

History of Canine Parvoviruses

Dr. Leland Carmichael was a leader in determining the immune response and developing the Canine Parvovirus vaccine. He wrote an historical summary about the emergence of Canine Parvovirus in which he remarks that he was on vacation when the outbreak occurred. He was phoned by Dr. Max Appel who at the time was receiving hundreds of fecal samples in the mail. Dr. Appel worked with Dr. Carmichael at Cornell University and he was one of the first to recognize the virus with electron microscopy. It was noted that this new virus was similar to feline panleukopenia virus. With that knowledge Dr. Appel was able to isolate the virus in feline cell cultures.

Dr. Collin Parrish from New Zealand came to Cornell and quickly realized he wanted to study a different aspect of the disease. He desired to study the virus itself. He was quoted by Dr. Carmichael as saying, "This is not what I came here to study – I want to know about the virus, the relationships between genetic and structural properties and the mechanism of how CPV-2 evolved to infect dogs and cause disease!" Though Dr. Carmichael may be credited with the formation of the vaccine, Dr. Parrish and colleagues were definite leaders in our understanding of the virus.

Dr. Solon Rhode III was the first to determine the complete nucleotide sequence of the major capsid proteins. The initial mapping of the virus demonstrated a close relationship between CPV-2, Feline Panleukopenia Virus and Mink Enteric Virus. Further analysis revealed that Canine Parvovirus was different from these viruses. The virus capsid contains viral protein-1 (VP-1) and viral protein-2 (VP-2) which allow the virus to bind to the host cell transferrin receptor. The capsid contains threefold spikes and peaks, major sites for neutralizing antibodies. Several important papers were published that demonstrated that the transferrin receptor plays a role in the determination whether an animal becomes infected, or not. Authors included names such as Dr. John Parker, Dr. Colin Parrish, Dr. Karsten Hueffer and Dr. Laura Palermo.