

Monell

Winter 2003

The
Monell
Connection

Leading the Way

Stimulate curiosity
Explore prospects
Plan for progress
Promote growth
Advance understanding
Contribute to the future



If it ain't broke, don't fix it.

Change is good.

Strange as it may seem, Monell adheres to both adages. The Center is poised to embark upon a major physical and programmatic expansion. Over the next two years, construction of new laboratories and reconfiguration of existing space will provide Monell's scientists with essential tools and resources to continue to successfully unravel the mysteries of the chemical senses.

Stimulating curiosity...

Although some aspects of Monell are in transition, many others haven't changed much over the last 35 years. Since the Center's inception, a guiding principle of its organization and research has been that multidisciplinary research can provide novel insights into understanding the chemical senses. Over the years, that principle has shaped a unique culture, in which values, attitudes and goals are strongly shared among the Center's scientists. The constant interaction of scientists from different disciplines is one of Monell's foremost strengths, and due to the resultant intertwining of objectives, the Center's growth is by necessity guided by the scientists themselves. It is their curiosity, drive, imagination, ability, ambition and commitment that propels the Center's progress. This amalgamation between Monell's growth and its scientists is exemplified by the career of Dr. Joseph Brand, whose professional development is linked in many ways to the evolution of the Monell Center.

Today, Joe Brand is a respected authority on the biophysics of taste, with over 100 publications to his credit. He has been



Exploring prospects...

Continued from cover page

instrumental in describing taste transduction, the series of receptor-driven intracellular events by which a taste receptor cell is able to translate chemical information from a food or flavor into an electrical message that can be understood by the brain. Moreover, as one of Monell's two Associate Directors, he has played a pivotal role in formulating the Center's plans for the future and in bringing to fruition its upcoming expansion.

Exploring prospects...

Things were different in the fall of 1971. When Joe first arrived at Monell as a young postdoctoral fellow with a degree in biophysics, he was just starting his career. Scientifically, very little was known about the molecular mechanisms underlying the sense of taste. Monell itself had only existed for three years, and the small staff of scientists had just moved into the present building at 3500 Market, occupying only two of the six floors. It was an exciting time, with countless opportunities to grow.

As the name implies, the field of biophysics relates physical principles to biological processes. Because sensory stimuli can be described in physical terms, biophysicists are attracted to problems related to sensory biology. Joe remembers working during his early days at Monell in the laboratory of biochemist Dr. Robert Cagan. At that time, scientists did not understand how taste molecules initiated signals to the brain. Joe recalls, "In many experiments, we were just trying to discover something — anything! —



Joseph Brand, PhD

of the basic tenets of taste transduction. We knew almost nothing about how the sense of taste worked at the molecular level." Scientific teams with differing theories about how taste worked were engaged in considerable dispute. The Monell researchers were convinced that protein molecules in the taste receptor cell membrane were an essential part of the receptor process, but as Joe recounts, "at the time this was a very hard sell for the rest of the taste and smell community."

Joe and his colleagues spent many years identifying and measuring biochemical events inside taste receptor cells. Their work helped to demonstrate that bitter taste perception begins when bitter taste molecules interact with proteins in the receptor cell membrane. He comments, "Working with receptor binding techniques on taste tissues from animals such as the catfish, which has an abundance of taste buds, we were able to put the receptor hypothesis on firm footing." Their work helped pave the way for today's programs in molecular biology and the recent discoveries of genes for sweet and bitter taste receptors. Looking back, "This

research gave me a lot of satisfaction." Joe muses, "It's very difficult for us in 2003, especially the younger scientists, to realize that there was a time when very few people believed that specific receptors were necessary for the recognition step in taste and smell."

Planning for progress: scientific...

Recognizing that human systems do not always parallel animal models, Joe decided that he also needed to work with human taste tissue. Together, he and longtime collaborator Dr. Andrew Spielman of the NYU School of Dentistry, developed a biopsy technique to collect living taste cells from the human tongue. The availability of human tissue immediately opened the way to obtaining biochemical and molecular correlates of individual differences in the ability to perceive different tastes. Using this type of analysis, Joe and his colleagues at Monell can relate a person's ability to perceive sourness to the activity of sour taste receptors.

Joe's current research goals are to use this approach to discover receptor mechanisms for sourness and saltiness in the human. Unlike membrane-embedded protein receptors for sweet, umami, and bitter taste that trigger the activity of second messengers inside the cell, receptors for sour and salty taste are ion channels — pores in the cell membrane. When stimulated by salty or sour taste molecules, these channels permit ions such as sodium, potassium and calcium to flow in and out of the cell. Joe states, "Believe it or not, the mechanisms for sour and salty taste are not yet fully described." A more complete understanding of these taste qualities would have many nutritional and clinical implications. Potential benefits include the development of alternatives or enhancers for salty taste, as well as personal tailoring of diets to assist in prevention or treatment of hypertension, obesity, and other diseases.

Psychophysics is a branch of science that relates sensory experience to stimulus

The Monell Chemical Senses Center, a nonprofit basic research institute, is devoted to investigation of taste, smell, and chemosensory irritation.

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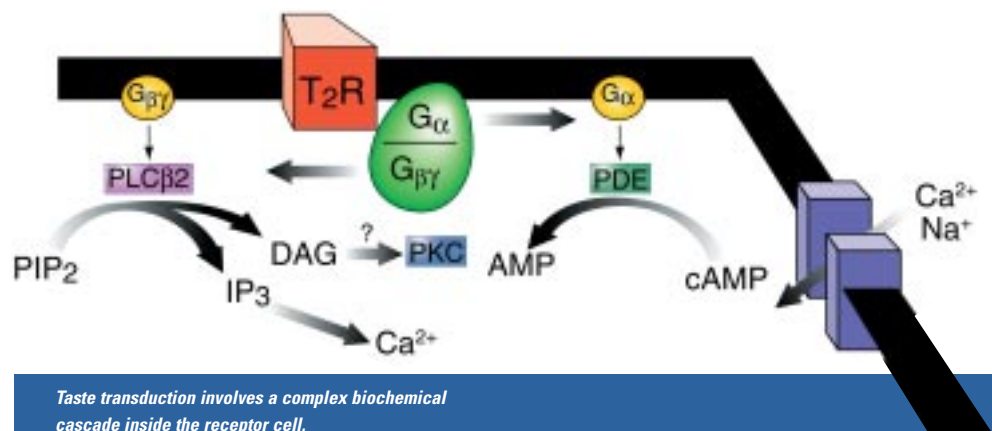
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Planning for progress...

properties. Joe points out that this relationship now can be extended to include receptors, explaining, "It's possible to make a direct link between an individual's behavior or sensory experience and their expression of taste receptors or taste transduction elements." Noting that "the collaboration between molecular genetics and psychophysics makes the discoveries much more powerful," he expects that this approach will have a beneficial clinical outcome for cancer patients undergoing radiation therapy to the head and neck. Such patients generally lose their sense of taste and become nutritionally compromised, impeding their recovery. Together with psychophysicist Paul Breslin and molecular biologist Liqian Huang, Joe is working to determine the effects of radiation on taste transduction pathways. He comments on the significance of this work, "Up until this time, not only were we unable to work with human cells, but we didn't know enough about the sense of taste to intervene in the course of disease or therapy. With today's knowledge and powerful molecular techniques, we can begin to understand this process and eventually intervene. I feel that this kind of work is the culmination of my career because now we can finally help people."

Like many of Monell's scientists, Joe is quick to credit the contributions of his colleagues. "I have been fortunate in having dedicated and motivated post-doctoral fellows, Research Associates and technicians working in my lab. Doug Bayley has been a technician in my lab for over 30 years. He has made numerous contributions to our work and has also become a good friend. Likewise I must say the same about a long-time colleague and Research Associate, Dr. Tauf Huque. He too has pushed our knowledge forward."

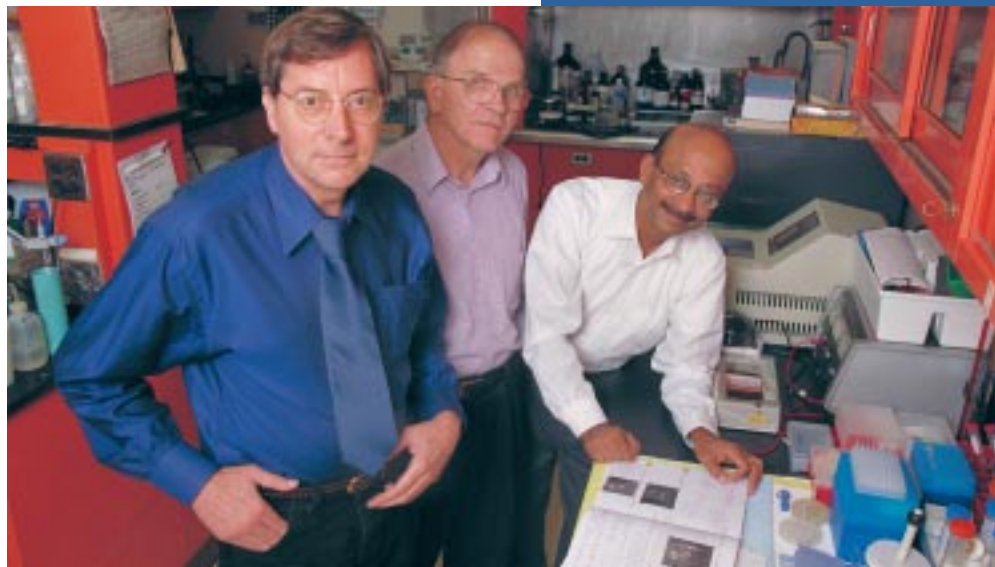
Joe's scientific partnerships extend beyond the walls of the Center. In particular, he has enjoyed a long and productive collaboration with Dr. Spielman, who was at Monell from 1989 to 1990. In addition to their current work on human taste cells, Joe and Andrew have identified and measured biochemical events in taste cells following binding of a taste stimulus to a receptor on the cell's surface. This work was technically demanding, as the reactions take place quickly — within the millisecond time frame. Joe reflects, "This was incredibly exacting and demanding work for both of us. But it was an exciting time and resulted in a better understanding of bitter taste transduction. Some

of these reactions peak at 75 milliseconds! For biology, that's fast."

Planning for progress: institutional...

Along with his scientific contributions, Joe has worn an administrative hat at Monell since the 1980s. In this role, he has been particularly attuned to implementing the research goals of the Center's scientists, especially with regard to space and facilities, "At Monell, the administrators are also scientists, which gives us a good feel for what is required for optimizing research." His many years at the Center and broad research perspective placed him in an advantageous position to play a role in planning Monell's future. In 1999, Director Gary Beauchamp appointed Joe to head a committee to prepare a "Five Year Strategic Plan" for Monell, covering the years 2001-2006. Joe comments, "This endeavor provided us with the challenge to look closely and critically at ourselves, to decide what was working and what wasn't, and to plan the future around those ventures that would be most beneficial for the Center and for science." He credits Monell's organizational structure for driving much of the rationale behind the plan,

Douglas Bayley, M A
Taufiqul Huque, Ph D



noting, "The almost family-like atmosphere of the Center was very important in designing details of the Five-Year Plan, simply because people were looking out for each other's welfare in a very generous way." After numerous meetings with the Center's scientists and other interested parties, the committee used a SWOT (strengths,

Contributing to the future...

weaknesses, opportunities and threats) analysis to evaluate Monell and put forward a number of recommendations for the Center's future.

Promoting growth...

The Plan specifically suggested strengthening and expanding the Center's programs in Sensation and Perception and in Neuroscience and Molecular Biology. It also proposed a new research initiative in Chemosensory Development, Aging, and Regeneration.

But a crucial prerequisite was more space. Since 1996, Monell has fully occupied the building at 3500 Market, and the need to acquire new research space was yet another of the goals specified in the Five-Year Plan. Once again, the Director called on Joe, asking

him to head an effort to evaluate how to proceed and to write a grant to the National Institutes of Health to partially fund the renovations. Joe recalls, "Writing this grant was difficult and exhausting work, but I had the total cooperation of absolutely everyone at the Center." His endeavors were successful, and on August 28, 2003, Monell was notified officially that the Center had been awarded 3.6 million dollars towards the construction of new laboratories in the adjoining building (see article on back cover for additional details on the evolution of the new labs).


Advancing understanding...

One floor of the new facilities, slated for occupancy in early 2005, will be devoted to

molecular biology, genomics, and proteomics. While this represents a departure from Monell's tradition of "mixing up" laboratories in different disciplines, the consolidation of molecular research programs will reduce the need for redundant equipment and facilities, while also promoting intellectual exchange and collaboration. Joe explains, "This facility will be an open laboratory type of design, something new for Monell. Collaborations will be easier to undertake without a solid wall separating each laboratory. There will also be flexibility to change the amount of space assigned to individual investigators as their research efforts expand or contract."

Following completion of the molecular labs, a second floor of the adjoining building will be renovated — along with the existing facilities — to create an entire floor (~17,000 sq. ft.) devoted to human chemosensory research. From the viewpoint of a scientist working in both fields, Joe points out that the physical proximity of the molecular and human sensory laboratories will "perceptually link these two areas which appear, at first glance, to be very far apart. Yet a complete understanding of the chemical senses would be difficult to achieve without taking advantage of the ways in which each of these disciplines impacts on the other. Locating the two facilities physically very close to one another will foster a direct scientific link between the two." From the perspective of someone who helped plan the new facilities, he notes that the new state-of-the-art labs will expand the breadth and impact of the Center's research by acting as magnets to strengthen existing external collaborations and attract new ones.

Contributing to the future...

Looking ahead, Monell will instigate profound changes over the next decade, including new research programs and new laboratories. These changes will be forward-looking, permitting the Center to build on its previous success. But at the core, the Center will continue to maintain its emphasis on a multidisciplinary approach to the study of the chemical senses, promoting innovative and integrative research through collaboration and staff unity. These principles are the building blocks on which Monell is constructing the future of chemosensory science. As Joe summarizes, "This model of multidisciplinary research has remained a steadfast tenant of the Center. It's unique and it works." 

Donna Kupniewski,
Director of Facilities Management
Joseph Brand, PhD



Joe reviews blueprints for the new laboratories with Donna Kupniewski, who will oversee the construction project.

New Faculty Members

At first glance, Monell's two newest faculty members are a study in contrasts: one is a renowned senior scientist, the other in the early stages of his career; one studies olfaction, the other taste; one explores neural networks, the other looks at the inner building blocks of cells. But on closer inspection, important similarities appear. Each develops and uses novel technologies to assist his scientific quest. Together, they exemplify the Center's commitment to excellence along with its vision of the future.

In the shorthand lingo of science, **Alan Gelperin, Ph.D.** is known as a computational neuroscientist. That convenient label, however, masks extensive research interests that span basic and applied investigation. Gelperin's distinguished career has ranged from academia to industry and back, all the while utilizing the olfactory system as a model to help decipher the mysteries of learning and memory. Following Ph.D. training at the University of Pennsylvania, Gelperin joined the faculty of the Department of Biology at Princeton University, where he remained for 14 years. During that time, he also served as chair of Princeton's Neuroscience Program. He then spent 20 "mind-stretching years" in the Biological Computation Research Department at Bell Laboratories, the research and

development arm of Lucent Technologies.

Gelperin's goal is to understand the cellular and molecular basis of learning and memory storage. As he puts it, "learning is omnipresent in olfaction, so use of the olfactory system has proven to be a good strategy." With an eye to the long-term implications of his research, he comments, "understanding the fundamental mechanism of memory storage is the best way to make progress in ameliorating the damage done by diseases of memory."

Gelperin's decision to come to Monell in



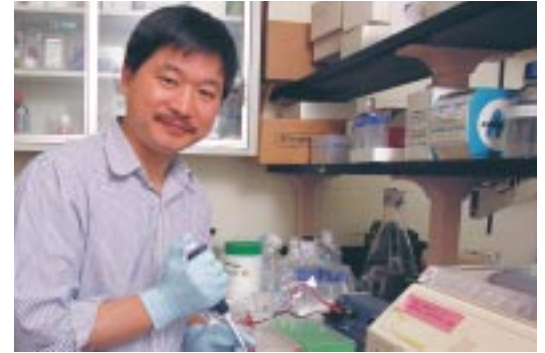
A l a n G e l p e r i n , P h D

2001 was influenced by the strength of the institutional leadership and by the "quality of the faculty and their expressed willingness to collaborate." Collaboration is a central component of Gelperin's approach, based on his belief that it is important to "integrate many different perspectives on problems in the neurological sciences." Interactions with Monell colleagues have already significantly impacted Gelperin's research endeavors, including a project in a rodent model that records from the olfactory bulb during the actual learning of odor associations. Based on early findings, The Whitehall Foundation recently awarded Gelperin a 3-year grant to support this work, for which research relationships will continue to be critical. "As we get closer to asking questions about the molecular mechanisms of memory storage in cells of the olfactory bulb," Gelperin states, "collaboration with my Monell colleagues who are card-carrying molecular biologists will be essential to our progress."

In a very different, yet related line of research, Gelperin and his colleagues utilize electronic models to complement biological approaches. Using robotic dogs equipped with an electronic "e-nose," Gelperin and Monell collaborators are working with Dr. Daniel Lee at the University of Pennsylvania and Dr. Boris Shraiman at Rutgers University to identify computational strategies used to recognize and localize odor sources. Gelperin believes that studies on computational modeling of olfactory processing and learning will provide new insights into odor processing and perception.

Liquan Huang, Ph.D., Assistant Member of Monell since 2002, uses the tools of molecular biology to decipher how taste receptor cells work. Specifically, he identifies receptor cell genes, along with the proteins they encode to receive and process information about tastants. By defining how genes and proteins differ among receptor cells, Huang can address questions related to the receptor cell's function, such as how disease and aging affect taste perception and appetite.

A native of China, Huang came to the United States to pursue graduate studies at



L i q u a n H u a n g , P h D

Yale University. His time at Yale resulted in a Ph.D. in Molecular Biology and "laid a solid foundation for me to investigate biomedical mysteries with molecular biological methods." Huang's subsequent postdoctoral training at the Mount Sinai School of Medicine in New York in the laboratory of Dr. Robert Margolskee, a pioneer in the molecular biology of taste, fostered his technical and intellectual growth.

Monell's reputation as an internationally known center for chemosensory research and its distinguished faculty were obvious draws for Huang. So too was its "supportive and nurturing environment, very attractive to young scientists like myself." Upon coming to Monell, Huang was not disappointed. "Monell staff members are the kindest, most enthusiastic, and helpful colleagues I have ever met," he says. "Interacting with them is always stimulating."

Seeking to overcome a major challenge in the field of taste molecular biology — the scarcity of taste cells — Huang developed a technique to augment RNA from a single taste cell. This enables him to generate sufficient cDNA products for his studies, and has facilitated his identification of several taste signal transduction components. Huang hopes to use the powerful techniques of molecular biology to identify genes critical to receptor cell development and regeneration. On a practical level, he predicts that "results from our research could lead to development of new flavors or diets that selectively enhance or suppress certain tastes, and treatments to restore taste sensation in the elderly or patients with diminished taste perception." □

After Years of Monkey Business...

A Fond Farewell to Dr. Gisela Epple

With Dr. Gisela Epple's retirement, Monell bids adieu to its longest-tenured investigator and to one of its most distinguished scientists.

Epple, a Fellow of the American Association for the Advancement of Science since 1981, is an internationally-recognized primatologist, with a life-long interest in the social organization and behavior of marmosets and tamarins — small Central and South American monkeys, about the same size and body form as squirrels.

Epple's work has included studies of the role odors play in primate communication, a scientific quest natural to Monell, but Monell was not the reason she came to Philadelphia. A native of Germany, Epple earned a Ph.D. in the natural sciences from the Johann-Wolfgang-Goethe University in Frankfurt am Main and migrated to the United States in 1967 for a postdoctoral fellowship at the Delta Primate Research Center at Tulane University. The following year she accompanied her husband to Philadelphia, where he had been recruited to a position at Jefferson University.

Epple arrived without a job, but possessing a lingering curiosity about some intriguing results uncovered during her doctoral research. She had found evidence that odors had more of an impact on social communications among marmosets than scientists had previously thought possible in higher order primates, and wanted to pursue this observation.

Fortuitously, Epple found herself in exactly the place where a fledgling research institute focused on the chemical senses was just getting established. A mutual colleague arranged a meeting with Monell founder and Director Morley Kare, and an enduring



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Ed Wheeler

relationship between Epple and Monell officially began in 1969 when Epple became an Associate Member of Monell. She attained full Member status in 1974.

From the very start, Epple's connection with Monell brought reciprocal benefits. "She was one of the most famous people at Monell in the early days and gave Monell a welcome boost at that time," says current Director Gary Beauchamp, a postdoctoral fellow during Epple's early years at the Center. For Epple, her new home opened up fresh investigative vistas. Not only did she begin to interact with scientists intensively interested in olfaction, but Monell's emphasis on multidisciplinary research permitted her to widen her disciplinary focus. "I'm a biologist," she says, "and never intended to conduct chemical analyses." But working in a place where biologists "could stick their heads into chemists' offices and vice versa" was a great advantage in extending the scope of her scientific questions.

Epple began to consider topics she might tackle from the vantage point of the chemist,





Gary Beauchamp, PhD
Amos Smith, PhD
Gisela Epple, PhD

and when organic chemist Amos Smith joined Monell in 1973, the two entered into a significant scientific collaboration. Their work spanned over two decades, resulting in 17 publications, including pioneering studies that established the importance of chemical communication in primates. Integrating behavioral observations with chemical analysis, their research demonstrated that chemically-complex scent marks provide an enormous amount of personal and social information about individual primates. As just one example of this line of inquiry, a seminal 1985 paper in *Science* demonstrated that primate scent marks can be analyzed using computerized chemical pattern recognition techniques to predict gender, sub-species, sexual receptivity, dominance, and other social traits.

Epple also devoted careful attention to describing social encounters of male and female tamarins and marmosets. She was the first to document the mating system of these primates, observing for example that only one female in a social grouping bears young, a finding with significant implications for breeding primates in captivity.

Epple and her collaborators were the only Monell scientists to work with primates, in part due to the increasing costs and regulatory scrutiny associated with all animal research and especially with investigations using non-human primates. In fact, Epple dismantled her primate colony in the 1990s, partly as a result of such constraints. Over the next decade, she contributed her expertise to several collaborations, including a series of studies that explored the influence of odor on cognitive performance of children.

Epple's contributions to science are manifest, but when asked what she would select as her preeminent accomplishment, she chose her work on conserving endangered species. This path occurred naturally as a result of her research on various species, such as the golden lion tamarin, which have been threatened by deforestation in their native regions. Epple also is well-recognized for the sensitivity with which she handled her primates. Indeed, she set standards for the treatment of animals and has consulted with zoos all over the world on the care of marmosets and tamarins.

Epple's memories of her years at Monell range from her numerous colleagues to the animals who were the foundation of her work. She still dreams of monkeys escaping from their cages and remembers the many



baby marmosets she raised and unavoidably "became attached to" after their mothers neglected them. Smith has a special remembrance of Epple which is also connected to primates on the loose, "Gisela and I went to Kennedy Airport to pick up some marmosets that had arrived and they told us we could have the animals, but not the boxes that the animals were shipped in." He continues, "The ride home to Philadelphia was very interesting!"

Retirement for Epple is probably the wrong word to use. She returns to her Monell office once a week to keep appointments and she writes at home, continuing her work spanning continents, disciplines, and species.

How, then, to sum up a life's work and a stellar career? When asked, her longtime colleagues are quick to reply. Reflecting on her contributions, Gary Beauchamp considers Epple to be one of the true founders of the study of pheromones in primates and a world leader in setting standards for the treatment of marmosets and tamarins. Amos Smith takes a broad view, identifying those attributes that made Epple an outstanding colleague, collaborator, and scientist — "her deep knowledge of the field, her innovation vis-à-vis experimentation, and her scientific integrity." □





Twin Spin

Gives Monell Researchers a Double Dose of Data



*Paul Breslin, PhD
Danielle Reed, PhD
Charles Wysocki, PhD*



“It’s a deeply surreal experience,” observes Monell scientist Paul Breslin, explaining what it feels like to be surrounded by 3000 sets of twins. This past summer, Breslin was one of fifteen Monell researchers initially overwhelmed with “double vision” while collecting data at the 27th Annual Twins Days Festival. In addition to providing countless opportunities for double takes, the world’s largest gathering of twins presents researchers with the enticing opportunity to quickly and efficiently collect large amounts of data to help them establish how genes contribute to individual differences in sensory experience. Molecular biologist Danielle Reed explains, “People differ markedly in how they experience their chemosensory world, and the use of twins allows us to assess the extent this variation is due to differences in their DNA.”

Held each year in — where else — Twinsburg, Ohio during the first weekend in August, the Festival’s primary purpose is fun. Twins march in a “Double Take” parade, compete in contests ranging from “most alike” to “cleverest outfit,” take pictures, enjoy the Talent Show, and socialize. But for many participants, the Research Tent is also a popular destination. The Monell team joined scientists from around the country, all interested in learning more about how our genes contribute

to who we are. “There were between eight and ten groups,” explains sensory psychologist Breslin. “One researcher from NASA was seeking subjects for studies on bone density, another was interested in baldness patterning, the Secret Service was there from Washington recruiting for studies on handwriting analysis, and a group from NIH was studying deafness.” Reed continues, “The organizers are very pro-research and the twins really enjoy doing it. It gives a broader dimension to the festival.”

This was the Monell team’s second year collecting data at the Festival. In 2002, Breslin recalls, “we were very happy with the data we collected, so we decided to invite everyone at Monell who wanted to do twin research to go with us.” Behavioral neuroscientist Charles Wysocki, who studies individual variation in olfactory sensitivity and preferences, had some “interesting questions that I wanted answered,” and decided to take advantage of the opportunity. He recalls, “Twenty years ago I collaborated in a twin study conducted at the University of Pennsylvania. It took nearly a year to collect data from 24 sets of twins. From what Paul was telling me about his experience last year at Twinsburg, I could test that many sets of twins in a couple of hours. I was thrilled by the prospects, albeit a bit skeptical about the potential.”

By comparing data from identical twins — who are genetically identical — with data from fraternal twins — who share only half their genes on average — scientists interested in a particular trait are able to separate genetic influences from those of environment. Reed says, “Twins are the most sensitive method to identify the genetic component of a trait.” She continues, “Relatively few have done basic twin research in chemosensation. Up until now, much of what we do, from marketing of foods to how we treat diseases, has been done with the assumption that there’s unity in how people perceive food and taste, smells and flavors. And that just isn’t true.”

And so Reed, Breslin, and Wysocki enlisted 12 students, post-docs and technicians

and loaded a trailer with supplies for an 800-mile road trip to Ohio. At the festival, they set up four stations in the research tent. At one station Reed and an assistant used swabs to collect cells from inside the cheek of each subject. The cells will provide DNA to assess whether twins were identical or not. At a second station, subjects could taste and rate a vast array of bitter and sweet stimuli. These data will help to shed light on individual differences in sensitivity and identification of receptors for bitter and sweet taste stimuli. Another station focused on sour and salty tastes, and yielded exciting results, demonstrating for the first time a strong genetic component for sensitivity to sour taste. “The data are really beautiful,” says Breslin. Regarding salty taste, “the data are less pretty, indicating that there may be more complicated genetics and more environmental contributors to sodium sensitivity.” At the fourth station, Wysocki’s group conducted five different studies, exploring genetic contributions to perceptual responses to odors and olfactory irritants. One test focused on the smell of cilantro. “Some like it and others hate it,” says Wysocki, “and it appears there is a strong genetic influence.”

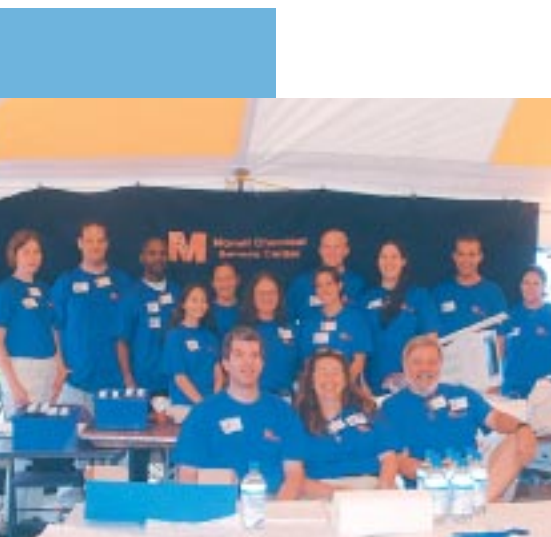
The Monell researchers studied almost 300 people over two days. Breslin comments, “We tested about twice as many people as last year in the same amount of time with probably 8 times as many tests. We went crazy, and intend to add even more tests next year.” And Reed recalls, “It’s so very busy — we’re clearly the most overwhelmed research area. I told the staff that there’d be no time to eat and they thought I was joking. We’re popular, because we pay and we give prizes — I was

surprised to see how much people really worshiped the Monell beach towels!”

The collaboration between Breslin and Reed exemplifies the integration of sensory psychology and molecular genetics that helps characterize Monell’s research. As Reed points out, “There are places with experts in molecular biology and places with experts in psychophysics, but few other places with expertise in both.” Breslin comments on the overall significance of combining sensory and genetic approaches, “Perceptually, people live in very different sensory worlds, and we hope to actually explain these worlds from a genetic perspective. The genes encode the proteins that make up our physiology that then somehow generate the perception.” The researchers anticipate that their collaboration will increase awareness and understanding of individual differences in perception of foods, flavors, and fragrances. Looking to practical outcomes, Reed predicts, “There’s a potential to develop tests to assess what tastes good and what tastes bad to individuals. Such tests will help us predict who will like and want to eat certain types of foods and drinks, and to make sensible recommendations with regard to nutrition, diabetes, and obesity.”

Looking ahead, the enthusiastic researchers envision a twins research center at Monell. In the meantime, they’ve reserved even more space in the Research Tent at Twinsburg and are already planning next year’s road trip. As for Breslin, he’s no longer perturbed by the “surreal” atmosphere, stating, “You just get used to seeing carbon copies of people everywhere.” And Wysocki admits, “Far more than I anticipated in my wildest dreams.”

Twins (monozygotic or dizygotic) wishing to participate in taste studies at Monell should contact Dr. Breslin’s lab at 215.898.9833 or breslin@monell.org. For olfaction studies, contact Dr. Wysocki at 215.898.4265 or wysocki@monell.org.



International Advisory Council

Over the years, Monell has benefited from the independent counsel of distinguished outside advisors voiced through the International Advisory Council (IAC). Established at the time of Monell's creation in 1968, the IAC helps the Center's

Director and Board of Directors steer resources to high priority research areas; identifies new opportunities in basic and applied research; and provides broad guidance for Monell's varied programs. Members of the IAC are drawn from the highest levels of

industry, academia, government, and the philanthropic community. The four newest members of the IAC continue Monell's tradition of seeking a diverse universe of opinion from leaders in their respective fields.



Brenda D. Gavin, D.V.M., M.B.A. is a venture capitalist with extensive experience in industry and applied science. She is currently a Managing Partner at Quaker BioVentures, a new fund based in Philadelphia focused on investments in life science companies in the Mid-Atlantic region. Gavin previously was President of S.R. One, Limited, GlaxoSmithKline's corporate venture fund; General Partner of EuclidSR Partners, an independent venture capital limited partnership targeting healthcare and information technologies; and Director of Business Development at SmithKline Beecham Animal Health Products. Since the 1980s, Gavin has been involved periodically with Monell through her business positions. She became impressed with the quality of Monell's investigators and their vigor in pursuing hard subjects. "Monell," she says, "is unique and superior in its field." And, "I like the people." Having long worked at the interface where research ideas and investment capital meet, Gavin seeks to strengthen Monell's capacity to evaluate the potential commercial value of specific research efforts. Her critical eye for "recognizing what may be interesting to people with dollars to invest" is attuned to helping Monell open up novel lines of inquiry and develop new sources of support.



Jordin T. Kare, Ph.D. is an astrophysicist and electrical engineer who heads his own successful aerospace consulting company. Kare Technical Consulting provides advice and guidance to aerospace companies and Federal laboratories on advanced space system architecture and design. Kare has worked as a physicist at the Lawrence Livermore National Laboratory and has also held numerous positions in government and industry within the aerospace field. Kare, son of Monell's founder and first Director, Morley Kare, has a longstanding interest in the Center: "I literally grew up with Monell and its people." Kare says that "being on the IAC is, for me, an excellent way to both stay informed about Monell and, I hope, contribute in a small way to its continuing success." Kare's viewpoint as a scientist and engineer will broaden the spectrum of opinion that shapes Monell's future. "I hope I'll be able to contribute a scientific outsider's perspective on work at Monell, and perhaps provide contacts or opportunities that would not otherwise be found."



Shiriki Kumanyika, Ph.D., M.P.H. is a clinical investigator whose interdisciplinary work integrates epidemiology, nutrition, aging, prevention, minority health, and women's health issues. She holds a Ph.D. in Human Nutrition from Cornell University and a

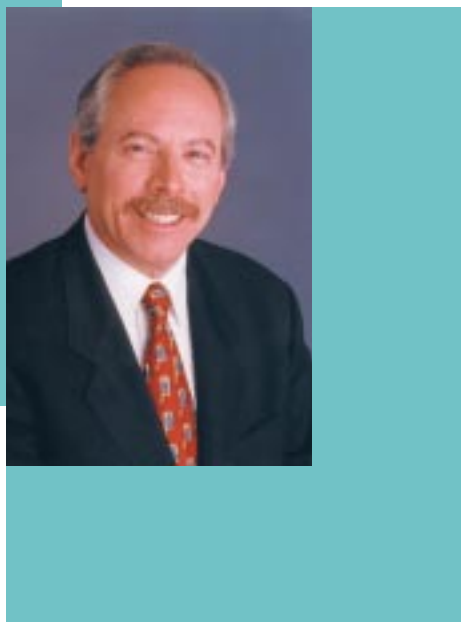
M.P.H. from Johns Hopkins University. Currently, she is Professor of Epidemiology and Associate Dean for Health Promotion and Disease Prevention at the University of Pennsylvania School of Medicine. Kumanyika's research has concentrated on the role of nutritional factors in the prevention of chronic diseases, with a particular focus on obesity, hypertension, and diabetes. Although her direct involvement with Monell and its faculty is recent, she says, "I have been an 'admirer' of Monell since the days when I did my doctoral dissertation on salt and hypertension and discovered the relevant work at Monell. To me, the entire area of sensory studies is of fundamental importance to health." Kumanyika believes she can best contribute to the IAC "by seeing potential connections between work being done at Monell and various health problems." As just one example, she notes that work on taste and satiety has many potential links to obesity development and, ultimately, may lead to new approaches to improving the health of the general public.

Ambrose K. Monell is an active philanthropist with a special interest in the affairs of the Center that bears his family name. Grandson of the man for whom The Ambrose Monell Foundation was named, Monell is a Member of that Foundation's Board of Directors, as well as a Director of The G. Unger Vetlesen Foundation. Through these positions, he plays a vital role in allocating resources to a wide variety of religious, charitable, scientific, literary, and educational activities throughout the world. The Monell Foundation now funds over 125 projects annually, including the Monell Center. "I would hope that my participation in the International Advisory Council would give me a better appreciation of how Monell will succeed in the future," Monell says. "The IAC is a good incubator for ideas that will help Monell as it expands over time." ☐

A Guest Perspective

Monell Director Gary Beauchamp introduces this issue's guest columnist:

Alan Leshner has been a friend and informal advisor to us at Monell for many years. During this time he served in senior positions at the National Science Foundation and the National Institutes of Health and consequently could not be formally connected to Monell's operations. However, he recently left government service to become CEO of the American Association for the Advancement of Science (AAAS), the world's largest general scientific society, and Executive Publisher of *Science Magazine*. The mission of the AAAS is "to advance science and innovation throughout the world for the benefit of all people." To this end, the AAAS sponsors programs and addresses issues ranging from the contribution of science to public policy to promotion of science education and literacy to responsible use of science and technology. When I learned of Alan's new position, I immediately pounced, successfully recruiting him to Monell's Board of Directors. He brings a novel perspective to the Board and sits at the nexus of our public face and scientific research activities. Recently, I asked Alan for his thoughts on Monell's standing in the scientific community. Here is his response.



Alan I. Leshner, Ph.D.
Chief Executive Officer,
*American Association for the
Advancement of Science*
Executive Publisher,
Science Magazine

There's nowhere like the Monell Chemical Senses Center. It's truly unique among research groups interested in the chemical senses, both in breadth and depth. Monell's superb research programs in taste and smell span basic molecular biology, to integrative and systems behavioral and neural science, to clinical work with human subjects. Monell scientists are at the forefront of chemosensory research, answering questions we couldn't even imagine a decade ago. Who would have thought then that we could actually identify and manipulate individual genes involved in the control of taste and smell? Or, that we could look into the brains of awake human beings and watch the mind in action anticipating and experiencing chemical sensory events? Monell's research programs apply advanced technologies to fundamental and significant questions concerning the role the chemical senses play in our interactions with our internal and external worlds.

I've been fascinated by Monell for over 25 years, and by now consider myself an advanced Monell groupie. I got to know the Center well back in the early 1980s when I

was running behavioral and neural sciences research at the National Science Foundation. Even then Monell was seen as doing pioneering work, helping to frame and build what now is a well-established and well-respected broad scientific field. I often talked with Morley Kare and Gary Beauchamp about my fantasy of taking a sabbatical year at Monell, though my bosses never seemed to agree I should take that year away. While working at NIH — first as Deputy Director and Acting Director of the National Institute of Mental Health (NIMH) and then as Director of the National Institute on Drug Abuse (NIDA) — I was frequently reminded of Monell's leadership position within the broader community of biomedical science. And now as CEO of the world's largest multidisciplinary scientific society and Executive Publisher of the journal *Science*, I appreciate Monell's commitment to interdisciplinary research as reflecting its recognition that true scientific advance depends on integrating the contributions from mathematics, physical and biological sciences. As a relatively new member of the Monell Board of Directors I now feel I can claim family pride for what I had been admiring from a greater distance before.

As good as Monell is, every research center can be even better. And now the Monell leadership has decided to take it from a position of great strength to even greater strength by expanding its overcrowded facilities. The primary goals are both to relieve the space pressure that is limiting the progress of existing groups and to provide appropriate facilities to help recruit and train the next generation of scientific leaders. The new labs will provide state-of-the-art facilities for basic, translational and even clinical research, using the most modern tools and scientific approaches to tackle some of the most stubborn questions about the nature and dysfunctions of taste and smell — and what to do about them.

As evidenced by its superb track record, your and my support of Monell's growth and development will pay off in benefits to society multifold. Join an ever growing cadre of Monell groupies! ☺

Breaking Down the Walls

Expanding Monell's Boundaries

For 35 years, Monell scientists have pushed the limits of chemosensory science. Now, the cumulative impact of those successes, along with anticipated new programs, have compelled Monell to expand its physical boundaries as well — literally by breaking down the adjoining walls.

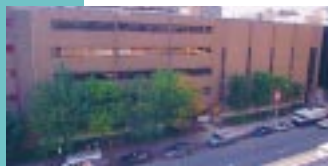
The decision to augment Monell's space originated in detailed programmatic planning. After evaluating several options, Monell's Board of Directors concluded that the optimal choice was just on the other side of the wall, at 3508 Market Street. However, because the building is in poor condition and not designed to support modern laboratories, a major investment would be needed to make this option feasible. And, the Center first had to procure the rights to lease or purchase the space.

Monell actively moved on both fronts. After long negotiations with the University City Science Center, an agreement to lease two floors of 3508 Market was signed in January 2003. The 20-year lease for the 4th floor will begin December 1, 2003. This floor will house the new molecular biology, proteomics, and genomics facility and will contain Monell's first laboratories in the "open lab" design. The lease for

■ **NIH Awards Monell \$3.6 Million Towards Construction**

■ **Center Launches "Science of The Senses" Capital Campaign**

■ **The Ambrose Monell Foundation Pledges \$1 Million**



the 3rd floor will begin in 2006. Renovations on this floor will extend the Center's human sensory facilities, with blood draw labs, waiting areas for subjects, and space for state-of-the-art olfactory research. Concurrent renovations of the 3rd floor at 3500 Market will update that space for use in taste research, creating an expansive Human Chemosensory Research Facility that will extend across the 3rd floors of both buildings.

First phase construction is scheduled to begin this Spring, with occupancy of the 4th floor slated for Spring 2005. During construction, the current 4th floor of 3508 will be entirely demolished and new lab space and facilities built. Also during this initial stage, new infrastructure — air handlers, chillers, etc. — will be placed on the roof and in the penthouse and basement of 3508 Market. Construction of the 3rd floor labs will follow completion of the 4th floor project. The lease arrangement with UCSC also allows Monell to occupy succeeding floors of 3508 Market every 5 to 7 years for the next 25 years. Monell has the right to purchase the entire building any time after two floors are occupied.

The estimated \$8 million required for construction will come from several sources. The Center submitted a grant for construction funding to the National Center for Research Resources (NCRR, part of the NIH), and in August, Monell

was notified that it had been awarded \$3.6 million. Under terms of the award, this amount must be matched by Monell dollar-for-dollar. Continuing its longstanding support of the Center, The Ambrose Monell Foundation has pledged \$1 million towards the project. The remainder will come from Monell's newly launched capital campaign. The "Science of the Senses" campaign will seek contributions from corporations, foundations, sponsors, employees, and friends to finance the construction, plus an additional \$2 million to recruit additional scientists and fund new programs. Monell has hired Jim Wellen to direct the campaign. An experienced fundraiser, Wellen most recently led a regional effort to raise donations for the Juvenile Diabetes Research Foundation.

At Monell, financial support for bricks and mortar is predicated on an even firmer foundation — that of sound and innovative science. Monell begins with its people and programs, known for breaking down disciplinary walls and other investigative impediments. Now this figurative wall-breaking has demanded that Monell really break through to the other side. □

Beginning Steps...

Gift provides impetus to Capital Campaign

"Once you get to know Monell, it's hard not to be a part of it," explains Lewis S.

Somers, 3rd, when asked why he supports the Center. Somers, a businessman who developed an early version of the artificial kidney, has contributed to the Center's growth through his long-time service on Monell's International Advisory Council. He notes, "Monell is a special place that needs to be protected and grown."

Recently, Somers had the opportunity to stand behind his words — and he stood quite tall. While considering the possibility of expansion, the IAC engaged in a lively debate concerning the feasibility of raising the needed funds. When it was suggested that a consultant could assess the Center's fund-raising potential, Somers immediately volunteered to pay the fee. "It was a crucial step and time to get moving," he recalls.

Somers' generosity enabled Monell to engage development consultant Monica Winter. Formerly Director of Foundation and Corporate Relations for the Wistar Institute, Winter was enthusiastic about the positive appeal of Monell's research and mission. Following her advice, the Center recently hired an experienced full-time fundraiser.

Somers is delighted with the results of his incentive and plans to remain involved in the campaign. He observes, "Every step, whether little or large, is important." For more information on the Science of the Senses campaign, contact Jim Wellen at 215.746.0354 or jwellen@monell.org.



**Monell Chemical
Senses Center**

