



Montague – CTE Scholar Mike Criscitiello (2011-2012)



College of Veterinary Medicine & Biomedical Sciences

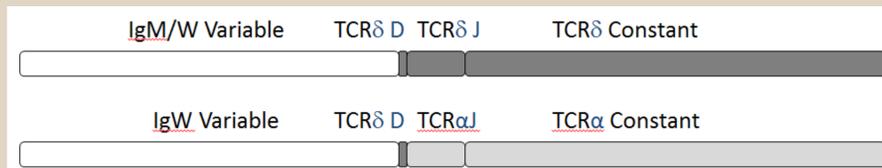
Enrichment of VTBP 415- Immunogenetics and Comparative Immunology and Its Instructor

Funding from the Montague-CTE Scholars Program

- 1) Allowed acquisition of a powerful workstation for immunogenomic work (\$5000)
- 2) presentation at an international conference in Japan in July 2012 (\$1500)

VTPB 415 – my unique course in immunology, genetics and evolution

I have developed a unique course that fuses biomedical immunology with modern genetics and genomics, taught in the context of the evolution of immune mechanisms. This course attracts undergraduates from the vet school's Biomedical Sciences (BIMS) program, but also students from Biology, Genetics, Biochemistry, and Wildlife and Fisheries Science. General immunology and genetics are prerequisites, effectively limiting the class to last semester seniors. The course is divided into three units. The first covers the genetics behind lymphocyte antigen receptor and antibody gene rearrangement, somatic hypermutation and MHC polymorphism. The second employs the material from the first in four human case studies of immunogenetic diseases picked from student interest (although I always include at least one cancer and one autoimmune disease). Lastly, we compare and contrast immune systems, mechanisms, tissues, cells, receptors and genetic loci from diverse species, including bacteria, plants, invertebrates and fish as well as common veterinary and biomedical models. No similar course is currently taught anywhere.



The Immunogenetic server

A large portion of the funds from this award contributed to the purchase of a computer with 512 gigabytes of RAM, 48 processors and 10 terabytes of hard drive storage. This powerful machine is kept in the CVM server room (upper right) maintained by my college's computer services group, and is therefore accessible from anywhere (my student Maxwell Su is shown accessing the server from his home off campus, lower right).

With this machine it is possible to store large genomic datasets for students to search, manipulate, and analyze in ways impossible with standard machines. For example, one exercise involved finding un-annotated gene segments for T cell receptors and immunoglobulins in a raw shark genomic dataset. Once identified, genomic distances between loci were compared to explain how sharks can make chimeric receptors (above) with components of both B and T lymphocytes to bind antigens that our immune system cannot.



Learning and sharing at ISDCI 2012

The Montague award also made it possible for me to attend the 12th Congress of ISDCI, the triennial comparative immunology meeting. In addition to speaking about my lab's work and chairing a session on T cell receptor genetics, I shared my experience developing this course and the hands-on immunogenomic exercises the new computer made possible with the society's education subcommittee.



I received positive reviews on the course scope, content and assessments. Using the latest research data communicated at the meeting, I was able to update many sections of the course and decided to drop some lectures in favor of other more relevant topics. I shared the course with others who would like to adapt it for their curricula in undergraduate, graduate and professional programs in Europe.

