Two little-known School of Veterinary Medicine laboratories play a big role in providing clinical services, collaborative research and educational experience.

Only at UC Davis does an electrophysiology laboratory work in conjunction with a neuromuscular disease laboratory (actually, under the same roof). The electrophysiology lab tests nerve and muscle function, while the neuromuscular disease lab elucidates pathology.

The two, both directed by Dr. Richard LeCouteur, have evolved to become an important part of the school. “The laboratories have a very low profile, but touch a lot of people in a lot of areas,” says Dr. LeCouteur.

**Electrophysiology**

The Electrophysiology Laboratory provides clinical services for the Veterinary Medical Teaching Hospital (VMTH), including muscle and nerve testing, electroencephalograms (EEGs) and hearing tests.

The laboratory also carries out research on a variety of problems such as genetic anomalies and nutritional deficiencies that affect nerve and muscle function.

Work is currently underway to develop an electrical test to quickly and easily diagnose outbreaks of botulism in cattle (the infection affects bovine nerves), and to discover why diabetic humans and animals develop muscle weakness.

**Neuromuscular Disease**

“The Neuromuscular Disease Laboratory is one of only two or three laboratories in the world that process both animal and human nerve and muscle tissue biopsies,” says Dr. LeCouteur.

The lab receives animal tissues of all species from anywhere in the world, and receives human nerve and muscle biopsies from the UC Davis Medical Center (UCDMC) and several other Northern California hospitals. Collaborating physician William G. Ellis, a pathologist at the UCDMC, reports the laboratory findings on all human samples.

Most labs preserve nerve and muscle tissue with formalin fixative, which neutralizes biochemical activity, giving very little information. But human and animal tissues arriving at the Neuromuscular Disease Laboratory undergo an elaborate process of preservation and storage at minus 140 degrees centigrade, which allows the tissues to retain all their enzyme activity.

Tissues are then stained with a battery of 14 biochemical stains that may provide clues and answers in the diagnosis of particular diseases. For instance, if muscular dystrophy is suspected, the stain for dystrophin may show that the protein is missing in the sample, leading to a positive diagnosis.

In addition to clinical services, says Dr. LeCouteur, “There is a very good team of PhD and masters students, and staff and faculty members from the School of Veterinary Medicine and the School of Medicine working here on a variety of collaborative research studies.”

Dr. LeCouteur says, “The laboratory has archived about 1,200 human nerve and muscle tissue biopsies, and tens of thousands of animal biopsies. The collection is a wonderful resource for graduate student education.”