

## THE ARTERIAL SYSTEM

**PULMONARY ARTERY:** arises from the conus arteriosus at the left side of the base of the right ventricle. It curves upward, backward and medially and divides behind the arch of the aorta into the right and left branches.

Near its bifurcation, the pulmonary artery is connected with the arch of the aorta by a fibrous band about 1.2cm in width known as the **LIGAMENTUM ARTERIOSUS** a remnant of the large **DUCTUS ARTERIOSUS** which conducts most of the blood from the pulmonary artery to the aorta of the fetus

The right branch is longer and wider than the left –it passes under the bifurcation of the trachea to enter the right lung.

## THE SYSTEMIC ARTERIES

**AORTA:** is the main systemic arterial trunk. Beginning from the base of the left ventricle and nearly median in position at its origin.

The initial portion – the aortic bulb is concealed between the atria and forms sinuses above the three cusps of the aortic valve; the right coronary artery arises from the cranial sinus, the left artery arises from the craniosinistral sinus.

The ascending aorta passes upwards, and forward between the pulmonary artery on the left and right atrium on the right. It then curves sharply backwards, dorsally and somewhat to the left to form the **aortic arch**. It reaches to the ventral surface of the spine of the 7<sup>th</sup>-8<sup>th</sup> or sometimes 9<sup>th</sup> thoracic vertebrae to traverse between the lungs caudally, pierce the diaphragm at the hiatus aorticus to enter the abdominal cavity lying ventral to the vertebral bodies and the Psoas minor slightly to the left of the median plane it extends caudally to the caudal lumbar regions where they divide into the internal iliac arteries

The thoracic aorta is enclosed within the pericardium to the point of attachment of the ligamentum arteriosus. It passes cranially between the two pleural sacs, crossed on the right by the oesophagus and trachea and on the left by the left vagus nerve.

### BRANCHES OF THE THORACIC AORTA

1. **Coronary arteries:** the left and right coronary arteries are distributed almost entirely to the heart but some send small twigs to the origins of the great vessels.
2. **Common brachicephalic trunk:** arises from the convexity of the aortic arch within the pericardium, crossed by the left vagus and cardiac nerves. The left recurrent nerve runs between it and the trachea. It divides into the brachiocephalic and left brachial arteries.

3. **Brachiocephalic artery:** dorsal to the cranial mediastinum and beneath the trachea. It gives off the bicarotid trunk and continues as the right brachial artery (subclavian). The latter turns ventral and bends around the cranial border of the first rib; insertion of the scalenus muscle and the brachial vein.
4. **Left brachial artery:** longer than the right. The left and right have similar divisions after these initial differences.

The left brachial and brachiocephalic arteries give off the following within the thorax

- Costocervical artery
- Deep cervical artery
- Vertebral artery
- Internal thoracic artery

At the first rib, each of them give off the

- External thoracic artery
- Ventral cervical artery

5. **Common Carotid artery:** the left and right arise from the brachiocephalic trunk by a common trunk. it is related to the terminal parts of the jugular veins, cranial vena cavae and laterally by the vagus and recurrent nerves

The collateral branches of the common carotid include

Muscular branches

Oesophageal and tracheal

Parotid

Cranial thyroid/thyrolaryngeal

Caudal thyroid

6. **Occipital Artery**
7. **Internal carotid**
8. **External carotid**
9. **superficial temporal**

## **BRANCHES OF THE THORACIC AORTA**

**Broncho-oesophageal**

**Intercostals**

**Phrenic**

## **BRANCHES OF THE ABDOMINAL AORTA**

**Coeliac**

- Gastric
- Hepatic
- Splenic

**Cranial Mesenteric**

- Left and right mesenteric branches
- Lateral caecal
- Medial caecal
- Ventral colic, dorsal colic

**Renal**

**Caudal mesenteric**

**Internal spermatic(Testicular) or Utero –Ovarian**

**Lumbar**

**Internal Iliac**

- Internal pudic
- Umbilical
- Middle haemorrhoidal
- Perineal

## **ARTERIES OF THE THORACIC LIMB**

**Brachial artery**

- Suprascapular
- Subscapular
- a) Thoraco-dorsal

- b) Caudal circumflex humeral
- c) Circumflex
  - Cranial circumflex humeral
  - Deep brachial
  - Muscular branches

### **Median Artery**

- Articular branches
- Muscular branches interosseous artery
- Volar carpal
- Lateral metacarpal

### **Common Digital Artery**

### **Digital Artery**

## **ARTERIES OF THE PELVIC LIMB**

### **External Iliac**

- Circumflex iliac
- External spermatic/ Middle uterine

### **Femoral**

- Prepubic
- Deep femoral
- Cranial femoral
- Muscular branches
- Saphenous
- Articular
- Caudal femoral

**Popliteal**

**Caudal Tibial**

**Cranial tibial**

**Metatarsal**

## **THE LYMPHATIC SYSTEM**

This system is responsible for the immunological defense of the body; protecting the body from exogenous and abnormal exogenous endogenous materials, viruses, bacteria and other invasive micro organisms.

**This system comprises of all lymphatic organs**

Thymus

Tonsils

Spleen

Lymph nodes

Hemal nodes

**Diffuse lymphatic tissue and lymphatic nodules present in many mucous membranes**

## LYMPHATIC SYSTEM

### THORACIC DUCT

Is the chief collecting trunk of the lymphatic system. It begins as an elongated irregular dilatation called the CISTERNA CHYLI which is located between the right side of the aorta and the right crus of the diaphragm at T1-L2 region. The duct enters the thorax through the hiatus aorticus and runs forward right of the median plane, between the vena cava and the aorta covered by the pleura. At about T6-7, it inclines ventrally, crosses obliquely over the left surface of the oesophagus, passes forward on the left side of the trachea to the thoracic inlet. The extra thoracic terminal part passes downward and forward on the deep face of the left scalenus muscle bending backward under the bicarotid trunk and opening into the dorsal part of the origin of the cranial vena cava behind the angle of the junction of the jugular veins.

### TRACHEAL DUCTS

Consisting of the left and right ducts, act as the collecting ducts for the glands of the head and neck. They lie on the trachea in relation to the carotid arteries. The right goes to the caudal cervical L.N while the left goes to the terminal portions of the thoracic duct.

## LYMPHOCENTRES OF THE HEAD AND NECK

Mandibular L.N: in the mandibular space along the omohyoid muscles

Pharyngeal L.N:

Cranial cervical

Middle cervical

Caudal cervical

Prescapular (Superficial cervical)

Nuchal

## LYMPHOCENTRES OF THE THORAX

Intercostal

Cranial mediastinal

Bronchial

Caudal mediastinal

## **LYMPHOCENTRES OF THE ABDOMEN AND PELVIS**

### **PARIETAL**

Lumbar

Internal Iliac

External Iliac

Superficial inguinal

Ischiatic

### **VISCERAL**

Gstric

Hepatic

Splenic

Mesenteric

Caecal

Colic

Rectal

Anal

## **LYMPHOCENTRES OF THE PECTORAL LIMB**

Axillary

Cubital

## **LYMPHOCENTRES OF THE PELVIC LIMB**

Prefemoral

Deep Inguinal

Popliteal

## FETAL CIRCULATION

Fetal blood is oxygenated and obtains nutrients from its vital connection with the maternal blood in the placenta.

**The right and left Umbilical artery** are large vessels arising from the internal Iliac arteries and pass into the umbilical fold of the peritoneum on either side of the bladder to the umbilicus. They become incorporated with the umbilical vein and the urachus in the umbilical cord to ramify in the allantois, and end as the capillaries of the fetal placenta.

They conduct impure blood to the placenta. After birth they retract and become thickened to become the round ligaments of the bladder.

**Umbilical vein** receives oxygenated blood from the placenta. It has no valves in it and the blood conveyed by it passes through the capillaries of the liver before entering the caudal vena cava. In some species, it is conveyed directly by the ductus venosus to the caudal vena cava.

Foramen Ovale is an opening in the septum between the atria of the fetal heart by which they communicate. It is guarded by a valve which prevents blood from passing from the left atrium to the right. The foramen soon closes after birth forming the FOSSA OVALIS

Pulmonary circulation is very limited in the fetal life because most of the blood enters the pulmonary artery passes through the DUCTUS ARTERIOSUS to the aorta. After birth the pulmonary circulation increases and the ductus arteriosus is transformed into a fibrous cord-LIGAMENTUM ARTERIOSUS.