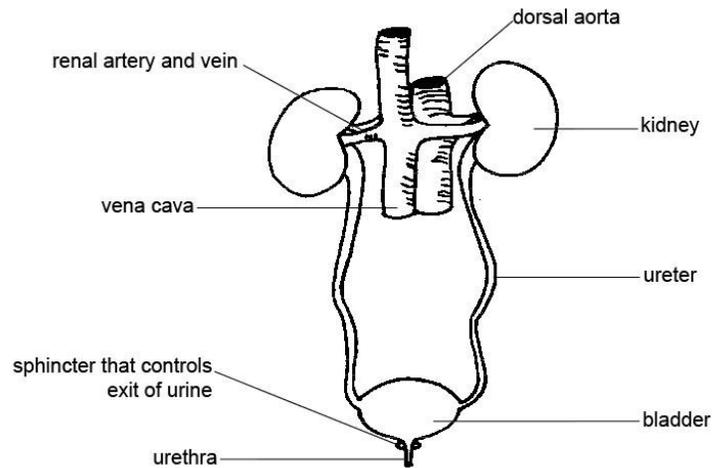


# The Urinary System



## Function

The main function of the urinary system is to filter the blood. By doing so, it accomplishes three tasks:

- It eliminates wastes and excess water in the form of urine.
- It also acts as a buffer in maintaining the proper pH of the blood.
- Finally, it returns the necessary electrolytes, proteins, and minerals to the system (good things found in the blood).

## Order of Go

1. Blood comes into the **KIDNEY** and begins the process of being filtered by the **NEPHRONS**. The nephrons are the powerhouse of the kidney. These units consist of a ball of small blood capillaries called a **GLOMERULUS** and a **RENAL TUBULE**. When urea, water, and other waste products are filtered out of the blood, these waste products go through the nephrons and down the renal tubules of the kidneys.
2. From here, the urine passes into the **URETER** and continues to flow.
3. The urine now passes from the ureter into the **URINARY BLADDER**, where it will stay until it is excreted.
4. When ready to be excreted, the urine will flow through the **URETHRA** to the outside. In the male horse, the urethra goes through the penis. In the female horse, the urethra is within the vulva.

## Fun Facts

- Some horses are born with only one kidney!
- Renal disease is hard to detect until the horse already has 75% kidney failure. This is because the kidneys work so efficiently.
- A horse produces up to 2.5 gallons or 10 liters of urine daily.
- Urine samples are important laboratory aids to clinical diagnosis.

## **Azoturia – Equine Exertional Rhabdomyolysis – Tying Up**

Azoturia is the main disease that is associated with the urinary system. In azoturia, muscle cells are damaged by the large amounts of lactic acid that is released. While the kidneys can handle releases of small amounts of lactic acid (acting as a buffering system), they kidneys have a difficult time when there is a fault with carbohydrate metabolism. Muscle cells are effected and begin to release myoglobin, which is the complex that gives the muscle its color and carries some oxygen. This myoglobin is picked up by the blood and the blood, of course, eventually makes its way to the kidneys to be filtered and “cleaned.” The kidneys filter out the myoglobin and the myoglobin is excreted in the urine, giving the urine of a horse with azoturia the characteristic red urine.

### Signs

Signs of azoturia (as listed in the USPC B, HA, A Level book) include:

- Unwillingness to track up, short strides and stiffness in the hind legs, which may worsen until the horse cannot move at all.
- Hard, tense, quivering hindquarter muscles.
- Sweating, restlessness, anxious expression.
- Dark-colored urine.
- Elevated temperature.

### Treatment

The best way to treat azoturia is restoring the cellular electrolyte balance, which can only be accomplished by immediate veterinary treatment. The vet will give fluids, anti-inflammatory drugs, a tranquilizer such as Acepromazine, and/or other muscle relaxants.

### Prevention

There are many basic management practices that can prevent azoturia. These practices include, once again as listed in the USPC B, HA, A Level book:

- Always adjust the feed schedule according to the work and exercise schedule.
- If a horse works on several consecutive days and then has a day off, he should be turned out for several hours of self-exercise rather than being confined.
- Always reduce the grain ration (to 50 percent or less) on days off.
- If a horse must suddenly be confined to a stall because of injury or other reasons, reduce the grain ration to a small handful, or eliminate grain from the ration entirely.
- Condition horses gradually and avoid overstressing horses beyond the limits of their fitness. Warm up slowly and warm down gradually after strenuous work.