BLOOD SUPPLY TO THE UDDER

To produce 1 litre of milk 500 litres of blood must pass through the udder. When a cow produces 60 litres of milk per day, 30,000 litres of blood are circulation through the mammary gland. This represents a blood flow of 1250 litres per hour.

There is a 2-6-fold increase in blood flow in the mammary gland starting 2-3 days prepartum. The decrease in production with advancing lactation is not due to decreased blood flow, rather it is due to the loss of secretory epithelial cells through apoptosis.

Two major arteries carry the blood to the udder, on for each half of the udder. Pudendal arteries enter the udder through the inguinal canal. The inguinal canal is the orifice in the body cavity in the inguinal region where blood vessels, lymph vessels and nerves enter and leave the body cavity to supply the skin in the posterior part of the animal. The external pudendal arteries become the mammary arteries which divide into caudal and cranial branches. They rebranch many times and end in small capillaries surrounding each alveolus. The pudendal arteries make S-shaped curves (sigmoid flexures) as they emerge from the inguinal canal. This allows for downward distension of the udder as it fills with milk, without stressing the blood vessels. Perineal arteries supply blood to a small portion of the posterior dorsal part of the udder.

Venous drainage:

Veins leave the mammary gland anti-parallel to the arteries. There are three veins on each side that carry blood away from the gland:

External pudendal vein leaves the udder parallel to the external pudendal arteries

Subcutaneous abdominal vein (milk vein) exits the gland at the anterior end of the front quarters and passes along abdominal wall. This is the large vein that is visible under the skin on the belly of the cow. It enters the body cavity at the xiphoid process and eventually empties into vena cava.

Perineal vein leaves the rear of the gland parallel to the perineal artery and carries less than 10% of blood leaving udder.

