

# WORK PHYSIOLOGY

The physiological behavior of the animals were maintained as per the convenience of the human being. It also depends upon the job profile of the animal among same species like, if a crossbred cow domesticate for the milk purpose, the draught ability may influence

### **Adjustment of circulatory systems-**

- Some signals are transmitted from the brain to target muscles before the initiation of any work so as to contract or relax
- Vasomotor centers in the brain initiate sympathetic discharge to stimulate heart
- The active muscles could dilate with contraction of peripheral circulation

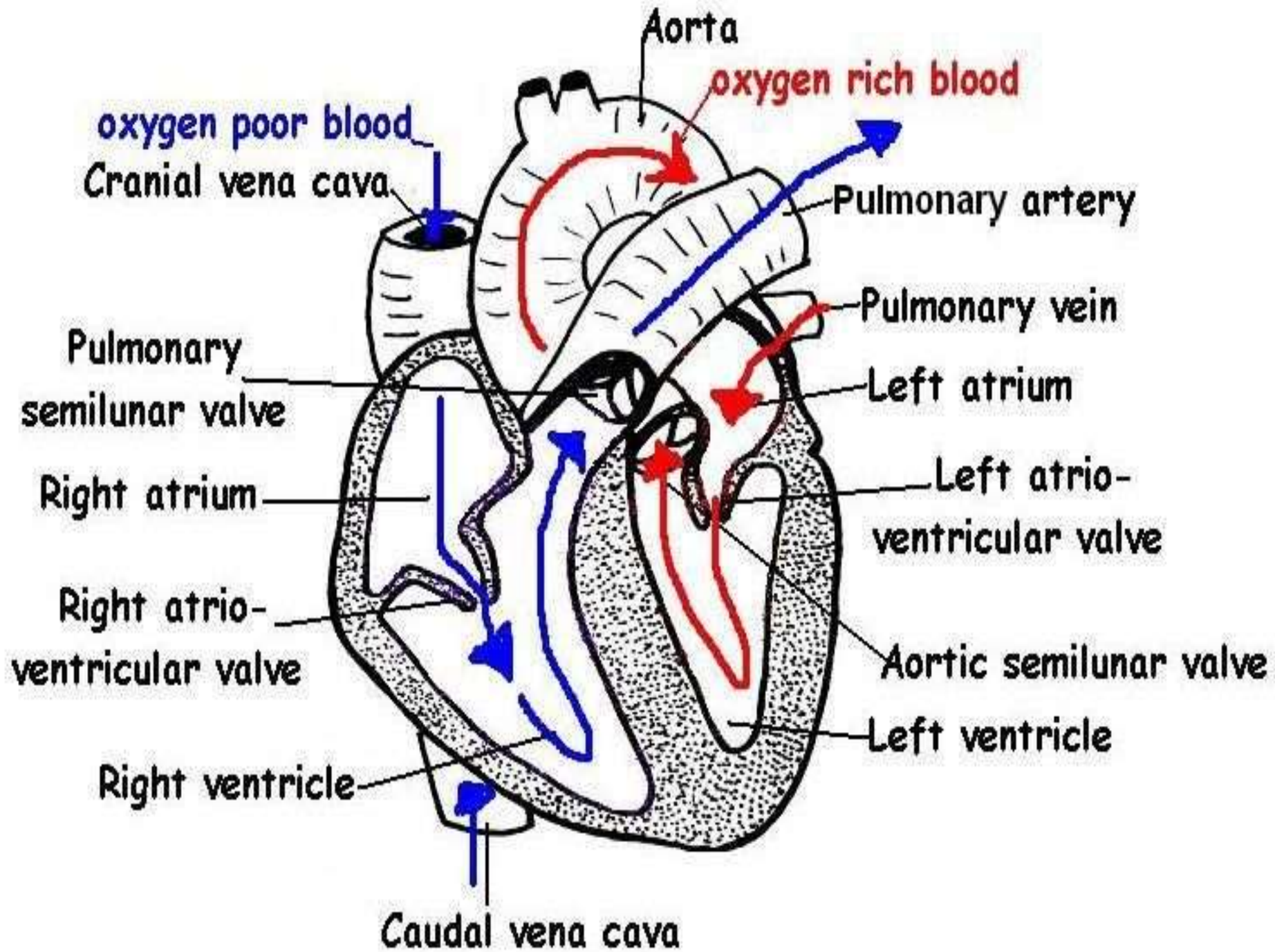
### **Pulmonary circulation-**

- It  $\uparrow^{\text{es}}$  with  $\uparrow$  in cardiac output & activates several capillaries in the pulmonary bed which are inactive in resting condition

- The ↑ circulation in the alveoli help to more exchange of gases for ↑ed muscular activity & control the excess pulmonary arterial pressure
- During heavy work joints transmitted impulses to the respiratory centre which may ↑ the alveolar ventilation
- Also the hypoxia produce in the muscle during heavy work also ↑ the alveolar ventilation

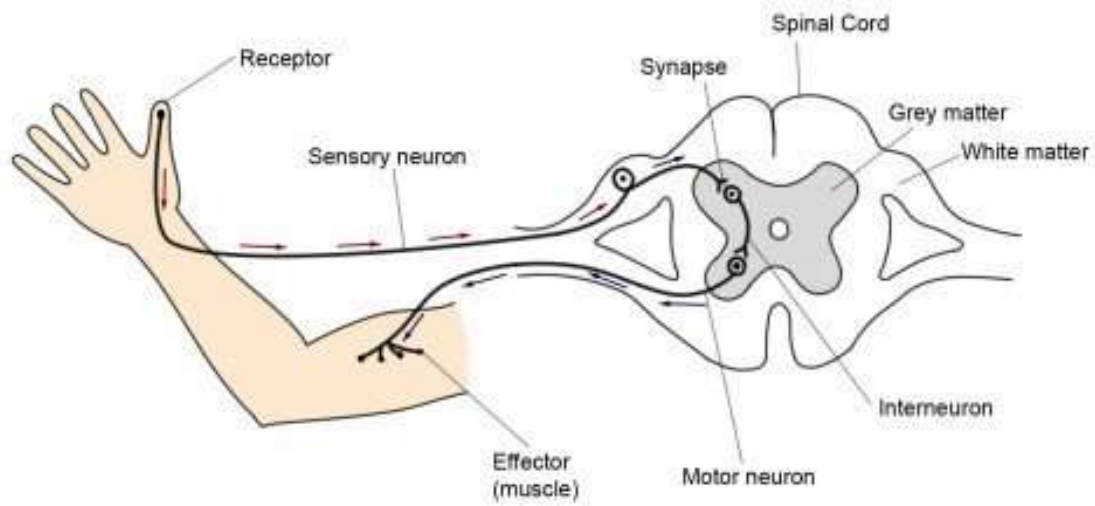
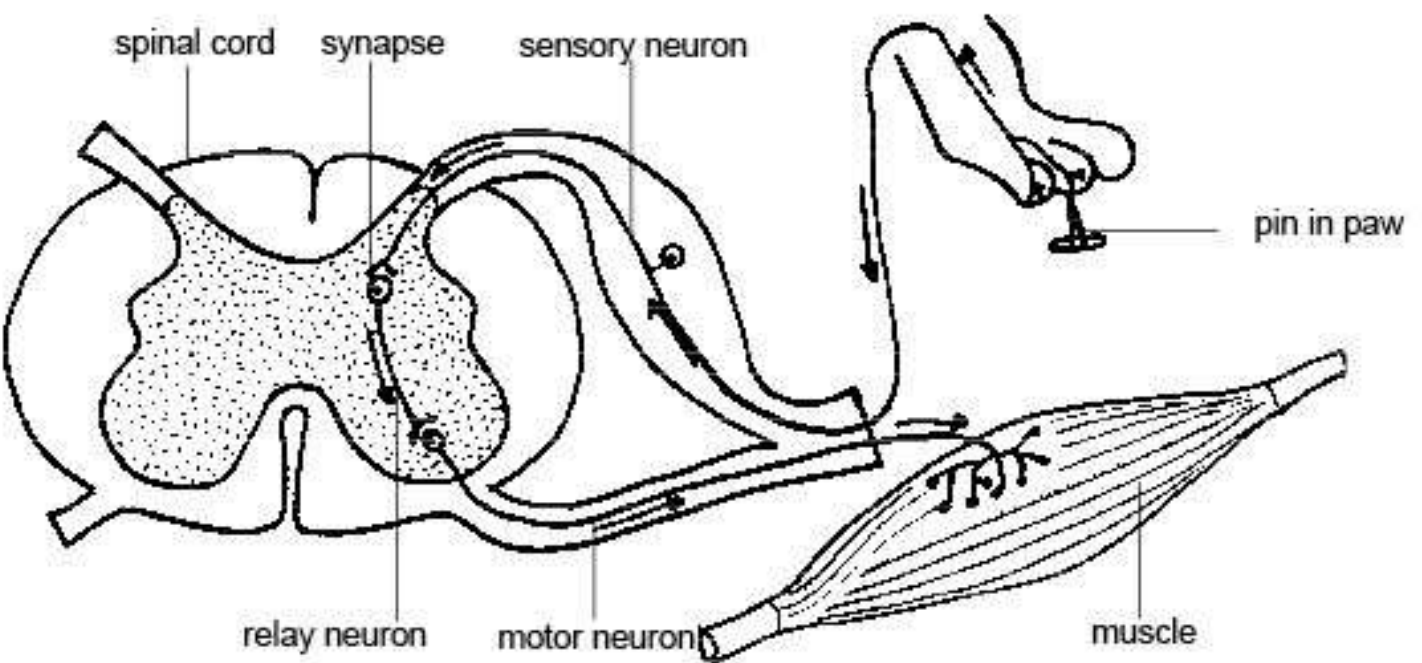
### **Movement of RBC & rise in blood viscosity:**

- During exercise or heavy work there is frequent ↑ in the numbers of erythrocytes, leucocytes & platelets per unit volume for exchange of gases
- In spleen erythrocytes are stored in some of the species which releases to come out form intravascular to extravascular space may cause the viscosity of blood



# Skeletal muscles-

- There is distinguish 2 types of muscle fibre
- Type I fibres have slower contraction & relaxation time & are highly oxidative & more resistant in respect of type II fibres
- The type II fibres are further subdivided into 3 types i.e., II A, II B & type II C
- Among these type II A exhibits oxidative property while type II B exhibits glycolytic property & type II C has on intermediate character of type II A & type II B (i.e. oxidative & glycolytic property)
- The cross sectional area of the individual fibre & capillary density have significant role in the work capacity
- Myoglobin has function to transfer  $O_2$  within the muscle cell and the amount can  $\uparrow$  with  $\uparrow$  work capacity
- ATP hydrolyses to ADP by the myosin ATPase with the liberation of high amount of energy supplying for muscles during muscular contraction
- The chemical energy is absorbed & used as kinetic energy for generating force during exercise or work



## Hormones-

- Thyroid hormone secretes  $T_3$  &  $T_4$  which stimulates cellular respiration (mitochondria) by  $\uparrow^{\text{ed}}$  rate of  $O_2$  utilization & liberating excess amount of energy
- Glucocorticoids concerned with  $\uparrow^{\text{ed}}$  production of RNA for protein synthesis
- Glucocorticoids are release by adrenal cortex influence from adreno-corticotropic hormones (ACTH) & it (Glucocorticoids) also combines with amino acids for glucose production & lipolysis to generate additional energy for muscles during prolong heavy work
- The epinephrine convert glycogen of muscle to glucose phosphate and  $\uparrow$  cardiac output & respiratory rate & relaxes bronchioles

**Kidney-** Kidney play an important role by conserving more of body water and electrolytes with the help of hormone ADH from posterior pituitary & aldosterone from adrenal cortex during heavy work

**Thermoregulatory response-** The  $\uparrow^{\text{ed}}$  production of metabolic heat during exercise or heavy work could be dissipated through the **physical reactions or principal mechanisms of heat dissipation** via **conduction, convection, radiation & evaporation**

Heat dissipation by sweating & respiratory tract evaporation plays a major role among all mechanisms