In Vitro Report

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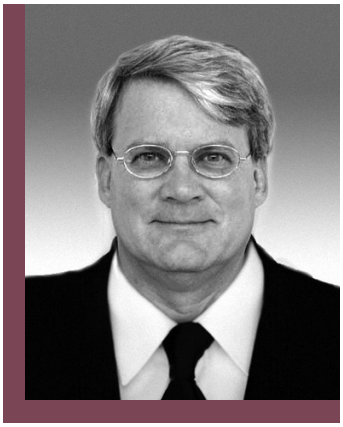
Systems Physiologist 2003 Congress Plenary Speaker

Physiologist Dr. Richard Stouffer will present the 2003 Congress on In Vitro Biology Plenary Symposium "ARTistic Use of Nonhuman Primates: IVR to Cloning and Beyond." Dr. Stouffer received a B.S. degree in Biology, Virginia Polytechnic Institute and State University and a Ph.D. in Physiology, Duke University. Following a fellowship at the Reproductive Research Branch, NICHD, NIH, he joined the faculty in the Department of Physiology, University of Arizona College of Medicine. Dr. Stouffer is currently Senior Scientist and Head, Division of Reproductive Sciences, Oregon National Primate Research Center (ONPRC). He holds joint appoints in the Department of Environmental and Biomolecular Systems, Oregon Graduate Institute and Departments of Physiology and Pharmacology, School of Medicine, Oregon Health & Science University.

Dr. Stouffer's research focus is the function and regulation of the primate ovary as applied to develop better contraceptive and infertility therapies. His studies include tissue, cellular and molecular approaches to study the complex mechanisms of hormone interactions that control the development, function and regression of rhesus monkey corpus luteum during the menstrual cycle and early pregnancy. Scientist in his laboratory recently determined that cells within the corpus luteum that produce the vital pregnancy hormone, progesterone, have specific steroid receptors. Studies and pre-clinical trials are ongoing to examine the receptor-mediated actions of progesterone in the primate corpus luteum.



Dr. Richard Stouffer, PhD

The Oregon National Primate Research Center, Beaverton, Oregon houses over 2300 monkeys and is a major supplier of macaques to other facilities throughout the nation. The ONPRC is funded by the National Center for Research Resources and National Institutes of Health to advance biomedical knowledge through basic research with in vitro rodent, primate and animal models. Investigators at ONPRC study the autocrine, paracrine and hormonal controls of reproduction and cardiovascular functions, as well as the effects of environmental factors (e.g. stress, nutrition, toxicants) on fertility. These studies are to better understand the basic reproductive process, contraception and to develop methods to treat specific types of infertility. The use of the nonhuman primate provides a unique model for future biomedical research through advances in reproductive technologies.

The Plenary Symposium will be held 3:00 – 4:30 pm, Sunday June 1, 2003 in Portland, Oregon with a reception to follow for attendees to meet and talk with Dr. Stouffer.

This Issue

IAPTC&B and SIVB Continue Successful Collaboration

The new officers of the IAPTC&B have agreed to continue to publish two issues of *In Vitro Cellular and Developmental Biology – Plant* as the official journal of the IAPTC&B. This action will positively affect the SIVB and the Plant Section through increased circulation and enhanced importance of the Society's journals.

The IAPTC&B fulfilled all of its contractual and financial obligations related to the IAPTC&B Secretariat and the 10th IAPTC&B Congress and has a respectable surplus. This surplus is being shared proportionately with the four official hosts of the 10th IAPTC&B Congress based on their sponsorship levels. A cheque in the amount of $33,000 was sent to the SIVB Plant Section as a donation by the

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Journal Highlights

In Vitro Model of the Back of the Eye

Wei Fan

Jing Juan Zheng

Barbara J. McLaughlin

At the back of the eye, the outermost cell layer of the retina, the pigmented epithelium, lies against a basement membrane that is adjacent to the choroidal vessels that supply the outer sensory retina. During pathogenesis, these interfaces become damaged and the homeostatic balance between the retinal pigment epithelium (RPE) and the choriodal vessels becomes disrupted, leading to choroidal neovascularization and blindness. To study the cell interactions at the back of the eye, we have used a coculture system, in which a stable RPE monolayer has been cultured on a transwell insert and placed over a collagen gel sandwich into which choroidal endothelial cells (CECs) have been seeded. RPE cells have been stimulated by an inflammatory cytokine, inteleukin-1 (IL-1b), and the ability of the underlying choroidal endothelium to form vascular tubes has been tested. IL-1b stimulation of the RPE insert increased the number of tubes formed by CECs in the gel as early as 3 d. By 7 d, tubes began to regress. Both IL-8 and monocyte chemotactic protein-1 (MCP-1) were found to be secreted in greater amounts in stimulated RPE. Because MCP-1 is also a chemokine for monocytes, which in turn secrete angiogenic factors, monocytes were added to the upper surface of the choroidal gel sandwich and then incubated with the stimulated RPE insert as above. By day 7, more tubes formed and there was no regression over the experimental time period. The versatility of this model has been illustrated in that both RPE and CECs can be cultured in a more natural construct and their molecular interactions tested by physiologically altering one cell type and not the other. ***Wei Fan, Jing Juan Zheng, and Barbara J. McLaughlin,*** *An In Vitro Model of the Back of the Eye for Studying Retinal Pigment Epithelial-chordal Endothelial Interactions, In Vitro Cellular and Developmental Biology –Animal, 38: 228 – 234, 2002.*

Tissue Culture and Wetland Establishment of Freshwater Monocots

Suzanne M. D. Rogers

Cell cultures of freshwater wetland monocots were regenerated, plants grown in the greenhouse and established and evaluated in wetlands. *Typha* (cattail), *Juncus* (rushes), *Scirpus* (bulrushes) and *Carex* (sedges) were studied because they are common, dominant, high biomass wetland-adapted plants, tolerant of chemically diverse ecosystems. The goal was to define micropropagation and wetland establishment protocols. Tissue culture systems, defined for numerous monocot crop species, can be readily applied to wetland plants, with a few modifications. Issues addressed were selection of explant material, shoot and root regeneration conditions, culture age verses regenerability, greenhouse acclimatization needs, plant uniformity and requirements for wetland establishment. *In vitro* germinated seedlings were an excellent source of pathogen-free regenerable tissue. *T. latifolia*, *T. angustifolia*, and *J. accuminatus* were regenerated from callus induced in the dark with picloram, then transferred to medium with benzyladenine in the light to promote shoot organogenesis. *J. effusus*, *S. polyphyllus*, and *C. lurida* could not be regenerated from callus, which turned black. They could be regenerated by culturing intact seedlings directly on cytokinin media in the light. Shoots rooted with little or no auxin. *J. effusus* rooting was promoted by the addition of charcoal to the medium. Covering plants for the first 2 wk with plastic facilitated greenhouse establishment. There were high rates of greenhouse and wetland survival. No abnormal plants were observed. These regeneration systems could be utilized for the production of wetland plants for potential application for habitat restoration and wetland creation, that would provide an alternative to field collection. ***Suzanne M. D. Rogers,*** *Tissue Culture and Wetland Establishment of the Freshwater Monocots* Carex, Juncus, Scirpus, *and* Typha, *In Vitro Cellular and Developmental Biology – Plant, 39: 1 – 5, 2003.*

Transformation of Aspen from Leaf Tissue

Wenhao Dai

Zong-Ming Cheng

Wayne Sargent

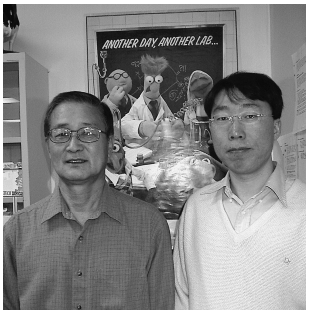
An efficient regeneration and transformation system was developed for two elite aspen hybrid clones *(Populus x canescens x P. grandidentada and P. tremuloides x P. davidiana)*. Callus was induced from *in vitro* leaf explants on modified MS medium (MSA) and woody plant medium (WPM) containing four different combinations of cytokinins and auxins. Callus tissues regenerated into shoots on WPM medium supplemented with 2.0 mg/l (9.12 ?M) zeatin or 0.01 mg/l (0.045 ?M) thidiazuron. *P. x canescens x P. grandidenta-ta* exhibited the higher callus and shoot production. *In vitro* leaf explants from the two hybrid clones were co-cultivated with *Agrobacterium* tumefaciens strain EHA105 harboring the binary Ti plasmid pBI121 carrying the uidA gene encoding for ?-glucuronidase (GUS) and the nptII gene encoding neomycin phosphotransferase II. Transformation was confirmed by GUS assays, polymerase chain reaction, and Southern blot analyses. *Agrobacterium* concentration, acetosyringone, and pH of the co-cultivation medium were evaluated for enhancing transformation efficiency with the clone *P. x canescens x P. grandidentata.* ***Wenhao Dai, Zong-Ming Cheng,*** *and* ***Wayne Sargent,*** *Plant Regeneration and Agtrobacterium-mediated Transformation of Two Elite Aspen Hybrid Clones from In Vitro Leaf Tissues, In Vitro Cellular and Developmental Biology – Plant, 39: 6 – 11, 2003.*

Acmella Radicans In Vitro Culture

E Ramirez-Chavez, P. Rios-Chavez, and J. Molina-Torres

Acmella radicans var. *radicans* propagation was established *in vitro*. This plant belongs to the Asteraceae from which some species are known for their insecticide, fungicide and antibacterial activity. The complete Murashige and Skoog (MS) medium was the best in assisting seed germination. In order to obtain shoots *in vitro*, a complete MS medium and half-strength MS medium were assayed with explants from leaves, nodes and internodes. The best medium for shoot production was the half-strength MS medium with no addition of plant growth regulators, and the highest shoot propagation was from single-node explants. Regeneration of roots on shoot explants in medium without the addition of growth regulators. Of the plantlets that were acclimated, 90% of them were obtained from rooted shoots with completely expanded leaves. The alkamide content was evaluated for each tissue, and the higher concentration was observed in flower heads. The main alkamides present in the leaves and the flower heads were N-(2-phenylethyl)-2Z,4E-octadienamide and the 3-phenyl-N-(2-phenylethyl)-2-propenamide. This study describes the methodology for the establishment and propagation of Acmella radicans *in vitro* and the evaluation of different tissue alkamide contents *in vitro* and in the field. *P. Rios-Chavez, E. Ramirez-Chavez, C. Armenta-Salinas, and J. Molina-Torres, Acmella radicans var. radicans: in vitro culture establishment and alkamide content of sterile tissues, In Vitro Cellular and Developmental Biology – Plant, 39: 37 – 41, 2003.*

Lipotropes Suppress Bcl-2 Gene in Breast Cancer Cell



Hyung H. Kim and Chung S. Park

Lipotropes, methyl group containing nutrients including choline, methionine, folic acid, and vitamin B12, are essential nutrients for humans. They are important methyl donors which interact in the metabolism of one carbon units and are essential for the synthesis and methylation of deoxyribonucleic acid. The purpose of this study was to examine the effects of excess lipotropes on the growth of a human breast cancer cell line, MCF-7 and normal mammary cells, MCF-10A, in culture. Both cell lines were grown in basal culture medium for 24 hours and then switched to medium supplemented with 50 times the amount of each lipotrope as basal culture medium (control). Although there were no significant differences in growth between treatments in either cell line, gene array and Northern analysis revealed that expression of bcl-2 was decreased in lipotrope treated MCF-7 cells. The ability to induce tumor cell death could have many uses in the prevention and treatment of cancer. Bcl-2 regulates apoptosis and has been shown to directly affect the sensitivity of cancer cells to chemotherapy agents, and it is suggested that strategies designed to block Bcl-2 might prove useful in sensitizing tumor cells to chemotherapy-induced apoptosis. This study shows that although excess lipotropes do not inhibit growth of breast cancer cells, they can down regulate the bcl-2 gene suggesting that lipotropes may increase the susceptibility of breast cancer cells to anticancer drugs. *Hyung H. Kim and Chung S. Park, Lipotropes Regulate Bcl-2 Gene Expression in the Human Breast Cancer Cell Line, MCF-7, In Vitro Cellular and Developmental Biology – Animal, 38: 205 – 207, 2002.*

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 – March 3 – 5, AAPS Workshop on a Scientific Approach to Analytical Instrument Validation, Arlington, VA, www.aapspharmaceutica.com
2003 – March 27 – 28, AAPS Workshop on the Exposure Response Relationships of Immunemodulators, Washington, DC, www.aapspharmaceutica.com
2003 – April 30 – May 2, AAPS Workshop on Particle Size Analysis, Arlington, VA, www.aapspharmaceutica.com
2003 – May 12 – 13, 2003, AAPS Workshop on Bioanalytical Method Validation for Macromolecules in Support of Pharmacokinetic Studies, Washington, DC, www.aapspharmaceutica.com

PENN STATE BIOTECHNOLOGY COURSES

2003 – April 1 – 4, June 17 – 20, Fermentation Methods and Scale-up Strategies
2003 – April 21 – 25, June 2 – 6, Animal Cell Culture Methods and Scale-up Strategies
2003 – May 12 – 16, September 22 – 26, Separation and Purification Strategies for Biotechnology Products
For course information, call the program office at 814-863-1738 or email them at conferenceinfo2@outreach.psu.edu. For up-to-date information, please visit their website at www.biotech.psu.edu.

UTAH STATE BIOTECHNOLOGY AND BIOPROCESSING COURSES

2003 – March 18 – 21, September 16 – 19, Protein Purification: Isolation and Characterization
2003 – April 8 – 11, June 24 – 27, Techniques in Animal Cell Culture and Scale-up Strategies
2003 – May 6 – 9, October 21 – 24, Microbial Fermentation: Development and Scale-up
To request a detailed brochure or to register, please call the program office at 435-797-3504 or email them at Heather.Kramer@usu.edu. For up-to-date information, please visit their website at www.usu.edu/biotech

Society Honors Gordon Sato

Dr. Sato Accepts Lifetime Achievement Award

The Society of In Vitro Biology honored Dr. Gordon Sato with the Lifetime Achievement Award at the 2002 Congress of In Vitro Biology, Orlando, Florida. The Lifetime Achievement Award is the highest Society award to recognize those who have achieved academic excellence in their field of study and to honor those who have made significant contributions and influenced the science of cell culture and in vitro biology.

Dr. Gordon Sato, PhD

Dr. Gordon Sato was born in 1927 in Los Angeles, California, the son of a Japanese-born immigrant father and a American-born Japanese mother. Dr. Sato's family was relocated to Camp Manzanar in the California desert as a result of internment of American citizens of Japanese descent after the bombing of Pearl Harbor.

After graduation from Manzanar High School in 1944, Dr. Sato attended Central College, Pella, Iowa, before enlisting in the U.S. Army. He was trained as an undergraduate in biochemistry at the University of Southern California and obtained a Ph.D. degree at the California Institute of Technology in Biophysics in 1955 with Nobel Prize winner Max Delbruck. After post-doctoral training with Gunther Stent at the University of California-Berkeley and Theodore Puck in Genetics at the University of Colorado Medical School, he was Professor of Biochemistry at Brandeis University, Boston, MA. From 1970 to 1983, Dr. Sato was Professor in the Department of Biology at University of California-San Diego.

In 1982, he became director of a ten-year program at the W. Alton Jones Cell Science Center in the Adirondack Mountains at the Olympic Village of Lake Placid, NY. Dr. Sato is the author of over 150 publications in cell and molecular biology and holds many academic and public service honors from around the world, including member of the National Academy of Sciences. He is a long-term member and supporter of the Tissue Culture Association and Society for In Vitro Biology, including serving as President and Editor-in-Chief of the SIVB journal, *In Vitro Cellular and Developmental Biology-Animal*.

Ornamental planting in the grounds of the Ministries of Fisheries in Massawa.

Since 1993, Dr. Sato has devoted himself fulltime to the humanitarian effort called, "The Manzanar Project," named after the camp where his family was interned and he spent his high school years. The Manzanar Project (http:// www.tamu.edu/ccbn/dewitt/manzanar/default.htm) is a global action project offering simple, practical and effective solutions to the planet's most critical problems that include reduction of poverty, hunger, environmental pollution, and global warming through seawater aquaculture and silvaculture in deserts. Its working prototype is located in the Republic of Eritrea where Dr. Sato resides most of the year.

Dr. Sato at the Plenary Session of the 2002 Congress on In Vitro Biology with Dr. Sandra L. Schneider and Dr. Wallace A. McKeehan

Recently, Dr. Sato was named a 2002 Laureate of the Rolex Awards for Enterprise (http:// www.rolexawards.com). The Rolex awards are given to visionary individuals whose unique work impacts the entire planet and human condition. Long time SIVB member, past president and editor of In Vitro, Dr. Sato is spending his retirement helping some of the world's poorest people to help themselves. His innovative Manzanar project (http://www.tamu.edu/ccbn/dewitt/manzanar/default.htm) harnesses two of the most abundant resources - intense sunlight and seawater - to grow mangrove plants that can be used not only to feed animals, but also to provide a habitat for fish and shellfish. His aim is to help impoverished, coastal communities the prototype of which is Eritrea to develop a low-tech, sustainable agricultural economy. The National Geographic Society has made a film about Dr. Sato entitled "The Mangrove Man" which is being distributed worldwide and will be shown on national TV. Dr. Sato's provocative SIVB Lifetime Achievement Award lecture entitled "More Questions Than Answers" is in press in In Vitro Cellular and Developmental Biology. Members of the Rolex Award selection committee remarked "it is impressive that a renowned American biologist is working in his retirement to help the people of Eritrea. His low-tech agricultural methods present a concrete approach with immediate results. The project's success will be enhanced by his devotion to improving the quality of life of the local people, his collaboration with young local biologists whom he has trained and the support of government ministries," and "Sato stands as a role model for scientists to show that one can, and should, apply laboratory-based knowledge in a much wider world...Here is proof that you do not have to be 'bright young things' to have an ingenious and workable idea."

Wallace McKeehan

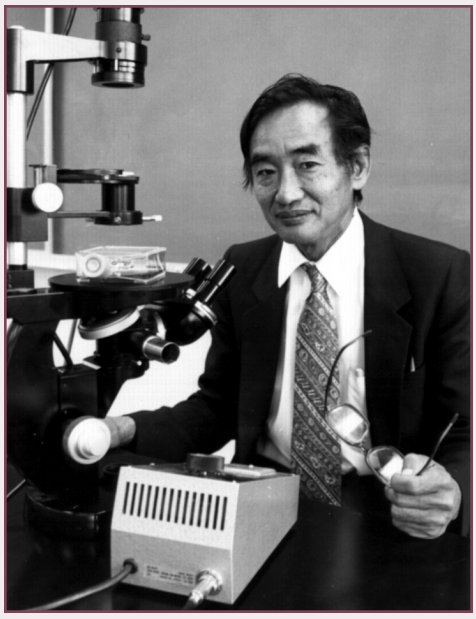
Excerpts from Dr. Sato's Distinguished Plenary Symposium

As I was beginning this work [the Manzanar Project], a young man came to me, and asked why I was doing this work. He said that I might succeed, and the population would grow very large, and they could be worse off then before. He said, "I never do anything before I ask why." Without thinking, I answered, "I never think why; I only think how." Ginette Serrero once explained our difference in worldview. This young man was an Existentialist, who holds that no question is worth asking until we answer the question, why do we exist. Obviously, I am no Existentialist, but considered the question why in several conversations with Barbara McClintock over the years while I was teaching a summer course at Cold Spring Harbor. Barbara was a remarkable, rigorous thinker with little trace of sentimentality. She was also a mystic. As a child, she did not go to school, but on her own studied Tibetan education. My conversations with her were immensely enjoyable, and memorable. Her insights were breathtaking. In my last conversation with her, as I was leaving, I said, "Barbara, what's it all about?" She said, "I'm baffled." My immediate reaction was momentary disappointment that gave way to relief. If Barbara could not figure it out, I need not bother trying. I can follow my instincts. If people are hungry, I asked how I can try to make them food. I need no philosophical justification.

By doing this work, I am manning one tiny outpost on one frontier of human advancement. Looking around, I am discouraged by the sheer magnitude of the challenge, but remain optimistic. I live and work on a continent rife with corruption and mismanagement that results in human misery -- hunger, poverty, sickness, and the ever present danger of sudden, violent death.
My conclusion from my experience… is that in efforts to use science to improve the lives of people, technology is the easy part. The difficult problems are politics, culture, and religion. These are areas in which I personally have no claim to any expertise. However, we, as scientists, have a legitimate claim to be able to formulate valid opinions in these areas, and possibly we must. We are scientists. We are heirs to the age of reason. We are practitioners of western rationality. That is to say, our thinking proceeds from observable facts, not from religious belief or historical myths.

The problem that concerns me most is the apocalyptic threat of Armageddon or catastrophic world conflict, most likely because of or in the region expounded in biblical prophecy. This problem has yet to appear widely on the radar screen of most people, yet it is dangerously urgent, and deserves our serious attention and widespread public discussion.

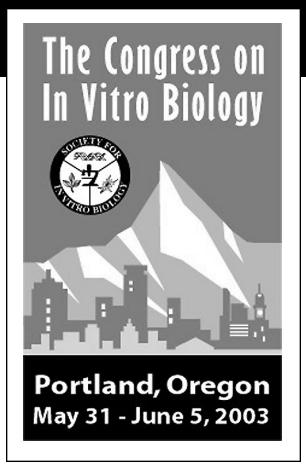
I would like to end my talk on an upbeat note. Over the years, I have organized several scientific conferences, always held in honor of a person---Gordon Tomkins, Jacob Furth, Johannes Holtfreter, Ralph Brinster, Leroy Stevens, Jack Gorski, Ted Rall, Nancy Bucher, Yasutomi Nishizuka, Michael Berridge, Stanley Cohen, Rita Levi Montalcini, and Martin Rodbell. Until today, I have not tried to explain to myself the reason for instinctively following this path. This is best explained by recounting the Cell Biology Symposium at Cold Spring Harbor that Russell Ross and I organized in memory of Gordon Tompkins. Gordon was a brilliant, multitalented human being. He was a classical musician and a jazz musician. He had been lead sax in Stan Kenton's band. To him, science was a joy, music was a joy, and life was a joy. He loved people. All who knew him grieved his passing. Ten days before the meeting, I arrived at Cold Spring Harbor, went to the meeting secretary, and said, "I want a string quartet, and a jazz band." Incredulous, she said, "You want a WHAT?!" A week later, I had hired a string quartet of Julliard students, and a jazz combo headed by a former member of Count Basie's band. At the beginning of the meeting, I asked the participants to contribute to the cost. Jim Watson stood up and said, "Don't make us look cheap; I'll pay for the musicians." The final night of the meeting was the jazz concert. The air was electric with emotion. We were listening to music that Gordon loved. Each was thinking personal memories of Gordon, and we were united in our love of this man, and the shared values that he embodied. One of the greatest satisfactions of a scientific career is the people.



Dr. Sato in 1984

Editor's note: The following paragraphs are excepts from Dr. Sato's acceptance speech. The entire text will appear future issues of In Vitro Cellular and Developmental Biology – Animal and – Plant.

What can we do in OREGON?



Here are some suggestions for things to do for a free afternoon/ evening/ day/ weekend in Oregon before or after the meeting. Check out this web site for more details, http://www.traveloregon.com/sights.cfm

Staying for a day or the weekend after the meeting?

1. Drive to Mt. Saint Helens or Mt. Hood. Plan an alternative in case it is cloudy or raining. Stop along the way for wineries or short hikes.
2. Go to the Oregon Coast at Astoria or Seaside (it's great no matter what the weather, but take your jacket!). Spend the weekend driving down the coast to Newport. Eat the local ice cream and watch them make cheese in Tillamook, visit the Oregon Coast Aquarium, eat clam chowder at Mo's, watch the waves, whales and tidepools at Yaquina Head. Stay at the Sylvia Beach Hotel where all the rooms are decorated for an author (the Edgar Allen Poe room is quite interesting) and the food is great. Drive back to Portland via Corvallis, up Hwy 99W through Oregon Wine Country.
3. Bring your hiking boots and camping gear and spend the weekend in the Cascades.
4. Drive past Mt. Hood to central Oregon. Go to Smith Rocks for a day of hiking or Rock climbing (be sure to have the huckleberry ice cream at the little store nearby). Visit the Ka Ne Ta Indian Reservation and Resort and stay overnight in a teepee. Lots of great geological sights, obsidian mountains, lava flows, cinder cones, "Hole in the ground", the lost forest, "Fort Rock", "Painted Hills" and other amazing features. You need 4 days for this one.
5. Drive north and see Mt. Ranier and Seattle.
6. Drive up to the Olympic peninsula to experience the temperate rain forest (obviously a place to take your raincoat....).
7. Visit Vancouver Island and the Buchart Gardens for a long romantic weekend.
8. Crazy for wind surfing or kiting? Bring your gear and spend the weekend at Hood River. Wet suit required, that water is COLD!

In Easy Driving Distance:

1. The Oregon Gardens just north of Salem provide a beautiful horticultural experience and the chance to tour a Frank Lloyd Wright home. Stop at Silver Falls state park on the way back and take a short or long hike under and near 10 waterfalls.
2. It stays light until almost 10 PM so there is plenty of time for a hike in the nearby woods, along the Columbia Gorge, or even the flanks of the Cascade Mountains.
3. Drive up the Columbia River Gorge to Crown Point, Multnomah Falls or the Bonneville Dam. Take the old scenic highway rather than the interstate. Take a picnic.
4. Visit McMinnville's airplane museum with the "Spruce Goose" on display.
5. Lots of wineries are open on weekends. Maps are available at visitors centers.
6. Outlet stores, No Sales Tax in Oregon, need I say more?
7. Drive up to Mt. Hood to enjoy the lodge and the view, come back through Hood River in the Columbia Gorge or stop and go wind surfing!
8. The horticulture industry is big in Oregon. Visit a specialty nursery for your favorite plants.

No car, little time??

1. Check out scheduled theater and opera presentations. See "Assassins", "Frogz", "Memoir", "Touch", "Spirits of the Ordinary", "Carnival" or "Les Miserables" or presentations at the Oregon Ballet Theater. http://www.travelportland.com/event_calendar/index.htm
2. Hang out at Pioneer Courthouse Square, in the center of downtown. Always something interesting to see or do there and it is surrounded by good shopping too.
3. Visit the Oregon Museum of Science and Industry on the banks of the Willamette River across from downtown. Its a science playground for both kids and adults.
4. Take a hike along the Columbia River near the hotel or in Forest Park.
5. Walk around downtown Portland and view all the public art. "Portlandia", the "Expose yourself to art" statue, fountains, animals and people along the downtown streets, lots to see. Then head to the "Art Blocks" and visit the Portland Art Museum and Historical Society.
6. Go shopping in the Hawthorne District, the artsy area of Portland.
7. On a weekend visit the Portland Saturday Market (actually all weekend) under the Burnside Bridge in downtown. Great arts, crafts, food and more.
9. Walk over to the Jansen Beach Shopping Center for a little shopping near the hotel. Pick up some outdoor gear at REI.
10. Hop on the hotel shuttle and go to downtown Portland to shop and see Pioneer Courthouse square. Ride MAX around fareless square, or pay for a ticket and see where you end up!
11. Visit Powells, a city of books, near downtown.
12. Go microbrew hopping (pun intended) at locations throughout Portland.
13. Visit Forest Park, the Japanese garden and the Rose garden for a serene experience. Or the Portland Zoo for a more animated afternoon.
14. Visit the Chinese garden in downtown and have tea.
15. Visit the Rose Festival Fun Center on the banks of the Willamette River or watch a Rose Festival Parade (there are 2 or 3 the weekends before and after the meeting).
16. Take a bus tour up to Mt. Hood. Ski on the glacier if you are an expert! Look at the mountain and play in the snow if you aren't an Olympic skier. Enjoy a hot or cold drink in the WPA built masterpiece of Timberline Lodge (you might recognize it as the lodge in the movie "The Shining"), pet the Saint Bernards sleeping by the massive fireplace.

Oregon, things look different here!

Barbara Reed

IFER Fellowship Awards

The International Foundation for Ethical Research (IFER), founded in 1986 by scientists and animal advocates working together, is dedicated to the development, validation, and implementation of new technologies in the pursuit of better, more humane scientific investigation. To promote this goal, IFER advocates the 4 "R's" of animal research: REDUCTION - A decrease in the number of animals used in research; REFINEMENT - Improvement that minimizes the pain, suffering and stress of animals used in research; REPLACEMENT - Scientifically valid substitutions for current live animal studies; and RESPONSIBILITY - to both human and nonhuman animals. As part of its mission, IFER established a Graduate Student Fellowship Program three years ago.

Members of the Society for In Vitro Biology may know of graduate students who are conducting research with cells and are using *in vitro* techniques and who may qualify for a Graduate Student Fellowship award of $15,000 per year ($12,500 stipendiary and $2,500 for supplies). Awards are renewable annually for up to three years as funds are available. Application is open to students enrolled in Master's and Ph.D. programs in all scientific disciplines (biology, biochemistry, microbiology, pharmacology, toxicology), humanities, law, journalism, and psychology. The foundation's interest is in how the proposed project will enhance the student's involvement in the study or use of alternatives to animals in scientific research and how the project's outcome will replace, reduce or refine the use of animals in research, product testing or education.

Briefly, pre-proposals should:

- Be submitted by a faculty member for an identified student or a student to be named later, or by a student with an identified faculty sponsor.
- Include a descriptive title.
- Include a brief description (maximum two typed pages) of the graduate project and how it incorporates the "4R's" of animal alternatives. Demonstrate current awareness of issues in Alternatives in Scientific Research.
- Include an abstract of no more than 100 words.
- Include a specific description of the proposed program (maximum two typed pages), which identifies the means for a student's evaluation and a plan for the dissemination of relevant knowledge both during and at the conclusion of the project.
- Include a bibliography of source materials.
- Contain a two-page Curriculum Vitae of the faculty sponsor.
- Provide a brief description of your institution and the facilities available for this project.

For more specifics on IFER and this Graduate Fellowship Grant, please visit our website at www.ifer.org or email your request: ifer@navs.org to obtain information about pre-proposal submissions. Pre-proposals are due on April 1, 2003 and awards will be announced by late summer.

IFER Graduate Fellowship awards have been made to the following:

Aaron Haubner, University of Kentucky, Lexington, KY, "Design and discovery of novel subtype-selective nicotinic receptor agonists and antagonists utilizing animal-free cell culture and microplate technologies"
Bin (Niky) Zhao, St. John's University, Jamaica, NY, "Development of a Human Kidney Cell Line Model for the Assessment of Antiviral Drug Transport."
Erik Suuronen, University of Ottawa Eye Institute, Canada, "Development of an Innervated Functional Human Corneal Equivalent for In-Vitro Testing."
Valeri Farmer-Dougan, Illinois State University (ISU), Bloomington-Normal, "The Zoo as a Natural Learning Laboratory: Developing a Behavior Research and Training Unit with ISU and Miller Park Zoo."
Stephanie M. Dloniak, Michigan State University, "Evaluation or Hormonal Status, Parasite Load, and Behavioral Correlates in Free-Ranging, Spotted Hyenas."
David Ucker, University of Illinois at Chicago, "Dissection of the Mechanism of Non-Inflammatory Clearance of Apoptotic Cells: A Quantitative and Systematic In Vitro Approach."

June Bradlaw

Invertebrate News

Invertebrate Symposium to be Presented at Annual Meeting

A symposium "Growth Factors in Invertebrate Growth, Differentiation and Development" will be presented at the 2003 Congress on In Vitro Biology, Portland, Oregon. Symposium participants and topics include:

Winston A. Anderson, *Professor, Department of Biology, Howard University, Washington DC.* Dr. Anderson has done considerable work involving co-culture of tissues and cell lines derived from both vertebrate and invertebrate tissue. Recently he has been able to culture and study the difficult-to-grow parasite, *Trypanosoma musculi,* in co-culture with fibroblasts with the aid of growth factors.

Guggsa A, Balan K, Macias C, Asraf M, Lee C, Hollis V, Wyche J and Anderson W. (2000). Fibronectin/fibroblast growth factor/cell matrix signaling pathways and reciprocal membrane interaction may be the regulators of cell growth and apoptosis in Trypanosoma musculi *in co-cultures with fibroblasts. J. Submicroscopic Cytology and Pathology 32: 281-296.*

Andrew W. Bulloch, *Professor, Chair Neuroscience Research Group, Faculty of Medicine, University of Calgary, Physiology and Biophysics, Calgary, Alberta, Canada.* Mammalian epidermal growth factor (EGF) is expressed in developing and adult central nervous system and has been implicated in the control of cell proliferation, differentiation and neurotropic events. Recently this group has found that expression of an EGF homolog from the pond snail (LEGF) is enhanced after injury; treatment with L-EGF enhanced axonal regeneration of several types of neurons in a coordinated manner. The evidence emphasizes the therapeutic potential of these molecules.

Wildering WC, Hermann PM, Bulloch AG. (2001). Lymnaea epidermal growth factor promotes axonal regeneration in CNS organ cultures. J. Neuroscience 21: 9345-9354.

Yoichi Hayakawa, *Associate Professor, Institute of Low Tempera -*

Continued on page 8

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ture Science, Hokkaido University, Sapporo, Japan. Dr. Hayakawa has isolated a peptide from parasitized Lepidopterans that was originally called the Growth Blocking Peptide (GBP) because it stopped the growth and inhibited development of insect larvae. It has recently been recognized as part of a family of insect growth factors with internal structure resembling mammalian Epidermal Growth Factor sequences. It can serve *in vitro* as a proliferation factor for mamalian and insect cells , and has other functions as well.

Aizawa T, Hayakawa Y, Nitta K, Kawano K. (2002) Struc - ture and activity of insect cytokine GBP which stimulates the EGF receptor. Mol Cells, 14: 1-8.

Penny M. Hopkins, *Professor of Zoology, Department of Biology, Richards Hall, University of Oklahoma, Norman OK.* Dr. Hopkins has studied the hormonal and growth factor-regulated regeneration of limbs and oocytes in the crab, *Uca pugilator*. Recent findings on the involvement of retinoic acid, steroid hormones (ecdysteroids) and fibroblast growth factor in regeneration have led to characterization of crustacean gene homologs and receptors.

Durica DS, Wu X, Anikumar G, Hopkins PM, Chung ACK. (2002). Characterization of crab EcR and RXR homologs and expression during limb regeneration and oocyte maturation. Mol Cell. Endocrinol. 189: 59-76.

Marcia J. Loeb, *Insect Biocontrol Laboratory, U.S. Department of Agriculture, Beltsville MD.* Dr. Loeb has been working with isolated stem cells from the midguts of Lepidoptera. In cooperation with others, she has found 4 different peptide factors that influence differentiation, and a protein factor that induces proliferation. At present, she is trying to determine modes of action for these peptides and proteins.

Loeb MJ and Jaffe H. (2002). Peptides that elicit midgut stem cell differentiation isolated from chymotryptic digests of hemolymph from Lymantria dispar pupae. *Arch. Insect Biochem. Physiol. 50: 85-96.*

Paul W. Sternberg, *Professor of Biology, Department of Biology, California Institute of Technology, Pasadena CA.* Dr. Sternberg has been studying reproductive differentiation in *Caenorhabdis elegans* mediated by growth factors, particularly EGF, as well as determination of pattern formation in embryos and differentiating systems. His prolifc work has led to an understanding of many of the biochemical cascades resulting from growth factor-receptor activation. The work is equally pertinant to vertebrate and invertebrate researchers since it deals with basic regulation of signal transduction between cells.

Bronner-Fraser M, Sternberg PW. (2002). Pattern formation and developmental mechanisms: the cell biological basis of inductive signaling. Curr Opinion in Genetics and Devel 10: 347-349.

Dichtel ML, Louvetvalle S, Viney ME, Felx MA, Sternberg PW. (2001). Control of vulval cell division number in the nematode Oscheius dolichorhabditis *sp Cew1. Genetics 157: 18883-197.*

The Invertebrate Section will hold a second symposium "Delivery of Genes to Mammalian Cells by Baculoviruses to include speakers:

Donald L. Jarvis, *University of Wyoming.* Developing transgenic insect cell lines for humanized glycoprotein production by baculovirus expression vectors.

Tom Kost, *GlaxoSmithKline.* Recombinant baculoviruses as mammalian cell gene-delivery vectors.

Vivian Dayeh, *University of Waterloo.* Enhancing the Sensitivity of Rainbow Trout Cells in Culture to the Toxicity of Metals.

Marcia Loeb and Guido Caputo

CLASSIFIEDS

POSTDOCTORAL POSITION

GS -11/12, USDA, Agricultural Research Service, Beltsville, MD, seeking applicants for a position to study development of a BIOARTIFICIAL LIVER-SUPPORT SYSTEM. Research is primarily directed to optimization of culture format and cell-function of a pig embryonic liver stem cell line. Tissue culture experience is required. Experience with hepatocyte culture, serum-free and 3-D culture systems, or stem cell differentiation is desirable. Citizenship restrictions apply. Ph.D degree in cell biology, tissue engineering, or a related field is required.

To apply send curriculum vitae to:

Dr. Thomas J. Caperna, Growth Biology Laboratory, BARC -East, Bldg. 200, Rm. 202, Beltsville, MD 20705. E-mail: ALDproject@anri.barc.usda.gov

Website: www.ars.usda.gov. Equal Opportunity Employer

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

POSTDOCTORAL MOLECULAR BIOLOGIST POSITION

The Project: The project focuses on the molecular biology and biochemical characterization of an insect-associated poxvirus (entomopoxvirus, EPV). The virus is introduced into the insect host by a parasitic wasp and invades and replicates in the host's hemocytes (blood cells). Viral infection disrupts host defense capabilities and induces apoptosis and the expression of novel parasitism-specific proteins. This virus-vector-host system is relatively new and provides a variety of research opportunities for an enthusiastic and creative postdoctoral scientist.

Duties: The appointee will: (1) optimize existing cell culture systems for virus culture to investigate viral morphogenesis and gene expression; (2) utilize current molecular techniques to further characterize viral genes in clones from existing genomic libraries and develop a restriction map of the viral genome; (3) identify and sequence viral transcripts from infected hosts and express selected genes in vitro with the goal of determining their function; (4) use current bioinformatics tools for gene analysis and phylogenetic studies; (5) assist undergraduate and graduate students in selected molecular techniques, etc.; (6) submit research results for publication in a timely manner, and perform other duties as assigned. The appointee may participate in other projects including: (1) sequencing and bioinformatic analysis of the poxvirus genome; (2) development and use of monoclonal antibodies to characterize hemocytes involved in the cellular defense response, and (3) in vitro translation of an apparent anti-viral protein (cDNAclones already available).

Qualifications: A Ph.D. in molecular biology or virology and willingness to work with insect systems are required.. Appointee must be ethical, reliable, willing to work in a team and take constructive criticism, be innovative and willing to try new approaches; Must be knowledgeable about standard and state-of-the-art molecular techniques and be willing to learn new ones. Must have an excellent command of English, good writing skills, and be able to design experiments and work independently in a small (5-7 people), well equipped laboratory.

Canadian citizens and legal residents are welcome to apply. All non-Canadian and non-US citizens and non-residents must already have legal authorization to work in Canada or the United States at the time of application. No offer can be made without a face-to-face interview. Renewal of appointment is on the basis of an annual review. Reappointments are based on satisfactory performance.

Salary and Benefits: Salary is negotiable and commensurate with experience but the minimum will be (US) $35,000 per 12 months plus coverage for health insurance. With satisfactory evaluation, an annual salary increase will be provided based on the State of Florida guidelines. All reasonable expenses will be paid to attend one national or international scientific meeting per year, to present results of work conducted on this project.

Inquiries and Application: Send curriculum vitae, statement of interest and the names of four referees, their postal and e-mail addresses, and phone numbers to: Dr. Pauline O. Lawrence, Department of Entomology and Nematology, University of Florida, Gainesville, Fl. 32611-0620. Phone: 352-1901, ext 127; Fax: (352) 846-2011; e-mail: pol@mail.ifas.ufl.edu.

Deadline: As soon as a suitable applicant is identified.

Points To Ponder

Dr. Vibha Dhawan is the guest columnist for this issue. Being in India, Dr. Dhawan faces a very different agricultural reality than the rest of us in North America and Europe. The introduction of GM crops into the United States and Canada has led to multiple economic and environmental benefits, amply quanti - fied by various sources. Nevertheless, agriculture in North America and Europe is seldom, if ever, a matter of life or death. In a developing country, the situa - tion changes entirely. To quote Dr. Dhawan, "the extent of malnutrition in many countries today is beyond imagination" for those of us who have never come face to face with poverty and malnutrition. Dr. Dhawan makes an impassioned argu - ment that all biotechnologies can and must improve life for all citizens of devel - oping countries.

Wayne Parrott

A View From a Developing Country

Vibha Dhawan, Ph.D
Director, Bioresources and Biotechnology
T E R I, New Delhi - 110 003, India

Mankind is facing the challenge of increasing food production from shrinking per capita land availability. In developing countries, the recent past witnessed technological advancements of the green revolution which have saved many from starvation, and in many countries have lead to self-sufficiency in terms of food production. However, the benefits of the green revolution are coming to a plateau, and the increase in food productivity today is not matching the population growth. Even today, the striking reality is that more than 800 million people cannot afford even two meals a day.

The extent of malnutrition in many countries today is beyond imagination. Approximately 30,000 people die each day due to hunger or malnutrition. Developing countries are typically characterized by high population growth, limited resources and small land holdings, all leading to low agricultural productivity coupled with serious problems of affordability, leading to the uneven distribution of food. Unlike developed parts of the world where less than 5% of the population is producing food, in developing countries as many as 70% of population is engaged in farming. Thus agriculture still remains the main source of income generation.

Unfortunately, agriculture, which was once identified as the key driver for economic growth, and thus led to government investments, is also witnessing declining governmental support, both in terms of investments and farm subsidiaries. The fear is that in the years to come with globalization, small and marginal farmers may not be able to compete with other global players in terms of quality food production at internationally competitive prices. The comparison is between individual farmers with small land holdings who are dependent on the mercy of monsoons and still suffer major losses due to diseases, pests, weeds, droughts, etc., on one side. On the other side are well-educated farmers with large land holdings, mechanized farm management, and access to the latest technology and the best of the planting material.

In years to come, perhaps no subsidies will work and the only option available for developing countries is to empower the farmer with the best quality planting material and the latest technology. Technologies need to be developed which are scale-neutral and help farmers increase their income in a sustainable way. The subsidies are to be provided year after year, but investment made on technical empowerment will make farmers competitive in all times to come.

Biotechnology is one of the tools which has great potential. Frequently, biotechnology is referred to as synonymous with genetic engineering. Under the vast umbrella of biotechnology, there are various technologies, which are acceptable to the public. However, one has to distinguish between traditional biotechnologies from modern biotechnology.

The traditional biotechnology is well-tested and is usually non-controversial. However, due to lack of efforts and unsatisfactory extension, traditional biotechnologies still have not percolated to small and marginal farmers. Technologies such as biofertilizers, biopesticides and micropropagation are some of the examples. There is an urgent need to commercialize these technologies as they have enormous potential, especially for small and marginal farmers. The growing demands of organic food can sustainably be met if farmers have technology for increasing their production. Application of Rhizobium in the case of leguminous crops; mycorrhizae, for practically all crops; and blue green algae in paddies, etc. are some of the examples. Many areas in developing countries today are producing food in an organic way, not by choice but out of compulsion. Here, farmers are too poor and thus cannot afford to buy synthetic fertilizers. The traditional biotechnology can help the farmers in these areas to increase their productivity and thus their economic upliftment. For example, the use of micropropagation can considerably increase production by planting superior quality genotypes, which are certified against known viruses.

Modern biotechnology has the potential to produce designer crops to match crops with sites and individual's preferences. Technology has enormous potential in producing plants, which are resistant to pest and diseases, have longer shelf life; are nutritionally improved, etc. The potential of genetic engineering is enormous and one has to weigh the benefits of the technology against the risks.

For example, the benefits, in terms of increased food production, outweigh the risks, i.e. the excessive use of pesticides/fertilizers etc., associated with the Green Revolution technologies. By designing crops resistant to pests and diseases, resource-poor farmers with a low level of education will be enormously benefited. Because of their lower literacy level and non-availability of finances, such farmers are not in a position to take preventive measures and apply chemicals only to cure/prevent further spread of the disease. This causes enormous loss in terms of crop productivity. Further, pesticide residue and excessive leaching from fertilizers gets into the ground water. In many areas, which still do not have access to potable water, this water is consumed directly by the local population thus exposing them to higher doses of chemicals, some of which are carcinogenic. While the indirect economic burden in terms of increasing instances of diseases is totally ignored, there are direct measurable economic gains to the farmer in terms of productivity.

Bt Cotton is one such success story. In India cotton is the single crop that consumes more than 50% of the total pesticides used in the country. Developing resistant varieties through genetic engineering is helping the farmers to increase their productivity with fewer applications of pesticides. Developing countries, which also typically lack cold chains, witness as much as 30-40% post harvest losses. By increasing the shelf life of perishable products, one can expect high realization price by the farmer and increased availability of food to the deprived population.

The importance of consuming a balanced diet is recognized all over the world. Balanced diets provide the basic calorific needs, minerals, vitamins, etc. required for the normal growth and development of the body. Unfortunately the poor section of the society, even though it realizes the importance of having balanced foods, is unable to afford such diets. Typically the fat intake is low and so is that of vegetable and fruits. While cereal provides their basic calorific need, it does not provide the essential amino acids, vitamins etc. The

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ExPlants

Mary Ann Smith stepped down as interim head of the Department of Natural Resources & Environmental Sciences and welcomed a new permanent head to the department. In January, she began a 5-year term as Assistant Dean for Research (half-time), College of ACES, with responsibilities for global research programming; focus on Central Asia.

Indra Vasil reports that "Plant Biotechnology 2002 and Beyond" (Indra K. Vasil, ed), the proceedings of the 10th IAPTC&B Congress, has now been published by Kluwer Academic Publishers, The Netherlands. The book will be out in January 2003.

Heidi Kaeppler has some good news to share. She is now tenured and she would like to send out a big thanks to all of her SIVB friends and colleagues who have helped her along the way. She also reports that she and Kan Wang (Iowa State University) have organized an NSF-funded Maize Transformation Workshop to be held March 10-13, 2003. The workshop will consist of hands-on training in maize transformation (both bombardment and agro-based methods), greenhouse management of plants, database training, and a minisymposium presented by guest speakers working in the area of maize transformation. Space availability is very limited, with preference given to personnel from public research laboratories. Those wishing to attend the workshop must complete an application. Inquiries regarding the application process can be directed to Dr. Kan Wang at: kanwang@iastate.edu

Melissa Hinga also has good news to share. She is expecting a baby girl in June. She does expect to continue to edit explants so keep the news coming.

Martie Wright, Bobby Smith and John Finer listen to Mike Horn explain Prodigene's programs in College Station, TX, in August 2002.

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Continued from Cover

IAPTC&B. It is the hope of the IAPTC&B that the Plant Section will use a good portion of this donation to provide financial support, on a competitive basis, to SIVB members wishing to attend the 11th IAPTC&B Congress in 2006 in Beijing, China.

Dr. Indra Vasil also arranged for CABI to send each member in the Plant Section of SIVB, who is not also a member of the IAPTC&B, complimentary copies of the two 2002 IAPTC&B issues of *In Vitro – Plant.* In addition, at the June 2003 SIVB meeting in Portland, Oregon, the IAPTC&B will provide to members of the Plant Section, on a first come, first serve basis, several hundred bags, commemorative plates, T-shirts, and writing pads from the 10th IAPTC&B Congress. The total cost of the journals and other items is estimated to be $10,000.

This substantial financial support of the Plant Section is also being acknowledged at the Plant Business Meeting during the 2003 Congress. Plant Section members are encouraged to become members of the IAPTC&B.

Latest information about the IAPTC&B, its officers, members, etc. can be found at the new IAPTC&B website at http://www.genetics.ac.cn/iaptcb.htm.

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USAID initiative to put the 'Beta-carotene' gene in rice and mustard is a bold initiative to fight vitamin A deficiency.

The argument put forth that there are many foods which contain vitamin A is well taken, but is definitely over-ruled by the fact that Vitamin A deficiency still remains a major problem in many parts of the world. We have to look into traditional foods consumed by the section of the society, which suffers from Vitamin A deficiency, and modify them so that without changing their food habit, the dietary requirements are met. The option of incorporating the gene for 'Beta carotene' synthesis is perhaps better than supplementation or fortification. The later option calls for a recurring expenditure because the vehicle is processed foods, which again may not be affordable by the poor section of society. In contrast, investing in GM technology is a one-time expenditure. Further, a high dose of Vitamin A can be toxic while the conversion of beta-carotene to Vitamin A is regulated by the human body and only converts what is required. Thus it is an excellent delivery system especially for pregnant woman and young children.

Thus crop biotechnology has enormous promise for the human kind. It is a tool, which must be used to supplement ongoing efforts for crop improvement. The technology being scale neutral has enormous potential in terms of improving farm production in a sustainable way and thus not only helps in improving the farmer's income but aids the consumers as well.

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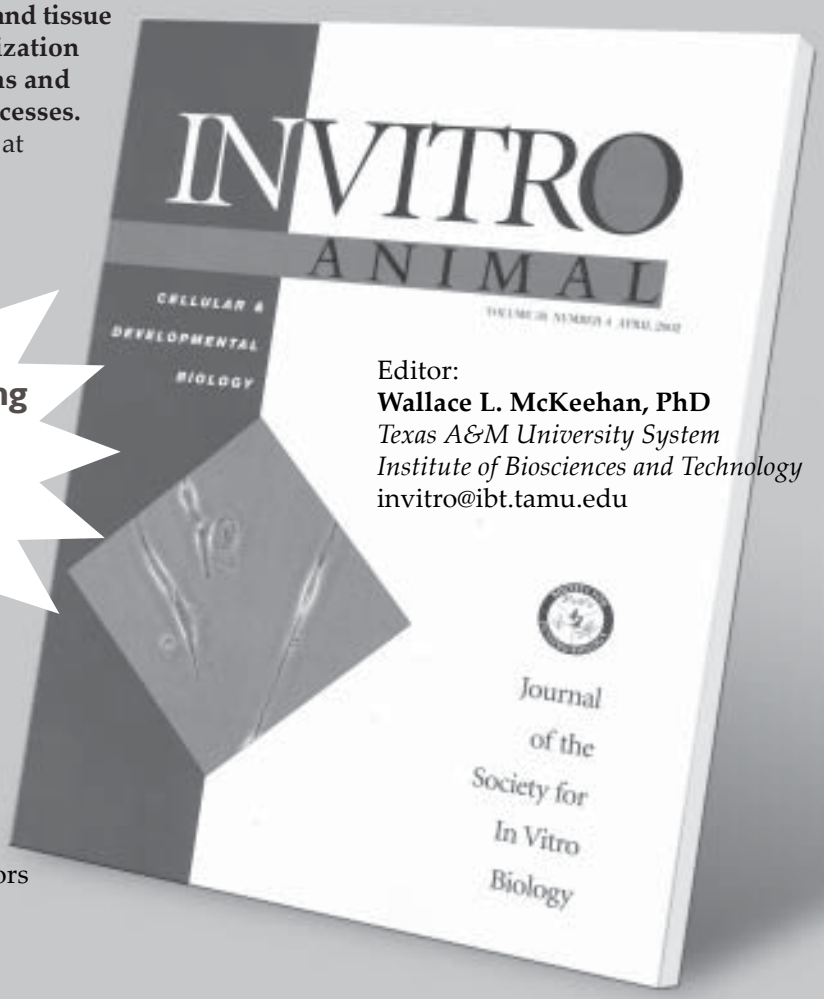

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In Vitro Report

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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.

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