



### Training the Pharmacists of Tomorrow

- The Skaggs School of Pharmacy and Pharmaceutical Sciences, established in 2002, is the first public school of pharmacy in Southern California.

### Leading Alzheimer's Disease Research

- The Shiley-Marcos Alzheimer's Disease Research Center at UC San Diego, founded in 1984, was one of the original five Alzheimer's disease Research Centers funded by the National Institute on Aging. Its founder, Robert Katzman, MD, exerted his national influence to increase federal research funding for Alzheimer's disease from \$5 million in 1980 to over \$300 million by 1996.

### Pioneering Surgical Techniques

- The Center for the Future of Surgery at UC San Diego is pioneering scarless surgery techniques including the first procedures in the United States to remove an appendix and a gallbladder through the mouth. Mark Talamini, MD, and Santiago Horgan, MD, are also developing other endoscopic surgeries through the body's natural openings, including a new option for treating obesity.

### Illuminating the Inner Working of Cells

- Roger Tsien, PhD, professor of pharmacology and chemistry, was one of three scientists awarded the 2008 Nobel Prize in Chemistry for a series of important developments which led to the use of green fluorescent protein (GFP) by scientists around the globe to monitor and image multiple molecular processes simultaneously in living cells. He was the first to improve and modify GFP from jellyfish and analogous red fluorescent proteins from corals to track a wide variety of cell signals, engineering fluorescent dyes of different hues that can gently infiltrate cells without harming or disrupting them.

### Chronic Inflammation Contributes to Cancer

- Michael Karin, PhD, Distinguished Professor of Pharmacology and Pathology professor in UCSD's Laboratory of Gene Regulation and Signal Transduction, was the first to demonstrate the molecular link between inflammation and cancer. Highlighted in the August 6, 2004 cover story of the journal Cell, Karin's team discovered the significance of pro-inflammatory gene I-kappa-B kinase (IKK beta).

## The World Discovers the Importance of Vitamin D

- Pioneering studies by Cedric Garland, DrPH, professor of family and preventive medicine, showed the first associations between a lack of vitamin D and breast and other cancers. More recently, Garland and his UC San Diego collaborators reported for the first time an association between deficiency in exposure to sunlight, which the body needs to make vitamin D.

## Developing Important Alzheimer's Drugs

- An early pioneer in Alzheimer's disease treatment, the late Leon Thal, MD, professor of neurosciences, published a 1993 study that was the first to show that memory could be enhanced in Alzheimer's disease patients by stopping the action of a brain chemical called acetylcholinesterase (AChE). These findings led to the development of AChE inhibitors (for example, Tacrine and Donepezil), some of the first drugs used to treat the disease.

## Transporting Stroke Specialists to the Patient Bedside

- Brett Meyer, MD, co-director of the UCSD Stroke Center, and colleagues were the first to prove the effectiveness of remote-site diagnosis of stroke patients through the use of telemedicine.

## Insulin Resistance Linked to Type II Diabetes

- Jerrold Olefsky, MD, professor of medicine and chief of UC San Diego Medical Center's Division of Endocrinology and Metabolism, was among the first researchers to show that insulin resistance is a primary cause of Type II diabetes. His research helped lead to development of insulin-sensitizing drugs that are now standard therapies for this disease.

## Research Led to First Drug to Treat Painful Bladder Condition

- Internationally recognized as a leading physician and researcher in interstitial cystitis (IC), Lowell Parsons, MD, of the UC San Diego Medical Center is a leader in the latest techniques for detecting and treating this painful bladder condition. His research led to the development of Elmiron, the first drug currently used to treat IC.

## Fire and Ice: A Life-Changing Treatment

- Hal M. Hoffman, MD, assistant professor of medicine and pediatrics, first identified the gene that causes a condition called familial cold autoinflammatory syndrome (FCAS), a discovery which led to development of an effective treatment for this rare, hereditary disease.

## Hope for a Crippling Disease

- In 1997, a group of researchers led by Gary Firestein, MD, professor of medicine, Health Sciences Dean of Translational Medicine and chief of the Division of Rheumatology, Allergy and Immunology, was the first to report that the p53 gene, perhaps best known for suppressing cancer tumors, also played a role in rheumatoid arthritis. They later discovered the precise location and potential mechanism by which mutated p53 genes destroy joints in rheumatoid arthritis patients, which has resulted in development of novel treatments to treat crippling effects of the disease.

## Defining the Concept of Gene Therapy

- Theodore Friedmann, MD, director of UCSD's Center for Molecular Genetics, and his colleagues were the first to define the concept of gene therapy as a way to treat diseases by using gene transfer techniques to treat the mutant genes responsible for disorders.

## Pioneering Gene Therapy to Treat Cognitive Decline

- Under the leadership of neurosciences professor Mark Tuszynski, MD, PhD, UCSD researchers initiated the first human trial of gene therapy for Alzheimer's disease in 2001. In that study, the research team delivered cells modified to produce human nerve growth factor (NGF) to the cholinergic basal forebrain to determine whether cholinergic cell loss, associated with memory loss in Alzheimer's disease, can be reduced and cell function amplified through the delivery of NGF to the affected area of the brain. Early results demonstrated a measurable slowing in the rate of cognitive decline and an increase in metabolic activity in the brains of these patients.

## Offering Hope for Children with Autism

- Researchers at the UCSD School of Medicine and Rady Children's Hospital, led by Eric Courchesne, PhD, published a 2003 study that was the first to identify the neurobiological early-warning signs of autism during a child's first year of life, a finding that offers the potential for earlier diagnosis, intervention and improved clinical outcomes for autistic children. Under his leadership, one of six Autism Centers of Excellence in the country was established at UC San Diego by the National Institutes of Health in 2007.

## First Facility Dedicated to Glaucoma Research

- The Hamilton Glaucoma Center, founded in 2004, is the first facility in the world dedicated solely to glaucoma clinical and laboratory research. Its founder, Robert N. Weinreb, MD, distinguished professor of ophthalmology, and colleagues at the Hamilton Glaucoma Center have developed and translated into clinical practice a series of laser-based optical instruments to objectively and quantitatively assess the optic nerve and retinal nerve fibers. These instruments are being used worldwide in clinical practice to diagnose and monitor glaucoma and other eye diseases.

## Researchers at Moores UCSD Cancer Center Develop Novel Therapies

- In 1999, the U.S. Food and Drug Administration (FDA) approved a chemotherapeutic agent that was conceived, developed, produced and tested in Phase I clinical trials at the Moores UCSD Cancer Center. An injectable sustained-release formulation of the drug cytarabine is used to treat patients with lymphomatous meningitis, a life-threatening complication of non-Hodgkin's lymphoma.
- Researchers here also conducted the first clinical trials testing the technique of delivering high doses of anti-cancer drugs directly to ovarian tumors. In 2006, the federal government announced that multiple randomized clinical trials had established this form of treatment as the new standard therapy for ovarian cancer patients whose tumors can be removed at initial surgery.

## Cancer Prevention Program Helps Kill Joe Camel

- The Moores UCSD Cancer Center's Cancer Prevention and Control Program is known internationally for documenting the effectiveness of cigarette advertising with adolescents, proving that tobacco marketing encouraged young people to start smoking. The finding helped lead to the withdrawal of Camel cigarettes' "Joe Camel" advertising campaign.

## Help for Smokers a Phone Call Away

- Moores UCSD Cancer Center researchers conducted the first randomized clinical trial to prove that a telephone-based smoking cessation service could be effective. The California Smokers Helpline was developed in 1990 and has become a statewide service that has helped hundreds of thousands of callers quit smoking. More than 35 other states and several other nations have established similar programs modeled on California's.

## World Leader in Surgery to Remove Blood Clots

- UC San Diego Medical Center pioneered a lifesaving procedure to remove blood clots from the pulmonary arteries. Physicians around the country and worldwide refer patients to the Medical Center for this treatment.

## “Golden Shield” Protects Staph Bacteria

- Victor Nizet, MD, professor of pediatrics and neurosciences and chief of the Division of Pharmacology and Drug Discovery at the Skaggs School of Pharmacy and Pharmaceutical Sciences, and colleagues were the first to prove that the molecules on the surface of a *Staphylococcus aureus* bacterium shielded the “superbug” from the immune system. The researchers exploited a structural vulnerability in that shield to develop an effective treatment with an anti-cholesterol medication.

## Nanotechnology Targets Cancer Tumors

- In 2005, the National Cancer Institute awarded a five-year \$20 million grant to establish a Center for Cancer Nanotechnology Excellence at UC San Diego, one of seven such centers in the nation. Researchers at the center collaborates with other institutions in San Diego, using nanotechnology to develop anti-cancer therapies that directly target tumor cells, as well as more accurate and faster diagnostics.

## Ground-Breaking Discoveries May Help Prevent Blindness

- A multi-institutional research team, led by Kang Zhang, MD, PhD, professor of ophthalmology and human genetics, has made important discoveries related to age-related macular degeneration (AMD), the leading cause of blindness in adults over the age of 60. The team discovered the first gene associated with severe, “dry” macular degeneration, also known as geographic atrophy. They also showed that there could be adverse consequences, including blindness, if individuals who possess a particular variation of this gene are treated with an experimental therapy currently being tested for another form of AMD.
- Robert N. Weinreb, MD, distinguished professor of ophthalmology and director of the Hamilton Glaucoma Center, and Felipe A. Medeiros, MD, PhD, assistant clinical professor of ophthalmology, created the first validated glaucoma risk calculator, which estimates a patient’s risk of converting from high eye pressure or ocular hypertension to glaucoma; this will help physicians determine whether to initiate glaucoma therapy for patients.

## Leading the World in Stem Cell Research

Catrina Jamieson, MD, PhD, director for Stem Cell Research at the Moores UCSD Cancer Center, moved research for a rare blood disorder from bench to bedside in just one year. In a unique partnership between industry and academia, a stem cell research team led by Jamieson brought a promising drug candidate for myeloproliferative disorders – which are all driven by the same genetic mutation and can evolve in leukemia – to Phase 1 clinical trials at major institutions around the country.

Karl Willert, PhD, director of the UCSD stem cell research core facility, and Shu Chien, PhD, professor of bioengineering, developed the first microarray that allows for real-time analysis of human embryonic stem cells. The technology will advance scientists' insight into how human embryonic stem cells differentiate into other specialized cells in the body, an understanding critical to future stem cell-based therapies.

Steven Dowdy, PhD, professor of cellular and molecular medicine and Howard Hughes Medical Institute Investigator, developed a method for delivering short interfering RNA fragments (si RNA) into primary cells and tumor-causing cells without toxic effect. Able to silence genes through RNA inhibition, siRNA have great potential to manage and treat cancer.