

## Importance of the Explant on Regeneration

The basic factor underlying the success of the tissue culture, large-scale micropropagation and genetic transformation of any plant species is regeneration. This has been achieved over the years through the use of various-sized explants ranging from protoplasts (small scale) to entire organs (large scale). Inherent problems underlie the use of either extreme leading to both nonspecific morphogenic reactions in the latter, or to undesired necrosis in the former. This review investigates the importance of different aspects of a thin cell layer (TCL) explant, from its source to its size. TCLs, as a result of their size and origin, in combination with other controllable factors such as media and environmental conditions, have shown this system to be superior to the use of conventional explants. Numerous species that were previously unsuccessfully tissuecultured have, with the use of TCL technology, resulted in their successful micropropagation and regeneration. These successes, based on the inherent qualities of the TCL explant – specific for a given species – are also examined. *Duong Tan Nhut, Jaime A. Teixera , D. A. Silva, and C.R. Aswath, The Importance of the Explant on Regeneration in Thin Cell Layer Technology, In Vitro Cellular and Developmental Biology – Plant, 39:266-276, 2003.*

*From left to right: Son Vu, Sandra Sharp, Alex Espinosa, and Xiomara Padilla*

## BC3H1 Myogenic Cells Produce an Infectious Ecotropic Murine Leukemia Virus

cDNAs representing an endogenous C-type ecotropic murine leukemia virus were isolated from a cDNA library constructed to represent mRNAs present in BC3H1 myogenic cells but not in C2C12 myogenic cells. RNA blot hybridization analysis using the cDNA inserts as probes revealed that BC3H1 cells produce MuLV-related transcripts of at least three different size classes. A polymerase chain reaction enhanced assay for reverse transcriptase activity revealed the presence of reverse transcriptase in a viral pellet from medium conditioned by BC3H1 cells. A fungizone enhanced assay for syncitium formation provided further evidence of ecotropic retroviral particle production. Exposure of 3T3 cells to medium conditioned by BC3H1 cells, using conditions that facilitate infection, resulted in infection of the 3T3 cells, as confirmed by the syncitium formation assay. We conclude that BC3H1 cells produce an infectious ecotropic murine leukemia virus. Whether or not this feature of BC3H1 cells contributes to their inability to express some muscle-specific genes or to carry out myotube formation is unknown. Invesitgators will want to take into account that BC3H1 cells are virus producers when planning experiments that involve coculture of BC3H1 with other cell types, BC3H1 conditioned medium, retrovirally mediated transfection into BC3H1 cells, or study of the mCAT-1 amino acid transporter (the viral receptor) in BC3H1 cells. BC3H1 cells and the virus they produce may be of interest to those studying retroviral genomes and products and their effects. Supported by NIH RISE. *Sandra B. Sharp, Maria Villavazo, Mickey Huang, Rodolfo Gonzalez, Irania Alarcon, Matthew Bahamonde, Diane M. D'Agostin, Sagar Damele, Alex Espinosa, Seog J. Han, Jessica Liu, Paula Navarro, Hugo Salguero, Jina Son, and Son Vu, In Vitro Cellular and Developmental Biology – Animal, 38:382-393, 2002.*

*From left to right: Martha Hernández, Lelurlis Nápoles, Aurora Pérez, and José Carlos Lorenzo*

## Protease Excretion During Pineapple Micropropagation

Biotechnology has become an important tool to produce plant natural metabolites and proteases are among them. Although pineapple plants have been found to produce proteases, most of the biotechnological investigations on this crop have been focused on propagation. The procedure involving the use of temporary immersion bioreactors is one of the most outstanding because of its high multiplication rate. We previously recorded specific protease activity in the culture medium during the pre-elongation step of this protocol. Therefore we decided to modify this phase, looking for an increase of protease excretion. Three independent experiments were performed to evaluate the effects of culture duration, and levels of gibberellic acid (GA) and 6-benzyladenine (BA). The following indicators were recorded: shoot fresh mass per bioreactor; and protein concentration, proteolytic activity, and specific protease activity in culture media. As happens in investigations focused on protease production, the specific protease activity was the most important indicator recorded here. It maximized at 21 d of culture. Moreover, GA (4.2mM) increased specific activity in the culture medium while BA produced a negative effect. Results shown here demonstrate that conditions adequate for propagation purposes (15-d preelongation phase; 2.8 mM GA; 2.2mM BA) are not necessarily adequate for protease excretion. *A. Perez, L. Napoles, J. C. Lorenzo, and M. Hernandez, Protease Excretion During Pineapple Micropropagation in Temporary Immersion Bioreactors, In Vitro Cellular and Developmental Biology – Plant, 39:311-315, 2003.*

# Points To Ponder

## Parting Thoughts
### *Scientists, Shoemakers, Spades and Society*

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111 Riverbend Road, The University of Georgia
Athens, GA 30602-6810, (706) 542-0928/ FAX (706) 583-8120
www.cropsoil.uga.edu/~parrottlab

*With the changing of the guard at* In Vitro Report, *the time has come to turn this column's responsibilities over to my successor who will bring new energy, ideas, perspective and insight. I did, however, want to leave a few parting points to ponder. These were inspired by a cartoon that was anonymously posted outside my laboratory. The cartoon asks a simple question: "What is the difference between science and magic?" The answer to an apparently simple question speaks volumes: "Magicians know what they are doing."*

*Point to ponder No. 1: Scientists must speak out!*

It is clear to society at large that scientists - in and out of biotechnology – don't always use their best judgment. Incidents ranging from the *Columbia* disintegration during reentry to StarLink's® spread and Prodigene's pharmaceutical maize mixed in with soybean have all helped undermine the public's confidence in science in general and transgenics in particular. Furthermore, the esoteric and complicated nature of cutting-edge science ensures it will be mystified and misunderstood in the public view.

Hence, it is essential that all scientists help demystify their work to the general public, and to do so in plain, clear language. "Technospeak" should never leave the confines of scientific conferences and journals. Seek out local reporters in your area and become acquainted – not with the intention of indoctrinating the reporter, but so that s/he has a handy resource when the need arises. Don't miss an opportunity to write a letter to the editor, or to make yourself available to schools and other community organizations. Society's trust is something to be earned, not automatically expected.

*Point to ponder No. 2: Scientists must speak out – in their area of expertise*

An oft-heard saying from my childhood in Central America was, "*Zapatero, a tus zapatos,*" *Shoemaker, stick to making shoes,* repeated whenever anyone would try to tell others how to do their job. When it comes to opinions on genetic engineering – everyone has one, from biotechnologists to shoemakers. That would not be so bad if it weren't for the fact that all opinions are treated like facts and given equal credence by the media and by the public.

The current state of affairs became particularly evident with the December 2002 issue of *Nature Biotechnology*. An opinion piece, written by a neurobiologist, occupied prominent space near the front of the journal. What was particularly troubling is that a neurobiologist's opinion, who obviously knew very little about what he was talking about, carried the same weight as the informed knowledge of plant scientists who had spent their careers on the topic.

How did we get to this point? The biotechnology industry, professional societies like ours, and the regulatory system all played a part. Too many people – with little to no scientific background in the field, but with an opinion to share, were brought to the table and treated as equals, and thus were given both credibility and respectability where there should have been none.

It has been like insisting the Flat Earth Society be given equal time at a geographer's convention. Maybe in the earlier days of the technology there were enough questions around that this approach was merited, but no more. There are literally volumes of data pouring in each day on agricultural biotechnology. So, while everyone has the right to express their opinions, with that right comes the responsibility to inform oneself before speaking like an expert. Those who speak out without first informing themselves must be held accountable. To the public, one scientist can come across as knowledgeable as the next, making it difficult to realize that someone is speaking in an area other than their area of expertise. So, when the public points out that the neurologist is as much a scientist as the genetic engineer, ask if they would feel comfortable asking their neurologist to perform open-heart surgery on them.

*Point to ponder No. 3: Regulations are speaking louder than words*

As knowledgeable scientists have failed to speak out, regulations have been written to fill in the information void. Far too often the biotechnology industry has looked to regulations to help reassure the skittish public after each public relations blunder the industry commits. Rest assured, stricter regulations do not necessarily reassure the public – they can scare the public. After all, the perception is that if the technology is really as safe as proponents claim it is, it would not need all these regulations.

The effects of unfettered regulations are even more insidious. As regulations are written to accommodate perceived risks rather than real risks, the regulatory costs of getting an engineered product onto the market are soaring into the tens of millions of dollars. The bottom line is that only a very few genes in a very few major crops will ever be profitable enough to recover the cost of regulatory approval. Forget about allergy-free peanut, vitamin-enriched tomato, or raspberries that don't get moldy and mushy while still in the supermarket. While these products may exist in the laboratory, they constitute too small a market to ever finance the cost of regulatory approval, and hence may never be released to help serve the public.

The key to regulations is common sense. On one extreme, engineering with scorpion toxin genes – were it ever to be done, clearly deserves scrutiny. On the other extreme, requirements to sequence insertion sites and prohibitions against the presence of vector sequences and clinically unimportant antibiotic resistance genes are scientifically indefensible, as are many of the huge number of component analyses and feeding trials.

Another current trend that bodes ill is the growing intolerance for gene flow. We must recognize that gene flow has been a fact of life since there was life on earth. Inasmuch as plants evolved pollen to facilitate gene flow, it is essential to set reasonable expectations for gene flow. Rational tolerance limits have been set for the presence of seeds from weeds and from other varieties, pesticide residues and even insect parts and rodent waste. Why should these tolerance limits not apply to transgenes?

*Final point: Speak out!*

The proper course of action should always have been to call a spade, a spade. Don't be afraid to question silly or unnecessary regulations. Don't be afraid to question the credentials of many that speak out on the topic. Don't be afraid to point out fallacious data from ill-conceived, ill-executed experiments with over-extrapolated results. Our role has always been to insist on facts, not on opinions. Comparatively speaking, there are relatively few scientists who work on crop transgenics – so few in fact, that we cannot afford for any of them to remain silent. In the end, magic will continue to be perceived as less threatening than science as long as those scientists who are experts in a given topic do not speak out when necessary.

Wayne Parrott

# *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 at (314) 286-4673/(800) 456-7572 ext. 4673 or by email at krayford@slsc.org, or contact the SIVB office at sivb@sivb.org.

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