

بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ



# **First Year MBBS (Batch 51) Foundation Module Skill Lab /Physiology Practical**

**(Apparatus Identification (Introduction To Neubauer's chamber, Red Blood Cell Pipette and White Blood Cell Pipette))**

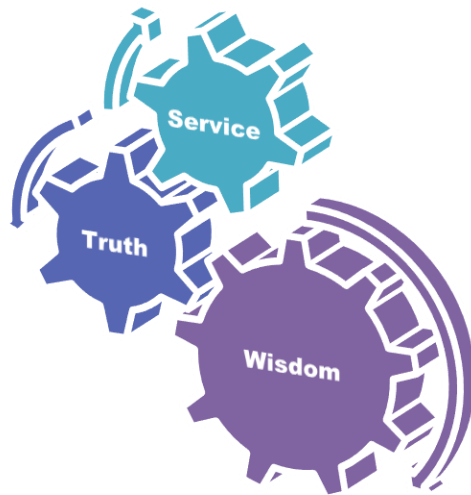
**Dr. Iqra Ayub  
25<sup>th</sup> January,2024**



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## Motto

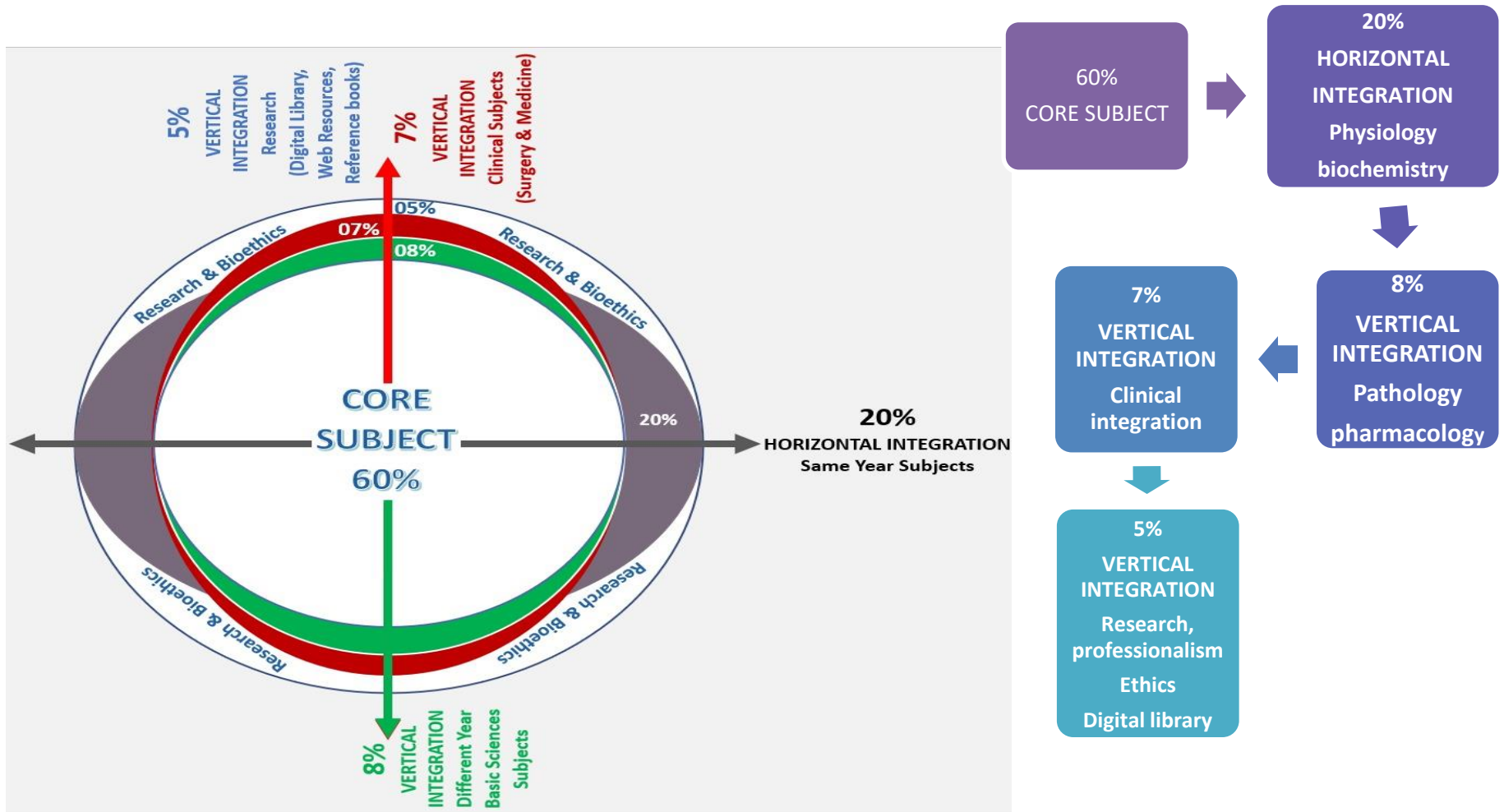


## Vision; The Dream/Tomorrow

- To impart evidence based research oriented medical education
- To provide best possible patient care
- To inculcate the values of mutual respect and ethical practice of medicine



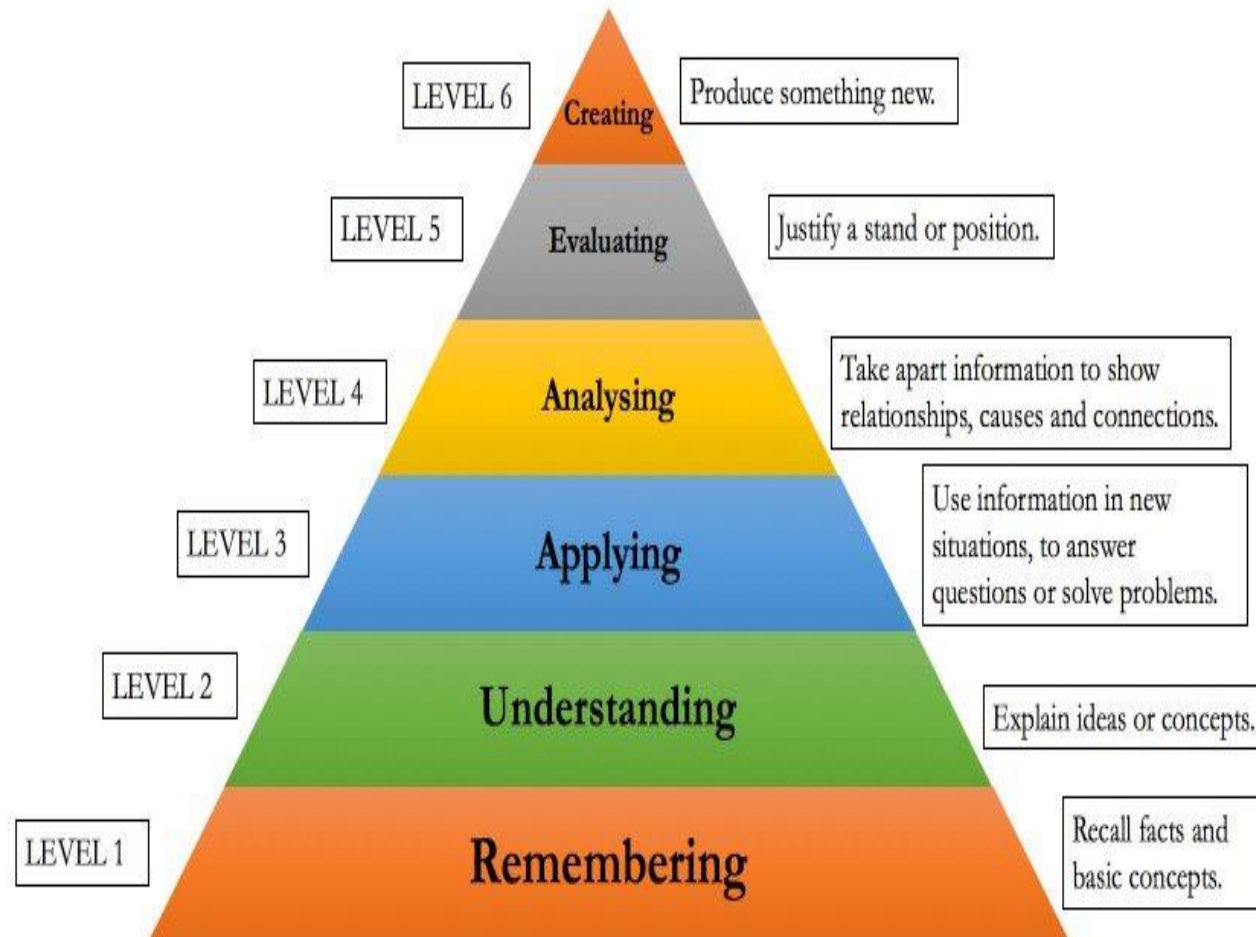
# Professor Umar Model of Integrated Lecture



# Bloom's Taxonomy : Domains Of Learning

Sr. #	Domain of learning	Abbreviation	Levels of the domain	Meaning
1	cognition	C	C1	Recall / Remembering
2			C2	Understanding
3			C3	Applying / Problem solving
4	Psychomotor	P	P1	Imitation / copying
5			P2	Manipulation / Follows instructions
6			P3	Precision / Can perform accurately
7	Attitude	A	A1	Receiving / Learning
8			A2	Respond / Starts responding to the learned attitude
9			A3	Valuing / starts behaving according to the learned attitude

# Diagrammatic Representation of Blooms Taxonomy



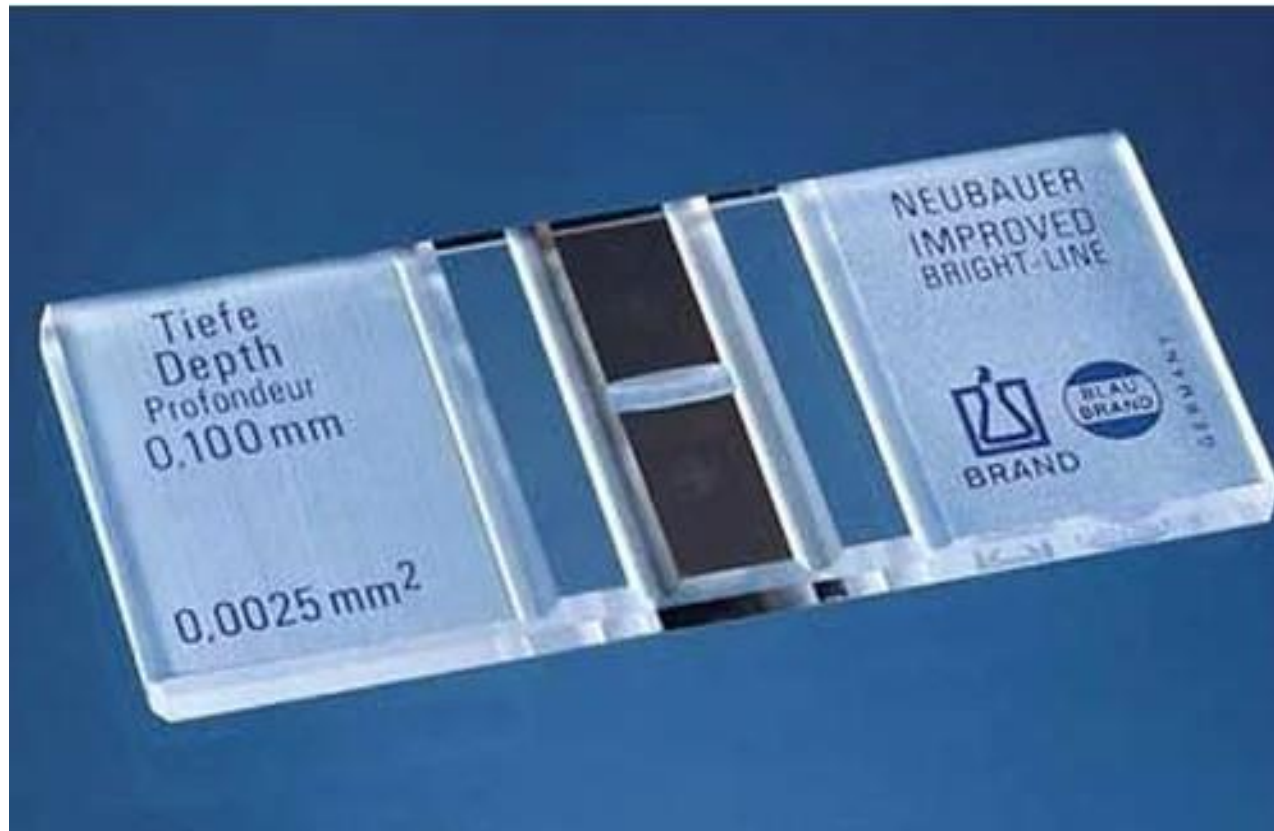


# Learning Objectives

Sr. #	Learning Objectives	Domain of Learning
1	To Understand Concept of Neubauer's Chamber	C2
2	To Explain Different Types of Cell Counts with the help of Neubauer's Chamber	C2
3	To Perform Procedure of Charging the Counting Chamber	C1,P3,A3



# Improved Neubauer's Chamber(Counting Chambers)



## Improved Neubauer's Chamber(Counting Chamber's)

- Single, solid, heavy glass slide.
- Three parallel pillars separated by gutters or troughs.
- **Central Pillar(Floor piece or Plateau):**
  - Wider and 0.1mm lower
  - 'H shaped' trench enclose 2 floor pieces
  - Counting Grids are etched on each floor piece

# Improved Neubauer's Chamber(Counting Chamber's)

## ➤ Lateral Pillars:

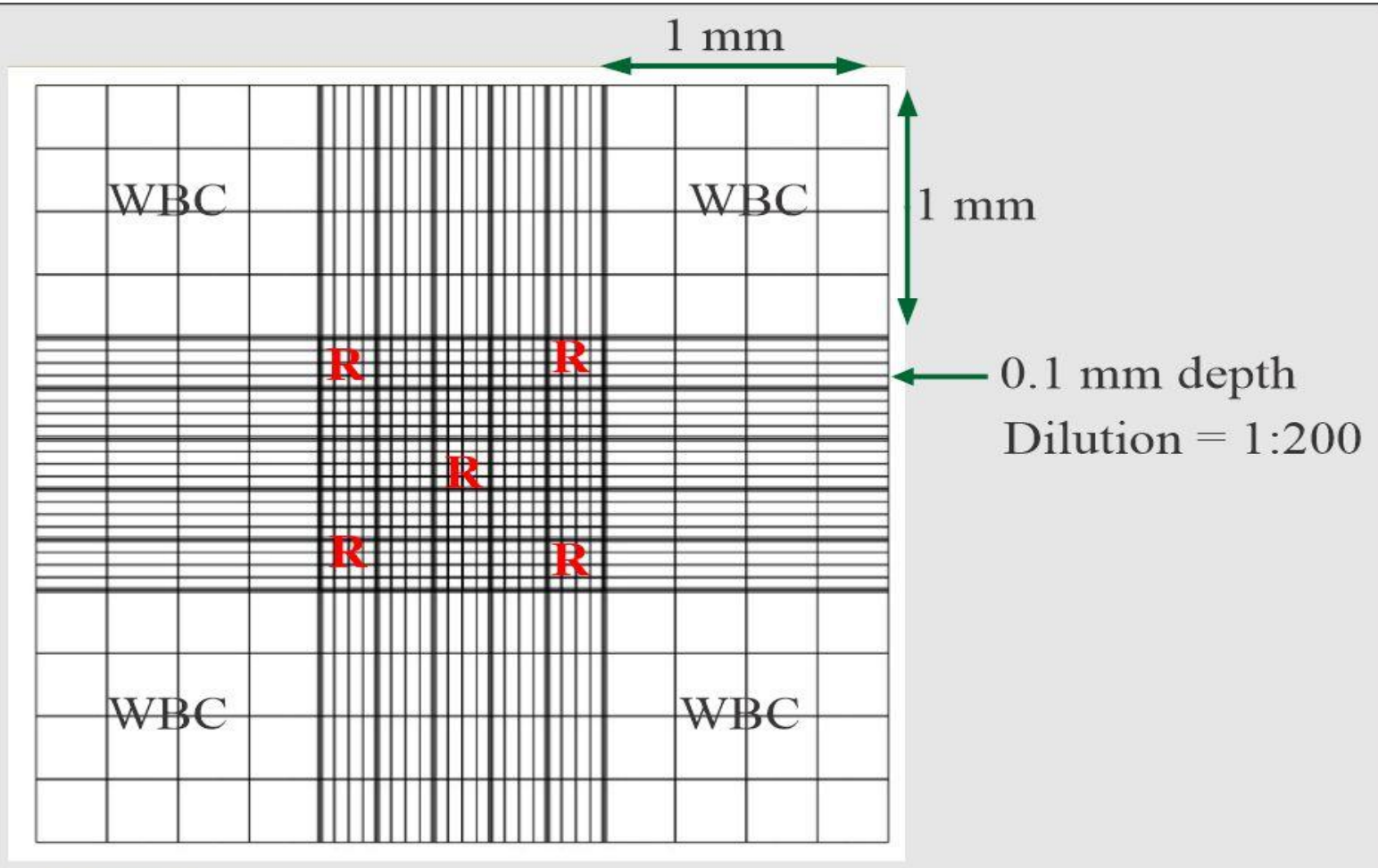
- Support cover slip
- Provide a capillary space 0.1mm deep between undersurface of cover slip and upper surface of floor piece.

# Improved Neubauer's Chamber(Counting Chamber's)

## ➤ Counting Grid:

- 9 large squares, each  $1\text{mm}^2$
- Four large corner squares divided into 16 medium sized squares, each of  $1/4\text{mm}$  and area of  $1/16\text{mm}^2$ .
- Central densely etched large square called RBC Square is divided into 25 medium squares (each of  $1/5\text{mm}$ ).
- Around the central RBC square are WBC squares.
- Each 25 medium squares are divided into 16 smallest squares(each of  $1/20\text{mm}$  and area of  $1/400\text{mm}^2$ )

# Cell Counting

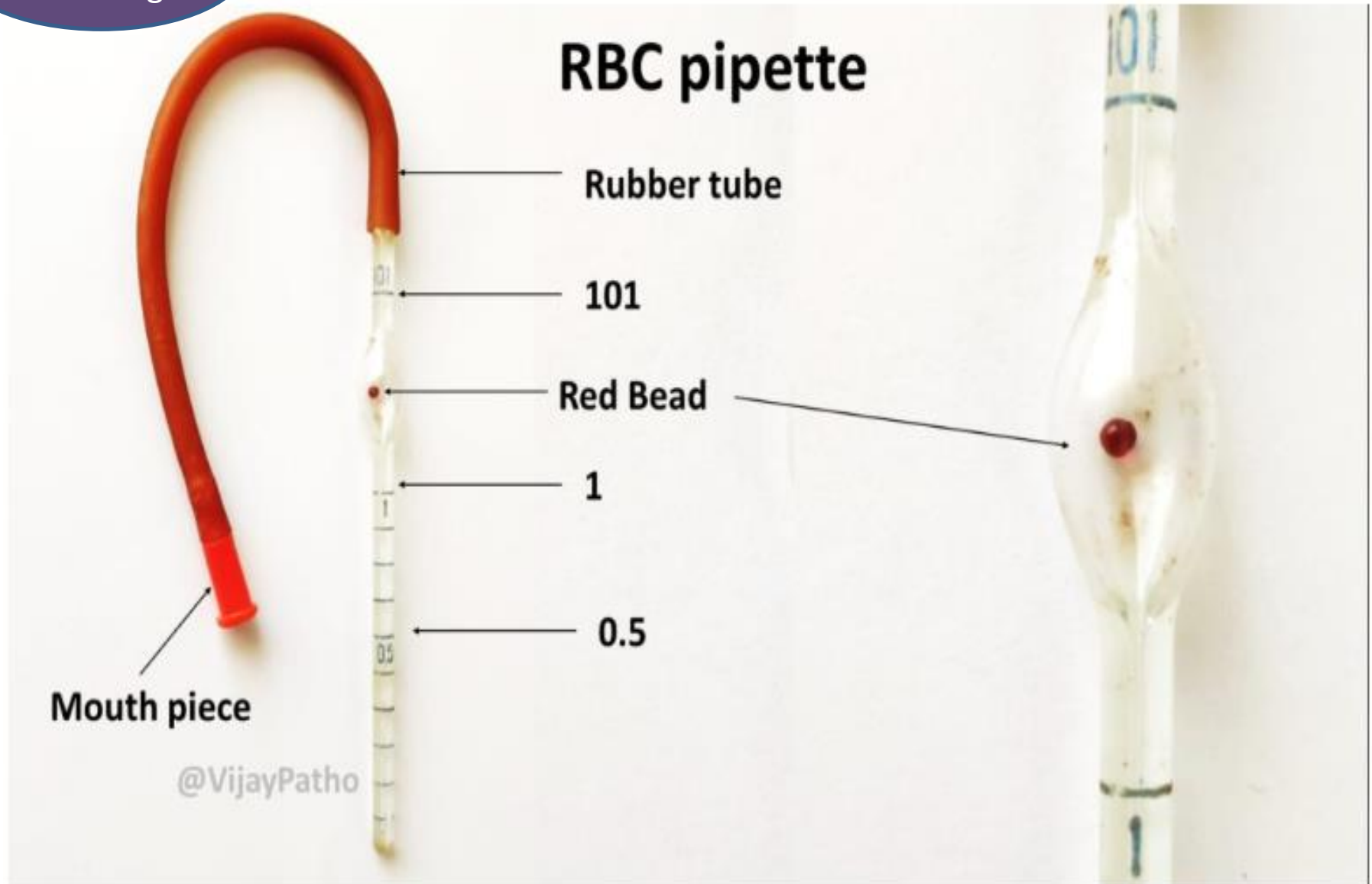


## Charging the Counting chamber

- Mix blood and diluent properly and place a cover slip on the chamber and charge it.
- Roll pipette between the palms.
- Hold pipette at appropriate angle and allow drop of diluted blood to run under cover slip by capillary action and form a uniform film on floor piece.

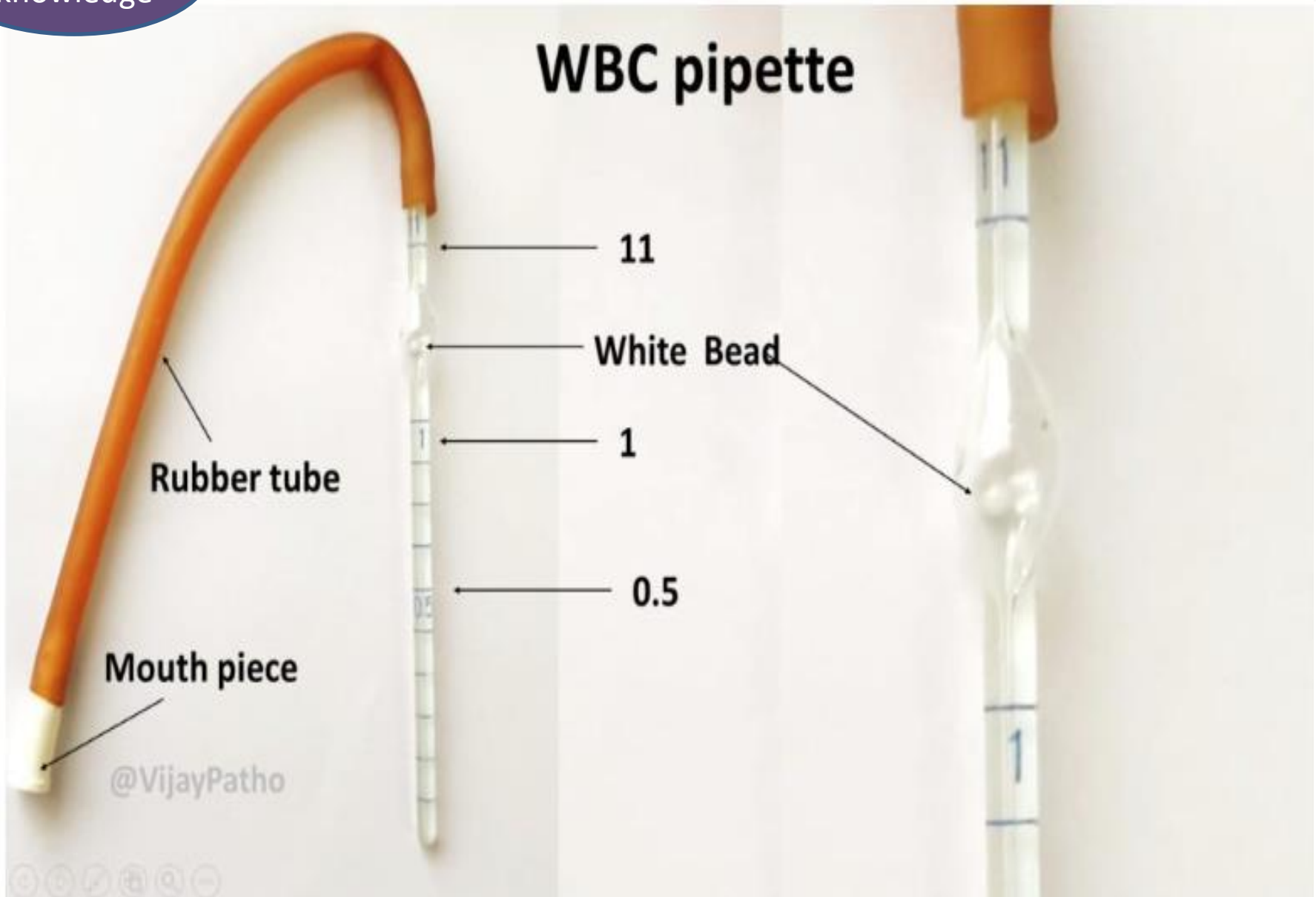
## Difference between RBC and WBC pipette

Red Blood Cell Pipette	White Blood cell Pipette
Size of lumen is larger.	Size of lumen is smaller.
It has gradation upto mark 101.	It has gradation upto mark 11.
Size of bulb is larger	Size of bulb is smaller
It has a red bead	It has a white bead





## WBC pipette





# Vertical Integration

## Common symptoms of **Leukemia**

### *Systemic*

- Weight loss
- Fever
- Frequent infections

### *Lungs*

- Easy shortness of breath

### *Muscular*

- Weakness

### *Bones or joints*

- Pain or tenderness

### *Psychological*

- Fatigue
- Loss of appetite

### *Lymph nodes*

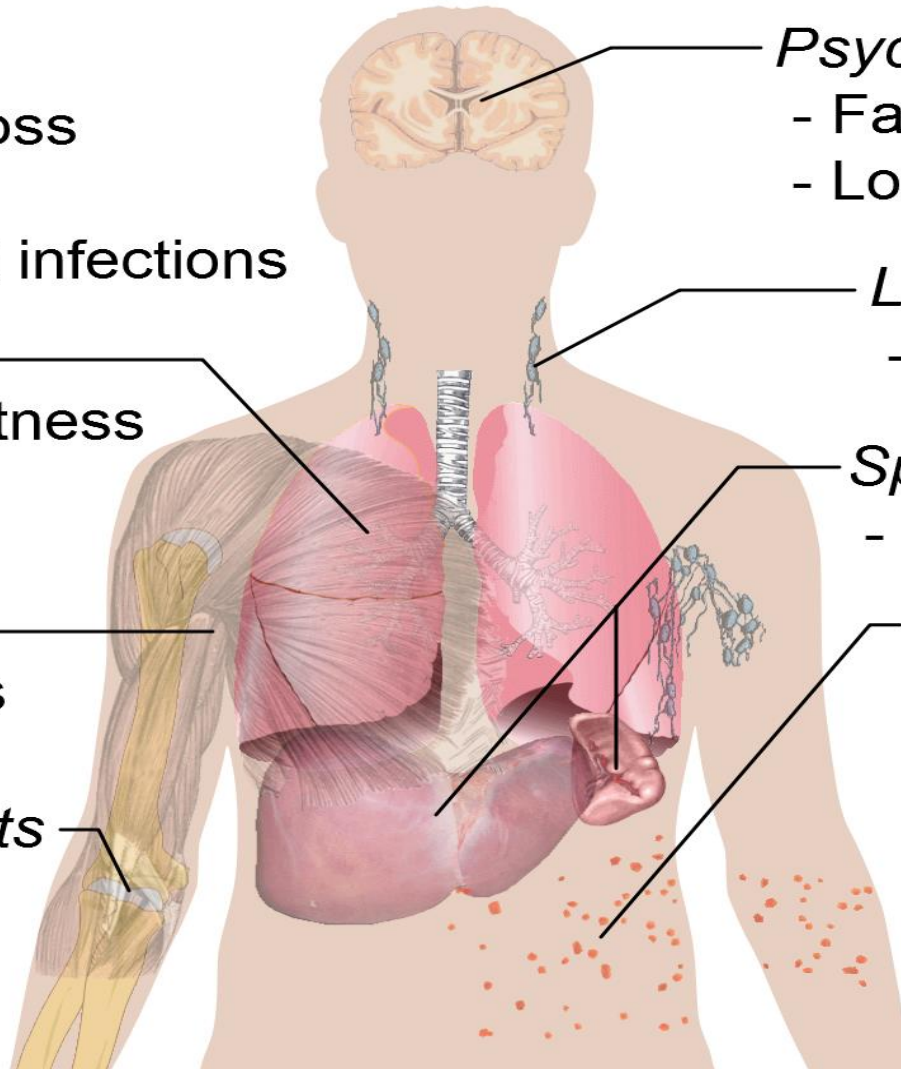
- Swelling

### *Spleen and/or liver*

- Enlargement

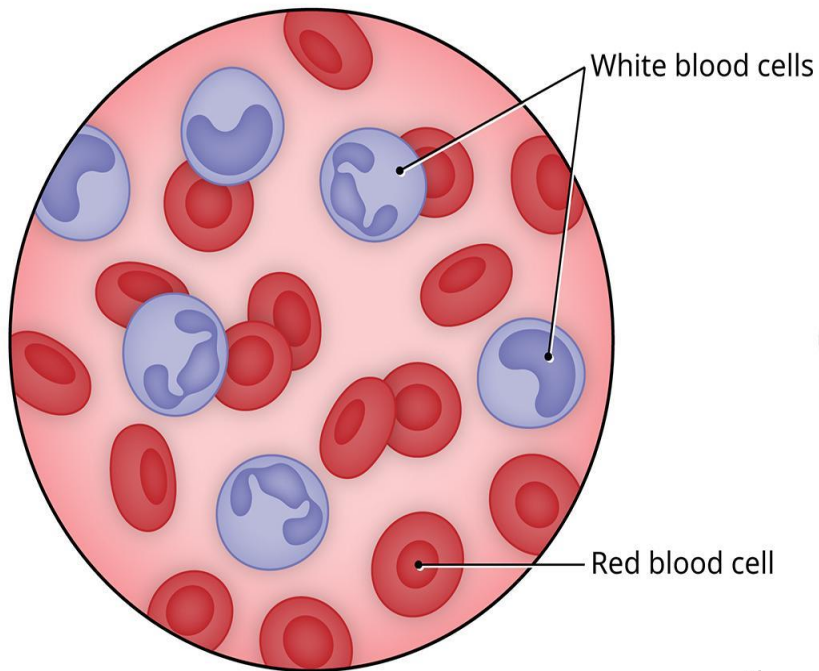
### *Skin*

- Night sweats
- Easy bleeding and bruising
- Purplish patches or spots

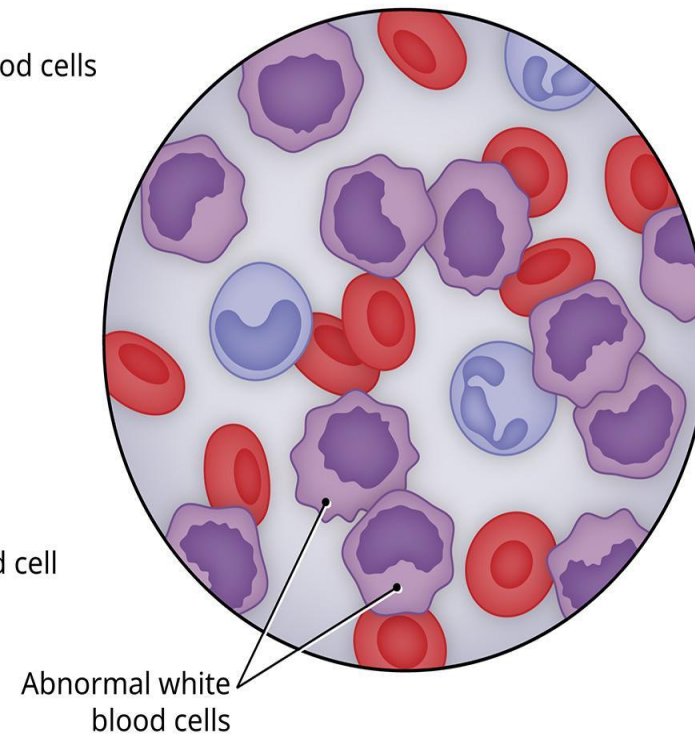


## Leukemia

Normal blood



Leukemia





# **Spiral Integration**

## **(Family Medicine, Biomedical Ethics, Research)**

# Role of Family Physician

**Case Scenario:** A 14 years boy presented to the medical outpatient department with the complaints of shortness of breath, fatigue, repeated chest infections and bruises on the body for 2 weeks. Complete blood count revealed decreased level of red blood cells and platelets and abnormally high white cell count.

a) What is the most likely diagnosis?

# Role of Family Physician

**Case Scenario:** A 14 years boy presented to the medical outpatient department with the complaints of shortness of breath, fatigue, repeated chest infections and bruises on the body for 2 weeks. Complete blood count revealed decreased level of red blood cells and platelets and abnormally high white cell count.

a) What is the most likely diagnosis?

Ans.                      Leukemia

# Role of Family Physician in Leukemia

- Early detection and diagnosis
- Education of the patient and their families regarding leukemia, its treatment options, and side effects.
- Monitoring of patients' overall health by regular check-ups and follow-up visits.
- In cases where leukemia cannot be cured, family physicians play role in palliative care to manage symptoms, improve quality of life, and support patients and their families.





# Bioethics

## 6 STEPS STRATEGY:- (BREAKING BAD NEWS)

**S**etting up and starting. Mentally rehearse and arrange for privacy.

**P**erception. Elicit the patient's perspective.

**I**nvitation. Ask the patient what they would like to know.

**K**nowledge. Provide information in small pieces.


**E**motions. Recognize and empathize with the patient's emotions.

**S**trategy and summary. Set out a medical plan of action.



# **Suggested Research article**

# Improvement of cell counting method for Neubauer counting chamber

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## Abstract

**Background:** We compared the cell counting accuracy of the conventional method and the improved method by using Neubauer counting chamber.

**Methods:** In the improved method, all the border cells were counted and then divided by two; while, in the conventional method, only border cells on the two boundaries (top and left) were counted.

**Results:** About 55.814% of the samples showed more accurate results by improved counting method, about 38.372% had more accurate results by conventional counting method, and about 5.814% were counted with similar counting error by both methods. The improved method had significantly smaller counting error than conventional method ( $P < .05$ ). The distribution ratio of the border cells was an independent factor for counting accuracy ( $P < .05$ ).

**Conclusion:** Together, the improved counting method can reduce the counting error of the Neubauer counting chamber to some extent, assess the distributing uniformity of border cells, and help to eliminate the samples with large differences in distribution.

## KEYWORDS

border cells, cell counting method, distributing uniformity, errors, Neubauer counting chamber

# Take home message of Suggested Research Article

- The improved counting method can reduce the counting error of the Neubauer counting chamber, assess the distributing uniformity of border cells, and help to eliminate the samples with large differences in distribution.

## How To Access Digital Library

- **Steps to Access HEC Digital Library**

1. Go to the website of HEC National Digital Library.
2. On Home Page, click on the INSTITUTES.
3. A page will appear showing the universities from Public and Private Sector and other Institutes which have access to HEC National Digital Library HNLDL.
4. Select your desired Institute.
5. A page will appear showing the resources of the institution
6. Journals and Researches will appear
7. You can find a Journal by clicking on JOURNALS AND DATABASE and enter a keyword to search for your desired journal.



# Brainstorming



# Multiple Choice Question related to Topic

Q. In improved Neubauer's chamber ,Counting grids are etched on :

- a) Floor piece
- b) Gutters
- c) troughs
- d) lateral pillar





# Multiple Choice Question related to Topic

Q. In improved Neubauer's chamber ,Counting grids are etched on :

- a) Floor piece\*
- b) Gutters
- c) troughs
- d) lateral pillar



# References

## 1. Books:

- Practical physiology 1<sup>st</sup> year MBBS by DR Saqib Sohail.
- Guyton And Hall textbook of Medical Physiology 14<sup>th</sup> Edition
- Sherwood, 9<sup>th</sup> edition.
- Silverthorn Physiology, 6<sup>th</sup> edition
- Vander's Human Physiology, 14<sup>th</sup> edition
- Google images.

## 2. Medical Journal articles:

<https://onlinelibrary.wiley.com/doi/epdf/10.1002/jcla.23024>

## 3. Video link /youtube:

<https://www.youtube.com/watch?v=ifMdyxL8Y2M>

*Thank  
you*