Descent of the Testes

1. During development the testes are first found in the abdominal cavity superior to the kidneys. They are retroperitoneal.

2. The testes are connected to the **gubernaculum**. As the abdominal wall develops, two structures form around the gubernaculum.
   A. The **inguinal canal** is a passageway between the abdominal cavity and the scrotum.
   B. The coverings of the spermatic cord (see below).

3. The **process vaginalis**, which is an outpocketing of the peritoneum, extends through the inguinal canal to the scrotum.

4. Each testis moves through an inguinal canal into the scrotum.

5. Each process vaginalis closes off and mostly disappears. A portion of the process vaginalis remains as a sac that covers most of a testis and epididymis. This sac is called the **tunica vaginalis**. The tunica vaginalis is a serous membrane sac that protects the testis.

6. Exactly how the testes move is unknown. It is believed that the gubernaculum plays a role in the descent of the testis, but how is not understood. It is known that testosterone promotes the descent of the testes.

7. As a testis descends, it drags along the **spermatic cord**, which consists of the ductus deferens (a tube that transports sperm from the testis), blood vessels, and nerves.

8. After the spermatic cord passes through the inguinal canal, it is surrounded by the **coverings of the spermatic cord**, which are connective tissue and muscle derived from the abdominal wall.
   A. The **internal spermatic fascia** is the deepest covering. It is derived from the transversalis fascia.
   B. The **cremaster muscle** and its fascia form the middle covering. They are derived mostly from the internal abdominal oblique muscle with some contribution from the transversus abdominis muscle.
   C. The **external spermatic fascia** is the most superficial covering. It is derived from the aponeurosis of the external abdominal oblique muscle.

For more detailed information on the inguinal canal and coverings of the spermatic cord: [http://www.med.umich.edu/lrc/coursepages/M1/anatomy/html/abdomen/inguinal_ans.html](http://www.med.umich.edu/lrc/coursepages/M1/anatomy/html/abdomen/inguinal_ans.html)
HERNIAS

A hernia is the protrusion of an organ or a tissue through the wall of a cavity that normally contains it. A hernia can occur most any place in the body. Hernias are named by their location (umbilical, diaphragmatic, femoral, inguinal) and time of onset (congenital, acquired).

Umbilical Hernia
During development there is a natural herniation of the bowel into the umbilical cord. The bowel returns to the abdominal cavity before birth. However, on occasion, the linea alba fails to fuse properly resulting in a weak area which is subject to herniation (congenital umbilical hernia; congenital means present at birth). An umbilical hernia in adults occurs when the umbilicus becomes greatly stretched, allowing omenta or intestines to pass through it. This condition is termed an acquired umbilical hernia.

Diaphragmatic (Hiatal) Hernia
Diaphragmatic (hiatal) hernias are abnormal openings in the diaphragm which permit herniation of abdominal viscera into the thoracic cavity. Congenital diaphragmatic hernias (hernias of Bochdalek) are present at birth and are due to failure of the diaphragm to develop properly. Acquired diaphragmatic hernias are located at the esophageal hiatus, which is an opening in the diaphragm through which the esophagus passes. Diaphragmatic hernias usually result in a portion of the stomach protruding into the thoracic cavity.

Femoral Hernia
Femoral hernias are protrusions of abdominal viscera or omenta into the femoral canal lateral to the lacunar ligament. Because of the sharp concave edge of this ligament, these hernias are subject to strangulation (compression resulting in loss of blood supply which could lead to gangrene).

Inguinal Hernia
Inguinal hernias are hernias into the inguinal canal. These can be acquired or congenital, direct or indirect, complete or incomplete.

An acquired inguinal hernia occurs after birth, particularly in adults with poor abdominal muscle tone. These can be either indirect, which pass through the deep inguinal ring lateral to the inferior epigastric vessels or direct, which pass through the abdominal wall medial to the inferior epigastric vessels. Direct hernias do not pass through the deep inguinal ring but enter the canal through its posterior wall and can then continue as far as the scrotum/labia majora.

A congenital inguinal hernia is one present at birth. These are considered to be indirect, that is to say they exit the deep inguinal ring, follow the entire length of the canal and exit the superficial inguinal ring. They are the result of failure of the processus vaginalis to close during development. Because the processus remains open, intestines can pass into the scrotum/labia majora.

A complete hernia is an indirect inguinal hernia in which the contents of the hernia have extended into the tunica vaginalis.

An incomplete hernia is an indirect inguinal hernia in which the contents of the hernia can extend to the testis, but does not enter the tunica vaginalis, which is sealed off.

The above information taken from the following Web site: