Thirteen steps to where we are

Synopsis:

Thirteen steps to where we are lists our peer reviewed publications and is designed to be a quick link for veterinarians to review our work. The works are presented as a blog because our path was stepwise and logical. Understanding the papers requires a foundation in medicine and parasitology. If you use the publications tab on the web page or the links in the blog you can find the paper. Here I list a layman's description of the papers.

- A protein on the surface of *Sarcocystis neurona*, the organism associated with EPM was identified as important and could be used to diagnose disease and a potential vaccine.
  - We used the surface protein to develop an ELISA assay.
  - Immune responses to rSAG1 validates the ELISA assay and shows the vaccinated horses were protected when challenged in the model.

- It was important to create tools to study *S. neurona* and filling the toolbox required learning how to grow and isolate parasites in the laboratory. Some of the work led to understanding which cells could be infected, that became important in developing a model to study disease in horses. Also fascinating was learning how to stall the parasites development for months in cells. Certain chemicals induce the parasite to hastily exit cells…this has important implications in treating EPM.
  - Identifying supporting cells led to A disease model for EPM
    - A disease model enabled us to observe Early signs of EPM

- We joined some famous parasitologists and designed an EPM treatment after testing chemicals in the cultured parasites. Before anyone will consider a treatment there are basics of drug development-safety and what is called pre-clinical development. Pre-clinical development starts with a feasibility study to show if the drug indeed works and then drug manufacturing in an FDA approved facility.
  - Would our treatment work in dogs? We worked with a small animal neurologist to figure that out.

- Inflammation was a line of research for us, it led us to polyneuritis equi
  - We found that a reactive site on a horse protein was linked to PNE and horses diagnosed with EPM had antibodies to the protein in their serum.
  - Human researchers had determined that a region of the PNE-protein was involved in cell immunity, inflammation, and disease. We followed their footsteps and cloned a new protein.

- Horses are naturally infected with another sarcocyst. We wanted to look at a toxin that is associated with the horse parasite and disease, we cloned another protein.

- We analyzed samples from our growing database and found a way to show that “EPM relapses” were not EPM but due to PNE from re-exposure in the environment. Repeated EPM treatments were inducing PNE.

- Much of science is serendipity and being ready to learn from observations is important. When our horses that were used in a safety study were diagnosed with equine muscular sarcocystosis we were able to use the serum from them to validate our *S. fayeri* assay for toxin against post-mortem exam, the gold standard.