**THE LIVER: Physiology & Pathology**

R.M. Clemmons, DVM, PhD

SACS, College of Veterinary Medicine

University of Florida, Gainesville, FL

The Liver is situated in the right flank. There is an Exterior and Interior relationship between the Gallbladder and Liver. The main functions of the Liver are: to store Blood, to maintain the smooth flow of Qi and to control the tendon.

**Storing Blood:**

The Liver is the most important organ for storing Blood and regulating the volume of Blood in circulation. The volume of Blood circulating in various parts of the body changes according to physical activity. When animal is at rest or lies on the ground, a part of Blood flows back to the Liver.

When the body is active, Blood in the Liver flows to the body to meet physical needs. The Liver function of storing Blood is closely related to the tolerance of body's tiredness. If the Blood in the Liver is sufficient, the body has good tolerance to tiredness. The Deficiency of Liver Blood can cause the animal tired.

**Maintaining the Smooth Flow of Qi:**

Maintaining the smooth flow of Qi is the most important one of all the Liver functions. In Traditional Chinese Veterinary Medicine, the flow of Qi is a general meaning of basic ways of Zang-Fu functions. When the flow of Qi is normal or smooth, the Zang-Fu functions are normal. Otherwise, abnormal flow of Qi will cause disease of the body.

The normal characteristic of Liver Qi is unrestrained and free going and dislikes depression. Stagnation of Liver Qi may cause some disease. The Liver function of maintaining the smooth flow of Qi has the following three aspects.

Ensuring the Spleen and Stomach digestive function. The Liver function of maintaining the smooth flow of Qi is related not only to the ascending and descending function of the Spleen and Stomach, but also to the secretion of bile. The Liver therefore has an important influence on digestion. If the Liver Qi flows smoothly, the Stomach can ripen and rot food, and the Spleen can normally extract and distribute the Food Qi.

The stagnation of the Liver Qi may cause disorder of flow of Qi, and as a result, it may obstruct the transformation and transportation of food, resulting in loss of appetite, diarrhea, abdominal fullness.

Maintaining normal vital activities of the whole body. In addition to the Heart, vital activities are closely related to the Liver Qi. Only when the Liver function of maintaining the smooth flow of Qi is normal, the Qi and Blood can be harmonious and vital activities are normal. If the Liver Qi is stagnant, there may be mental depression.

Ensuring the smooth flow of water-damp path. The stagnation of Liver Qi can cause obstruction of the three burner, and water-damp path, resulting in edema and ascites.

**Controlling the Sinews:**

The sinews are the main tissues linking the joints and muscles and dominating the movement of the limbs. The sinews' capacity to contract and relax depends on the nourishment and moistening of the Liver Blood. If Liver Blood is abundant, the sinews will be moistened and nourished, ensuring smooth movement of joints and good muscle action. Deficiency of Liver Blood may fail to moisten and nourish the tendons, resulting in convulsion, weak strength of the limbs.

**Opening into the Eyes:**

The eyes are offshoot of the Liver. The Liver stores Blood and its Meridian connects exteriorly with the eyes. If Liver Blood is abundant, the eyes will be normally moistened. Deficiency of the Yin and Blood of the Liver may lead to dryness of the eyes. The excessive Heat of the Liver may cause redness, swelling and pain of the eyes.

**Liver Pathology:**

The Liver is involved whenever there is stagnation (Qi or Blood) leading to pain and swelling. The Liver can be obstructed by phlegm and influence many other Zang-Fu systems if the Liver fails to maintain smooth flow of Qi. Liver Qi is never deficient. The Liver itself can be excess or deficient. The common conditions of excess are: 1) Liver damp-heat; 2) Liver fire blazing upwards; 3) extreme heat generating Liver wind; and 4) cold retention in the Liver. Chronic Liver deficiencies include Liver Yin and blood deficiency which can lead to internal wind.

Because of the Liver’s central importance in maintaining body Qi and blood flow, it is involved in Yu syndromes (depression), seizure disorders, and endrocrine disorders (including diabetes, Cushing’s disease, Addison’s disease and hypothyroidism). Examples of these conditions and their treatment will be presented.