

**School of Veterinary Medicine
University of California Davis**

**ACADEMIC PLAN
2008**



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UNIVERSITY OF CALIFORNIA, DAVIS SCHOOL OF VETERINARY MEDICINE

ACADEMIC PLAN

EXECUTIVE SUMMARY

The School of Veterinary Medicine serves the public through its animal, human, and environmental health teaching, research, and service programs. Veterinary medicine has evolved to become a highly sophisticated health profession, which must balance changing societal demands and expectations with regard to the care and treatment of animals, the use of animals in research, and the effect of animals and people on the environment. We embrace these responsibilities with enthusiasm and strive to not just meet the standards and expectations of the veterinary profession, but to display leadership and vision.

The U.S. Department of Education dictates that all schools of veterinary medicine must be accredited by the American Veterinary Medical Association on a prescribed set of essential criteria. These criteria dictate to the schools the minimum standards which must be met in the areas of: faculty, finances, physical facilities and equipment, clinical resources, curriculum, research programs, organization, admissions policies, student support services, library and information resources, and outcomes assessment. Accreditation ensures that veterinary graduates are qualified to enter the profession and practice veterinary medicine. As a health profession, the basic and clinical sciences are integrated and interdependent such that all disciplines must be present to meet accreditation requirements and provide a complete veterinary education.

The School seeks to meet all essential requirements and to forecast the future role of veterinary medicine in our constantly changing environment. We have studied the societal and professional demands of recent years, considered the School's strengths and expertise, and projected the following academic developments for the School over the next five years.

- **Education** – Maintain our leadership position in veterinary education, to produce graduates with the ability to be leaders within the profession, to embrace public service, and pursue academic careers.
- **Research** - Focus our future research enterprise on translational research that addresses animal, human and environmental health. Areas of particular emphasis include: infectious and zoonotic diseases, genetics, genomics, reproductive biology, respiratory biology, immunology, toxicology, biochemistry, epidemiology and statistics, stem cell research, comparative medicine, food safety, and ecosystem health.
- **Service** – The faculty are committed to solving real problems impacting animal, human and environmental health, continued excellent clinical practice and patient care, enhanced public education, rapid diagnostic support for California's animal agriculture industries and wildlife, and even disaster response and recovery assistance.
- **Faculty** - Recruitment and retention of the top faculty candidates available is the most critical challenge facing the School. Increasing the faculty salary plan in recognition of the educational training and expectations of veterinary faculty, and marketplace competition is essential.
- **Diversity** - We are committed to promoting career and cultural diversity of our faculty and students that mirror society and expand the career pathways for veterinarians beyond companion animal practice.
- **Clinical Teaching and Service** - To maintain our premier clinical education and patient care programs in the face of internal and external challenges we are actively engaged in planning for future program emphasis and growth, infrastructure and facility support needs, and restructuring of the teaching program

and patient caseload to enhance both DVM and Resident teaching experiences, and manage primary vs. tertiary cases more efficiently.

- ***Ecosystem Health*** - Ecosystem health provides the foundation for the “one medicine/one health” concept uniting medicine, veterinary medicine, agriculture, wildlife, environmental, and government groups. Our focus, on the interactions among livestock, pets and people, is critical to addressing ecosystem issues.
- ***Food Systems*** - The School plans to adapt its food animal curriculum to meet the changing needs of animal agriculture industries by incorporating information on management, medical skills, nutrition, waste management, biosecurity and other key topics. Related research will ensure that policy decisions and consumer perceptions are based on scientific fact and good agricultural and manufacturing practices.
- ***Clinical Nutrition*** - Animal and human health are impacted by nutrition and environment and ecosystem balance is impacted by nutrient waste material. The School will emphasize multi-unit, multi-species programs on different aspects of nutrition and its clinical application in the health of animals.
- ***Comparative Medicine and Laboratory Animal Medicine/Pathology***- Future expansion of animal and human health programs will bridge common health investigations, understand and control disease outbreaks, develop animal models of human disease and promote translational medicine approaches.
- ***Emerging Infectious Diseases***-The School will increase interdisciplinary infectious disease programs, particularly in the area of zoonotic diseases, for better diagnostic methods, innovative vaccines, prevention and control strategies, and fundamental studies on the basic nature of infectious agents, and the infections caused by human and animal pathogens.
- ***Genetics, Genomics and Stem Cell Biology***- The power of genetic tools, to identify and understand inherited diseases, to develop genetic therapies, and to create better diagnostic tests, offers a huge potential for future research and clinical application. Growth in this area will create a greater critical mass of faculty and capitalize on research and service programs already in place.
- ***Oncology***-The School is developing a center of excellence in the area of oncology. The faculty will be expanded to foster basic and clinical faculty interactions, further develop a comprehensive translational research program, and expand the clinical service enterprise for the benefit of animals and people.
- ***Veterinary Public Practice***- The School is leading the development of veterinary public practice as a career pathway, recognizing the significant contributions veterinarians offer to bridge animal, human and environmental health issues, zoonotic diseases, and food safety to improve public health.

In addition to these initiatives, the School and the University have projected the need for more veterinarians and veterinary specialists to serve the people of California in the future. Thus, the School sees substantial growth in its programs over the next five years including additional expansion of the DVM class size to 160 students, expansion of the graduate clinical program to 150 residents, increases in the graduate academic student program to 180-200 students, and further development of the southern California program. The School will make significant contributions to the advancement of each of our major initiatives, and those program plans outlined in detail throughout our academic plan. The School of Veterinary Medicine faces significant financial and facility challenges over the next five years. We will need to consider more entrepreneurial approaches to increasing our revenue streams, partnering with private companies for program development, enhanced fundraising efforts, and innovative changes to our teaching, research and service operations to improve efficiencies at all levels. The strength of our programs, the vision identified by our faculty, the support of campus administration, and the distinction earned by the School will sustain us in our efforts to meet those challenges.

THE MISSION OF THE SCHOOL

The mission of the School of Veterinary Medicine is to serve the people of California by providing educational, research, clinical service, and public service programs of the highest quality to advance the health and care of animals, the health of the environment, public health, and contribute to the economy.

To carry out this mission, we focus upon our students, who are enrolled in our professional Doctor of Veterinary Medicine program, our graduate professional Master of preventive Veterinary Medicine program, our graduate clinical residency program, and our graduate academic MS and PhD programs. We focus on the health of all animals, including livestock, poultry, companion animals, captive and free-range wildlife, exotic animals, birds, aquatic mammals and fish, and animals used in biological and medical research. Our focus also includes related human health concerns. To further this mission, the School operates comprehensive teaching, research and clinical programs, and 28 research/service units. Our statewide mission includes diagnostic services, clinical referral services, continuing education programs, and extension.

SOCIETY DEPENDS UPON VETERINARY MEDICINE

Veterinary Medicine provides critical societal needs that are rapidly expanding in many ways. Rising public expectations call for greatly increased breadth and depth of veterinary medical knowledge, skills, and professional expertise. At the heart of meeting these societal needs lies the School of Veterinary Medicine at the University of California, Davis, dedicated to animal, human, and environmental health. Veterinary medicine is unique: it is the broadest of the health sciences. It deals with incredibly diverse societal issues. For example, veterinary medicine has responsibilities, interests, and concerns for:

- Companion animal health, advancing the role and health of animals as pets, as companions for the elderly, and guides for the blind, deaf, and disabled
- Equine health and performance, advancing the role and health of horses as companion animals, and in racing and performance settings
- Food animal health and production economy, advancing the economic value and the food and fiber value of livestock, poultry and fish, and dealing with associated animal well-being issues
- Wildlife health, contributing to our stewardship of our endemic animal populations and adding to our quality of life
- The prevention and control of zoonotic diseases (diseases transmitted from animals to humans)
- The safety and wholesomeness of foods of animal origin, with particular responsibility for pre-harvest food safety
- Environmental health, advancing our understanding and control of the risks posed by hazardous environmental chemicals and microbes affecting both animals and humans
- Comparative medicine, advancing the wise and humane use of animals to solve human health problems and advancing medical and surgical innovation, medical technologies, and medical instrumentation Basic biomedical research, advancing the health of animals while at the same time contributing to the practical understanding of the general biological processes that are crucial to medical research.

VETERINARY MEDICINE AND CALIFORNIA AGRICULTURE

California agriculture is a \$27 billion industry; animal agriculture account for 31 percent of total cash receipts. Milk, depending on healthy dairy herds, is the number one agricultural commodity in California – California leads the nation in milk productions. Beef, poultry, turkey, and swine production are major industries in California; the profession of veterinary medicine serves California agriculture in many ways:

- Veterinary medical practitioners are responsible for the health, welfare and environmental health aspects of beef cattle, dairy cattle, egg layers, turkeys, broilers, sheep, swine, goats and aquatic species.
- Veterinarians have major responsibility for improving human health by providing safe and high quality foods for the consumer.
- Veterinarians have major responsibility for enhancing environmental quality by addressing infectious and toxic diseases at the agriculture animal/wildlife/urban interfaces.
- Veterinarians serve as professional public health specialists in rural and urban communities
- Veterinarians are a major resource for the adoption of new technologies, such as biotechnology, and information technology to improve production economy and enhance livestock and human health
- Veterinarians serve small business and communities in many other ways

THE HISTORY OF THE SCHOOL

The University of California first established a college of Veterinary Medicine in San Francisco in 1894 along with Colleges of Medicine, Dentistry, and Pharmacy. This enterprise later became the University of California, San Francisco. This college of Veterinary Medicine closed in 1899. A Division of Veterinary Sciences was established in the College of Agriculture at the University of California, Berkeley in 1901. As the program expanded, a branch of the Division was established on the Davis campus. The Division offered undergraduate courses, participated in graduate programs, and developed a renowned livestock disease research program. In 1946, the present School of Veterinary Medicine was established on the Davis campus, and the program of the Division of Veterinary Sciences was absorbed into the School. The first class of 42 Doctors of Veterinary Medicine entered in 1948 and graduated in 1952.

Since 1952, the School has graduated more than 5,000 Doctors of Veterinary Medicine, developed another professional degree program, the Masters of Preventive Veterinary Medicine, and has established outstanding graduate clinical and graduate academic programs. The faculty has expanded the scope and scale of our programs to the point where today this School is the largest, the most diverse, and the best school of veterinary medicine in the world.

When the School of Veterinary Medicine was established in 1946, its programs were *uni-dimensional*. That is, the school's faculty and its physical facilities were principally directed towards serving only the interests of the animal agricultural industries of the State. Most teaching, research, and service activities focused on the health of individual farm animals, with only minor attention paid to the health of horses, cats, dogs, or other species. Since then, the scope and scale of the School's programs have expanded tremendously. The School today is truly *multi-dimensional*. One dimension can be described in terms of the number of animals and the number of species of animals which veterinarians serve. Another dimension of the School's programs can be described in terms of disciplines and technologies. In earlier years, the classic disciplines of

veterinary medicine, such as anatomy, physiology, and pathology described a *uni-dimensional* perspective. However, today all of the disciplines of biomedicine, such as molecular biology, cell biology, and developmental biology have been brought together to form a *multi-dimensional* mosaic. All of these disciplines and their technologies are brought to bear to educate our students, and to solve the animal, human, and environmental health problems that society has assigned to us.

THE INSTRUCTIONAL PROGRAM OF THE SCHOOL

The faculty of the School of Veterinary Medicine provides instruction at the undergraduate, professional, graduate clinical, graduate academic and graduate professional levels. We contribute substantially to continuing education programs for veterinarians across the state, national, and international settings. We also develop and carry out extension/informational programs on disease prevention and control, animal well-being to the livestock industries, and government agencies.

Professional Doctor of Veterinary Medicine Instructional Program

The professional Doctor of Veterinary Medicine (DVM) curriculum is the largest teaching program of the School, with a current enrollment of 506 veterinary students (131 students per class). Admission to the program is extremely competitive with only 10 percent of applicants being admitted. Future enrollment growth to meet societal demands and provide increased access for California residents is projected at 640 veterinary students (160 students per class). The vision, justification and request for increased enrollments are included in the UC Health Sciences Growth Initiative (2007).

The goal of the professional DVM program is to educate our students to a level where they may enter the profession of veterinary medicine as licensed practitioners. We provide our students with a strong background in animal biology, an in-depth understanding of animal diseases, and clinical skills commensurate with entry-level into the practice of veterinary medicine. Providing this level of education has become very complex with the explosion of knowledge and the increasing societal expectations for veterinarians to take responsibility for the health needs of the entire animal kingdom at an increasing level of sophistication and specialization.

The professional DVM instructional program consists of preclinical and applied clinical educational experiences. The preclinical program for first and second year students includes intensive instruction in the fundamental principles of biomedical sciences including multi-disciplinary laboratory-based instruction in gross and microscopic anatomy, cell biology, systemic physiology, physiological chemistry, pharmacology, toxicology, microbiology, parasitology, immunology, biotechnology, epidemiology, nutrition, neurobiology, and information technology. The clinical education experience for third and fourth year students involves lecture and laboratory-based instruction in anesthesiology, clinical pathology, cardiology, dermatology, dentistry, internal medicine, neurology, oncology, ophthalmology, pathology, reproduction, obstetrics, preventive medicine, production medicine, ethics, radiology and surgery. Hospital-based instruction involving these clinical disciplines, with associated primary patient care, also extends to training in client relations and practice management.

Graduate Clinical Instructional Program

The graduate clinical program of the School consists of clinical residency training designed to provide veterinarians with advanced and specialized clinical knowledge and skills. A variety of clinical specialties are offered to prepare veterinarians for certification by Specialty Practice Boards. The State budget supports 90 residents; additional residents participate in the program via extramural funding sources. Future enrollment growth to meet societal demands for increased specialists and for academic faculty needs is projected at 150 veterinary residents. The vision, justification and request for increased enrollments are included in the UC Health Sciences Growth Initiative (2007).

Graduates of our residency programs enter academic faculty positions or the private sector to provide advanced clinical referral services. Residency training programs are offered in anesthesiology, behavior, cardiology, clinical pathology, companion avian/exotic pet medicine, dairy production medicine, dentistry and oral surgery, dermatology, equine medicine, equine reproduction, equine surgery, food animal medicine, food animal herd health, laboratory animal medicine, neurology, nutrition, oncology, ophthalmology, radiation oncology, renal medicine/hemodialysis, pathology, primate medicine, radiology, shelter medicine, small animal emergency/critical care, small animal surgery, and zoological medicine. Resident instruction is largely hospital-based, and the success of this program is highly dependent on state-of-the-art facilities, equipment in support of the faculty's clinical teaching, service programs, as well as, the high patient numbers seen at the William R. Pritchard Veterinary Medical Teaching Hospital (VMTH). The avian diagnostic medicine and diagnostic pathology residents take advantage of the resources and satellite locations associated with the California Animal Health and Food Safety Laboratory System (CAHFS). We also offer a combined Resident/Master of Preventive Veterinary Medicine (MPVM) program in dairy production medicine, which combines on-the-farm activities with advanced professional instruction focused on the herd population as the patient.

Graduate Professional Instructional Program

Graduate professional programs are designed to prepare veterinarians for the practice of professional skills in a specialty field requiring added competence in both basic and applied sciences. The School currently has one, the Masters of Preventive Veterinary Medicine (MPVM) program with an average enrollment of 25 postgraduate students. The MPVM degree program is designed to prepare veterinarians more adequately to serve in areas involving the prevention and control of livestock diseases, wildlife health, public health, and food safety. Using modern methods of epidemiology, population medicine, and disease prevention/control, the program prepares veterinarians to investigate and evaluate disease and production problems in animal populations, and to design and implement control measures. Graduates of this program are employed by public agencies, such as the U.S. Department of Agriculture, specialty veterinary practice (especially herd health-related practice), academia, the military services, the U.S. Centers for Disease Control, California Departments of Health Services, Food and Agriculture, and Fish and Game. Graduates also include veterinarians from more than 75 foreign countries, many of whom have become leaders in the animal health agencies of their countries.

Graduate Academic Instructional Program

There is an expanding demand for individuals who have advanced disciplinary research training in the sciences basic to veterinary medicine. Our faculty are heavily engaged in graduate academic instruction for both veterinary professionals and non-professionals. Upon graduation, these veterinary scientists will have the ability to combine their clinical and research training to identify and solve disease problems. For example, there is a tremendous need for research-trained veterinarians in the areas of comparative pathology, food safety, wildlife health, environmental health, genomics, and human health-related problems. Ultimately, these graduates will serve in important positions in academic, research, governmental, industrial and other institutions that contribute to the educational, research, and development needs of veterinary medicine and the public's health.

The School's authorized graduate academic enrollment is 137 students. However, this figure does not reflect our overall commitment to graduate education. Each year an additional 30-40 students pursue MS or PhD training with our faculty. There are also many other graduate students who take graduate level courses offered by our faculty. This instruction is largely laboratory-based and supported by the research programs of the School's faculty. The success of this instructional program is dependent upon state-of-the-art facilities, equipment, and the scope and scale of the faculty's research programs. The School is interested in growing

our graduate student enrollment to 220 to meet the demand for more veterinary scientists, and particularly to address the crisis in academia for veterinary faculty in basic and clinical science disciplines.

We are teaching more graduate students in more biomedical fields than any other veterinary school in the country. The impact of our graduates on industry and the academic community nationwide is significant. Our diversity stems from the faculty's broad interest and participation in graduate training. Currently, the faculty of the School participates in 23 campus graduate groups including: Animal Behavior, Animal Biology, Animal Science, Avian Science, Biochemistry, Biochemistry and Molecular Biology, Biomedical Engineering, Cell and Developmental Biology, Comparative Pathology, Ecology, Epidemiology, Exercise Science, Food Science, Forensic Science, Genetics, Geography, Immunology, Microbiology, Molecular Cellular and Integrative Physiology, Molecular Biology, Nutrition, Pharmacology and Toxicology, and Physiology

Undergraduate Instructional Program

The faculty of the School has traditionally invested a significant effort in undergraduate instruction for animal science, biological science, and food science undergraduate majors. Over the years, this effort fluctuated depending on campus need and faculty expertise. Our faculty's broad discipline expertise enables us to serve many different instructional needs, especially as modern biology and environmental sciences have become more popular. Areas of instruction have included: physiological chemistry, anatomy, bacteriology, clinical pathology, epidemiology, immunology, immunogenetics, neuroscience, histology, parasitology, animal health and disease prevention, food hygiene, public health, pathology, biostatistics, animal health economics, pharmacology, toxicology, microbiology, and virology.

THE RESEARCH PROGRAM OF THE SCHOOL

The School has the largest and most diverse research program of any veterinary school in the world. Moreover, our research program has grown in dramatic fashion over the past five years. Our research programs are making significant contributions to improving the quality of life for animals and humans across our State and our nation, and are of international importance.

Research investigations include:

- New and re-emerging infectious diseases
- Chronic pulmonary diseases
- Nutritional diseases
- Fetal/neonatal lung diseases
- Gastrointestinal diseases
- Bone fatigue and stress fractures
- Vaccine development
- Herd health and production management
- Neurologic disorders
- Environmental and forensic toxicology
- Imaging and nuclear medicine
- Parasitic diseases
- Comparative medicine
- Diseases of the heart and circulatory system
- Diseases affecting reproduction
- Genomic/Genetic diseases

CLINICAL AND PUBLIC SERVICE

The School, like the university, has a deep commitment to serve society and its many different needs. Service is provided through many different units and activities through the School, including the:

- William R. Pritchard Veterinary Medical Teaching Hospital
- Veterinary Medical Teaching and Research Center
- California Animal Health and Food Safety Laboratory System
- Veterinary Extension
- Oiled Wildlife Care Network
- UC Veterinary Medical Center – San Diego
- Center for Continuing Professional Education
- California Raptor Center
- Consultative services to veterinarians, private citizens and public agencies

PROFESSIONAL RELATIONS

The Office of Public Programs provides leadership, service, and outreach to the School's professional colleagues and alumni -- all veterinarians practicing in California. The program provides the vehicle by which the energy, experience, and views of California's veterinary profession can be incorporated into the future development of the School's programs. Public Programs also coordinates the Center for Professional Continuing Education which provides continuing education programs to veterinarians and registered veterinary technicians for lifelong learning and to meet licensing requirements. This unit fosters interactions between the faculty, the public, and animal-related industries, acts as the liaison between the School and various professional organizations and societies, administers the School's service award programs, and promotes legislative contacts and veterinary activities within the legislative arena.

DEVELOPMENT ACTIVITIES

The Office of Development advances the teaching, research, and public service programs of the School of Veterinary Medicine by increasing the amount of private financial support available to the School and its faculty. The program seeks to increase the fund-raising potential of every faculty member through the development of fund-raising plans and proposals, the production of informational materials, the organizing of promotional programs, and the maintenance of volunteer organizations. The program stimulates a climate of fund-raising entrepreneurship based on the knowledge that donors are attracted by visionary plans and retained by personalized attention to their interests. Our goal is to systematically identify, cultivate, solicit and re-solicit, an expanding number of individuals and organizations to increasingly support the programs of the School. To date, this program has been very successful – each year we have reached new levels of private donorship and have brought important new friends into our programs.

THE ACADEMIC DEPARTMENTS OF THE SCHOOL

To carry out its teaching, research, and service missions the School's academic structure is organized into six departments:

- Department of Anatomy, Physiology and Cell Biology
- Department of Medicine and Epidemiology
- Department of Molecular Biosciences
- Department of Pathology, Microbiology and Immunology
- Department of Population Health and Reproduction
- Department of Surgical and Radiological Sciences

The School has also established a broad array of interdisciplinary programs and units to compliment or assist the faculty effort in addressing the School's missions. This brief description of our departments will attempt to paint a broad picture of the School's diversity and complex nature.

DEPARTMENT OF ANATOMY, PHYSIOLOGY AND CELL BIOLOGY

Mission

The primary mission of the Department is to provide students with strong basic information in comparative anatomy, physiology, cellular biology and behavior. The faculty's strong interdisciplinary research programs and broad perspectives enhance the Department's ability to provide outstanding educational opportunities for professional, graduate and undergraduate students. Teaching and research emphases are to define molecular, cellular and integrative physiological mechanisms underlying function, their maintenance in health and alteration in disease.

The goals of the Department are to create and disseminate new knowledge in anatomy, physiology, behavior, and cell biology and to maintain the highest quality educational programs in animal health and disease. Additionally, the Department promotes excellence and originality in advancing the knowledge of physiological mechanisms of cellular, organ and whole animal function, and acts as a hub for the creation and dissemination of interdisciplinary research and its application in the areas of 1) cardiopulmonary and hemostatic systems; 2) aquatic ecotoxicology; 3) gastrointestinal physiology and metabolism; 4) musculoskeletal system; 5) reproduction and gamete biology and 6) nervous system and behavior.

The disciplinary focus of the Department includes:

- Cell Biology
- Physiology
- Behavior
- Functional Morphology
- Neuroscience
- Developmental Biology
- Environmental Toxicology

Faculty

At present, there are nine faculty FTE, four research scientists, three adjunct professors and two lecturers in the Department.

Teaching

The faculty has an outstanding record in teaching and will continue to provide instruction in the areas of anatomy, physiology, behavior and cell biology for the professional DVM Curriculum, the professional MPVM curriculum and graduate programs, and for professional and non-professional students. The faculty provide leadership in the UCD Immunology Graduate Group and graduate program support in Animal Behavior, Biochemistry and Molecular Biology, Biomedical Engineering, Cell and Development Biology, Comparative Pathology, Endocrinology, Pharmacology and Toxicology, Molecular, Cellular and Integrative Physiology, Neurobiology, Nutritional Biology and Ecology. The faculty also teach an undergraduate course in the functional morphology and physiology of vertebrate species.

Research

The research programs of exceptional merit are concentrated in ten areas:

- *Comparative Lung Pathophysiology.* This program spans the respiratory system from the molecular level to the whole animal. These highly collaborative efforts focus on the airways epithelia, innervation and inflammatory/immune cell interactions and the interaction of these cells to maintain homeostasis (ability to combat infectious disease, particulates removal and/or repair of injured cells) in the lung.
- *Aquatic Ecotoxicology.* Investigative studies in aquatic ecotoxicology examine nutrition, pathology and toxicology ranging from the diagnostic to the molecular level. These studies acquaint graduate students and project scientists with approaches to cellular and molecular pathology; effects of feeding strategies and dietary nutrients on fish growth performance, reproduction and tolerance to stressors including temperature and chemical contaminants; fish otolith microchemistry, and integrating effects on biological organization at the levels of population and communities.
- *Musculoskeletal system.* The musculoskeletal research program is a strong, multidisciplinary group which investigates the biology of musculoskeletal tissues including bone and cartilage. There is a strong focus on the importance of mechanical load on regulating cellular, tissue and organ level events for the maintenance of healthy bone and cartilage. Research efforts are also aimed at understanding the etiology of musculoskeletal diseases such as osteoporosis and inflammatory diseases, including arthritis.
- *Gastrointestinal Physiology.* The main research focus is to understand the neural and humoral regulation of the gastrointestinal function. Research efforts are aimed at understanding the mechanisms and pathways by which nutrients are detected in the wall of the gut, and how these processes are involved in the regulation of normal gut function and altered in diseases such as obesity, inflammation and functional bowel disease.
- *Metabolism.* The overall emphasis of research in metabolism is to define the impact of cellular events on the (disease response) in metabolism of the whole organism as well as metabolic processes that impact on specific organisms and cellular functions. Considerable strengths exist in the areas of ruminant metabolism and in the gastrointestinal, liver, lung and endocrine-pancreas organ systems.
- *Tobacco-Related Studies.* Studies related to the Tobacco Research Development program examine the effects of exposure to environmental tobacco smoke on the lung during pre and postnatal lung development. The effects of environmental tobacco smoke exposure on the lung are determined by comparing the gene expression profiles and histopathology of samples obtained from exposed animals with those from filtered-air control animals.
- *Reproduction.* Reproduction research is focused on determination of the nature of cellular cryoinjury to spermatozoa. Studies are conducted in equine, non-human primate, and other vertebrate models.
- *Cell and Molecular Biology of the Hemostatic System.* This research focuses on the cell biology, biochemistry and biophysics of the hemostatic system. Studies are conducted in all animal and human species and include basic biology as well as developing storage techniques for blood cells to be stored in the dry or frozen state.
- *Orthopedic Research.* The J.D. Wheat Veterinary Orthopedic Research Laboratory provides an environment for multidisciplinary studies pertaining to musculoskeletal disorders of animals to enhance the welfare of animals and people working in animal industries. Programmatic goals include enhancing the understanding of the pathophysiology of musculoskeletal diseases of performance, companion, and

production animals and wildlife and elucidating therapeutic and preventive techniques to combat these diseases, with an emphasis on musculoskeletal disorders of racehorses.

- *Behavior.* The Behavior component is comprised of clinical studies in problematic behaviors of dogs and cats, including feline urine marking, canine aggression, cognitive dysfunction, as well as field studies of animal behavior.

Service

Faculty provide service to:

- Federal and state governmental agencies (i.e., NIH/NSF/USDA/USEPA study sections; consultation and expert advice)
- National and international scientific societies (i.e., officers, executive boards, committees)
- Livestock commodity groups
- Scientific journals (i.e., editors, editorial boards and reviewers)
- Laboratory animal, biotechnology and pharmaceutical industries
- Continuing education and seminars to various professional groups
- Zoological parks and wildlife conservation groups
- Veterinary practitioners
- Pharmaceutical industries
- Welfare organizations
- Animal owners

Future Directions

Teaching

The faculty will continue to educate graduate students, professional students, residents and undergraduate students in comparative veterinary anatomy, physiology, cell biology and behavior and in the strengths of the various research foci within the department. Due to an increasingly senior faculty, the Department will need to complete a number of recruitments in the near future and is currently considering recruitments to replace two recently retired faculty members. Additionally the department will develop and introduce new technology into the DVM curriculum and provide training of faculty in use of the new technology.

Research

Faculty will continue to excel in the existing research programs developing new and emerging techniques in cell biology, cell physiology, organ physiology, systems biology and quantitative morphology. The Department will promote and encourage translational research to ensure that advances in basic research are incorporated into the current programs. This will be accomplished by fostering collaborative interaction between research and clinical activities. Additionally, the Department will continue to assess and provide shared-use facilities via recharge operations. The intent of these facilities is to provide communal resources for units within the School and on campus. The Department will move towards the creation of new programs (aligned with NIH roadmap and in key areas in veterinary medicine including food safety, bioterrorism, zoonosis), and embrace new and emerging areas of life sciences including systems biology, computational biology, bioinformatics.

DEPARTMENT OF MEDICINE AND EPIDEMIOLOGY

Mission

It is the mission of the Department of Medicine and Epidemiology to be responsible for and to represent the teaching, research, and service programs for the disciplines of medicine and epidemiology in the School. Medicine encompasses the diagnosis, treatment and prevention of disease and maintenance of health and optimal productivity for all species of animals except humans, including mammals, birds, reptiles, and fish. Epidemiology encompasses those same facets of medicine in the context of the herd, flock or population, and provides the scientific basis for diagnosing, treating, preventing, and eradicating diseases and other health-related conditions.

The Department seeks to maintain programmatic excellence by advancing the disciplines through integration of existing and new information, developing methods, technologies, and strategies for diagnosis, treatment and prevention of disease, and the maintenance of healthy individual animals and populations.

The disciplinary focus of the Department includes:

- Cardiology
- Companion Avian Medicine
- Comparative Biology
- Dermatology
- Ecosystem Health
- Emergency Medicine
- Endocrinology
- Epidemiology
- Epidemiologic Modeling
- Exotic Pet Medicine
- Fish and Shellfish Health
- Free-ranging/Captive Wildlife Medicine
- Gastroenterology
- Health and Ecological Risk Analysis
- Infectious Diseases
- International Veterinary Medicine
- Internal Medicine
- Laboratory Animal Medicine
- Neonatology
- Nephrology
- Primatology
- Urology

Faculty

At present, there are 40 academic senate faculty with three additional positions in recruit, 5 academic federation faculty, and 20 affiliated faculty through without salary appointments.

Teaching

The Department has significant teaching responsibilities in the DVM curriculum, the MPVM curriculum, the graduate clinical (resident) program, and the graduate academic program. The faculty's goal is to offer quality teaching at all levels, to incorporate new and improved methods of instruction and information delivery to our students, and to emphasize skills that promote self-instruction and lifelong learning. Faculty provide resident training in cardiology, companion avian medicine, companion fish medicine, dermatology, equine medicine, food animal herd health, food animal medicine and surgery, primate medicine, small animal internal medicine, veterinary diagnostics, and zoological medicine. The Department houses the graduate group in epidemiology, and faculty members participate in graduate academic instruction through graduate groups in avian sciences, comparative pathology, ecology, epidemiology, immunology, and microbiology.

Research

The Department strives to provide an environment, which promotes research endeavors. Faculty are engaged in active, diverse, and productive research programs within their specialty areas, which are funded through external and internal sources. Grant and contract funds averaged a total of \$12 million per year, during the past three years. Primary funding sources are National Institutes of Health, United States Department of Agriculture, and United States Department of the Interior, California Department of Fish and Game, California Department of Health Services, Department of Homeland Security, Pfizer Inc., Beckman, Biotrends, Morris Animal Foundation, Grayson Foundation, American Quarter Horse Association Center for Equine Health, Center for Companion Animal Health, and Center for Food Animal Health. A sampling of research activities include equine sports medicine and performance evaluation, laboratory animal medicine, infectious disease of fish and shellfish, retrovirus and AIDS research, FeLV immunosuppression and leukemia, cardiovascular function and disease, epidemiologic methods, hyperkalemic periodic paralysis in horses, salmonellosis in cattle, livestock production economics, FMD outbreak modeling, and bovine neospora infections.

Service

The faculty are heavily engaged in service activities particularly through the clinical programs at the Veterinary Medical Teaching Hospital, and the UC Veterinary Medical Center – San Diego. Faculty members provide clinical oversight, diagnosis and treatment of animal patients, and provide consultation services to clients and referring veterinarians throughout the State. Department faculty are actively engaged with State regulatory agencies in the control, impact, and eradication of diseases threatening livestock, poultry, wildlife, and aquatic animals. Faculty also provide service to industry representatives and producers on specific health issues for management practices. They participate in numerous state, federal, and international advisory committees, work groups, and professional societies, including serving as editors and advisors for several scientific journals, and sponsoring industry workshops on disease problems. The Department encourages and offers an extensive list of continuing education courses for practicing veterinarians on new techniques, and information on a broad number of subjects and species.

Future

As we look to the future, it is critical that the veterinary profession and the University of California address in new ways the complex and costly issues, currently and potentially impacting all areas of animal health. Interactions between the School, the public, and the diverse industries we serve are increasingly important. The conditions presently affecting animals and the environment, the exponential increase in knowledge, and the new and emerging problems all impact how we prepare our students to meet these challenges. New efficiencies will be required in the delivery of health care and more emphasis on protecting and enhancing the health of the individual animal, of populations of animals, and of the environment. This redirection will require new and innovative research to develop economically viable strategies for disease control, prevention, and eradication that address both indigenous and exotic diseases. New resources must be sought, new technologies developed, and new efficiencies employed to address the information boom, the new threats to animal health and productivity, and the changing expectations of society for animals, food safety, and the environment.

DEPARTMENT OF MOLECULAR BIOSCIENCES

Mission

The Department's mission is to provide the academic basis for advancing and disseminating knowledge in the disciplines of biochemistry, nutrition, pharmacology, and toxicology within the School. The faculty strives to promote teaching and research excellence, and originality through advanced techniques of molecular biology, genomics, proteomics, and analytical chemistry. The faculty interacts regularly with the toxicologists and pharmacologists at the California Animal Health and Food Safety Laboratory System (CAHFS) and provides expertise for the Equine Analytical Chemistry Laboratory. The Department is also responsible for the Clinical Pharmacology, Clinical Toxicology, and Clinical Nutrition Programs, including the Nutrition Consulting Service at the Veterinary Medical Teaching Hospital.

The disciplinary focus of the Department includes:

- Biochemistry
- Molecular Biology
- Nutrition
- Pharmacology
- Toxicology
- Nutritional Toxicology
- Neurobiology, neurotoxicology, and neuropharmacology

Faculty

At present, there are 13 Academic Senate faculty, 8 research scientists, 3 courtesy appointees and 1 Associate Staff Veterinarian with a courtesy faculty appointment in the Department. Current recruitment efforts are focused on a clinical nutritionist and a basic pharmacologist/toxicologist, and a soon to be approved position in clinical toxicology with CAHFS responsibilities. Faculty accomplish their teaching, research, and service activity responsibilities by interacting with multiple units inside and outside the School.

Teaching

The Department provides instruction in the areas of biochemistry, nutrition, and pharmacology and toxicology. This responsibility includes contributions to the DVM professional curriculum, MD professional curriculum, and graduate and undergraduate education programs of the campus. Faculty provide leadership in the UC Davis Graduate Groups of Biochemistry and Molecular Biology; Cell and Developmental Biology; Genetics; Microbiology; Molecular, Cellular and Integrative Physiology; Neurosciences; Nutritional Biology; and Pharmacology and Toxicology. One of our faculty members serves as the chair of UC Davis Graduate Group in Pharmacology and Toxicology.

Research

There are nine major areas of research within the Department:

- *Analytical Toxicology*: This work is focused on the development and implementation of high throughput analytical methods, based primarily on gas/liquid chromatography/mass spectrometry.
- *Antiviral Chemotherapy*: Studies that include the development of animal models for AIDS therapy and study of the mechanisms for and strategies to prevent resistance to antiviral drugs.

- *Biochemistry*: Research is focused on obtaining a better understanding of the process, and the control of assembly of lipoproteins in liver, the effects of mitochondrial mutations on aging and disease, the pathophysiological consequences of oxidative and nitrative stress using proteomic and metabolomic research methodology, and mechanisms regulating leptin production and the role of endocrine, metabolic, and dietary factors in the pathophysiology of obesity and type-2 diabetes.
- *Neuropharmacology and Neurotoxicology*: This work is focused on understanding the interactions of xenobiotics at the level of receptors, and how these interactions affect the status of ion channels and second messengers. One of our faculty (PI: Pessah) is Director of the Center for Children Environmental Health Sciences (CCEH) which is jointly supported by NIH and EPA. The Center is an interdisciplinary effort to understand how genetic and environmental factors influence autism susceptibility.
- *Developmental Neurobiology*: Transcriptional factors responsible for early neuronal differentiation and migration are being investigated using spatial/temporal gain of function, loss of function, and gene silencing technologies. These investigations are contributing to our knowledge about how somatic stem cells can be marshaled to combat brain tumors.
- *Nutrition*: Studies are related to delineating essential nutrients for cats and dogs, and understanding how differences in these nutrients relate to differences in metabolic regulation as well as the effects of caloric intake and nutrition on aging and health and diabetes and obesity.
- *Pulmonary Toxicology*: Research is focused on the mechanisms by which environmental and occupational exposures interact with respiratory epithelium to produce emphysema, fibrosis, and cancer of the lung.
- *Clinical and Diagnostic Toxicology*: Research is focused on the development of diagnostic criteria and therapeutic approaches in cases of poisonings in a variety of animal species and the establishment of criteria with regards to food safety and residue accumulation in tissues of animal origin.
- *Cytherapeutics*: Research is focused on the use of stem cells in treating small companion animal diseases such as dilated cardiomyopathy, degenerative myelopathy, refractory inflammatory bowel disease, and inborn metabolic disorders.

Research within these areas is currently well funded from extramural sources (both governmental and industrial). Collaborative interactions within Molecular Biosciences and with other campus departments and research centers have been excellent.

Service

The Department is committed to its service responsibilities. The following are examples of service programs actively being pursued:

- California Animal Health and Food Safety Laboratory System (CAHFS): providing diagnostic services to the people, and animal industries of California
- William R. Pritchard Veterinary Medical Teaching Hospital (VMTH): clinical service and operation of the Clinical Pharmacology Service and the Clinical Nutrition Service provide service to the clinical faculty and service to the public-at-large
- WALTHAM University of California Veterinary Medical Center-San Diego: clinical service and operation of the Clinical Nutrition Program provide service to clinical faculty and the public-at-large.

- Nutrition and Pet Care Center
- Amino Acid Analysis Laboratory
- Microarray Facility
- Governmental Agencies and Industry: faculty provides their expertise in evaluation of grants and program projects to the National Institutes of Health, National Science Foundation, the Environmental Protection Agency, the Department of Defense, the American Heart Association, and various industrial concerns.
- Scholarly Journals and Professional Societies: faculty serves as Editors, Associate Editors, members of Editorial Boards, critical reviewers, and committees of professional societies such as the National Academy of Sciences.
- Continuing education of veterinarians

Future

The long-term vision for the Department includes:

- The development of translational research programs in genetics/genomics, environmental health, aging, and integrative medicine and development of research programs in Foods for Health and nutritional toxicology.
- The development and fostering of long-term relationships with related industries to assist the School in its efforts to capitalize on new technology, and new sources of revenue.
- The replacement of outdated research equipment for joint department/schoolwide use.
- The strategic recruitment of faculty to rectify a campus-wide weakness in neuropharmacology/toxicology and an anticipated need in respiratory toxicology as faculty retire. Faculty will be needed to expand our involvement in new programs for a Professional Masters in Environmental Health and Professional Masters in Veterinary Public Health as well as the School of Public Health.
- Recruitment of a veterinary toxicologist.
- Recruitment of a faculty member in molecular, cellular, and integrated pharmacology/toxicology who will become a leader in the strategic expansion at UC Davis, in the areas of nutritional basis of metabolic disorders, oncogenesis, developmental neurotoxicity, asthma, or cardiovascular health.
- In cooperation with other units within the School and Campus, develop a professional Masters degree program in Environmental Health, a program leading to a Bachelors degree in Pharmacology, and enlarge the Clinical Nutrition Training Program to include the nutrition of horses and food animals.
- Expand research in the Nutrition and Pet Care Center to include the nutrition of dogs and some exotic pets and upgrade animal facilities.
- Expand expertise, through the Nutrition and Pharmacology and Toxicology Consulting Services, to various state and federal agencies, to industry, to the VMTH, and to veterinarians in private practice. Further develop and supervise the Nutrition Consulting Service in Southern California.

- Interact with the Foods for Health program on campus, with particular attention to the pharmacological/toxicological aspects of agrochemicals and natural toxicants.
- Increase contributions to the teaching of graduate courses in the Graduate Group in Nutrition and in Pharmacology and Toxicology.
- Location of the department in one building (VM3B).

DEPARTMENT OF PATHOLOGY, MICROBIOLOGY AND IMMUNOLOGY

Mission

The mission of the Department is the effective integration of the disciplines of pathology, microbiology, and immunology into the teaching, research, and service programs of the School and campus. The faculty promotes the understanding of causes, and diagnosis of disease in animals, and the mechanisms by which diseases develop at the organismal, cellular, molecular, and genetic levels.

The disciplinary focus of the Department includes:

- Pathology
- Microbiology
- Immunology
- Virology
- Parasitology
- Bacteriology
- Clinical Pathology

Faculty

At present, there are 28 core faculty, 10 CAHFS faculty, and 11 affiliated faculty in the Department.

Teaching

The faculty provides didactic instruction for undergraduate students, professional DVM students, and graduate students, and clinical instruction for graduate clinical (resident) students. The Department's responsibilities are in the para-clinical sciences. This teaching has great long-term influence on our students; it contributes to the quality of clinical expertise, and to professional longevity and creativity. Our major goals are to:

- Better integrate current instructional offerings, particularly didactic, and clinical instruction to optimize their impact on student learning;
- Facilitate innovations in instruction, and use of audiovisual teaching aids;
- Regularly analyze all courses for programmatic need;
- Clearly define clinical teaching responsibilities at the VMTH;
- Promote increased integration of department instructional activities at the VMTH.

Research

The central research theme of the Department is pathogenesis of disease and the interface of the host and agent therein. A major goal of the faculty is the promotion of communal research equipment, and shared research space to further foster interdisciplinary research within the Department and the School. The Department also seeks to foster synergistic interaction between its clinical and basic research activities, including clinical activities at both the William R. Pritchard Veterinary Medical Teaching Hospital (VMTH) and the California Animal Health and Food Safety Laboratory (CAHFS). Current research strengths are:

- *Microbial Pathogenesis/Infectious Diseases*: Characterization and biology of infectious agents, pathogenic mechanisms, microbial genomic/proteomic interactions, development of improved diagnostic reagents and methods, vaccinology, and disease prophylaxis
- *Comparative Immunology and Immunopathology*: Leukocyte antigen biology, cytokines and mediators, immunologic genomic/proteomic interactions
- *Toxicological Pathology*: Pulmonary, hepatic, hematologic and central nervous system, pathogenic mechanisms including genomic/proteomic interactions
- *Wildlife/Exotic Animal Health and Disease*: Marine mammals, zoo animals, free-ranging terrestrial wildlife

Service

The Department has major outreach activities involved with various aspects of animal health and disease, via its various clinical services at the VMTH, and through the research activities of its faculty in both the public and private sector. The close affiliation between the Department and the CAHFS deserves special attention because the majority of CAHFS faculty are included in this Department. The Department seeks to promote even greater service and research collaborations with CAHFS faculty to better serve the people and government agencies of the State of California.

Future

The future focus of the Department will initially be to balance the teaching and service obligations to a level commensurate with faculty, staffing, and support. Simultaneously, the faculty will increase and then further develop our dynamic research program in the characterization of host/agent interactions, especially as they occur at the molecular level. The Department seeks to grow in the areas of anatomic pathology, clinical pathology, microbiology, and immunology.

DEPARTMENT OF POPULATION HEALTH AND REPRODUCTION

Mission

The Department of Population Health and Reproduction provides School-wide leadership in fostering and promoting creative and multidisciplinary efforts in basic and translational research, didactic teaching, clinical training, graduate student training, and service that support the concept of sustainable animal and public health. Pursuant to these initiatives the Department actively promotes and participates in the development and funding of these activities. The core of these efforts includes animal reproduction, genetics, management of animal populations (avian and mammalian), population-based disease prevention, and public health.

The Department emphasizes the development and delivery of superior instruction, the creation of new knowledge, and a commitment to local, regional, national and international service.

The disciplinary focuses of the Department include:

- *Reproductive Biology/Genetics*
 - Clinical Theriogenology
 - Comparative Reproductive Biology/Physiology
 - Animal Genetics and Biotechnology
 - Genetic Engineering

- *Avian/Livestock Production Medicine*
 - Livestock Ecology/Epidemiology
 - Livestock Nutrition
 - Infectious Diseases of Livestock
 - Poultry Health and Management
 - Poultry Infectious Diseases
 - Poultry Pathology

- *Biometrics and Preventive Medicine*
 - Food Safety
 - Statistical Analysis
 - Epidemiology: large and small animal
 - Regulatory Veterinary Medicine
 - Law and Ethics
 - Zoonotic diseases
 - Veterinary Public Health
 - Applied Statistics

Faculty

The Department has 18.6 faculty FTE which including 14.15 I and R faculty FTE and 4.45 AES faculty FTE. Eleven faculty have clinical assignments, fourteen faculty have a partial appointment (including administration) in another department or unit, and seven faculty hold without-salary appointments in PHR. At present, two faculty positions are under recruitment within PHR, including Food Safety (1.0 FTE) and Risk Assessment (0.5 FTE).

Teaching

The faculty continue to contribute to the professional DVM and MPVM degree programs, undergraduate and graduate academic curricula. The department leads the School's teaching programs in reproduction, genetics, population health, as well as policy and leadership training. The Department also supports the expansion of distance learning initiatives that promote the extension of our core mission beyond the Davis campus.

Research

In general, research emphasizes the application of scientific technologies relevant to population health for promoting "wellness" in animal and human populations. Examples of these research activities currently being pursued include: epidemiology of the zoonoses, molecular epidemiology of *Bartonella* sp., agricultural/environmental law and ethics, genomics, genetic testing for diseases in large and small animals, genetic mapping, foreign animal and zoonotic diseases, microbial ecology, embryo development in livestock, development of DNA techniques for identification purposes, reproductive studies in domestic ruminants, and bacterial and viral diseases of dairy cattle.

The Department's research activities are focused in the three main areas of:

- *Reproductive Biology/Genetics*: development, validation, and use of endocrine assays for studying fundamental reproductive processes; gamete interaction; immunocontraception for population control of feral horses; wildlife and companion animal infectious diseases of reproduction; genetic mapping; animal modeling; equine reproduction techniques; and the molecular basis for inherited diseases in dogs and horses.
- *Avian/Livestock Production Medicine*: livestock ecology--the relationship of livestock production operations to environmental health; livestock nutrition; identification, treatment and prevention of livestock diseases caused by infectious organisms; mastitis diagnosis, treatment and prevention; neonatal immunology; analysis and enhancement of performance in production animals; avian immunology and virology; embryonic responses and vaccination; and Marek's disease and avian influenza.
- *Biometrics and Preventive Medicine*: development of on-farm and post-harvest food safety methods; epidemiology of the zoonoses; studies of Bartonella (including cat scratch disease) organisms; legal and policy studies; animal welfare science and ethics; environmental ethics; functional genomics; microbial ecology; foodborne diseases and intoxications; foreign animal disease surveillance; small animal epidemiology; and biostatistics and sampling methodology.

Service

The Department provides direct and indirect service to the public by developing health programs in the School's clinical units, and by training health care professionals to provide services where the principles of population health and assessment can be used for the public good. Examples of activities include:

- Service to food industries on the improvement of health, welfare, production and profitability
- Service to commodity groups and government/regulatory agencies for scientific information, continuing education, problem-solving capabilities, consultation, and advisory services
- Service to veterinarians—the faculty conduct formal and informal continuing education programs and distance learning opportunities
- Service on national and private competitive grant review panels (NIH, USDA, Canine Health Foundation, and others)
- Service to the profession through peer/editorial review of scientific literature

Future

The future of the department is predicated on anticipating where science in the 21st century will lead us. An understanding of the genomic basis of disease and therapy is essential if we are to influence the health and reproduction of populations. The disciplines of genetics, genomics, biotechnology, and reproduction are now so interdependent that classical definitions and interpretations of these are no longer applicable. Stem cell research is an inevitable and essential part of the School's future. Populations are fundamentally comprised of individuals: to influence the former by necessity requires influencing the latter, hence genomic health, reproduction, and population health are inextricably linked. The new frontier of epidemiology lies in the development of new and vastly more precise methods of exposure assessment, especially markers of genetic propensity of disease, so as faculty positions are replaced and new ones become available the critical addition of molecular epidemiologists will both bridge and unify the Department's subdisciplines. In addition, an integrative approach to public health (including epidemic disease, zoonotic disease, and foodborne disease)

will help the School better serve its California constituents; addition of new faculty in this area is essential to poise the School to take advantage of future national and global initiatives.

The department will never achieve its full interdisciplinary collaborative potential until it's entire Davis faculty are co-located in the Health Sciences District. Although the faculty in Tulare are over 200 miles away from the central campus, the Department regards this as a fortuitous opportunity for expansion of the School's commitment to distance learning and teaching – a function made even more feasible with the recent opening of the expansive continuing education lecture hall at the VMTRC and the eventual completion of the futuristic California Dairy Technology Center.

DEPARTMENT OF SURGICAL AND RADIOLOGICAL SCIENCES

Mission

The mission of the Department is: to provide education, and leadership in the veterinary clinical disciplines embraced by the Department; to facilitate research activities into the diagnosis, pathogenesis, prevention and treatment of diseases of animals; to provide veterinary services to the people of California; to nurture faculty development; to participate in the governance of the university; and to contribute actively to the development of the profession of veterinary medicine.

The disciplinary focus of the Department includes:

- Surgery
- Radiology
- Radiation Therapy
- Anesthesiology/Critical Patient Care
- Ophthalmology
- Neurology/Neurosurgery
- Oncology
- Dentistry
- Computed Tomography
- Nuclear Medicine
- Ultrasonography
- Magnetic Resonance Imaging.

Faculty

At present, there are only 24 Faculty FTE in the Department. Recruitments are underway for a Veterinary Surgeon (small animal oncological surgery), Veterinary Ophthalmologist, Radiologist and a Veterinary Neurologist/Neurosurgeon.

Teaching

The Department supports all of the School's educational programs:

- *Professional DVM Curriculum:* The Department's primary responsibility is to refine and integrate the veterinary student's basic foundation in biological science into the applied clinical sciences, so that students can develop the necessary clinical skills to practice veterinary medicine. This process occurs initially through didactic lecture and laboratory instruction, then reinforced and amplified by direct clinical experience through the programs in the Veterinary Medical Teaching Hospital.

- *Graduate Clinical Education:* These programs are designed to provide veterinarians with advanced training in a discipline-oriented, clinical specialty in preparation for specialty veterinary practice or academic clinical veterinary medicine.
- *Graduate Academic Education:* Departmental faculty members actively participate in several graduate groups within the Graduate Division on the Davis campus. Most faculty are affiliated with the Graduate Group in Comparative Pathology and provide mentorship to individuals, mostly graduate veterinarians, seeking research training in the basic or clinical sciences.
- *Continuing Education:* Faculty members are actively involved in and committed to the continuing education of practicing veterinarians and veterinary technicians within the State of California, and on a national and international level. This instructional activity is considered a logical extension of instruction offered through both the DVM curriculum, and the graduate clinical education programs, and is of paramount importance to fostering lifelong learning in graduate veterinarians, and to the evolution of the profession.
- *Undergraduate Education:* Selected faculty participate in didactic instruction in the general education courses of the campus. Other faculty assumes responsibility from time to time for mentorship of individuals in research methodology through independent study programs.

Research

The research goals of the Department are directed at fulfilling its obligation to the university and society to advance knowledge directly related to the health and welfare of animals. Faculty members pursue research activities individually or collaboratively to expand knowledge with and across clinical disciplines. Examples of these research pursuits include veterinary anesthesia, emergency medicine and critical care, large animal surgery, intensive care, pre- and post-operative care, Neurologic diseases, new and emerging cancer, chemotherapeutics, somatic gene therapy, diagnostic imaging, interventional radiology and radiotherapy, cardiovascular research, orthopedic research, and surgical immunology.

The Department maintains a Surgical Support Unit, a Microsurgical Laboratory, and the Center for Imaging Sciences to facilitate the research activities of its faculty, and as a specialist service (recharge basis) for faculty outside the Department. The Microsurgical Laboratory is also used for training physicians affiliated with the UC Davis Medical Center and other scientists in microsurgical technique, and as such, represents a unique resource on the Davis campus.

Service

Service goals involve professional service within and outside of the VMTH, and service to the university. Professional service requires the highest level of clinical competence to provide state-of-the-art animal health care delivery to clients and referring veterinarians. Professional service activities are directed at active participation in organized veterinary medicine, particularly those specialty colleges within the American Veterinary Medical Association that have representation within the Department, and in allied biomedical science disciplines.

Future

In a multi-disciplinary department that represents 12 specialty disciplines, it is difficult to define a unifying theme that embodies a single vision for the Department's future beyond the need to continue striving for excellence in teaching, research, and service within each of those disciplines. Programmatic growth and development in large measure will depend on the particular research interests cultivated by individual faculty within each discipline, and on the changing dimensions of veterinary clinical practice. The nature of the

interaction between disciplines within the clinical environment will always ensure that cross discipline development occurs, as advances in one area dictate matching advances in other areas. For example, recognition of new disease processes stimulates the development of improved diagnostic tests, new methods of treatment including surgical intervention, appropriate techniques for anesthesia and pain relief, and advances in critical patient care before and after interventional therapy.

The Department has targeted oncology, neurology/neurosurgery and the imaging sciences as areas for expanded research. Currently, a medical oncologist and small animal oncological surgeon are being recruited to strengthen our ability in the delivery of care to animal patients with cancer. Improvements in diagnostic test, imaging, interventional therapy, and pain relief form the basis of a multifaceted approach to the management of cancer. Critical elements needed to realize these short and long-term goals include the acquisition of state-of-the-art imaging, surgical, and radiation therapy equipment to enhance scientific inquiry, and to improve our capacity to deliver top quality patient care. This conclusion is based on increased student numbers, the demand for advanced clinical training in the surgical and radiological sciences, and society's new treatments for their animals. Future faculty recruitments will require competitive salary packages and upgrade research facilities.

INTERDISCIPLINARY PROGRAMS AND UNITS

The School of Veterinary Medicine operates the largest number of the most diverse sort of interdisciplinary programs and units of any school of veterinary medicine in the world. This is one of the School's strengths and a great asset to all of our educational, research, outreach programs, and clinical and public service. These units are also major assets campus wide.

Aquatic Toxicology Program

The Aquatic Toxicology Program examines disease in fish to determine if toxic chemicals or compounds are present, the source of the toxicity, and the effect the toxicity produces in the fish and on aquatic ecosystem health. Investigations include environmental toxicology studies in watersheds throughout California, water quality studies, and rapid response testing following environmental toxicity episodes. The program encompasses research, service and educational activities, and training for undergraduate, graduate, professional and postdoctoral students.

Biological Media Service

The Biological Media Service is a centralized service to provide efficient and economical provision of biological media and clean sterile supplies in support of the teaching and research activities of the School, the campus, other major universities and colleges, and practicing veterinarians on a national and international level. The service also provides assistance to end users on the proper handling and disposal of media products to comply with government regulations. The service is a self-supporting unit.

California Animal Health and Food Safety Laboratory System

The California Animal Health and Food Safety Laboratory System (CAHFS) provides appropriate and timely diagnostic support to safeguard the health of California's livestock, poultry industries, and to protect the public health from animal disease. The laboratory supports both governmental regulatory agencies in their efforts to control animal diseases or their spread to people, and veterinary practitioners who provide primary care to food animals in the State. The CAHFS is comprised of a central reference laboratory located on the Davis campus and branch laboratories at Fresno, Tulare, Turlock, and San Bernardino. Laboratory support is also provided for the State's equine industry's health needs, and analytical chemistry testing for its horse racing industry.

California Raptor Center

The California Raptor Center is committed to preserving, protecting, and perpetuation the health of all raptor species, especially those native to California and the West. The Center provides: care to injured and sick raptors; hands-on training for veterinary students in the proper care, treatment, prognosis, convalescence and rehabilitation of injured or sick raptors; a facility and resource for research on normal raptor medicine, diseases, physiology, behavior; and a rehabilitation programs. The Center provides extensive public education to K-12 students, the university community, and the public-at-large.

Center for Children's Environmental Health

The Center for Children's Environmental Health (CCEH) promotes daily interactions among a multidisciplinary team of scientists whose main research interest is to understand the complex web of etiologic factors that contribute to autism. The shared philosophy among Center participants is that a better understanding of the immunological and neurobiological mechanisms associated with this neurodevelopmental disorder can not only lead to a better understanding of the mechanisms that influence it but can also accelerate the discovery of effective intervention strategies.

Center for Companion Animal Health

The Center for Companion Animal Health provides a core program on all aspects of health, well-being, and diseases of companion animals. The Center promotes resident, graduate student and postdoctoral training, and research investigations into the health and disease of companion animals. The Center brings together all faculty interested in companion animal health and oversees a competitive research grant program supported by private donations. Current research is focused in the areas of oncology, infectious diseases, nutrition, genetics, companion animal medicine, and surgery.

Center for Comparative Cancer

The Center for Comparative Cancer investigates the pathogenesis and treatment of animal and human cancers through basic, translational and clinical research. The overarching goal is to manage or eliminate cancer in companion animals (dog, cat, horse, and other companion animals) and to improve human health by helping our animal patients and using animal cancer as a model for human cancer research. Research is conducted in the Veterinary Oncology Core Laboratory and individual faculty laboratories. Teaching is enhanced by the research program for professional, graduate, and post-graduate students as well as veterinary practitioners and the public-at-large.

Center for Comparative Medicine

The Center for Comparative Medicine (CCM) is a cooperative, interdisciplinary research and teaching center that is co-sponsored by the School of Veterinary Medicine and the School of Medicine. The CCM embodies the "one-medicine" concept bringing together research teams focused on persistent infectious diseases common to humans and animals. Investigations emphasize the pathogenesis of diseases and intervention strategies for the treatment, control, and prevention of infectious diseases. Current research involves: human, simian and feline immunodeficiency viruses; human, simian, bovine, feline and murine leukemia viruses; human and simion cytomegaloviruses; human and simian papillomaviruses, human and animal Lyme disease; human and animal ehrlichiosis; and murine gene targeting for animal model development.

Center for Continuing Professional Education

The School's faculty and veterinary technicians are heavily involved in continuing education programs for veterinarians, other health professionals, leaders in animal agriculture and animal owners. The School annually presents more than 350 hours of educational programming divided between 45-50 programs and attended by 2,000-2,500 registrants. These programs include lecture, laboratory and experiential programs ranging from 1-20 days in length. The School provides veterinary practitioners in the State of California with opportunities to acquire and maintain their veterinary competency essential to serving the people of California.

Center for Equine Health

The Center for Equine Health is dedicated to research, teaching, clinical service, and public education related to advancing equine health. The Center acts as an umbrella organization to coordinate equine funding resources, equine-related research, and horse related programs with a broad array of other university and public units. The Center distributes funding to a variety of equine research investigators through a competitive peer-reviewed grant program. Current research is focused on: colic/colic surgery, racing breakdowns, orthopedics, anesthesia, foal immunology oncology, pulmonary medicine, infectious diseases, genetics, and sports medicine/exercise physiology. The Center serves as a teaching resource for the training of professional DVM students in medicine, reproduction, surgery, breeding farm practices, disease prevention, medical treatments, lameness evaluation, and emergencies. As a service to the equine industry the Center is designated as the Department of Agriculture's West Coast Isolation and Treatment Station for Contagious Equine Metritis.

Center for Food Animal Health

The Center for Food Animal Health is an organized research program of the School whose primary purpose is to organize resources for, and conduct research on, animal diseases important to the livestock industries, important food-borne and vector-borne disease problems, zoonoses associated with diseases of livestock, poultry and aquatic species, and the development of environmentally sound production practices. Specific objectives include establishing surveillance systems to identify new and emerging diseases, assist livestock producers in meeting international standards for trade, and protecting U. S. livestock production from foreign diseases. Future emphasis will focus on the role of food safety, genomics/genetics/proteomics in livestock and poultry production operations and disease control, and the development of an improved program for managing ecosystem health and environmentally sustainable agriculture.

Center for Imaging Sciences

The Center for Imaging Sciences was created to facilitate research utilizing a variety of imaging modalities, and interaction with various departments, schools, and campuses within the university system, and with private enterprise. The Center combines the capabilities of nuclear medicine, ultrasound, computed tomography, magnetic resonance imaging, digital angiography, and radiation therapy for use in animal research. Faculty use the Center's capabilities to foster research in anatomy, physiology, the function of various organ systems, and for biological and non-biological testing. Teaching and clinical service activities are also enhanced by the Center. The Center operates as a self-supporting unit by recharging faculty or programs for unit services.

Center for Laboratory Animal Science

The Center for Laboratory Animal Science (CLAS) provides an accredited and licensed laboratory animal facility for the humane care and housing of animals used in teaching, research, and service programs, as regulated by applicable local, state, and federal laws. CLAS provides care to research animals, quality

customer service to the research community, and teaching and training opportunities to animal users to promote appropriate use of animals in research. CLAS seeks to maximize resources to offer the most cost effective and efficient services, avoid duplication and underutilization of campus facilities, and facilitate the economy of animal care and construction costs. Services to campus users of research and teaching animals are provided on a fee recharge basis designed to cover costs.

Center for Vector-borne Diseases

The Center for Vector-borne Diseases works on mosquito and insect-transmitted viral diseases afflicting humans, livestock, domestic animals, and wildlife such as: Dengue Fever, West Nile Virus, Babesiosis, Rickettsial, Encephalitis infections, tick-borne diseases. Some of these viruses pose major impediments to international trade. Bluetongue, for example, is of major concern to U.S. Livestock industries because the virus can have disastrous effects on cattle and sheep. Faculty associated with the center have expertise in vectorborne veterinary and human infectious diseases and in public health entomology. The Center's research focuses on developing rapid and more accurate molecular methods for disease diagnosis and surveillance, to understanding the ecology of diseases in its natural setting, to the development of strategies and tools for disease prevention and management.

Central Services

The Central Services unit is a self-supporting activity, which provides a centralized receiving and dispensing service and maintains a readily available inventory of supplies in support of the instruction, research, and administrative programs of the School and other campus users. The unit emphasizes high quality customer service, a diverse product line, an effective cost-to-price structure to benefit the end user, a daily free delivery service, and advice on product quality/usage for specific research purposes.

Comparative Pathology Laboratory

The Comparative Pathology Laboratory is the laboratory animal medicine diagnostic laboratory for the Davis campus. It provides a complete range of diagnostic and veterinary medical services for the animals used in teaching and research. The services include anatomic pathology evaluation, clinical chemistry panels and evaluation, hematology determinations with analysis, parasitology examinations, microbiology cultures, serology, polymerase chain reaction diagnostics for laboratory animal diseases and polyclonal antibody production. These services are provided to the faculty, staff, and students working with research animals in the UC system, other academic institutions, and private research/biotechnical facilities.

Computer and Technical Services

The Computer and Technology Services (CATS) unit provides a focal point for faculty, staff and students who seek assistance with computing technology, web enabled systems, computer-based educational materials and instructional aids. Desktop support is provided for Macintosh and PC computer hardware and associated software. Technical staff provide consultation, software development, and training for courseware, administrative, networking, and multimedia projects. CATS serves as the School's liaison with other campus units on matters relating to technology and administrative computing.

Dairy Food Safety Laboratory

The Dairy Food Safety Laboratory addresses issues directly related to the dairy industry including consumer, regulatory, and producer concerns regarding animal health, public health, environmental health, food safety/food defense and the financial well-being of the dairy production unit. The Laboratory provides consistent, rapid response, applied research and education on herd health, animal well-being, and food safety questions, as they arise. Research efforts emphasize the following issues: antibiotic resistance, vaccines for

disease prevention, food safety, public health, biosecurity, automated records, animal identification, water quality/nutrient management, the production unit as a mini-ecosystem, good management practices, and HAACP.

Equine Analytical Chemistry Program

The Equine Analytical Chemistry Program provides expertise, leadership, and service to the State and its horse racing industry. The program operates through the auspices of the California Animal Health and Food Safety Laboratory System by contract with the California Horse Racing Board. The School's faculty provides a wide range of equine medical expertise for advice and collaboration on all aspects pertaining to equine health. The program is specifically focused on the areas of equine medicine, equine welfare, pharmacology, toxicology, diagnostics, and pathology, encompassing four major programs: equine drug testing, quality assurance, confirmatory testing, and equine drug research.

Feline Nutrition and Pet Care Center

The Feline Nutrition and Pet Care Center was developed around a specific pathogen-free cat colony, which supports studies on nutrition, physiology, genetic and medical research, and as animal models for humans. The Center offers graduate students, residents, and post-DVM students training in clinical nutrition. Future research studies will specifically focus manganese deficiency and requirements, obesity and energetics and adaptation of cats to various dietary concentrations of protein.

Ira M. Gourley Clinical Teaching Center

The Ira M. Gourley Clinical Teaching Center provides the facilities and infrastructure to support the DVM surgical teaching program. The Center also serves as the home for the Community Practice Surgical Program which is an innovative surgical teaching program which both prepares veterinarians of the future and provides veterinary care for animals. A list of surgical procedures which we believe an entry-level veterinarian should be able to perform has been identified and students are allowed to learn these procedures under very close, direct supervision of a veterinarian. Cases come from local animal shelters or VMTH clients who seek a low-cost surgical alternative for one of these identified procedures and are willing to allow the students to conduct the procedure.

International Laboratory of Molecular Biology for Tropical Diseases

The International laboratory of Molecular Biology for Tropical Diseases conducts a coordinated research program that brings together experts working on the molecular biology of human and animal tropical disease agents. The Laboratory is focused on the development of vaccines and rapid diagnostic kits to aid in tropical disease control. Faculty are specifically working on livestock vaccines for infectious diseases such as rinderpest, bluetongue, and foot and mouth disease, and a safe and effective vaccine for human immunodeficiency virus (HIV) infection.

International Programs

The Office of International Programs serves as a focal point for international activities within the School, and provides information and opportunities in international veterinary medicine for students and faculty. Specific programs include facilitating opportunities for students to train abroad and for international student exchanges, publicizing of student international activities, coordination of international research or training agreements, and informing faculty of international research funding opportunities. The office also maintains a database of faculty international interests and expertise, offers a seminar series in International Veterinary Medicine, and an annual field study project in Baja California.

Lucy Whittier Molecular Core Facility TaqMan Service

The TaqMan® Service is an independent Molecular Core Unit at the School initiated to stimulate veterinary related research and optimize the investment in technical equipment to serve a broad array of faculty scientists. Molecular biology centers simplify and accelerate the process of research at the University and in the pharmaceutical industry. This core unit supports the increasing need for genomics based services for research, preclinical and clinical testing of drugs, vaccines and diagnostic procedures. The service assists researchers in choosing the right targets for projects, gives support in the project design, and provides guidance on how to optimize the TaqMan® PCR systems. The service is self-supporting.

UC Veterinary Medical Center – San Diego

The UC Veterinary Medical Center (UCVMC) – San Diego provides the administrative infrastructure for veterinary teaching, research, and service programs in the San Diego Area. UCVMC – San Diego is a joint program with the UC San Diego School of Medicine, to foster collaborative programs in diagnostic medicine, comparative medicine, and laboratory animal medicine. The Center also includes a veterinary clinical component which is currently co-located with a private specialty hospital in Sorrento Valley. Clinical services will focus on specialty practices in behavior, hemodialysis, clinical nutrition, clinical pharmacy and cardiology. A pathology residency program with the San Diego Zoo is currently offered. Outreach programs for professional continuing education and development are conducted in the southern California area through the Center.

Veterinary Genetics Laboratory

The Veterinary Genetics Laboratory contributes to the teaching, research, and service programs of the School pertaining to the genetic component of animal health. The service program provides reliable genetic diagnostic services and counseling to cattle, horse, dog, sheep, goat, cat, pig, llama, and alpaca animal owners, breeders, veterinarians, scientists and breed registries and public agencies. The Laboratory conducts research using molecular technology on genetic aspects of disease, DNA marker development, trait and gene mapping, comparative genomics, population conservation, and ecological and diagnostic testing. The Laboratory also provides forensic analysis of DNA evidence for agencies and individuals worldwide. Test results and expert analyses have helped to prosecute persons responsible for murder, arson, burglary, animal abuse, dog fighting, poaching, sexual assault and rustling.

Veterinary Medicine Extension

As the veterinary unit of the Cooperative Extension Service, Veterinary Medicine Extension serves as the bridge between the research capabilities of the School and the needs of the livestock and poultry industries, and the general public of California. The Unit's primary objectives are: rapid dissemination of the latest research information and technology to livestock owners, and producers; presentation of training workshops; cooperative research projects with various farm, dairy advisors, and veterinarians; research on solving problems relating to safe foods and environmentally sound production animal and poultry practices; and collaborative programs with other cooperative extension specialists on the Davis campus and within the UC system. Future program plans include offering quality assurance programs for all livestock and poultry industries, investigate occupational health issues for the veterinary profession, assessing disease risk and developing disease control programs, target residue avoidance programs to smaller producers and develop pre-harvest pathogen reduction/modification programs.

William R. Pritchard Veterinary Medical Teaching Hospital

The Pritchard Hospital serves as the primary clinical teaching resource for the training of veterinary students and residents in the diagnosis, treatment, and prevention of diseases in many different species of animals. The hospital serves the general public's need for animal care while providing essential caseload material for the School's instructional programs. Veterinarians refer cases to the hospital when unique facilities or services are required for a specific animal patient. The hospital also facilitates the collection of clinical material for use in research, and provides a database of reliable information on naturally occurring disease. Future activities will include the expansion and renovation of clinical facilities to accommodate the increased DVM and Resident educational programs, the expansion of the community practice service, growth of the specialty services, imaging capabilities, and the large animal clinic.

Veterinary Medicine Teaching and Research Center

The Veterinary Medicine Teaching and Research Center provides field-oriented teaching, research and public service programs, in food animal medicine. The VMTRC provides training for professional DVM, professional MPVM, graduate clinical (residents), and graduate academic students in methodologies focused on enhancing the production of abundant, wholesome animal-origin foods, while emphasizing animal welfare issues, and environmentally friendly practices. Veterinary services are provided in the diagnosis, control, prevention, and treatment of livestock diseases, and the improvement of herd health and flock management in livestock enterprises. The VMTRC is located in the largest livestock production region in California with access to large-scale livestock production operations, and industry-related databases, which offer scientists unique food animal research opportunities. Current studies are focused on diseases of dairy cattle and poultry, production quality control, biotechnology, on-farm food safety, animal well-being, antimicrobial susceptibility, and environmental topics.

J. D. Wheat Veterinary Orthopedic Research Laboratory

The J. D. Wheat Veterinary Orthopedic Research Laboratory (VORL) provides a unique and specialized facility and research environment for faculty, postdoctoral fellows, graduate students, residents and visiting scientists who are interested in pursuing research in orthopedic diseases of animals. The Laboratory provides an environment in which complex problems presented by most musculoskeletal diseases can be addressed by using the collective expertise of investigators from several different disciplines in the basic and clinical sciences of the School. The VORL is the only facility on the Davis campus: capable of preparing and examining musculoskeletal tissues of large mammalian species, and equipped for the biaxial testing of the mechanical properties of musculoskeletal organs and tissues. Research programs include biomechanical factors associated with fractures in athletic animals, new implants for the treatment of fractures in horses, causes and pathogenesis of breakdown and joint disease in racehorses, and bone fatigue.

Western Institute for Food Safety and Security

The Western Institute for Food Safety and Security is a partnership between the UC Davis School of Veterinary Medicine, the College of Agricultural and Environmental Sciences, the School of Medicine and the California Departments of Food and Agriculture and Health Services, the Food and Drug Administration, U.S. Department of Agriculture and food industry partners. The Institute conducts research that will enhance food safety and defense in all sectors of the food systems' continuum from environment to consumer; provides outreach programs that extend the Institute's research and information management programs to the public; and, builds an information management system that positions the Institute to be a leading resource for scientific information facilitating innovations and new practices that enhance food safety and defense, enhance economic stability of the food industry and, overall, lead to improved human health and welfare.

Wildlife Health Center

The Wildlife Health Center (WHC) is the nation's only comprehensive, university-based organization dedicated to the conservation of healthy wildlife and ecosystems. It coordinates a broad range of research, education and service programs, and provides a reliable resource for scientific investigation of controversial and complex wildlife conservation issues. The center bridges the gaps between science, policy, industry and advocacy by bringing key players together to discuss problems and find solutions. Students are taught the skill and ecological perspectives to address the multifaceted issues affecting the health and sustainability of wildlife populations and the environment. WHC activities include increasing the public understandings of all wildlife health issues, developing new techniques to better manage wildlife populations, investigating wildlife health problems, and studying environmental health and conservation issues. The WHC administers the Oiled Wildlife Care Network, a network of 22 wildlife care providers, and regional facilities designed to rehabilitate sea birds, marine mammals, and sea turtles in the event of an oil spill in marine waters off the California coast.

NEW INITIATIVES/OPPORTUNITIES

Education (Core Program)

At the heart of the School of Veterinary Medicine is our commitment to the innovative education of future veterinarians, veterinary specialists and veterinary scientists. We are dedicated to maintaining our position at the forefront of veterinary education, to producing graduates with the educational and creative ability to be the academic leaders within the profession, to serve the state, nation and globe in public service capacities, and to fill the faculty ranks in academic veterinary medicine. We aspire to be the standard for veterinary professional education. To fulfill this goal we are engaged in: a redesign of the DVM Curriculum to offer exposure to new and emerging career areas of the profession; embrace new teaching methodologies and technologies; the development of new specialty disciplines for post-DVM training; increasing the number of professional students to better serve society; particularly in those interested in public service, public health, food animal, wildlife and research careers; extending distant learning opportunities and the development of satellite training programs which offer students animal/academic experiences not available here.

Research (Core Program)

The School has built a foundation of faculty excellence in both the clinical and basic disciplines and created an environment to support sustained excellence in biomedical and environmental research. We are committed to maintaining this degree of excellence in the face of declining funding, facility limitations, equipment costs and faculty recruitment challenges. To continue to be a major leader in biomedical research we will focus our future research enterprise on translational research pursuits that address animal, human and environmental health particularly in the areas of infectious and zoonotic diseases, genetics, genomics, reproductive biology, respiratory biology, immunology, toxicology, biochemistry, epidemiology and statistics, stem cell research, comparative medicine, food safety, and ecosystem health. We are committed to addressing the needs for future faculty and veterinary scientists by providing advanced education for veterinary students and graduates in the principles and techniques associated with becoming an outstanding research scientist. We will promote the advantages of team science and develop private support funding for endowed faculty positions, graduate student fellowships and to support scientific initiatives within the School. We will also support the development of the UCD School of Public Health; promote collaborative educational and research programs, and faculty recruitments between SPH and SVM.

Service (Core Program)

Public service is a major mission of the School which the faculty, staff and students define in many different formats. Excellent clinical practice and patient care is the hallmark of our clinical service and our student learning experience. The faculty are also committed to applying their expertise and skills to solve real problems impacting animal, human and environmental health, enhance public education, provide diagnostic support for California's animal agriculture industries and wildlife, and even disaster response and recovery assistance. We are assessing the challenges and issues facing the VMTH clinical environment and will make adjustments as necessary to best serve our clinical teaching and patient care service needs. We are considering the development of wildlife and environmental diagnostics services to rapidly determine the cause of disease in animal populations and the further expansion of the role of veterinary and advancing the role of veterinary professionals in the realm of "One Medicine."

Faculty (Core Program)

The School's reputation hinges on the expertise and commitment of its faculty. To maintain the School's outstanding teaching, research, clinical patient care and public service programs requires the recruitment and retention of the top faculty candidates available. We commit to the recruitment of the best candidates and the fostering of their best work by promoting the facility and equipment infrastructure support needed, the development of financial resources for teaching and research activities, the collaboration with colleagues from multiple disciplines, and the creation of an environment that nurtures a balance between work and life pursuits. To address these goals we are: promoting a culture of excellence in teaching, team science and service; developing a systems of mentorship for new faculty; encouraging increased collegiality and collaboration through enhanced participation in schoolwide activities; and looking for ways to improve the quality of life and balance for faculty. We have developed and submitted a proposal to increase the faculty salary plan in recognition of the educational training and expectations of veterinary faculty, and marketplace competition.

Diversity (Core Program)

As a health profession, veterinary medicine's workforce is limited in its career, ethnic and cultural diversity. The School is committed to promoting the diverse populations of talent and cultures within our faculty and students that mirror our society. We are also committed to expanding the career pathways for veterinarians beyond companion animal practice, educating students in the increasing career opportunities available, and promoting a greater societal understanding of the breadth of skills veterinarians bring to animal health, public health and environmental health. We have identified several strategies to increase the numbers of under-represented minorities recruited and retained in veterinary medicine and to promote career diversity, including: establishing scholarships to attract students targeted for career or cultural diversity; conducting outreach and recruiting efforts to attract students to public service careers; partnering with community colleges in rural, food animal producing areas, to attract students for food animal, veterinary public practice, and community practice careers; and hiring personnel dedicated to assist with our diversity outreach and recruitment activities.

Clinical Teaching and Service

The School's outstanding clinical teaching and service programs emanating out of the VMTH are facing a number of internal/external challenges. Our goal is to maintain our premier clinical education and patient care status, plan for future program emphasis and growth, and address appropriate infrastructure and facility support needs. To address this goal we conducted a review of the internal/external challenges and issues impacting our clinical program. The review produced a number of short-term and long-term recommendations related to teaching, community practice, small animal surgery, time management, organizational structure, finances, facilities and the hospital's culture and communications. The faculty are

considering separating the professional DVM and Resident training activities within the individual services in order to enhance both teaching experiences, and manage primary vs. tertiary cases more efficiently. They are also beginning to plan for an expanded community practice service to promote DVM educational opportunities of routine animal care cases. Addressing these issues and programmatic recommendations are the key steps towards developing a vision for the VMTH that will sustain our outstanding clinical programs long into the future.

Ecosystem Health

The School uniquely approaches public and environmental health from an animal population perspective. Our focus, on the interactions among livestock, pets and people, is critical to addressing the issues impacting ecosystems. We see ecosystem health as the foundation for the “one medicine/one health” concept uniting medicine, veterinary medicine, agriculture, wildlife, environmental, and government groups. We embrace the “one health” concept and aspire to be the global leader in ecosystem health education, research and service. Strategies to advance this initiative include: utilizing ecosystem health examples in the core DVM curriculum to promote critical thinking, and to emphasize the connectedness of animal and human health with the environment and emerging diseases; offering a core, survey course to introduce all facets of veterinary medicine and illustrate how ecosystem health principles are important throughout the curriculum; increase diagnostic laboratory capacity to rapidly determine the cause of disease in wildlife populations; provide research based information to help legislators develop effective policies; foster collaborations and linkages with the public health community, international health and aid organizations, state and federal resource conservation and wildlife management agencies; and add faculty in key disciplines to support ecosystem health training for veterinary and graduate students.

Food Systems

The School recognizes the changing needs of animal agriculture industries and the need to adapt the management, medical skills and services offered by veterinarians to match the needs of these food animal/food system operations. Our goal is to set the standard for veterinary food animal/food systems education and research. Food systems and industries are impacted by many outside influences; we seek to ensure that policy decisions and consumer perceptions are based on scientific fact and good agricultural and manufacturing practices. Opportunities for addressing this goal include: adapting our educational programs to the new needs of the food animal industries; changing the professional approach to food animal production units to consider them as managed ecosystems interacting within larger ecosystems; establishing recruitment and admissions targets for students with food animal interests; and participating in the effort to develop national Centers of Excellence to train veterinarians in emerging diseases and agroterrorism/bioterrorism associated with catastrophic diseases.

Clinical Nutrition

The School recognizes the broad influence of nutrition on animal health, human health and the impact of nutrient waste material on the environment and ecosystem balance. The development of a multi-unit, multi-species program on different aspects of nutrition and its clinical application in the health of animals is an exciting future program emphasis. Clinical nutrition in companion animals, equine, livestock, and poultry can be addressed in many different ways. Dietary changes can aid with healing, prevent the advancement of some diseases, and when formulated with prescribed pharmaceutical therapies can have other healing benefits. Nutrition decisions based on feed stuffs available, or economically practical, have different impacts on livestock and poultry health, growth and the nutrient content of their waste products. The development of multi-faceted clinical nutrition programs and the recruitment of additional nutrition focused faculty will be an area for future program growth. We are also exploring the development of a public/private partnership to create a Center for Pet Food Safety which would promote programs for surveillance testing, diagnostic tools, nutritional research, and outreach/communication efforts. The analysis and surveillance of ingredients used

in pet foods which are also used in human food products will have the added benefit of acting as a sentinel for potential human health impacts.

Comparative Medicine and Laboratory Animal Medicine/Pathology

The School fully supports the “one medicine” concept for the benefit of animals and people. This concept can be applied to all of our education, research and service programs. Future programs will focus on ways to expand animal and human health programs to bridge common health investigations, understand and control disease outbreaks, develop animal models of human disease and promote translational medicine approaches. Laboratory animal medicine and pathology faculty and programs are natural collaborators with comparative medicine faculty and programs. Ninety percent of NIH funded animal-related research involves mice. There is a recognized national shortage of veterinarians with expertise in laboratory animal medicine. We see a great potential for developing a world-class program in laboratory animal medicine here, uniquely affiliated with the School of Veterinary Medicine and in concert with the School of Medicine, College of Biological Sciences, California National Primate Research Center, Mouse Biology and other campus programs and units.

Emerging Infectious Diseases

The threat of emerging infectious diseases impacting animals and people is constant. The School recognizes the need for an increased program focus particularly in the area of zoonotic diseases. Future programmatic growth of faculty will include the development of a critical mass of individuals with expertise in infectious diseases. The ultimate goal is the development of a center which would become a focal point for interdisciplinary research on better diagnostic methods, innovative vaccines, prevention and control strategies, and fundamental studies on the basic nature of infectious agents, and the infections caused by human and animal pathogens.

Genetics, Genomics and Stem Cell Biology

The power of genetic tools, to identify and understand inherited diseases, to develop genetic therapies, and to create better diagnostic tests, offers a huge potential for future research and clinical application. The faculty embrace the opportunities in the area of genetics, genomics and stem cell research for the benefits of animals and people, through the development of animal models of human disease. Growth in this area would create a greater critical mass of faculty, enhance the genetic research and service programs already in place, capitalize on the data collected through services of the Veterinary Genetics Laboratory and advance the application of genetic and stem cell tools through collaborative efforts with other disciplines.

Oncology

The School aspires to be a center of excellence in the area of oncology. Building upon the existing strong clinical oncology service, and in collaboration with the School of Medicine and the Northern California Cancer Center, the faculty will be expanded to foster basic and clinical faculty interactions, further develop a comprehensive translational research program, and expand the clinical service enterprise for the benefit of animals and people. The collaboration of multiple faculty will be accomplished through individual faculty research laboratories, the creation of a core oncology laboratory, and the state-of-the-art oncology patient service at the VMTH. These research and service resources will naturally create a rich teaching environment which will offer professional, graduate, and post-graduate students a unique educational experience. The program’s major objective is to manage or eliminate cancer in companion animals and to improve human health by using animal cancer as a model for human cancer research. This unique program focus makes perfect sense as animals and humans share the same environment, often sharing the same air, water, food and sleep patterns and animals, like humans, tend to develop tumors that arise spontaneously, grow fairly slowly and are associated with old age.

Veterinary Public Practice

The School embraces the emerging field of veterinary public practice and the role of veterinarians as public health leaders. Veterinarians are essential to public health and many areas of public service; bridging animal, human and environmental health issues. We are committed to leading the development of veterinary public practice as a career pathway and marketing the significant public service contributions these professionals will offer to improve public health and address zoonotic diseases. Public practice veterinarians will also be in a position to pursue careers in the areas of diagnostic veterinary medicine, biomedical research, academia, regulatory medicine, ecosystem health, and the interface issues between wildlife, agriculture, and urban development. To address this initiative we will build on existing programs of strength in the areas of: marine and aquatic waterborne diseases, food safety and security, environmental public health, air quality and impacts on human health, and aquatic toxicology. We will explore the opportunity for combined degree programs (i.e. DVM/Physician Assistant or Nurse Practitioner, etc.), integrate public practice/ecosystem health throughout the DVM and MPVM educational programs, and expand programs in global health “One Medicine/One Health.”

RESOURCE CHALLENGES/STRATEGIES

Faculty

The School's full FTE allocation of 156 includes Instruction and Research faculty and Agricultural Experiment Station faculty. Of this total, 111 positions are currently filled, 18 have been held open for to meet annual budget targets, and 27 are either in recruitment or under discussion for future recruitment. In addition to these permanent faculty, the School has 45 Professor of Clinical X faculty to fulfill the School's diagnostic laboratory and clinical teaching/service missions.

Over the next 5-7 years an estimated 30% of our permanent faculty will be eligible to retire. This will leave major needs in the areas of: surgery, food animal medicine/food safety, pathology, and on-going unmet needs in ophthalmology, oncology, and toxicology. Faculty recruitment priorities are determined based on current teaching and clinical service program needs coupled with long-term research initiatives and emphasis. Faculty recruitment in most disciplines is in crisis because of the multiplier effects of salaries that are no longer competitive with the marketplace including competing institutions; high cost of living (housing) in Davis and surrounding communities; high educational debt; and tuition offsets for dependents offered by peer institutions. Small applicant pools and high start-up costs exacerbate recruitment of faculty. The continued erosion of start up support for higher education and the need to hold more FTE open to meet budgetary reduction targets is markedly impacting our ability to adequately provide the depth and breadth of faculty expertise to sustain a professional curriculum. The School is committed to promoting the diverse populations of talent and cultures within our faculty and students that mirror our society.

Financial

The School's state funding continues to decline creating a significant financial challenge to find other revenue streams to support our teaching, research and service programs, maintain an affordable educational opportunity for students, recruit and retain top quality faculty, build or renovate up-to-date facilities and fund new initiatives. The faculty, staff and students are creative and increasingly entrepreneurial in their approach to ensuring the sustainability of their programs. Faculty recruitments depend upon adequate permanent funding for salaries and support. Facilities depend upon state funded capital initiatives and of late include a substantial private donation component. Administrative, technical and clinical staff all require steady sources of support from a myriad of sources including state funds, client income, research grants or private donations.

There remains substantial concern over the continued erosion of state support and a static level of indirect cost return to support the research enterprise. The continued emphasis on, and related growth of research programs, despite a more competitive funding environment, is in conflict with the decline in infrastructure support to administratively manage grants and associated personnel, and meet other university policy/practices requirements. Because granting agencies are also substantially reducing or not funding administrative overhead in grants, the campus needs to reallocate a higher percentage of indirect cost returns to grant administration to sustain departmental/unit infrastructure

In order to maintain financial resources, we recognize the need to consider new approaches to developing new revenue streams including: partnering with private companies for program development; increased client income opportunities; strategic grant applications; enhanced fundraising efforts, and innovative changes to our teaching, research and service operations to improve efficiencies at all levels. Our primary development priorities are focused on facilities, endowed chairs, program funding, professional student scholarships, and graduate student fellowships. These activities will help, but do not address the fundamental erosion of the School's budget. Philanthropic organizations are reluctant to fund sustained educational programs as they view this as a state obligation. The teaching, research and service programs of

the School are in danger of becoming unfunded mandates, with unrealistic expectations for continued excellence and growth from the campus, university, state legislature and society at large.

Facilities

Adequate facilities for faculty, researchers, graduate students, and residents is a major challenge for the School. Recruitment of new faculty is dependent upon state-of-the-art research facilities located in the Health Sciences District. Despite campus efforts to address facilities needs, there are several programmatic areas that urgently need replacement facilities – identified in the initial long range planning to resolve the Schools facilities deficiencies. These include:

- 1) relocation of the Dean’s Office to the Health Sciences District. Estimate cost \$15 million,
- 2) provision of warehouse space to replace equivalent space in Haring Hall and Surge III not accommodated because of budget constraints in Veterinary Medicine IIIB. Estimate cost \$3 million,
- 3) expansion and modernization of the Veterinary Medical Teaching Hospital to accommodate expanded clinical teaching programs and class size. Estimated cost \$120 million,
- 4) Provision of faculty research and office space to decompress overcrowding in Tupper Hall (identified in long range planning) and to allow for growth of research programs and further enrolment expansion in the DVM and graduate programs identified by the UC Health Sciences Growth Initiative (2007). Estimated cost \$80 million,
- 5) Provision of large animal BSL-3 facilities. Estimated cost \$50 million.

OUTCOMES ASSESSMENT

Outcomes assessment of the School’s teaching, research and service programs requires a myriad of measurements some very tangible and easily applied, and others are inferred such as fundraising success based on program vision and reputation. Research success is most commonly demonstrated by academic advancement, faculty publications, grant success, grant funding, faculty awards, public/private partnerships, program growth and new discoveries. Teaching success is demonstrated by the successful graduation of students, employment rates, evaluation of faculty teaching, and student test scores on state and national board exams. We have also recently employed an education specialist to provide leadership and vision in outcome assessment to assist the faculty in the development of a comprehensive outcome assessment program of our professional curriculum to meet accreditation standards. The goal is to determine objective, structured measurement strategies to assess the knowledge, skills, and attitudes of professional students from admittance, through veterinary school and then into career pathways. Service includes clinical patient care, professional continuing education for life-long learning, public education programs and seminars, consultation and advice to livestock producers, agency representatives, disaster response, and public health diagnostic testing. Outcomes are measured by the participation in these programs, patient treatment and recovery, rapid response to outbreaks or disasters and general public satisfaction.