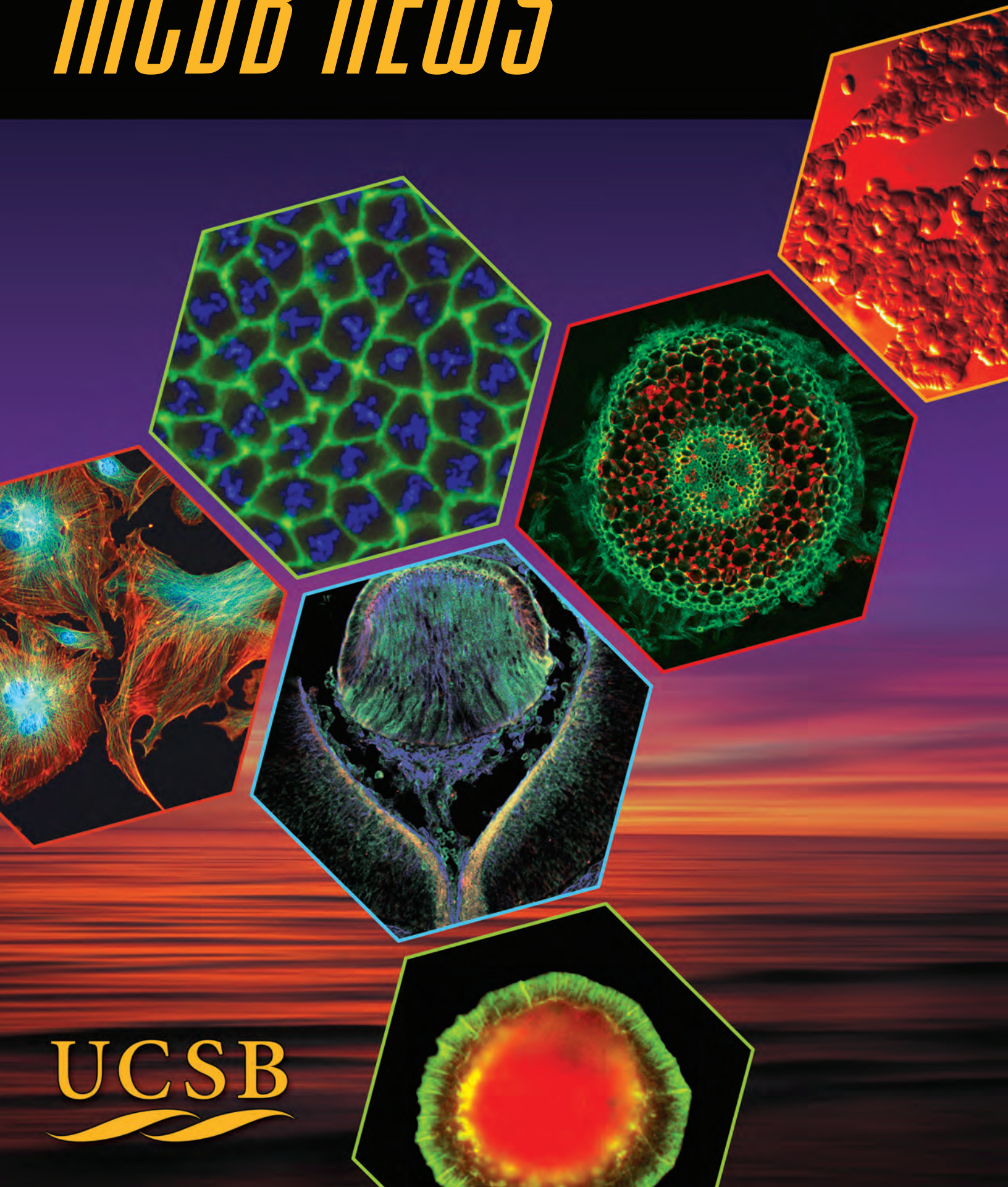


MCOB NEWS

2006



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Chair's Corner

Greetings from UCSB! Many of you who are receiving this newsletter received degrees from the former Department of Biological Science, which, like a growing yeast cell, split into two daughter departments in 1995: Molecular, Cellular and Developmental Biology (MCDB) and Ecology, Evolution and Marine Biology (EEMB). MCDB inherited the molecular majors (biochemistry/molecular biology, microbiology, pharmacology) and created a new major in cell and developmental biology. MCDB has 26 faculty members, 900 undergraduates, and over 100 graduate students, postdoctoral fellows, and staff.

It is an exciting time for biology at UCSB! To keep pace with the explosion of new knowledge in the molecular biosciences, and take advantage of the tremendous potential of new research directions, MCDB is expanding via recruitment of new faculty and graduate students. We initiated this newsletter to keep in touch with our alumni and provide a forum for alumni to keep in touch with each other. We hope you enjoy it and encourage you to stop by for a visit if you are in the Santa Barbara area!

Wishing you all the best,



Dennis O. Clegg, Chair



New Life Science & Technology Building Opens

Advances in molecular biology are changing the world and UCSB biologists take a leading role in this research at every level; from nanotechnology, to molecules and cells, to therapeutics and human disease. The MCDB department has outgrown its home in the Biological Sciences 2 building and has now expanded to occupy space in the new Life Science and Technology Building (LSTB), which was completed in July 2005.

The four-story building occupies the site of the old barracks building 478 on UCEN road, which housed the staff of the former Department of Biological Sciences. The LST building provides space for biology administrative staff offices, and two new teaching laboratories. Also included is the George and Joy Rathmann Lecture Hall, named in honor of the founder of Amgen. A group of Rathmann friends have made generous gifts and pledges totaling \$1 million for support of graduate students in MCDB and the Biomolecular Science and Engineering Program. The first floor of LSTB houses the Alzheimer's Disease Research Laboratory, funded in part by an NIH construction grant, that includes the research laboratories of

Professors Wilson, Jordan and Lew. The second floor includes the laboratories of Professors Samuel and Weimbs, a specialized biosafety level 3 virus laboratory, and the Amgen Laboratory, which will be the home of the John Carbon Endowed Chair in Biochemistry and Molecular Biology. Professors Hayes, Ma and Cooper are setting up shop on the third floor, with the Department of Ecology, Evolution and Marine Biology filling in the remaining space. This new cutting edge facility will allow the department to expand and upgrade its laboratory courses and recruit excellent new faculty to keep pace with new developments in molecular biology research.

The LST building is one of three new buildings that will fill out the "Biology Campus" on the bluff overlooking the pacific. Other buildings include the Bren School of Environmental Science and Management and the Marine Science Institute, two recent additions that now fill the area of the parking lot that was in front of Bio 2. All of this expansion is part of a building boom at UCSB that incorporates 13 different new construction and renovation projects and totals \$900 million!



Photo by Cindy Anderson, Courtesy NBBJ

New Faculty

Chris Hayes



Dr. Chris Hayes, a Damon Runyan postdoctoral scholar in Dr. Robert Sauer's laboratory at M.I.T. for the past four years, has accepted an appointment as Assistant Professor in MCDB. Chris was the top choice from a pool of over 300 applicants. Chris studies translational control in prokaryotes, and his work has opened a new area of research. Chris received his B.A. at the University of Southern Maine and his Ph.D. from the University of Connecticut. Chris strengthens our Microbiology program which includes investigations of gene regulation in bacteria.

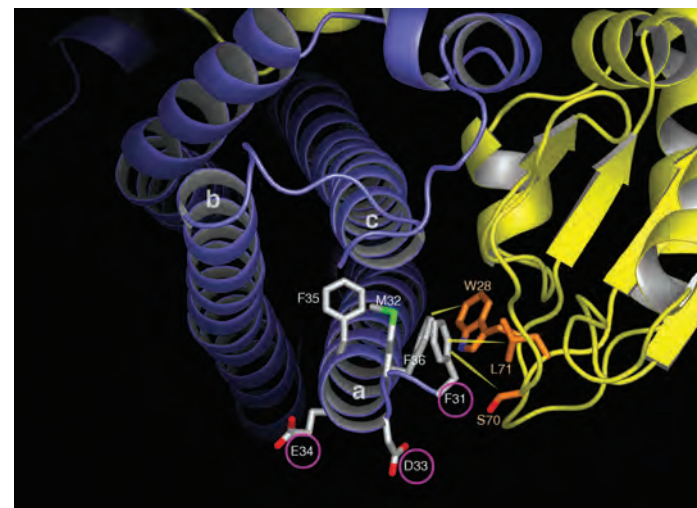
Kenneth Kosik



Dr. Kenneth "Ken" Kosik, formerly Professor of Neuroscience at Harvard Medical School and Senior Neurologist at Brigham and Women's Hospital, has joined the MCDB Faculty effective July 2004. Ken is an international leader in the fields of neuronal development, neurodegeneration and Alzheimer's disease. At UCSB Ken is the inaugural holder of the distinguished Harriman Endowed Chair in Neuroscience, and serves as co-director of the Neuroscience Research Institute. Ken is an imaginative and creative scientist who is expanding his research efforts into the evolution of synapses, and the functions of micro-RNAs in stem cells. We are excited about Ken joining our ranks.

Thomas Weimbs

Dr. Thomas Weimbs joined the MCDB department as a new Assistant Professor in July 2005. Dr. Weimbs' research is in the areas of epithelial cell polarity in normal cells and polycystic kidney disease, membrane fusion in cytokinesis and renal cell carcinoma. He has made outstanding contributions to our understanding of how membrane proteins are trafficked to different locations in the cell. Dr. Weimbs received his Ph.D. degree from the University of Cologne and was an Alexander von Humboldt Fellow at UCSF. He was an Assistant Professor at Case Western Reserve and the Lerner Research Institute at the Cleveland Clinic before joining UCSB.



Structural model of syntaxin 3 in complex with Munc18b. The residues critical for apical targeting of syntaxin 3 are highlighted by red circles (From Sharma, Low, Misra, Pallavi, Weimbs, *Journal of Cell Biology*, in press).

Awards & Recognition

Steve Fisher Receives von Sallmann Prize in Geneva

Professor Steven K. Fisher was awarded the prestigious "Ludwig von Sallmann Prize for Outstanding Contributions to Vision and Ophthalmology". The Award Committee, which was unanimous in its support of Dr. Fisher, made special note of his "continuing research over many years toward a better understanding of the pathophysiology of retinal detachment". The award was presented at a ceremony in Geneva. Congratulations to Steve for this fitting recognition of his distinguished record of research!

David Low Elected as AAAS Fellow

Congratulations to David Low, MCDB Professor, who was elected as a Fellow of the American Association for the Advancement of Science. This distinction is based on David's many significant research contributions to the field of gene regulation. David has carried out pioneering studies of the role of DNA methylation in controlling gene expression and pathogenesis in bacteria.

Chuck Samuel Receives Prestigious Humboldt Research Award

The Alexander von Humboldt Foundation in Germany awarded the Humboldt Forschungspreise Biochemie to Professor Charles E. Samuel for his work on interferons. The Forschungspreise awards honor "lifetime achievement in research and teaching." Chuck's award in the field of biochemistry is for his work on the interferon system and virus-host interactions, carried out at UCSB over the past 25+ years with numerous graduate students and postdoctoral fellows. The award was conferred at a ceremony in Berlin.

Ed Orias Receives the Emile Maupas Medal

Research Professor Eduardo Orias was awarded the "Emile Maupas Medal" for his contributions to the knowledge of Ciliate genetics. The medal commemorates the scientific work of Emile Maupas, a visionary 19th century French cytologist whose primary job was the Directorship of the National Library of Algiers. Professor Orias is the 5th recipient of this medal during its 90-year history. The Award was conferred in Nijmegen, Netherlands.



MCDB Home of New Endowed Chair

The College of Letters and Science and the MCDB Department recently announced the wonderful news of a new endowed chair at UCSB: The John Carbon Chair of Biochemistry and Molecular Biology. This new Chair honors Professor John Carbon, and his seminal contributions to science, to UCSB, and to Amgen. Dr. Carbon is one of the founders of molecular biology at UCSB, and he served as one of the original scientific advisors to Amgen, where he played a pivotal role in shaping the company's future. The John Carbon Chair is made possible by several generous gifts from individuals and foundations. These extraordinary donations and commitments provide MCDB with an excellent opportunity to recruit a leading senior scholar who will provide future leadership to MCDB, and who will carry on Dr. Carbon's tradition of excellence in research and teaching. The gifts both establish the endowment and provide start-up funds for a research program.

STUDENT ACHIEVEMENTS



Each year, on a June afternoon before commencement, students, faculty, family and friends cheerfully gather at a reception to recognize years of hard work. The MCDB class of 2006 includes 280 undergraduate degrees conferred in biological sciences, pharmacology, microbiology, cell and developmental biology, and biochemistry-molecular biology.

Nicholas Robertson Receives Sinsheimer Award This award was initiated in 1997 through the generosity of MCDB Professor Robert L. Sinsheimer, a distinguished molecular biologist and former UCSC Chancellor. It distinguishes the graduating senior with the highest academic performance in genetics and biochemistry. In addition to stellar grades, pharmacology major Nicholas Robertson helped to discover novel proteins from the glue of California mussels, working with Professor Herbert Waite. This bit of bio-inspiration is likely to influence how future dental and orthopedic implants are engineered. Nick plans to attend medical school.

Christopher Huntsman Selected as Stipanich Research Scholar Through the generosity of the Stipanich Family, whose son graduated with a biological sciences degree at UCSB, the Stipanich Award is given every summer to a top MCDB undergraduate student who engages in research with a faculty member. Their continuing generosity helps the department reach one of its major goals by engaging students in an extensive variety of cutting-edge research. Working with Professor Zach Ma, Chris studies signaling proteins involved in drug addiction, and he plans to continue this work next year in the MCDB MA program.

Vivian Ericson and Nicholas Reese Share Colville / Dearborn Award The Frances Colville and Terry Dearborn Memorial Award is for outstanding academic achievement by a senior in the College of Letters and Science. Vivian investigated the molecular basis of eye disease in Professor Dennis Clegg's lab, and will work for a year in Professor Bill Smith's lab before pursuing her doctorate in molecular biology. Nicholas worked in Professor Steve Fisher's lab on a potential new therapy for retinal injury. He will obtain his MD at Vanderbilt University.

Aldrich Award Goes to Taralee Kemp Awarded to a graduating senior in the College of Letters and Science for outstanding scholarship and contributions to the campus community, this award is in memory of Daniel G. Aldrich, Jr., Chancellor at UCI and Acting Chancellor of UCSB. Microbiology major Taralee Kemp's many extracurricular accomplishments included serving as a teaching assistant in undergraduate courses, acting as a dorm resident advisor and a peer alcohol advisor, serving as a LEAP leadership intern for the Director of Admissions, and a student outreach speaker for Northern California students admitted to UCSB. She plans to pursue a graduate degree in Public Health.

Fourteen MCDB Seniors are Awarded Distinction in the Major This distinction is for students who have engaged in creative research projects with an MCDB faculty member and have completed a senior honors thesis summarizing their work. Congratulations to: Christopher Clave, Vivian Ericson, Erin Fuchs, William Graham III, Scott Howard, Christopher Huntsman, Elliott Meer, Stephen Morris, Katie Podshivalova, Nicholas Reese, Nicholas Robertson, Karen Saks, Brandon Smith and Brandon Walker.

Cancer Federation Scholarship Awarded to Katie Podshivalova Established in 1985, this award is given to an undergraduate senior doing research in microbiology, immunology, or oncology. Katie's research is aimed at understanding the role of specific receptors in phagocytosis by macrophages. After an internship at Scripps Research Institute, she will enroll in the MCDB MA program.

Tackling World Hunger, Molecule by Molecule

If you've never done undergraduate research in your life and wonder if it's really only glorified busy work, trust the words of one of UCSB's five Nobel Prize winners: "It isn't just 'make-work,'" says Herbert Kroemer, professor of electrical and computer engineering and of materials, who received the 2000 prize for physics. "Undergraduate projects arise in the context of bona-fide research. Students' findings contribute to solving questions no one has been able to answer before. In fact, that's often the most exciting part of the work."

Susan Cohen, who graduated with honors in microbiology, agrees. "I enjoyed the undergraduate research I did because it was challenging," says Susan. Her research addressed food-spoilage problems, which are particularly important in the developing world, where large portions of hard-won harvests are often lost because of scant refrigeration and poor transportation.

MCDB Professor Rolf E. Christoffersen and Susan investigated the mechanism of an enzyme that produces the plant hormone ethylene, which helps regulate plant development, including fruit ripening. Professor Christoffersen's future findings could lead to new food-storage strategies and dramatically increase the nutritional quality of food supplies for millions of people. As part of her inquiry, which focused on substrate binding properties, Susan used computer models to engineer novel enzymes using recombinant DNA techniques.

An Investment That Yields Major Dividends

Susan became interested in biology during high school in Cerritos, California; as an honors student at UCSB, she enrolled in the Introduction to Research course through the California Alliance for Minority Participation in Creative Activities (CAMP) program for academic credit.



Photo: Norma Marquez

Susan Cohen, now at MIT, engineered plant proteins.

Later on, when she wanted experience doing undergraduate research, she was intrigued by Professor Christoffersen's work, and approached him about working in his lab. He worked with her to submit a grant application to the Office of Undergraduate Research and Creative Activities (URCA). The result: CAMP awarded her a scholarship amounting to \$1,500.

Susan's undergraduate research is paying off in other ways. She became one of nine UCSB juniors and seniors who presented their research at a symposium at UC Irvine.

Susan's research experiences also were a key addition to her graduate-school applications. The winner of MCDB's Beatrice M. Sweeney Award in the Biological Sciences, she was accepted at CalTech, Princeton, and M.I.T., and is now attending M.I.T. for her doctoral studies in biology.

Biology Undergraduate Program

<http://www.lifesci.ucsb.edu/undergrad/>



Microbiologist Peggy Cotter will study gene regulation in bacterial pathogens.

Biodefense and Infectious Disease Study Wins NIH Grant

Research on countering threats from bioterrorism agents and infectious diseases will be conducted at UCSB under a \$1.5 million grant from the National Institute of Allergy and Infectious Diseases of the National Institutes of Health. UCSB microbiologist Peggy Cotter is a project director in the newly established Pacific-Southwest Regional Center of Excellence (RCE) for Biodefense and Emerging Infectious Disease Research – one of only 10 NIH-funded centers in the nation dedicated to such research.

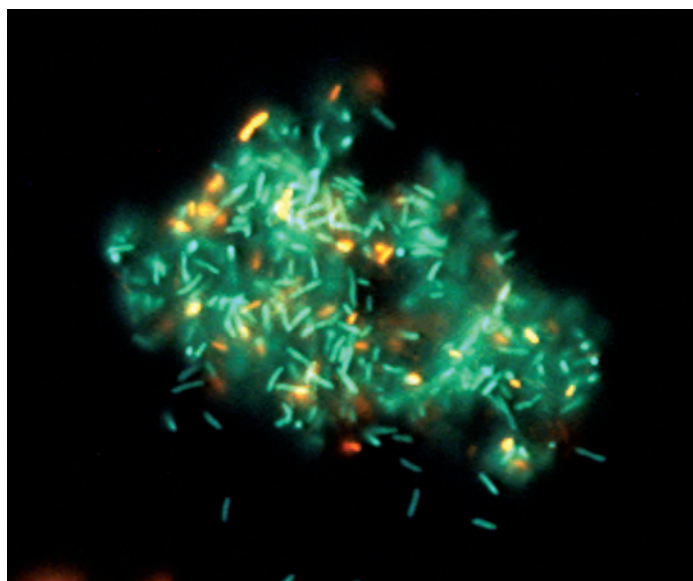
UCSB Wins Support for Stem Cell Research Project

Professors in MCDB and several other departments are to receive \$1,343,859 in state funds over three years to fund stem cell research. The grant was announced by the Independent Citizens' Oversight Committee and is one of the first 15 awarded by the California Institute for Regenerative Medicine (CIRM). The long-term goal of UCSB's stem cell research program, directed by Professor Dennis

Clegg, is to understand how human embryonic stem cells can be differentiated into ocular cells that might be used to treat eye disease, particularly macular degeneration.

One Bacteria Stops Another on Contact; Findings Have Implications for Chronic Disease

Stephanie Aoki and a group of scientists including Rupri Pamma, Aaron Hernday, Jessica Bickham, and Bruce Braaten in David Low's laboratory have discovered an entirely new phenomenon in which one bacterial cell can stop the growth of another on contact. The bacteria that are stopped may enter a dormant state, rather than dying completely. The findings, reported in the journal *Science*, have possible implications for management of chronic diseases, such as urinary tract infections. The research team discovered two genes required for this "stop on contact" phenomenon, the result of two years of work. Aoki explained, "These genes are present in *E. coli*, including uropathogenic *E. coli* that cause urinary tract infections, and similar genes may be present in other pathogens such as the plague bacillus, *Yersinia pestis*. We are currently exploring how contact between bacteria can inhibit cell growth – and determining what this contact-dependent inhibition of growth (CDI) system is used for."



E. coli aggregate showing cells producing a novel contact-dependent inhibitor (green), which block the growth of target cells (yellow).

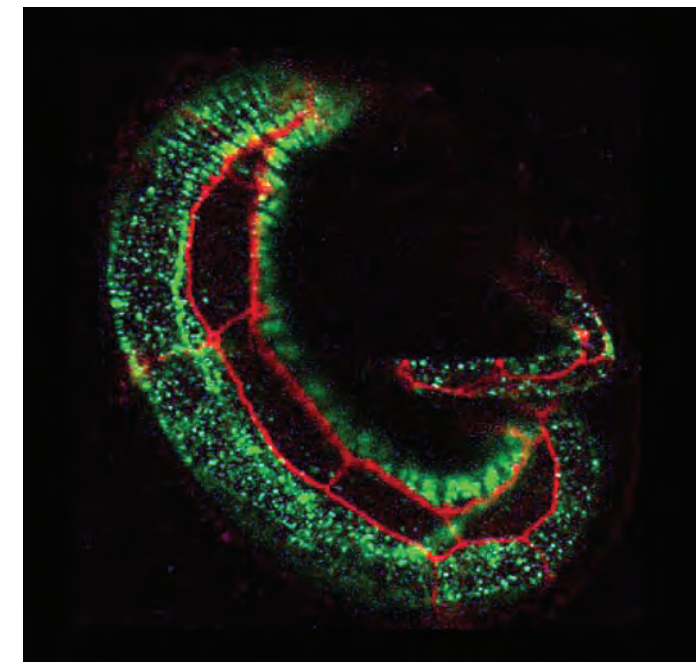
UCSB Awarded \$1.25-Million Keck Foundation Grant to Investigate MicroRNAs

The W. M. Keck Foundation's Medical Research Program has awarded a consortium of UC Santa Barbara researchers \$1.25 million to support a pioneering multidisciplinary research initiative focusing on tiny RNA molecules—microRNAs—and their impact on the regulation of gene function. Led by MCDB Professor Ken Kosik, who is also Co-Director of the Neuroscience Research Institute, the team will investigate microRNAs at many different levels, from basic biology to therapeutic applications. MCDB Professor Joel Rothman will also participate in the study.

MCDB Researchers Uncover Novel Molecular Mechanisms Underlying Polycystic Kidney Disease

MCDB Professor Thomas Weimbs and coworkers have recently discovered two novel functions of the polycystin-1 protein. Mutations in the polycystin-1 gene give rise to polycystic kidney disease, a widespread genetic disorder that leads to kidney failure. In a recent issue of *Developmental Cell*, Weimbs and his group of graduate students, post docs and researchers reported that, under normal conditions, the polycystin-1 protein keeps transcription factors localized in the cilia and away from the nucleus. If there is an injury, the flow of urine stops, polycystin-1 is cleaved and the transcription factors migrate to the nucleus of the cell, signaling the cell to divide to replace those cells that have been lost. These results suggest that in patients with this disease the repair mechanism is always turned on because polycystin-1 is mutated.

In a separate paper published in the *Proceedings of the National Academy of Sciences*, Weimbs' group reports that polycystin-1 also controls the activity of the important regulatory kinase mTOR. mTOR was found to be inappropriately active in the polycystic kidneys of patients and mice. Treatment of mice and human patients with the drug rapamycin, which inhibits mTOR, resulted in marked shrinkage of polycystic kidneys.



The cell fusion regulating protein (green) and adherens junctions (red) in a late stage *C. elegans* embryo.

Cell Fusion Discovery by MCDB Researchers May Lead to Improved Cancer, Fertility Therapies

A recent discovery in cell fusion from Joel Rothman's lab may allow scientists to enhance organ regeneration by stem cells, prevent the progression of cancer, and control fertility. Cell-cell fusion allows a sperm to unite with an egg and is also used widely in development, for example during the formation of organs, including muscles, bones, and placentas. In addition, stem cells can reprogram their fates by fusing with other differentiated cells. However, there is a sinister side to cell fusion: tumor cells can fuse with normal cells, causing progression to more aggressive or chemotherapy-resistant forms of cancer. In a recent paper in *Developmental Cell*, post-doc Kenji Kontani (now an Assistant Professor at the University of Tokyo), former graduate student Ivan Moskowitz, and Professor Rothman reported that the inappropriate joining of cells by fusion in *C. elegans* is naturally prevented by a familiar protein, the vacuolar ATPase, acting in an unanticipated context. This discovery could lead to new methods and drugs for controlling cell fusion.

Where are They Now?

Gary Wilcox earned his BA ('69) in cellular and molecular biology, and his MA and PhD ('72) in molecular biology and biochemistry at UCSB. After receiving his PhD he was a professor at UCLA for 14 years. Currently he serves as Executive Vice President of ICOS, a leading biotechnology firm in the Seattle area. He earlier co-founded International Genetic Engineering (Ingene) and served as its President and CEO. He also acted as Vice Chairman, Executive Vice President and Director of XOMA Corporation. Dr. Wilcox has contributed lectures to graduate courses in Biotechnology at UCSB, served as a commencement speaker, and is currently a Trustee of the UCSB Foundation.

Eric Knudsen (BA '71; MA '73) is Professor at Stanford University School of Medicine Department of Neurobiology. He is a member of the National Academy of Sciences and is involved in studying mechanisms of attention, learning and strategies of information processing in the central auditory system.

George Perry (BA '74) went on to receive his PhD in marine biology at the Scripps Institution of Oceanography and then did post-doctoral work at Baylor College of Medicine. He is currently a Professor of Pathology and Neurosciences and Interim-Chair of Pathology at the School of Medicine at Case Western Reserve. While his research remains at Case Western Reserve, he also became the Dean of Sciences at the University of Texas at San Antonio. His interests include the role of cytoskeletal abnormalities and oxidative stress in human diseases, especially Alzheimer's disease.

John Elder (BA '72; MA '74) graduated from Creighton University school of Medicine and did post graduate work at UCSF. He is lucky enough to be well established as a nephrologist back here in Santa Barbara at the Sansum-SB Medical Clinic. He is also the Medical Director of the Santa Barbara Community Dialysis Center here in Santa Barbara.

Steven J. Norris (MA '75) is the Robert Greer Professor of Biomedicine at the University of Texas-Houston Medical School. He received his doctoral degree at UCLA and is currently studying pathogenesis and its relationship to the molecular genetics of invasive bacteria.

Scott Votey (BA '78) received his M.D. from UCSF School of Medicine and after interning at the University of Chicago he continued his studies at UCLA School of Medicine where he specialized in Emergency Medicine. He is currently a Professor of Clinical Medicine at UCLA and is the Assistant Dean for Graduate Medical Education. He recently released the second edition of an important text in the field, *Signs and Symptoms in Emergency Medicine*.

Ron Vale (BA '80) received his bachelor's degree in biology through the College of Creative Studies and went on to receive his doctoral degree in neuroscience from Stanford. His postdoctoral studies at the NIH Marine Biological Laboratories were on microtubule-based motors. Dr. Vale has been at UCSF since 1986 and currently is a Professor and the Chair of the Department of Cellular and Molecular Biology, where he continues his groundbreaking work on molecular motors. He also holds appointments as Investigator in the Howard Hughes Medical Institute and is the W.K. Hamilton Distinguished Professor in the Department of Anesthesia at UCSF.

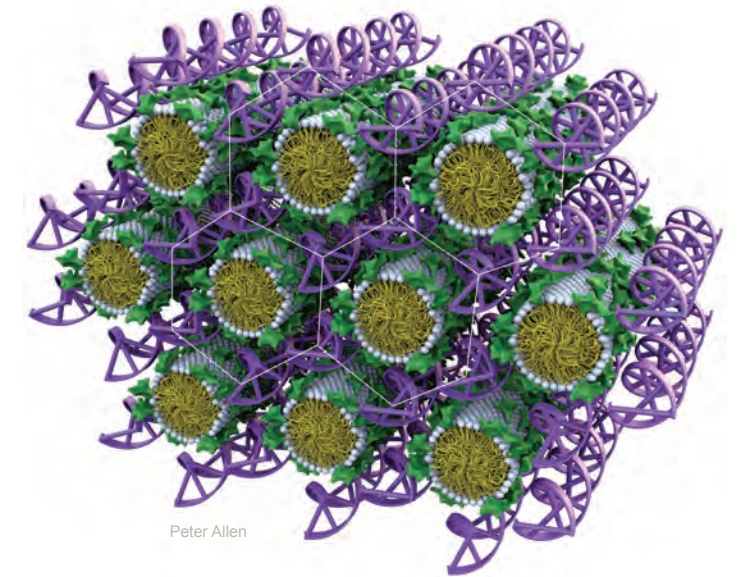
Shawn Newlands (BA '82) graduated from UCSB with a bachelor's degree in biochemistry-molecular biology and a Masters in chemistry. He was one of the first M.D. – Ph.D (Neurosciences) graduates from the University of Texas Medical Branch in Galveston. He completed his post-graduate work at the University of Washington specializing in Otolaryngology. He has served on the faculty of medicine at University of Washington, University of Mississippi and is currently the Wiess Professor and Department Chair in Otolaryngology at University of Texas, Galveston.

Paul Jaconette (BA '83) currently serves as executive vice president and chief administrative officer at the Sansum Santa Barbara Medical Clinic in Santa Barbara. He received a Master of Health Care Administration degree from Yale University and previously served as assistant medical group administrator at Kaiser Permanente Medical Center in Santa Clara. In 1993, he returned to Santa Barbara to work for the Santa Barbara Medical Foundation Clinic. He is married and has two children.

Christopher Francklyn (PhD '88) is currently a Professor at the Vermont Cancer Center of the University of Vermont College of Medicine. After receiving his doctoral degree with Professor Nancy Lee, Dr. Francklyn carried out postdoctoral studies under the direction of Paul Schimmel at the Massachusetts Institute of Technology. His work at the Vermont Cancer Center involves applying the tools of biochemistry and biophysics to study the structure of an important oncoprotein produced in many cases of leukemia.

Chauncey Sayre (BA '91) is president and chief scientific officer for PrimeGen Biotech LLC, a stem cell engineering company dedicated to optimizing the therapeutic potential of adult stem cells. He also worked at Santa Barbara Research Center, where he was involved in micro graphing, nuclear magnetic resonance analysis, circuit analysis, material engineering, materials processing and analyzing alloys and other composites.

Bruce Goode (BA '87; PhD '95) is currently an associate professor of biology at Brandeis University. He earned his bachelor's degree in biological science and then stayed at UCSB for his PhD, investigating the molecular biology of microtubule binding proteins. As a post doctoral fellow at Berkeley, he began his studies of actin binding proteins in yeast, which he has continued at Brandeis. Bruce enjoys running, cooking, playing guitar and spending time with his wife Avi, son Simon, and two dogs Sasha and Kira.



Peter Allen

We Would Like to Hear From You!

Send a brief news story of a personal or professional nature. If you would like us to include your "story" in the next newsletter, email the department at: mcdb-newsletter@lifesci.ucsb.edu.

Change of Address?

Visit the UCSB Alumni Association website at the following address to update your information: http://www.ucsbalum.com/alum_dir_plus/index.html

Giving to MCDB

Would you like to help Molecular, Cellular and Developmental Biology with its education and scientific mission? There are many opportunities to contribute. For more information contact Dan Oh in the Development Office at (805) 451-4875 or visit our website: <http://www.lifesci.ucsb.edu/mcdb/giving/>

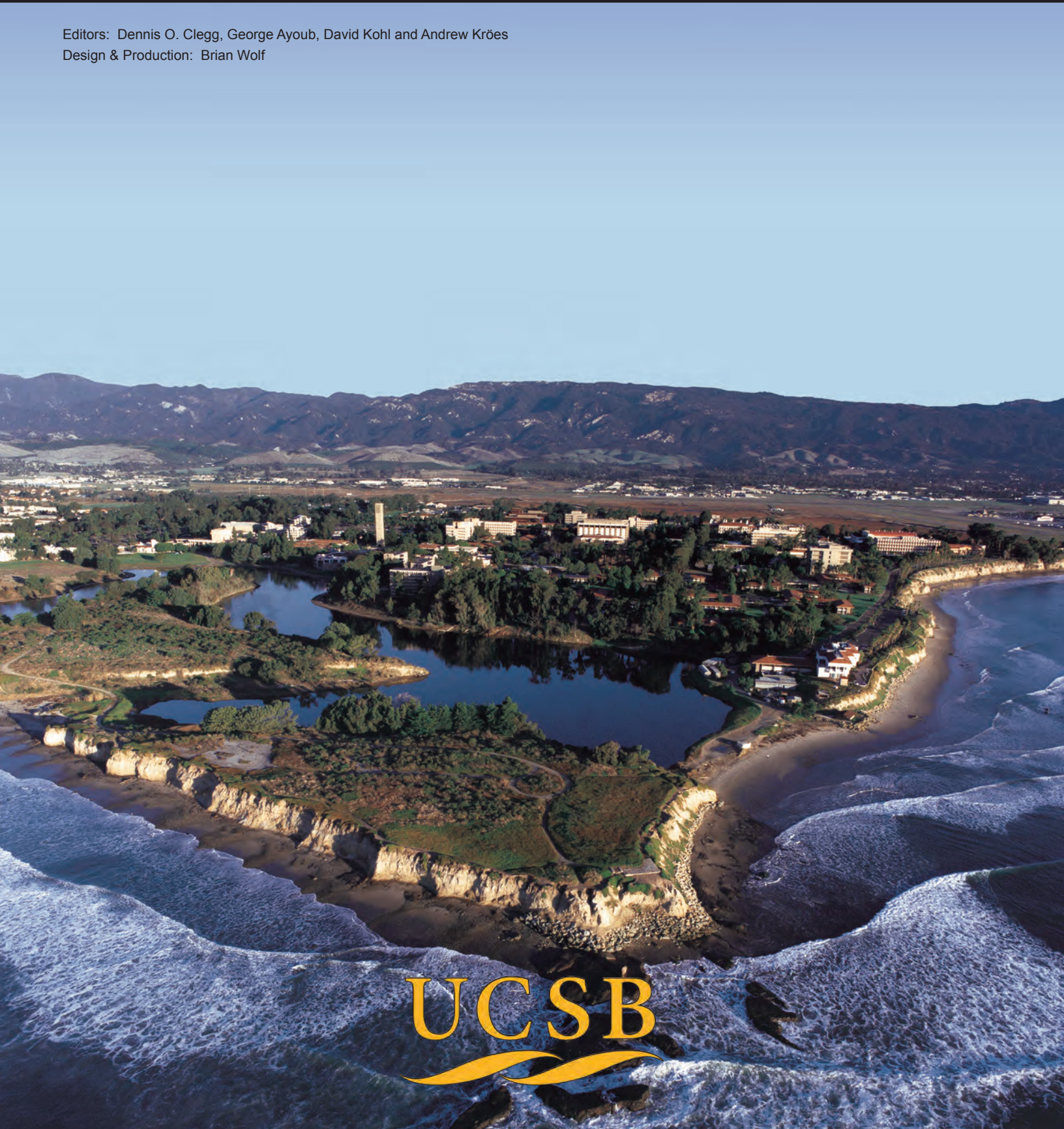
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