The University of Arizona
Instructions and Approval Sheet
Proposal for New Academic Organizational Unit

Directions:
1. Provide information regarding the proposed unit in the form requested on the attached pages. Respond to each item individually using “not applicable” where appropriate. Attach this approval sheet to the front of the proposal.
2. Obtain signatures of the proposed unit administrator and department or committee head.
3. Forward the original and one copy to the college office for the dean’s signature and retain a copy for departmental files.
4. The dean should forward the original to Curriculum and Registration, Academic Programs, Attn: Sandra Beeler, CCIT 337, and retain the remaining copy for college files.

Note: In some situations signatures of more than one dean or department head may be required.
If you have any questions, please contact Sandra Beeler, CCIT 337, 621-1847.

Initiating college, department, or committee:

College of Medicine

Description of the proposed organizational unit change:
New department
New committee
New laboratory, center, institute, or bureau (X)
Reorganization
Other

Title: Venom Immunochemistry, Pharmacology, and Emergency Response Institute
(VIPER Institute)

Unit Administrator (title and signature)

Department Head, Date

Dean, Date

See attached letters of support:
Dean, College of Medicine: Keith A. Joiner, M.D.
Dean, College of Science: Joaquin Ruiz, Ph.D.
Director, BIO5 Institute: Vicki L. Chandler, Ph.D.
Assoc. Dean, College of Pharmacy and Exec. Dir., Arizona Poison and Drug Information Center: Theodore G. Tong, Pharm.D.
Head, Department of Pediatrics: Faye Z. Ghishan, M.D.
President, R and R Registrations: Ronald G. Leonardi, Ph.D.
I. DESCRIPTION OF THE PROPOSED ORGANIZATIONAL UNIT CHANGE

A. Identify the name of unit(s) affected by the change and its place in the organizational structure of the university.

The Venom Immunochemistry, Pharmacology and Emergency Response Institute, hereafter referred to as VIPER, will be administratively housed within the College of Medicine. It will work in formal partnership with the Arizona Poison and Drug Information Center, within the College of Pharmacy, and in collaboration with many other University colleges and departments, including in particular the College of Science. Its financial and budgetary matters will be managed through the College of Medicine.

B. Explain the nature of the change; i.e., formation of a new unit or reorganization of an existing unit.

VIPER has evolved over time as an informal partner to the Arizona Poison and Drug Information Center (APDIC). APDIC, which for 25 years has been administered by the UA College of Pharmacy under a State of Arizona mandate, functions principally as a public service, providing emergency assistance to over 72,000 callers annually. APDIC calls involve every kind of toxic exposure, from household cleaning product ingestions to drug overdoses, workplace spills to snakebites. Approximately 20% of APDIC’s calls are a consequence of bites and stings. APDIC’s funding is 90% State, 10% Federal, totaling approximately $1.4 million annually toward salaries and resources within the College of Pharmacy. Both for public outreach and as a clinical practice site, APDIC participates in the University’s education mission. APDIC also serves as an occasional dry lab for clinical and epidemiological studies.

APDIC’s clinical service mission is supported by faculty from three College of Medicine departments, who participate in a clinical call schedule designed to provide emergency assistance to medical professionals managing poisoning emergencies. Over many years, these faculty have used APDIC as a shared forum for the training of medical students and residents; and APDIC caller data have been the basis of fruitful research brainstorming. By far the most exciting, and the most successful, projects stemming from this forum have been those involving the venom of Arizona’s snakes, scorpions and spiders. By its nature, venom research is interdisciplinary and multinational, with need of expertise in medicine, evolutionary biology, biochemistry, physiology, business, manufacturing, international law, and pharmacy.

Successful bids for grants, industry contracts, and State appropriations have over the past several years yielded a net venom research budget equal in magnitude to that of APDIC itself. And interdisciplinary collaboration stemming from these projects has resulted in a loosely-knit coalition of clinicians and scientists from ten Arizona hospitals, ten University departments and the Arizona-Sonora Desert Museum, with science affiliates at Texas A&M, Lewis & Clark University, and the National Autonomous University of Mexico. Because a shared identity enables stronger research programs, more innovative training opportunities, and enhanced funding opportunities, the venom research group began referring to itself as “VIPER” in 2004. VIPER faculty, taken in aggregate, are poised to take the national lead in a field of unusually promising translational work. In recognition of this potential, the University of Arizona has approved a VIPER funding proposal for submittal as an FY07 UA Federal Priorities request.

This proposal makes no change to the College of Pharmacy’s Arizona Poison and Drug Information Center, which retains its own mission, structure, funding, staff, activities and basis in
Arizona law. Rather, the proposed VIPER Institute will function as an independent research partner of the more public service-based APDIC, with a shared commitment to education and multidisciplinary work.

II. PURPOSE AND ACTIVITIES OF THE UNIT

A. Explain the rationale for the change and the relationship to the Mission and Scope Statements adopted by the Board.

VIPER brings together a group of scientists and clinicians in a multidisciplinary, translational research effort that shares the University of Arizona’s mission and strategic goals. The mission of the VIPER Institute is applied phylogenetics of venom: using clues from the genealogy of animals to guide scientific discovery toward practical applications. VIPER scientists use venom function and diversity toward discovery of new diagnostic and pharmaceutical tools and toward economically sustainable improvement in medical care of venom injury worldwide. The VIPER Institute strives to be a world leader in the combination of phylogenetic and drug-development resources across international boundaries, resulting in better, more cost-effective medical care for all.

The UA mission is to discover, educate, serve and inspire. As the state’s land grant university, the UA has explicit statewide responsibilities for agriculture and medicine and a strong tradition of service to its many communities. VIPER’s unique applicability to Arizona’s ecology, health care needs, and research strengths means that the new institute will share all five of the UA Strategic Goals:

1. Build a world-class and diverse academic community at the forefront of discovery. VIPER will enjoy, from the outset, collaborative relationships in venom phylogenetics and antivenom development worldwide. Established and expanding relationships with colleagues in Mexico, Africa, South America, Australia and the Middle East ensure that VIPER scientists and students have access to both the human and the animal diversity of the world. VIPER’s strong ties with physicians, scientists and industrial partners in Latin America mean that the program will have broad appeal to students interested in international science and business.

2. Increase student engagement, achievement, retention and graduation rate. VIPER faculty all participate in existing University degree programs, in biochemistry, pharmacy, biology, medicine, public health, physiology, and pharmacology. Students in these fields have previously had access to venom science, drug discovery and development only through the limited number of degree-specific opportunities offered within their area. It has been a common experience of VIPER faculty that students in the basic sciences request better access to clinical opportunities, and that students in medicine and pharmacy want more training in science. VIPER will enable faculty across disciplines to share students and to develop shared curricular offerings that will enhance the student experience in this fundamental Arizona subject.

3. Extend the concept of a land-grant university to position the University of Arizona, across all colleges and campuses, as a model for linking scholarship and creativity to societal and community needs. Under the 1862 Morrill Act, Federal Land-Grant institutions including the UA were established to teach “agriculture and the mechanic arts,” with the goal of extending a practical and liberal education to students from all walks of life. Later rulings of the Secretary of the Interior extended the areas of endeavor
explicitly included in the land-grant mission to include the natural and physical sciences, among these chemistry, biology, zoology, entomology, physiology, and pharmacy. From the beginning, VIPER faculty in these natural and physical sciences will draw on an established practical research consortium involving hospitals and clinicians across Arizona. Arizona communities with endemic snake, spider and scorpion populations — including many where an agriculture-based economy accentuates the occupational risk — will benefit directly from translational venom research.

4. **Achieve a strong financial foundation.** VIPER faculty share this strategic goal and anticipate that the institute will enable more effective grant and contract acquisition. Consolidated infrastructure and purpose will enable much more efficient interaction with funding agencies and with subcontracting research affiliates. Memoranda of Understanding between the UA/VIPER, the Arizona-Sonora Desert Museum, Texas A&M’s Natural Toxins Research Center and the US Military will greatly facilitate the UA’s ability to secure funds for ongoing venom research.

5. **Increase recognition as a research extensive university committed to an outstanding educational experience and connected to its community and the world.** For VIPER faculty, this final strategic goal focuses the broad opportunities of Goal #1 through the community needs of Goal #3. Connection to the community and the world are fundamental to venom phylogenetics and envenomation treatment. Worldwide venom studies collaboration, multicenter clinical drug trials, and public education and outreach through collaboration with the Desert Museum will all bring the impact of University science directly in line with public interest.

**B. Identify the basic goals and objectives of the new reorganized units.**

VIPER’s specific goals support its mission of practical application of venom phylogenetics, within the UA’s mission to discover, educate, serve and inspire. They are:

1. **Discovery:** VIPER will provide a common forum for venom and envenomation research within the University itself and in collaboration with other academic, public and private sector entities. Combined access to venoms, laboratory facilities, patient records and sera will greatly facilitate translational work; and shared infrastructure will improve grant and publication submissions.

2. **Education:** VIPER will consolidate UA faculty and curricular elements essential to drug discovery and testing, emphasizing venom-derived products and treatment of envenomation. Availability of faculty knowledgeable in the full spectrum of drug discovery and testing to students in laboratory and clinical training programs will enhance the readiness of UA graduates to participate in drug development within industry, business, government or academics.

3. **Service:** VIPER will enable medical toxicologists from multiple university departments to work together more efficiently, including an on-call schedule, poison center response, clinical consultation and billing, clinical teaching, and clinical research.

4. **Inspiration:** VIPER will share the evolutionary richness of Arizona’s unique venom resources with the public and with colleagues from around the world, through collaboration with the Arizona-Sonora Desert Museum, by hosting international
scientific conferences, and by providing lay and professional audiences with reliable information about one of nature’s most inherently fascinating phenomena.

C. Describe the activities, projects, and programs that will be conducted by the new or reorganized units. Identify the curricular implications of the activities, projects, and programs.

**Snakebite coagulopathy studies:** A multidisciplinary basic science investigation into markers of venom-induced coagulopathy is currently under way, coordinated by proposed VIPER protein chemistry Lead Scientist John Osterhout. Investigators on the coagulation team include members of the College of Medicine’s Pathology department, who oversee the collection and hospital analysis of human sera, as well as faculty from the College of Science’s Biochemistry department and collaborators from Mexico and Minnesota. Studies currently under way will enable the establishment and validation of surrogate markers of clinical disease, for use in upcoming Phase III human studies related to pit viper bite. A preliminary study of sera from African snakebite victims is planned for summer of 2006, in collaboration with African clinicians involved in antivenom clinical trials.

**Snakebite treatment clinical trials:** In close collaboration with the protein chemistry team, VIPER clinicians working under Lead Investigator Leslie Boyer are currently conducting Phase II human trials of a novel F(ab)_2 polyvalent antivenom against pit viper bite in Arizona. Team members draw from College of Medicine departments of Pediatrics and Emergency Medicine, with strong support from the College of Pharmacy’s Arizona Poison and Drug Information Center. Physician co-investigators at 6 southern Arizona hospitals make use of VIPER protocols, in close collaboration with industrial and business sponsors. The clinical trials team is currently involved in the creation of additional, hypothesis-generating Phase II study protocols for use at other sites in the US and in Mexico. Phase III trials are planned to follow.

**Exotic venoms clinical decision-making support:** VIPER has been the principal organizing and coordinating site in the creation of an online Antivenom Index, for use by members of the American Zoo and Aquarium Association and the American Association of Poison Control Centers. Affiliated clinicians in Nebraska, Colorado, California and Minnesota are creating a set of standardized treatment protocols for Americans bitten by captive cobras, mambas and other exotic venomous snakes. Both resources will be made available for emergency treatment of snakebite victims through the coordinating efforts of the Arizona Poison and Drug Information Center. In addition, VIPER clinical staff intend to identify follow-up grant support for the development of unique library and web resources needed for international venom studies.

**Scorpion venom neurotoxicity:** The neurophysiology of scorpion venom has been extensively studied by VIPER affiliates at the UNAM Biotechnology Institute. VIPER scientists working at UNAM and under Physiology Lead Scientist Andrea Yool are now investigating in greater detail the physiology of receptor interactions, with an eye toward potential new drug design. In addition, VIPER scientists and technologists from the College of Medicine’s Departments of Pediatrics, Radiology, and Biomedical Communications have begun work on bioimaging of the clinical neurotoxicity of scorpion sting, with the intentions of validating the clinical diagnostic criteria necessary for future clinical trials and of enabling future training and long-distance telemedicine support.

**Scorpion sting treatment clinical trials:** In 2005, VIPER clinicians under Lead Investigator Leslie Boyer have completed Phase II/III clinical trials of a novel F(ab)_2 antivenom for treatment of systemic scorpion sting neurotoxicity. This set of studies, which were conducted using grant
funds from the US FDA’s Office of Orphan Product Development, is intended to result in formal
FDA approval of the first F(ab)2 antivenom in the United States. Preliminary results have been
compelling enough that transition funds were appropriated, by the Arizona legislature, to enable
distribution of the antivenom statewide pending formal licensure. The resulting clinical trials
network, developed by VIPER, currently involves 8 hospitals in Arizona and is expected to
involve 25 over the course of the next 2 years. Clinical trials at these sites will enable the success
of the bioimaging study described above.

**Widow spider treatment clinical trials:** VIPER clinicians in College of Medicine departments
of Emergency Medicine and Pediatrics are participating in clinical trials of a new F(ab)2 black
widow spider antivenom. This Phase II/III trial is coordinated by affiliates at the Rocky Mountain
Poison and Drug Center in Denver, Colorado.

**Brown spider phylogenetics and diagnostic investigations:** VIPER affiliate Greta Binford of
Lewis and Clark University has become a world leader in the improved understanding of injury
brought about by Sphynxomyelinase D, the toxin found in Brown Recluse and related spider
venoms. VIPER clinicians collaborated with Dr. Binford to establish the first biopsy-proven case
of Sphynxomyelinase D injury caused by an Arizona brown spider. Through collaboration with
industrial and business partners, and with the assistance of the Arizona-Sonora Desert Museum,
VIPER expects to build on this promising start and to begin clinical trials of diagnostic and
therapeutic products within the next several years.

**Phylogenetic arachnarium:** Inspired in part by the drug-development potential of scorpion
venom studies and in part by the astonishing implications of recent Sphynxomyelinase D work,
VIPER proposes to team with the curatorial staff of the Arizona-Sonora Desert Museum in the
development of an entirely unique live animal collection, based permanently at the museum and
available to VIPER scientists as a source of venom, protein and DNA for many ongoing studies.
This collection, and the collaboration itself, will enable public educational displays that
demonstrate the compelling value of evolutionary biology and balanced ecology to the well-being
of humans as well as of animals. The ready availability of essential materials to VIPER scientists
will greatly facilitate assessment of chemicals and phylogenetic relationships that are otherwise
nearly impossible to study on a limited grant budget.

**International conference planning:** In 2005, VIPER affiliate Steven Seifert hosted, at the
University of Nebraska and at the Omaha Zoo, a first-of-its-kind snakebite treatment symposium.
This was a resounding success, drawing participants from four continents and specialists from the
basic as well as clinical sciences. A follow-up event is planned for Tucson in 2007, this time to be
co-hosted by VIPER and the Arizona Sonora Desert Museum. Anticipated collaboration with the
International Society on Toxinology, and support from Mexico’s Bioclon Institute, will make this
event potentially the largest venom studies conference in history. VIPER affiliates from
Australia, Latin America, and Africa are expected to participate this time, as conference faculty,
in addition to returning conference faculty from the first event.

**Collaboration with US Military:** For nearly two decades, the Arizona Poison and Drug
Information Center has hosted US Army physicians from the emergency medicine training
program at Ft. Hood, Texas, in their core toxicology training rotation. Since mobilization of US
troops for action in the middle East, the poison center has therefore received a significant number
of inquiries from our now-deployed graduates, regarding antivenom stocking and emergency
response while practicing medicine on foreign soil. A Memorandum of Understanding is now
planned among VIPER, the Natural Toxins Research Center of Texas, and a nascent Combined
Services Toxicology Group, which will enable the shared training of young physicians in venom
and poison management. A formal proposal for federal assistance in funding a 24-hour support service for the US military has been approved as a federal priority for UA and Texas A&M lobbyists, for presentation in CY 2006.

**Antivenom pharmacoeconomics:** Over the course of several decades worldwide, antivenom manufacturers have diminished in number and in net productivity. Developing countries, which are home to the majority of venomous species, lack the resources to develop and produce antivenoms; while economically advantaged countries generally have epidemiologically minor problems with envenomation and lack the economic incentive to develop new antivenom products. Dr. Edward Armstrong, of the College of Pharmacy’s HOPE Center, will work with VIPER clinical scientists to use the existing scorpion envenomation database as a starting point for formal pharmacoeconomic analysis of envenomation and its treatment.

**Medical toxicology clinical operations:** Unlike most medical subspecialties, medical toxicology shares formal sponsorship by three parent specialties, involving varied training programs and departments. As a result, College of Medicine participants in VIPER, and in the call schedule of the poison center, are based in several different departments. There currently exists no formal mechanism for sharing students, patients, billings, or administrative responsibilities, which greatly hinders efforts to build collaborative projects. VIPER clinicians, under the leadership of John Sullivan, will for the first time share a common administrative infrastructure. This will greatly facilitate collaboration in clinical research, teaching and patient care.

**Curricular implications:** All VIPER faculty participate in teaching of undergraduate students, graduate students, medical residents, or some combination of these. Most of the involved courses and projects will remain in the departments of origin, where venom physiology and clinical toxicology will remain a subset of broader curricular offerings. Specialty graduate training in drug discovery and development is a much-needed area of emerging educational endeavor, however; and VIPER faculty will be better-positioned than almost anyone in the world to take advantage of venom phylogenetics as a starting point for a full curriculum in this field. VIPER’s special relationships with the US Military, the Arizona-Sonora Desert Museum, Texas A&M and UNAM should enable successful competition for training funds from multiple sources, including the Department of Defense, NIH, CONACYT, public-interest foundations, and industrial sponsors. Institute Director Leslie Boyer, Lead Scientist Andrea Yool, and Lead Clinician John Sullivan propose to establish a new University program in drug discovery and development, within five years of Institute establishment.

**D. Identify the unit(s) that will assume the responsibilities of any units that are recommended for elimination.**

Not Applicable

**E. For instructional units, project the number of majors for the next three years.**

Not Applicable

**III. RESOURCES**

**A. Faculty and Staff**

1. **List the name, rank, highest degree, and estimate of the level of involvement of all current faculty and professional staff who will participate in the new or**
reorganized unit. Also indicate the position each person will hold in the new unit.

For clarity, faculty and staff are listed based on the provisional VIPER organizational chart. External liaisons are therefore listed under the director, followed by clinical and laboratory staff respectively. Administrative staff are listed in Section III. Resources, A.2.

**Director and External Liaisons:**

**VIPER Director:** Leslie Boyer, MD, FACMT, Associate Professor of Pediatrics; Medical Director of Arizona Poison and Drug Information Center and National Library of Medicine Local Legend. Dr. Boyer will serve as Lead Investigator for clinical studies, and she will be responsible for implementing the vision and mission of the Institute.

**Arizona Poison and Drug Information Center Liaison:** Jude McNally, RPh, ABAT; Managing Director, APDIC. Mr. McNally oversees the day-to-day operations of the poison center and has extensive experience in venom research. He will enable ongoing collaboration between VIPER clinicians and APDIC staff and participate in shared public and professional education activities of the two organizations.

**AHSL Library Liaison:** Gary Freiburger, MLS, AHIP; Director, Arizona Health Sciences Library. Mr. Freiburger oversees all activities of the Health Sciences Library, and in this capacity he has worked with VIPER faculty and staff in the preparation of grant submissions toward expansion of the library’s venom reference collections. Success in this collaboration is intended to enable the creation of a unique international resource that will bring together the knowledgebases of many cultures and languages, to further the needs of applied phylogenetics for international VIPER collaboration.

**Arizona-Sonora Desert Museum Liaison:** Craig Ivanyi, MS; General Curator of Living Collections, Arizona-Sonora Desert Museum, Tucson. Mr. Ivanyi has been a valued ally in numerous past UA clinical and scientific endeavors requiring safe and humane management of captive animals. He will oversee development live animal collections at the museum, including the proposed Phylogenetic Arachnarium, which will be available to VIPER scientists for ongoing venom studies. He will also facilitate the coproduction of public education materials by ASDM, APDIC, and VIPER staff, relative to venomous animals and their interaction with the human world.

**US Military Liaison:** Michael Miller, MD; Lieutenant Colonel, US Army Medical Corps, Darnall Army Community Hospital, Ft. Hood, Texas; Director of Emergency Medicine Program for residency training. Col. Miller’s program has for many years sent its emergency medicine residents to APDIC for toxicology training under supervision by VIPER clinicians. He has recently been involved in the organization of a Combined Services Military Toxicology Group for response to military toxicology emergencies worldwide. VIPER intends to develop a formal MOU with this group to enable shared training of physicians in venom and poison management, with significant enhancements if the current UA Federal Priorities request is successful.

**Natural Toxins Research Center Liaison:** John Perez, PhD, Regents Professor, Texas A&M, Kingsville; Director, Natural Toxins Research Center. Dr. Perez is the founder and director of the only research center of its kind in the United States, combining a world-class serpentarium with basic science capabilities necessary for the characterization of snake venoms. Collaboration between UA and Texas A&M has begun with the FY07 Federal Priorities requests of both
institutions, which propose a formal research affiliation in connection with Col. Miller’s Combined Services Military Toxicology Group.

**Clinical Team:**

**Lead Investigator:** Leslie Boyer, MD, FACMT, Associate Professor of Clinical Pediatrics, Medical Director of Arizona Poison and Drug Information Center. Dr. Boyer is currently multicenter PI for all active scorpion sting and snakebite studies described in Section C. She will be responsible for overall coordination of multicenter work, regulatory and IRB compliance, and business and industry interface for VIPER.

**Lead Clinician:** John Sullivan, MD, FACMT, Associate Professor of Clinical Emergency Medicine. In addition to having developed the technology behind the only Fab antivenom currently licensed for US use, Dr. Sullivan maintains an active clinical practice of medical toxicology at UA, UMC and APDIC. He will serve as supervisor of clinical training and education within VIPER.

**Lead Nurse:** Jody Mallie, RN, Research Nurse Senior, Department of Pediatrics. Ms. Mallie currently serves as lead research nurse for all clinical antivenom trials. She will supervise the VIPER research nurse team, oversee outreach to all collaborating sites, and assist with protocol development and data management for clinical studies generally.

Ed Armstrong, Pharm.D., Professor of Pharmacy Practice and Science. Dr. Armstrong will provide pharmacoeconomic expertise for analysis of envenomation and antivenom use as described in Section C; and he will supervise the related work of students in College of Pharmacy degree programs.

Peter Chase, MD, PhD, Assistant Professor of Clinical Emergency Medicine, Director of Medical Toxicology Fellowship Program. Dr. Chase will serve as Principal Investigator of widow spider treatment clinical trials in conjunction with Rocky Mountain Poison and Drug Center, Denver, Colorado. Twice mobilized to active duty in the US Army Reserves, he will facilitate VIPER relations with Col. Miller’s Combined Services Military Toxicology Group. He will also serve as site PI and liaison to the UMC and Kino Emergency Departments for clinical studies generally.

Jean Philippe Chippeaux, MD, Director of Research, Institut de Recherche pour le Développement, Dakar/Mbour, Senegal (Proposed UA Adjunct). Dr. Chippeaux is internationally recognized for his epidemiological and clinical work involving snakebite in Africa, and he has expressed willingness to precept rotations abroad for VIPER residents and students. An adjunct appointment within the College of Medicine in 2006 will enable a pilot project involving coagulopathy in African snakebite patients.

Lucia Esparza, BSN, RN, Research Nurse, Department of Pediatrics. Ms. Esparza has worked extensively on VIPER projects including exotic venoms clinical decision-making support, scorpion antivenom clinical trials, and widow spider antivenom clinical trials organization.

John Hall, PhD, Adjunct Assistant Professor, Communication, Associate Director, Biomedical Communications. Dr. Hall and members of his department have collaborated with VIPER clinicians for over 15 years on snake, spider and scorpion imaging projects. Dr. Hall will oversee video production work in the bioimaging of clinical neurotoxicity of scorpion sting.

Elizabeth Krupinski, PhD, Research Professor, Radiology. Dr. Krupinski brings expertise in
telemedicine, statistics, experimental design, and data analysis to the bioimaging of clinical neurotoxicity of scorpion sting.

Tina Pearson, BSN, RN, MPH, Research Nurse Senior, Department of Pediatrics. Ms. Pearson has extensive background in clinical studies, including work with VIPER’s snakebite coagulopathy project.

Steve Seifert, MD, Professor of Medical Toxicology, Department of Surgery, University of Nebraska Medical Center, Director, Nebraska Regional Poison Center, Omaha, Nebraska; Associate in Pharmacology and Toxicology at UA College of Pharmacy. Dr. Seifert has been a longstanding collaborator on antivenom clinical trials, development of exotic venoms clinical decision-making support, and international conference planning.

Mazda Shirazi, MD, PhD, Assistant Professor of Clinical Emergency Medicine, Fellow in Medical Toxicology. Dr. Shirazi will complete formal training in Medical Toxicology in 2006, at which time he is expected to join VIPER faculty together with Dr. Chase. Dr. Shirazi proposes to develop medical toxicology services at UPH Kino hospital and to become involved in medical student mentoring. His research involves cardiac toxicity and gender-specific effects of ion channel toxins, in association with VIPER scientist Andrea Yool.

Andy Theodorou, MD, Professor of Clinical Pediatrics, Medical Director, Pediatric Intensive Care Unit, UMC. Dr. Theodorou has is site PI for clinical trials of antivenom at UMC and TMC Pediatric Intensive Care Units.

**Laboratory Team:**

**Lead Scientist (Neurobiology):** Andrea Yool, PhD, Professor of Physiology. Dr. Yool’s research team focuses on analyzing the molecular mechanisms and physiological significance of diverse channel functions in the Major Intrinsic Protein family that includes aquaporins. Within VIPER, her laboratory will provide opportunities for drug discovery from channel-active toxins found in venoms. Dr. Yool proposes to develop an innovative, cross-disciplinary graduate program in drug discovery, involving close collaboration with VIPER’s clinical and laboratory teams.

**Lead Scientist (Protein Chemistry):** John Osterhout, PhD, Associate Research Professor, Biochemistry and Molecular Physics. Dr. Osterhout’s research team focuses on aspects of protein chemistry including protein folding, Trojan-horse inhibitor peptides for HIV, and the proteomics and immunochemistry of venom and envenomation. Dr. Osterhout will lead VIPER’s multidisciplinary investigation of markers of venom-induced coagulopathy, and he will coordinate the involvement of affiliated scientists outside the UA.

Alejandro Alagon, MD, PhD, Professor, Biotechnology Institute, UNAM, Mexico (Proposed Adjunct). Dr. Alagon’s laboratory studies the structural and functional diversity of arachnid venoms, and Dr. Alagon has provided VIPER scientists with serum analytical expertise in clinical studies of snake and scorpion envenomation. A recent recipient of the Premio Nacional (Mexico’s highest civilian honor), Dr. Alagon is president of the American branch of the International Society on Toxinology, which will bring its conference to join VIPER’s in Tucson in 2007. Through the recently established MOU between UNAM and the UA, we intend that this collaboration will enable international studies and training opportunities in drug discovery and testing.
Greta Binford, PhD, Assistant Professor of Biology, Lewis and Clark University (Proposed Adjunct). Dr. Binford has been a VIPER collaborator in the area of injury caused by Brown Recluse and related spider envenomation. Her work on venom phylogenetics and its applicability to real-world diagnostic and therapeutic challenges has served as the inspiration for the VIPER mission. Through VIPER, Dr. Binford will assist in creation of the new phylogenetic arachnarium at the Desert Museum.

Bryan Fry, PhD, ARC-APD Research Fellow, Deputy Director of Australian Venom Research Unit, University of Melbourne, Australia (Proposed Adjunct). Dr. Fry’s recent landmark work revisiting the evolution of the reptilian venom apparatus illustrates that reptiles as well as Dr. Binford’s arachnids are a promising source of applied phylogenetics. Dr. Fry has recently expressed interest in VIPER affiliation, with specific interest in venomous lizard research through collaboration with Craig Ivanyi and the Arizona-Sonora Desert Museum collections.

Deborah Fuchs, MD, Assistant Professor of Pathology. Dr. Fuchs has learnt her expertise in human coagulation physiology to the snakebite coagulopathy project, and she is involved in the proposed African snakebite project for 2006.

Dan Keyler, PharmD, Professor, Experimental and Clinical Pharmacology Co-Director, Toxicology, Minneapolis Medical Research Foundation (Proposed Adjunct). Dr. Keyler is a longstanding VIPER collaborator, particularly in the areas of antivenom-venom interactions and knowledgebase development for exotic envenomation.

Michael Mayersohn, PhD, Professor, Pharmaceutical Sciences. Dr. Mayersohn is a collaborator in the interpretation and laboratory analysis of pharmacokinetic and toxicokinetic data stemming from the snakebite coagulopathy project.

Lourival Possani, PhD, Professor, Biotechnology Institute, UNAM, Mexico (Proposed Adjunct). Dr. Possani is a world leader in the morphology, physiology and molecular genetics of scorpions, and he has recently reclassified the medically important US species with assistance from VIPER faculty. As with Dr. Alagon’s laboratory team, VIPER proposes to affiliate directly with Dr. Possani’s lab in order to facilitate shared opportunities in venom studies and training enabled by the recent UNAM/UA MOU.

2. **List the clerical and support staff positions that will be included in the new unit.**

**VIPER Projects Manager:** Judi Carrington is currently Venom Projects Coordinator for existing clinical studies. Ms. Carrington will assist Dr. Boyer with oversight of programs listed in section C., including regulatory compliance and budget issues, and she will oversee the day-to-day work of VIPER support staff.

**Administrative Assistant:** Helen Ferris currently works on all antivenom projects and will become incorporated into the new administrative structure without any change in job description.

3. **Indicate the number of graduate assistants who will be assigned to the new unit.**

None. Graduate students and assistants in physiology, biochemistry, pharmacy and other programs will retain their primary affiliation with their home departments.

4. **Project the number and type of new faculty and staff positions that will be needed**
by the unit during each of the next three years.

Business manager: new funding is anticipated late in fiscal year 2005/06 to enable hiring a specialist in contracts and financial management for the VIPER administrative team. This position is required because of the growing number of contractual commitments involving VIPER (currently 15, with growth to 30 authorized under current projects). Funding will draw from a combination of existing sources and new industry contracts.

Education Coordinator: a half-time position is anticipated in FY 06/07, funded through the College of Science. The VIPER education coordinator would work closely with the APDIC education specialist. APDIC would retain its primary poison prevention and public education role, whereas the VIPER coordinator would have primary responsibility for coordination of professional education, including graduate and professional student experience and international conference planning.

New Faculty: no funding is requested for new faculty positions. Adjunct positions (no salary) will be sought for Clinical and Laboratory faculty identified as “potential adjunct” in section III A 1. In addition, VIPER administration expects to take an active interest in recruitment of joint appointments that may become important particularly in the fields of Biochemistry, Physiology, Molecular Biology, Herpetology and Arthropod Biology.

B. Physical Facilities and Equipment

1. Identify the physical facilities that will be required for the new unit and indicate whether those facilities are currently available.

VIPER will at its inception require no additional physical facilities beyond the office, dry-lab and laboratory space already occupied or under consideration for its component faculty. To the extent practical within the University’s space planning process, faculty and students in VIPER would benefit from ongoing coalescence of allocated space toward the eventual goal of housing VIPER offices and laboratories in a common building. In the event of successful acquisition of outside funds, VIPER may in the future seek additional space to house funded faculty and projects, in keeping with University and Board of Regents policy. Specific issues under consideration at the time of this application include:

Core office/dry lab space: APDIC will move to new Drachman Building in early CY 2006. Members of the core VIPER clinical research team that previously shared poison center space in the Health Sciences Library have applied to the College of Medicine for office / dry lab space sufficient to meet current programmatic needs. Ideally, the site chosen for this move would be in close proximity to collaborating entities such as APDIC, the Health Sciences Library, or a shared research facility housing Dr. Yool’s and/or Dr. Osterhout’s laboratory teams.

Laboratory space: The first joint project under consideration by faculty of VIPER and curatorial staff of the Arizona-Sonora Desert Museum is development of a phylogenetic arachnarium. This unique live animal facility will be housed on the campus of the desert museum, with animals and their venom available to affiliated UA faculty and students. No UA space is requested for the proposed collaboration.

2. List all additional equipment that will be needed during the next five years and the estimated cost.
No funds are requested for additional equipment. Existing funds will cover the purchase of two image analysis workstations in FY06-07 and a telemedicine unit in FY 07-08. The VIPER federal initiative includes $430,000 for UA equipment and supplies, plus $20,000 for arachnarium remodeling.

C. Library Resources, Materials, and Supplies

1. Identify any additional library acquisitions that will be needed during the next three years and the estimated cost.

No funds are requested for library acquisitions. The VIPER federal initiative includes approximately $500,000 total direct costs toward UA library in FY07-08.

2. List any special materials or supplies, other than normal office supplies, that will be required by the new unit.

Nothing that must be provided by University.

D. Other Information

1. Identify any implications of the proposed change for regional or programmatic accreditation.

Formal structure for clinical and research collaboration enabled by VIPER will enhance the training opportunities and supervisory network available to a variety of existing UA programs, potentially including graduate and undergraduate studies in the Colleges of Science, Medicine, Pharmacy, Agriculture and Business. No specific program requiring accreditation will be based within VIPER at this time.

2. Provide any relevant information, not requested above, that will assist reviewers in evaluating the proposed change.

Not applicable.

E. Financing

1. Explain the university’s plan for providing adequate financing for the unit.

Financing for VIPER will draw almost entirely from existing sources, without requirement for additional University funds. Funding for VIPER infrastructure currently derives from multiple sources, including State and Federal grants, Industry contracts, and a special state line assigned for scorpion antivenom distribution.

The College of Science has generously pledged a half-time administrative support salary to the new unit. We propose to apply this support toward the hire of the Education Coordinator described in section A 4.

2. Identify potential sources for external funding for the unit.

Potential funding for the new unit includes new and ongoing grants and contracts analogous to those currently in place, including Federal, State, and private agencies interested in the science of
applied phylogenetics. It is understood that continued function of the unit is contingent on ongoing funding from such extramural sources.

In addition, we foresee two new sources of potential funding, which will be sought aggressively during the next several years. These are:

2a. **VIPER has been selected as a UA Federal Priority** for the coming fiscal year. A request totaling $6.87 million is under development by UA lobbyists during the coming Congressional year. Strategic allies for this endeavor include the Natural Toxins Research Center at Texas A&M Kingsville and the Combined Services Toxicology Group of the US military. In the event of success in this endeavor, VIPER would apply the new funds to development of enhanced UA and Texas A&M research capability, expanded UA library resources, expanded scope of the APDIC and military training mission, and development of the new phylogenetic arachnarium at the Arizona-Sonora Desert Museum.

2b. **Shared fund-raising opportunities with the Arizona-Sonora Desert Museum.** Completion of a formal MOU between VIPER and ASDM will enable a series of fund-raising opportunities hitherto unavailable to either organization alone. Potential projects currently under consideration range from public education display enhancement at the Museum to long-term bricks-and-mortar research institute development.

3. **If state funds will be used, indicate whether new appropriations will be requested or existing appropriations will be reallocated.**

An existing line in the state Department of Health Services budget for scorpion antivenom distribution, available to VIPER under an Interagency Service Agreement through the College of Pharmacy, will be reallocated to the new unit without any change in its management or implementation.

4. **Complete the New Organizational Unit Budget Projections sheet, projecting the operating budget for the proposed unit for the next three years.**

See attached.

5. **Estimate the amount of external funds that may be received by the unit during each of the first three years.**

**FY 2006-2007:**

Approximately $150,000 from the State of Arizona, Department of Health Services, for statewide scorpion antivenom project.

Approximately $300,000 from Rare Disease Therapeutics, Nashville, Tennessee for clinical collaboration on antivenom projects.

Approximately $150,000 from Arizona Biomedical Research Commission for a statewide study using tele-imaging for diagnosis and treatment of scorpion envenomation in pediatric patients.
Approximately $25,000 from the College of Science for half-time support for position of Education Coordinator.

**FY 2007-2008:**

Approximately $150,000 expected from the State of Arizona, Department of Health Services, for statewide scorpion antivenom project.

Approximately $300,000 from Rare Disease Therapeutics, Nashville, Tennessee for continuation of clinical collaboration on antivenom projects.

Approximately $200,000 from continuation of Arizona Biomedical Research Commission grant for a statewide study using tele-imaging for diagnosis and treatment of scorpion envenomation in pediatric patients.

Approximately $25,000 from the College of Science for half-time support for position of Education Coordinator.

Potential of up to $2.7 million from federal initiative (Sec. III.E2a) to establish integrated venom injury management system.

**FY 2008-2009:**

Approximately $150,000 expected from the State of Arizona, Department of Health Services, for statewide scorpion antivenom project

Approximately $300,000 from Rare Disease Therapeutics, Nashville, Tennessee for continuation of a clinical collaboration project on rattlesnake antivenom

Approximately $190,000 from continuation of Arizona Biomedical Research Commission for a statewide study using tele-imaging for the diagnosis and treatment of scorpion envenomation in pediatric patients

Approximately $25,000 from the College of Science for half-time support for position of Education Coordinator.

Potential of up to $3.2 million from continuation of federal initiative (Sec.III.E2a) to establish integrated venom injury management system.

**IV. OTHER INFORMATION**

**A.** For new centers, institutes, laboratories, and bureaus, indicate the sunset date as required by Regents’ policy 2-301.G.

Five years from date of approval.

**B.** Provide any other information not requested above that may be useful in evaluating the proposal.

The mission and objectives of VIPER Institute coincide directly with the goals and strategies
presented in Arizona’s Bioscience Roadmap to improve Arizona’s competitive position in the biosciences sector. This vision of strengthening the innovation and technology infrastructure of Arizona’s economy based on world-class, multi-disciplinary research is reiterated by the Arizona Town Hall, 2005; the Governor’s Council on Innovation and Technology; and the City of Tucson Strategic Plan, FY 2005 and 2006.