Title: Advanced Certification Program for Extracorporeal Therapies

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Introduction:
Extracorporeal blood purification, which includes hemodialysis, hemoperfusion and therapeutic apheresis, is the process of purifying the blood of pathologic contaminants in patients with kidney failure, immune-mediated diseases, or other intoxications. Hemodialysis (the prototype therapy) has evolved considerably over the past 40 years and today has become the advanced standard of care for the management of acute kidney failure in veterinary medicine. Despite its long history of development, the application of hemodialysis in veterinary therapeutics has been relatively obscure until the past 10-15 years when interest and demand for this therapy and establishment of new hemodialysis programs for companion animals has flourished. Hemodialysis has now emerged as a highly sought therapeutic entity to support the management of animal patients with acute or chronic kidney failure, acute poisonings, life-threatening fluid overload, and kidney transplantation. As a consequence, there is heightened demand for highly qualified and specifically trained individuals who can manage these burgeoning programs and critically ill patients. This demand is noted especially in Europe and Asia where the development of extracorporeal programs is outpacing the emergence of such programs in the United States.

Hemodialysis (as well as other extracorporeal therapies) remains technically complex, professionally demanding, and medically challenging. The delivery of hemodialysis is not readily mastered by the untrained, self-taught, or the casual practitioner, and despite the interest and development of these programs in both academic centers and private practice,
there currently is little established expertise in these de novo programs. New programs often are faced with reinvention of 40 years of established experience, and may have little understanding of the current standards of care for the delivery of these complex therapies. Clinicians (and technicians) engaged in a new hemodialysis program should seek training opportunities at an established extracorporeal program to more fully understand the complexities of this sophisticated therapeutic modality and to acquire the requisite experience and quality assurance standards required for the delivery of this specialized care. Unfortunately, formal training opportunities are sparse and may require on-site commitment at an establish program for 6 months to 2 years.

To remedy the ongoing need for instruction in the foundations of extracorporeal therapies, we have established a web-based academy that is available worldwide. This interactive, self-paced program will provide didactic instruction, case-based discussions, literature review, and virtual real-time extracorporeal experiences. Upon successful completion of the curriculum, the trainee will be awarded a certificate of mastery.

The utility of our developments in “Teledialysis™” has provided the vision for the virtual clinical experience proposed as a component of the extracorporeal training program. Multiple trainees simultaneously can experience a real-time, “on-the-floor” presence in our hemodialysis units and would be able to participate effectively in personalized interaction with the doctors and technicians attending to patients. This case-based instruction could be provided during all phases of patient assessment, surgical procedures, hemodialysis prescription and delivery, and patient management. Additionally, the Academy will provide a “classroom” experience during non-clinic times for didactic instruction and regularly scheduled rounds sessions.

Structure of the Extracorporeal Therapies Academy: The training program will be modeled after the on-site Internship and Clinical Fellowship in Hemodialysis and Nephrology approved at the Veterinary Medical Teaching Hospital (VMTH) and the University of California Veterinary Medical Center-San Diego (UCVMC-SD) of the University of California School of Veterinary Medicine.

1. Objectives of the program: The objectives of the program will be to provide advanced clinical and didactic training in the discipline of blood purification by extracorporeal therapies including hemodialysis, hemoperfusion, and therapeutic apheresis and the adjunctive discipline of clinical nephrology. More specifically, the program will provide directed instruction in:
   a. The basic science and clinical application of hemodialysis, hemoperfusion, and apheresis in uremic and non-uremic animals.
   b. The basic science and pathophysiology of renal failure and its management.
   c. Operation of a full-time extracorporeal therapies service for companion animals.
   d. Advanced concepts of uremia, urinary disease, and critical patient care.

2. Training Procedures:
   a. All trainees will be provided a digital copy of training materials which are organized into topic modules and a bibliography of relevant literature on hemodialysis, extracorporeal therapies, nephrology.
   b. Didactic topic review, journal review, and hemodialysis rounds will be scheduled on Monday, Wednesday, and Friday using web-based conferencing. In addition, trainees will be expected to attend International Renal
Replacement Rounds, a twice monthly web-based conferencing session, established at UC Davis to unite, engage, and advance the discipline of extracorporeal therapy among hemodialysis programs based throughout the world.

c. Training modules will be self-paced and mastery of each module will be determined by examination and project assignments associated with each module.

d. Completion of initial module is required before trainees will have access to subsequent modules.

e. The virtual clinical experience will be an important and novel component of the training to provide real-time exposure to patients presented for hemodialysis and extracorporeal therapies by web-based, “telehealth” conferencing. This experience will provide the virtual trainee:

i. Opportunity for “telehealth” assessment of animals for extracorporeal management.

ii. Access to patient management activities during extracorporeal sessions which will include vascular access placement and prescription, implementation, and monitoring of the hemodialysis treatments.

iii. Opportunity for interactive discussion and decision making for hospitalized animals with kidney disease and inpatients and outpatients receiving extracorporeal management.


3. **Faculty/Staff participating in the proposed program:** The hemodialysis and blood purification Academy is staffed by a faculty head, Cowgill (UC Davis and the UCVMC-SD); four Renal Specialists, Dr. Cathy Langston (AMC), Dr. JD Foster (UPenn), Dr. Sheri Ross (UCVMC-SD), Dr. Carrie Palm (UC Davis); a Renal Medicine/Hemodialysis Fellow and/or Intern (UCVMC-SD and UC Davis); and 4 hemodialysis/extracorporeal technicians who will provide “virtual hands-on” instruction during all phases of the training. The faculty will reinforce a level of training in the foundations and practice of internal medicine and nephrology in addition to hemodialysis to maintain breadth and expertise in this discipline.

4. **Process of evaluation:** The Academy trainee will be evaluated quarterly to assess timely progress and mastery of the didactic modules and participation in virtual clinical activities by established criteria for existing clinical programs at UC Davis. It is recognized that varying time zones and local institutional responsibilities as well as the erratic and emergent nature of patient care will be the most consistent constraint for regular attendance and participation. These allowances will be taken into consideration in the assessment of overall participation.

**Certification:** There are no current standards for training in this discipline, and training through the Academy is likely to be regarded as the model for future criteria. Upon successful completion and mastery of all didactic training modules and participation in a minimum of 30-50 virtual hemodialysis sessions, trainees will be granted a certificate of completion acknowledging involvement and attainment of a minimum clinical experience.