# CARDIOVASCULAR SYSTEM

## functions of CV system :

1) Transport $O_2$ + $CO_2$
2) Transport nutrients + waste
3) Control body temperature.

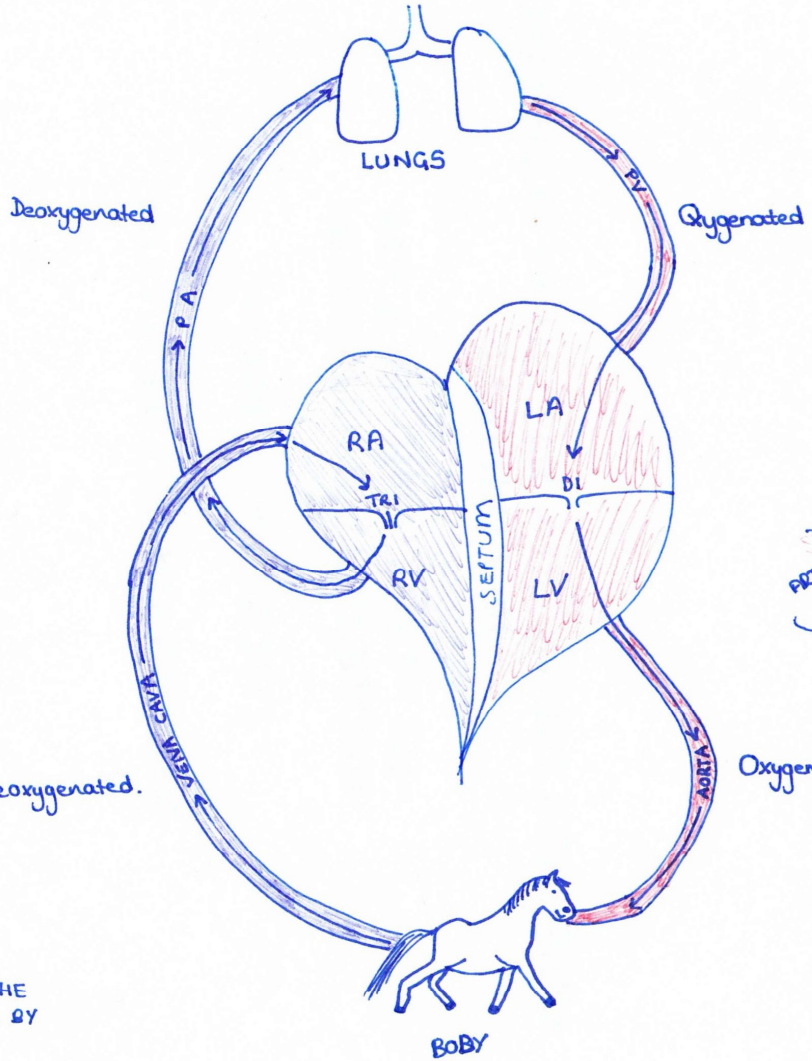
↓

**Vasoconstriction**
- Blood moves away from surface.
(TO WARM UP)

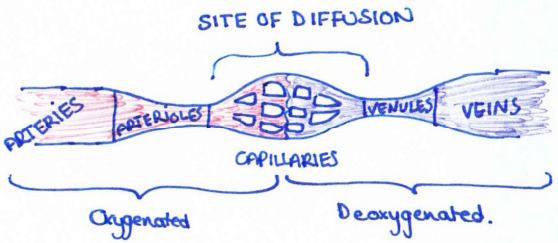
**Vasodilation**
- Blood moves towards skin surface
(TO COOL DOWN)

## Blood is made up of :

1) Plasma
2) RBC
3) WBC
4) Platelets




## Gaseous Exchange

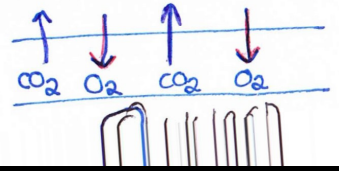



## HEART + CV DISORDERS

1) MURMUR - ABNORMAL SOUND
2) ARRHYTHMIA - IRREGULAR HEART BEAT
3) ANAEMIA - LACK OF IRON
4) PIROPLASMOSIS - DISEASE OF THE BLOOD CAUSED BY PARASITE

## DIFFUSION

Nutrients moving across a concentration gradient using no energy.



## EDATION + ANAESTHESIA

**SW DO YOU KNOW WHEN TO SEDATE?**

DEPENDANT ON : HORSE
AGE + CONDITION
PROCEDURE
FACILITIES

**HAT DO THEY DO?**

FFECT THE NERVOUS SYSTEM BY
LOWING OR STOPPING THE MESSAGES
ENT BETWEEN LIMBS AND BRAIN.
OR
LOCK RECEPTORS IN THE BRAIN.
OR
ELAY MESSAGES WHICH SLOW THE
ORSES RESPONSE TIME.

**OW ARE THEY ADMINISTERED?**

INTRAVENOUS
INTRAMUSCULAR
ORAL FORMS

F INJECTED INTRA-ARTERIAL WILL
SUALLY LEAD TO CONVULSIONS + DEATH!

**EFFECTS OF SEDATION**

ACP
- TAKES 20-30 MIN TO WORK
- NO ANALGESIC PROPERTIES
- LONG DURATION

**HANGE CV FUNCTION**
- ↓ HEARTRATE
- ↓ CARDIAC OUTPUT
- EFFECT BLOOD PRESSURE
- EFFECT RESPIRATORY SYSTEM
- EFFECT GUT MOBILITY

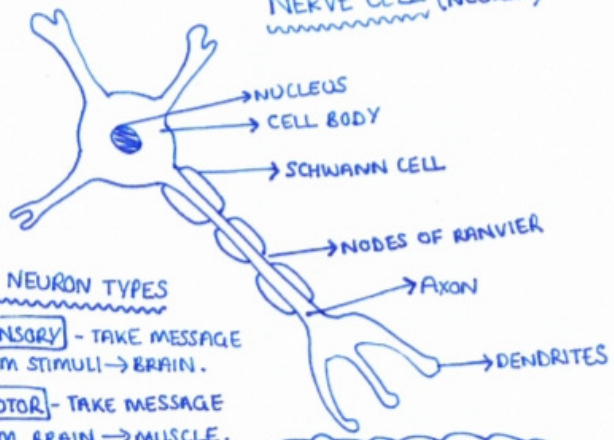
**2 TYPES OF SEDATION**

1) ADRENERGENIC AGONISTS : PRODUCE 'DOPED' EFFECT, RELAXED.
(DETOMIDINE / ROMIFIDINE)
2) OPIOIS : DRUGS THAT BIND WITH SPECIFIC RECEPTORS IN BRAIN

## THE NERVOUS SYSTEM

(COMPOSED OF NERVE CELLS AND FIBRES, IN THE BRAIN, SPINAL CORD AND LIMBS.)

**NERVE CELL (NEURON)**




**TWO NEURON TYPES**

1) SENSORY - TAKE MESSAGE FROM STIMULI → BRAIN.
2) MOTOR - TAKE MESSAGE FROM BRAIN → MUSCLE.

**FUNCTION OF N.S**
TO ALLOW THE BODY TO COMMUNICATE MESSAGES QUICKLY BY ELECTRICAL IMPULSES.

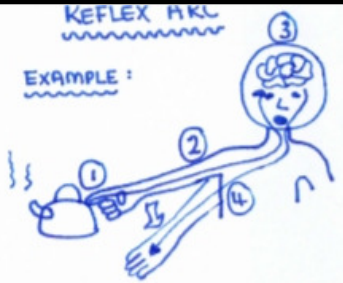
**CNS + PNS CONDITIONS**

1) PARALYSIS - CAUSES - DAMAGE
VIRAL INFECTION
BACTERIAL TOXINS
HAEMORRHAGE
TRAUMA
2) ENCEPHALOMYELITIS - AFFECTS NERVOUS SYSTEM
3) LARYNGEAL HEMIPLEGIA - PARALYSIS OF LARYNX MUSCLES
4) WOBBLERS (SHIVERING) - NERVE DAMAGE
STRINGHALT

**CNS + PNS STRUCTURE**


**REFLEX ARC**

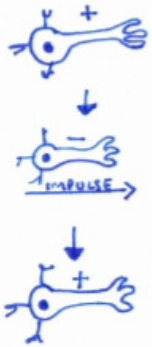
EXAMPLE :




1) Hot object touched
2) Nerve impulse conducted
3) Impulse reaches brain
4) Brain sends response to move hand.

**DEFINITION OF REFLEX ARC :**
A 2 WAY SYSTEM OF MESSAGES WHICH RESULT IN A RESPONSE TO A STIMULI.

**NERVE IMPULSE**

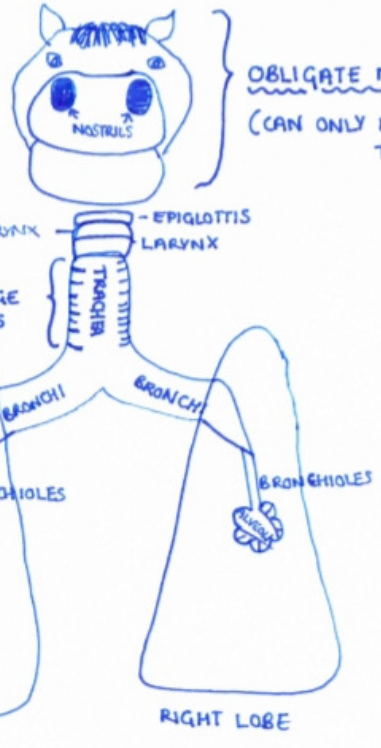



1) AXONS ARE POLARISED
2) ELECTRICAL STIMULATION PASSES MESSAGE ALONG, WHICH DEPOLARISES THE AXON.
3) ONCE MESSAGE HAS PASSED AXON REPOLARISES.

# RESPIRATORY SYSTEM

## RESPIRATORY SYSTEM DISEASES

1) INFLUENZA, EHV, RHINOVIRUS - Common cold
2) PNEUMONIA - INFLAMMATION OF LUNGS
3) PLEURITIS - MEMBRANE INFLAMMATION IN THE CHEST CAVITY
4) LUNGWORM - CHRONIC RESPIRATORY INFECTION
5) COPD - HYPERSENSITIVE TO DUST ALLERGENS
6) EIPH - NOSEBLEEDS (HAEMORRAGE IN THE LUNGS DUE TO EXCERCISE STRESS.)




OBLIGATE NASAL BREATHERS (CAN ONLY BREATHE THROUGH THEIR NOSES.

CAPILLARIES (COVER THE ALVEOLI AND THIS IS WHERE GASEOUS EXCHANGE VIA DIFFUSION OCCURS.)

## BREATHING CONSISTS OF

1) INSPIRATION (AIR IN)
2) EXPIRATION (AIR OUT)

## AIR FLOW DIAGRAM

AIR IN THROUGH NOSTRILS.
↓
AIR PASSES EPIGLOTTIS
↓
AIR ENTERS LARYNX
↓
AIR GOES DOWN TRACHEA
↓
AIR GOES DOWN BRONCHI
↓
THROUGH BRONCHIOLES
↓
TO ALVEOLI WHERE GASEOUS EXCHANGE HAPPENS.

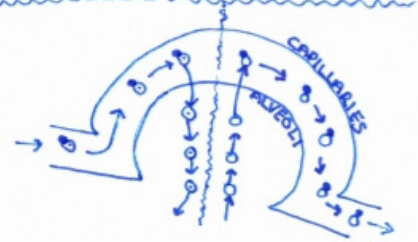
## RESPIRATORY LOCOMOTORY COUPLING

AT CANTER THE HORSE ONLY BREATHES ONCE PER STRIDE.

## FUNCTION OF THE RESPIRATORY SYSTEM

TO PROVIDE THE BODY CELLS WITH OXYGEN AND RID THE BODY OF WASTE PRODUCTS VIA RESPIRATION.

## WHAT IS GASEOUS EXCHANGE ?




KEY
- HAEMOGLOBIN (HB)
- ⊙ $CO_2$
- ○ $O_2$

DEFINITION { GASEOUS EXCHANGE IS THE OXYGENATION OF BLOOD IN THE LUNGS.

WHAT HAPPENS { HB + $CO_2$ ENTER ALVEOLI / $CO_2$ EXCHANGED FOR $O_2$ / HB + $O_2$ LEAVE ALVEOLI.

# GASTRO INTESTINAL TRACT

## ESSENTIAL NUTRIENTS

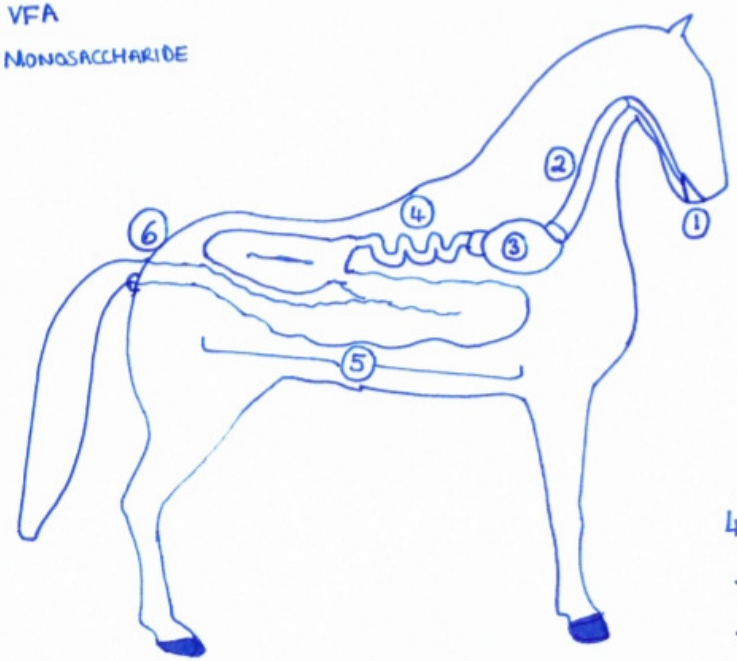
1) PROTEINS → BROKEN DOWN TO → AMINO ACIDS
   - STRUCTURE : LINKED AMINO ACIDS
   - 2 TYPES : ESSENTIAL + NON-ESSENTIAL
2) LIPIDS → BROKEN DOWN TO → FATTY ACID + GLYCEROL
   - STRUCTURE : SOLID OR OIL
   - BROKEN DOWN BY BILE FROM THE LIVER
3) CARBS
   - STRUCTURAL → BROKEN DOWN TO → VFA
   - NON-STRUCTURAL → BROKEN DOWN TO → MONOSACCHARIDE
4) VITAMINS
5) MINERALS
6) WATER

CALCIUM IS ALSO IMPORTANT AS IT IS IMPORTANT FOR GROWING AND BONE STRUCTURE!

### OVERALL FUNCTION OF G-I TRACT

TO BREAK DOWN NUTRIENTS IN ORDER TO PROVIDE THE BODY WITH ENERGY.

CALCIUM : PHOSPHOROUS RATIO IN A MAINTENANCE OR WORKING HORSE SHOULD BE 2:1




### 1) Mouth (STRUCTURE : LIP, MOUTH, TONGUE, INCISORS.)

- GASTRO INTESTINAL TRACT BEGINS HERE WITH MASTICATION.
- SALIVA IS PRODUCED AND FORMS BOLUS

### 2) Oesophagus

DELIVERS FOOD FROM THE MOUTH TO THE STOMACH BY PERISTALSIS (- MUSCULAR CONTRACTIONS)

### 3) Stomach

- BEGINNING OF CHEMICAL DIGESTION. FATS AND PROTEINS ARE BROKEN INTO SMALLER CHAINS HERE.
- PANCREAS SECRETES DIGESTIVE JUICES
- THE STOMACH HAS SPHINCTERS EITHER SIDE WHICH ACT AS ONE WAY VALVES.

### 4) Small Intestine

- DUODENUM - MORE ENZYME ACTION; MAIN SITE FOR DIGESTION
- JEJUNUM + ILEUM - BEGINNING OF ABSORPTION

BY THIS STAGE ALL PROTEIN, FAT AND NON-STRUCTURAL CARBS HAVE BEEN DIGESTED.

### 5) Large Intestine

DIVIDED INTO 3 PARTS:

WHERE STRUCTURAL CARBS ARE BROKEN DOWN

- CAECUM - THE LAST OF THE REABSORPTION SHOULD HAVE OCCURED BY THIS STAGE. VFA'S.
- LARGE COLON - WATER REABSORBED, VITAMINS, VFAS AND MINERALS ABSORBED.
- SMALL COLON - FORMATION OF FAECES TO PRODUCE WASTE

### 6) Rectum + Anus

WHERE THE GASTRO INTESTINAL TRACT ENDS.

# MACHINE MODES OF DIAGNOSTIC TECHNIQUES

| ULTRASONOGRAPHY | RADIOGRAPHY | THERMOGRAPHY | SCINTIGRAPHY |
|---|---|---|---|
| • VERY HIGH FREQUENCY WAVES ARE PULSED ONTO TISSUE AND ARE BOUNCED BACK ONTO A RECIEVER.<br>• THESE ARE THEN CONVERTED INTO ELECTRICAL IMPULSES WHICH ARE DISPLAYED ON A TV MONITOR IN VARYING SHADES OF BLACK + WHITE.<br>• USED TO SHOW INSIDE THE BODY CAVITY.<br>• SHOWS FLUID, TISSUES AND SOLID STRUCTURES. | • XRAYS BEAMED ONTO AN OBJECT AND THE MORE DENSE AN OBJECT IS, THE LESS XRAYS ARE ABSORBED.<br>• THEY ARE USED TO EXAMINE BONES AND OBJECTS OF HIGH DENSITY.<br>• CAN ALSO BE USED TO DETECT FOREIGN OBJECTS IN THE GUT. | • A COLOUR SCALE IMAGE WHICH SHOWS THE MEASUREMENTS OF HEAT GIVEN OFF BY STRUCTURES.<br>• BLACK BEING COLDEST, RED BEING WARMEST. | • A RADIOACTIVE DRUG IS INJECTED.<br>• THE DRUG BECOMES CONCENTRATED IN INFLAMED AREAS AND THE CONCENTRATION IS THEN MEASURED. |

# PERIODONTAL DISEASE

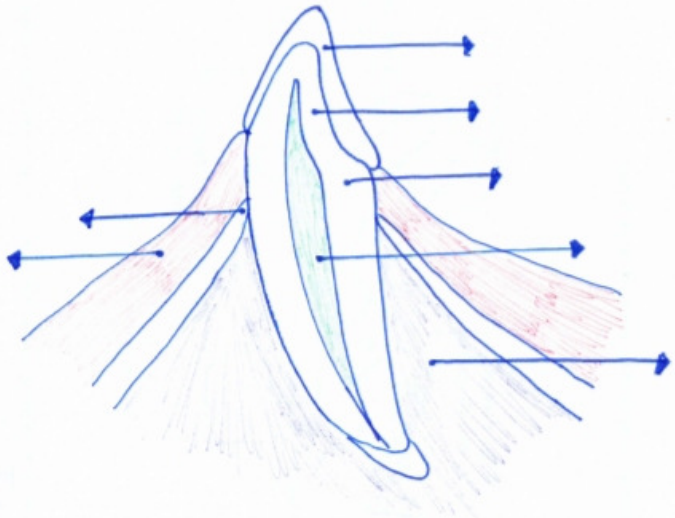
PREVENTION IS THE KEY

## WHAT IS PERIODONTAL DISEASE?

- IT IS AN INFLAMMATION OF THE PERIODONTIUM.

## WHAT CAUSES IT?

- BACTERIA ADHERE TO, GROW AND REPRODUCE ON THE TOOTHS SURFACE AND THEN DEGENERATE THE CONNECTIVE TISSUE AND ALVEOLAR BONE SURFACE SURROUNDING THE TOOTH. THIS THEN LEADS TO LOOSENING OR LOST TEETH.
- IF UNTREATED CAN RESULT IN DEEP POCKETS OF INFECTION.



## 2 GRADING SYSTEMS TO EVALUATE TOOTH CONDITION

1) MOBILITY INDEX : TOOTH LOOSENESS

CLASS 1 : SLIGHT MOVEMENT
CLASS 2 : LESS DISTANCE THAN CROWN WIDTH
CLASS 3 : MOVES DISTANCE GREATER THAN CROWN WIDTH
CLASS 4 : LOST MORE THAN 50% OF SUPPORT AROUND TOOTH
→THEREFORE EXTRACT!

## HOW IS IT DIAGNOSED?

- EXAMINATION AND XRAYS OF THE SOFT TISSUE AND BONE DEGENERATION AROUND THE TOOTH.

## STAGES AND TREATMENT

| STAGE | INDICATION | TREATMENT |
|---|---|---|
| 1) | EDEMA | SEALING + POLISHING |
| 2) | EDEMA POCKETS | SCALING, ROOT PLANNING, POLISHING |
| 3) | DEEPER EDEMA POCKETS | ABOVE AND APICAL REPOSITION FLAP SURGERY IF INDICATED. |
| 4) | MORE ADVANCED | ABOVE AND GINGIVAL SURGERY TO SAVE TEETH OR EXTRACTION |

## HOW IS IT TREATED?

ITS HERE TO STOP THE BACTERIAS PROGRESSION IF ITS NOT TREATED IN THE EARLY STAGES.

THE AREA NEEDS TO BE CLEANED AND PACKED WITH ANTIBIOTICS IN ORDER TO PREVENT FURTHER INFECTION AND KILL THE CURRENT.

# THE IMMUNE SYSTEM

## MICROBE DEFINITION

MICROBES OR MICROORGANISMS INCLUDE BENEFICIAL AND PATHOGENIC ORGANISMS. AND COME IN DIFFERENT CLASSES.
AN EXAMPLE OF THESE CLASSES IS:

- BACTERIA
- VIRUS
- FUNGI
- PROTOZOA

**STRUCTURE OF IMMUNE SYSTEM**
WORKS ALONGSIDE THE CV SYSTEM AND CONSISTS OF LYMPH VESSELS

**TWO TYPES OF IMMUNITY:**
1) MECHANICAL IMMUNITY (PREVENT PATHOGEN ENTRY EG HAIR)
2) CHEMICAL IMMUNITY (WBC'S THAT DESTROY PATHOGENS)

**FUNCTION OF I.S**
TO DETECT AND PREVENT ENTRY OF PATHOGENS.
AND TO KILL HARMFUL PATHOGENS.

| | MICROBE | JOB |
|---|---|---|
| PATHOGENS | BACTERIA EG PATHOGENIC CHOLOSTRIDUM (CT) TETANI | IS A PROKARYOTE WHICH IS CLASSIFIED BASED ON ITS SHAPE. |
| | | BACTERIA CAN FORM HEAT RESISTANT SPORES WHICH CAUSE DISEASE |
| | | NOT ALL OF THEM ARE PATHOGENIC |
| | BENEFICIAL LACTOBACILLUS | GUT BACTERIA ARE BENEFICIAL, NOT PATHOGENIC |
| | VIRUS EG: EQUINE INFLUENZA AHV | ALWAYS DISEASE CAUSING |
| | | THEY INJECT IN LIVING CELLS AND REPLICATE. |
| | | SMALLER THAN BACTERIA |
| | | CAN BECOME IMMUNE TO VACCINES BY MUTATING. |
| | FUNGI EG: RINGWORM | MANY ARE BENEFICIAL |
| | | PATHOGENIC FUNGI CAN CAUSE DERMATOLOGICAL DISEASES |
| | HELMINTHS | INCLUDES ALL TYPES OF WORMS |
| | | WORMS ARE ORGAN SPECIFIC |
| | | MOST ARE HARMFUL |
| | | THEY HAVE A LIFE CYCLE |
| | ARTHROPODS | INCLUDE INSECTS AND ARACHNIDIA EG MITES/TICKS |
| | | DO NOT CAUSE DISEASE BUT ARE CARRIERS |
| ILLNESSES | TETANUS | CAUSED BY BACTERIA CT. |
| | | SPORES FOUND IN SOIL AND INFECT WOUNDS. |
| | | PRODUCES TOXIN THAT BLOCKS NEUROTRANSMISSION |
| | | SYMPTOMS:<br>- RESPIRATORY PARALYSIS<br>- MUSCLE CONTRACTION<br>- SAW HORSE POSTURE<br>- SPASMS |
| | INFLUENZA | CAUSED BY A VIRUS |
| | | HIGHLY CONTAGIOUS |
| | | RESPIRATORY DISEASE THAT CAN PROGRESS TO PNEUMONIA |
| | | COMMON IN LARGE GROUPS OF YOUNG HORSES |
| | | VACCINATIONS AND ISOLATION TO CLEAR UP |

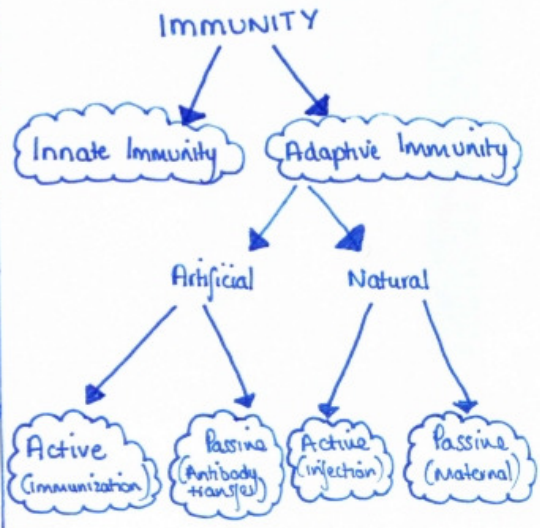
## IMMUNE SYSTEM DEFINITION

MEANS TO BE FREE FROM THE BURDEN OF..

**TYPES OF VACCINE**
1) MODIFIED LIVE VACCINE
2) INACTIVATED
3) SUB UNIT

**WHAT IS A PATHOGEN?**
A DISEASE CAUSING AGENT
EG - BACTERIA, VIRUS ETC

## Immune System

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