VELAMMAL MEDICAL COLLEGE
HOSPITAL AND RESEARCH INSTITUTE
MADURAI - 625009

1.2.2

Add-on Certificates Details with Report

Index

Prof. T. THIRUNAVUKKARASU, M.D.,D.A.,
Dean
Velammal Medical College Hospital
and Research Institute
"Velammal Village"
Madurai-Tuticorin Ring Road
Anuppanadi, Madurai-625 009, T.N.

Department of Physiology

Velammal Medical College Hospital and Research Institute

Madurai

VMCH/Physio/CC/2021/03

CIRCULAR

To First MBBS students of 2020-21 batch

3.8.2021

There will be a certificate course on **Coping with stress** for first MBBS students from 10.30am to 1pm on Tuesday, 10-8-2021. All the students are expected to attend the course without fail.

Date: Tuesday, 10th August 2021

Time: 10.30am to 1pm

Venue: Zoom platform

Dr.S.Anu

Professor and Head

Department of Physiology

Coping with stress

an interdisciplinary approach...

10th August 2021

To First MBBS students 2020-21 batch

PATRON
Honourable Chairman
Shri M.V. Muthuramalingam

ADVISORS

Dean
Dr.T.Thirunavukkarasu

Medical Superintendent
Dr.S.R.Dhamodharan

Vice Principal
Dr.P.K.Mohanty

ORGANIZING CHAIRPERSON
Dr.S.Anu

Organized by

Department of Physiology

In association with

Department of Pathology

Department of Pediatrics

Department of OBG

Department of Psychiatry

10.30am onwards

via Zoom platform

Velammal Medical College Hospital and Research Institute
Anuppandi - Madurai

Agenda

Welcome address

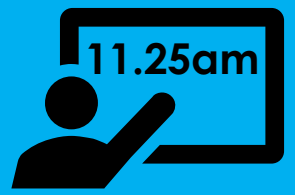
Dr.K.Rekha
Associate Professor
Physiology

Physiology of stress

Dr.S.Anu
Professor and Head
Physiology

Pathophysiology of stress

Dr.P.G.Sathiyadevi
Assistant Professor
Pathology



Stress in Pregnancy

Dr.R.Rajakeerthana
Assistant Professor
OBG

Stress and children

Dr.Jenish Rajma
Associate Professor
Pediatrics

Stress and mental health

Dr.S.Sumitra
Assistant Professor
Psychiatry

Psychological Management of stress

Ms.K.Thangam
Clinical Psychologist
Psychiatry

Feedback

Dr.S.P.Kausikan
Postgraduate
Physiology

Vote of thanks

Dr.K.Rekha
Associate Professor
Physiology

What is stress?

"Any interference that disturbs a person's
mental or physical well-being."

- Common causes of stress and anxiety at medical school
- adherence to tough schedules,
- exam taking,
- sleep deprivation,
- attempting to balance a healthy lifestyle while trying to meet goals
- Ist year-- increased work load, adjustment to a new school.
- IInd year-- develop hypochondriasis while studying many diseases for the first time.
- III year-- adjusting to clinical rotations, may deal with issues of life and death for the first time.
- IVth year-- deciding on a specialty, transition from medical school to internship

Physiology of Stress

- Stress releases hormones
- Cortisol and epinephrine (adrenaline)
- Fight or Flight Reaction – Hans Selye
- increases heart rate, metabolism, breathing, muscle tension, and blood pressure.
- some chemical reactions continue for hours after the stressor that caused it has passed.
- Too much stress affects digestion, growth, tissue repair, and decreases immunity.
- 70-80% of doctor visits are stress-related illnesses.
- high blood pressure, headaches,

backaches, indigestion, ulcers, diarrhea, fatigue, insomnia, physical weakness.

Prof. T. THIRUNAVUKKARASU, M.D.,D.A.,
Dean
Velammal Medical College Hospital
and Research Institute
"Velammal Village"
Madurai-Tuticorin Ring Road
Anuppanadi, Madurai-625 009, T.N.

EMOTIONAL EFFECTS OF STRESS

- Anger
- Hostility
- Irritability
- Anxiety
- Sadness
- Depression
- Powerlessness
- Total overwhelm
- When these symptoms appear-
- recognize them as signs of stress
- find a way to deal with them.
- Just knowing why you're feeling the way you do may be the first step in coping with the problem.

Practice, practice, practice

- Build up your confidence:
- Read extra ,
- practice test-taking at home,
- rehearse your speech a couple of times before the presentation

Use it

- A little stress is a good thing.
- Athletes use it to increase performance.
- A small amount of anxiety can help to keep you active and alert.
- Use it to increase your performance.

Think positive.

"If you think you will fail,
or think you will succeed, you are probably right." --Henry Ford

- Seek balance.
- Balance emotions with reason.
- Combine detachment with doing our part.
- Balance giving with receiving.
- Balance work with play, business with personal activities.
- Balance tending to spiritual needs with our other needs
- Balance caring about others with caring about ourselves.
- Whenever possible, let's be good to others, but be good to ourselves too.

Prof. T. THIRUNAVUKKARASU, M.D.,D.A.,
Dean
Velammal Medical College Hospital
and Research Institute
"Velammal Village"
Madurai-Tuticorin Ring Road
Anuppanadi, Madurai-625 009, T.N.

Department of Physiology
Velammal Medical College Hospital and Research Institute
Madurai
Report

Topic:	**Certificate course on Coping with stress**
Date:	**10-8-2021**
Venue:	**Online – Zoom platform**
Target Audience:	**First MBBS students 2020-2021 batch**
Number of participants:	**145**

Report:

An certificate course on Coping with stress was organized by the Department of Physiology, Velammal Medical College Hospital and Research Institute, Madurai, Tamilnadu for first MBBS students 2020-21 batch on 10.08.2021 from 10.30 am to 1 pm.

The program began with the welcome address by Dr.K.Rekha, Associate Professor, Department of Physiology, Velammal Medical College, Madurai. It was followed by an informative talk on Physiology of Stress by Dr.S.Anu, Professor and Head, Department of Physiology, Velammal Medical College, Madurai. After this session, Pathophysiology of stress was revealed by Dr.P.G.Sathyadevi, Assistant Professor of Pathology.

Following this, lecture on Stress in pregnancy was delivered by Dr.R.Rajakeerthana, Assistant Professor of Obstetrics and Gynecology. Stress and Children was emphasized by Dr.Jenish Rajma, Associate Professor of Pediatrics. The concept of Stress and Mental Health was covered by Dr.S.Sumitra, Assistant Professor of Psychiatry. To help in real life, the Psychological management of stress was taught by Ms.K.Thangam, Clinical Psychologist, Department of Psychiatry.

The students came with questions and the doubts were immediately and appropriately cleared by the resource persons. Feedback from the audience were obtained and oriented by Dr.S.P.Kausikan from Department of Physiology. The program concluded by the Vote of thanks delivered by Dr.K.Rekha, Associate Professor, Department of Physiology, Velammal Medical College Hospital and Research Institute, Madurai. The program was

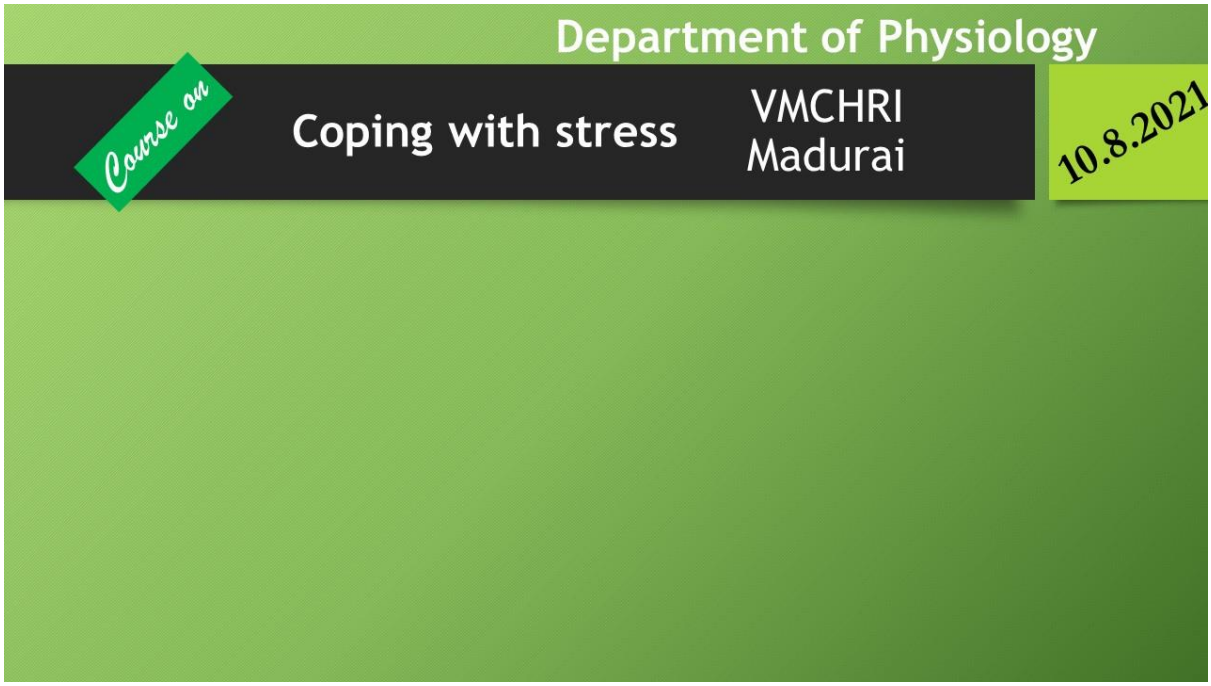
Prof. T. THIRUNAVUKKARASU, M.D.,
Dean
Velammal Medical College Hospi
and Research Institute
"Velammal Village"

well received the first MBBS students 2020-21 batch of Velammal Medical College Hospital and Research Institute, Madurai.

Outcome:

Students got benefitted by knowing about Stress and ways to management it in such stressful times.

Photos:



Department of Physiology

Velammal Medical College Hospital and Research Institute

Madurai

VMCH/Physio/CC/2021/05

CIRCULAR

To First MBBS students of 2020-21 batch

30.9.2021

There will be a certificate course on **Physics and Physiology** for first MBBS students on 7th and 8th, October 2021. All the students are expected to attend the course without fail.

Date: 7 and 8, October 2021

Time: 8 am onwards

Venue: Lecture Hall 1, Velammal Medical College

Dr.S.Anu

Professor and Head

Department of Physiology

La Physique

Physics and Physiology

National Online Conference (& PG seminar competition)

7th and 8th October 2021

Organized by

DEPARTMENT OF PHYSIOLOGY

Velammal Medical College Hospital and Research Institute

Madurai, Tamilnadu

(Under the auspices of

Association of Physiologists of Tamilnadu)

Tamilnadu Medical Council

4

Credit hours

La Physique 2021

(Physics and Physiology)

National Online Conference (& PG seminar competition)

7th and 8th October 2021

Organized by

DEPARTMENT OF PHYSIOLOGY

Velammal Medical College Hospital and Research Institute

Madurai, Tamilnadu

Under the auspices of Association of Physiologists of Tamilnadu

PATRON

Honourable Chairman

Shri M.V.Muthuramalingam

ADVISORS

Dean

Dr. T. Thirunavukkarasu

Med. Superintendent

Dr. S.R. Dhamodharan

Vice Principal

Dr. P.K. Mohanty

Chief Administrative Officer

Mr.R.Manivannan

ORGANISING SECRETARY

Dr.S.Anu,

Professor and Head

ORGANISING COMMITTEE

Academic support

Dr .S. John Rajpathy, Professor

Treasurer and Technical support

Dr.M.Saravanan,

Associate Professor

(9842185430)

Scientific committe

Dr.M.Shanthi, Professor

Dr.K.Rekha,

Associate Professor

(8870224027)

Student coordination

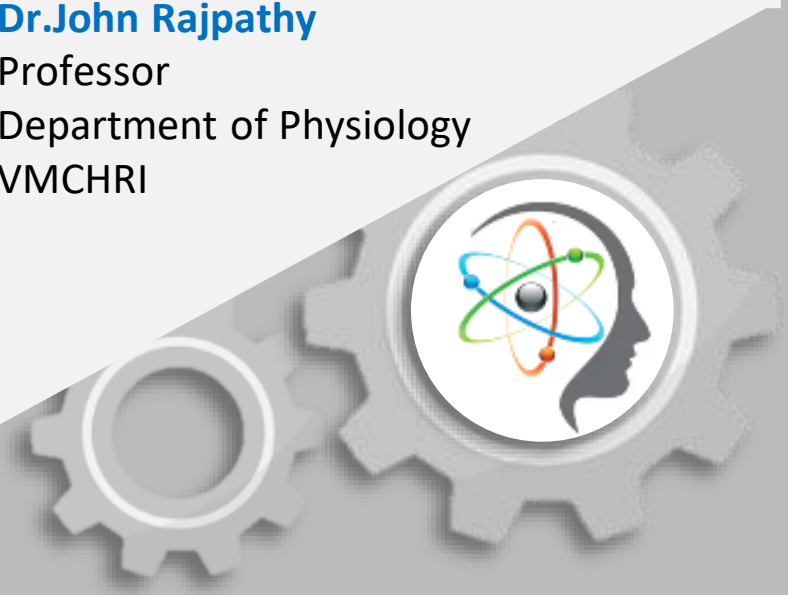
Dr.S.P.Kausikan, Post graduate

Day 1 – 7.10.2021

8.30 am	**Inauguration**
8.35 am	**Welcome Address** **Dr.S.Anu,** Professor and Head Department of Physiology, VMCHRI
8.40 am	**Address by Dean**, VMCHRI
8.42 am	**Address by Vice Principal**, VMCHRI
8.45 am	**Presidential Address** **Dr.Viji Devanand,** President Association of Physiologists of Tamilnadu
8.50 am	**Key note address** **Dr. B. Vishwanath Rao,** Professor Panimalar Medical College, Chennai
9 am – 10 am	**Physicist perspective of Physiology** **Dr. R. Rajesh** Asst. Professor, Department of Physics Velammal College of Engg. And Tech. Madurai
10 am – 11am	**Physics & Respiratory Physiology** **Dr.K.N.Maruthi,** Professor and Head Department of Physiology Sri Narayana Medical College, Nellore, AP
11.15 am – 12.15 pm	**Physics & Cardiovascular Physiology** **Dr. M. Anbarasi,** Professor Department of Physiology Chettinad Hospital and Research Institute Chennai
12:15 pm – 1.15 pm	**Physics & Special senses** **Dr. Biju Bahuleyan** Professor and Head Department of Physiology Jubilee Mission Medical College and RI. Thrissur, Kerala
2 pm – 5 pm	**Post graduates Seminar competition**

Day 2 – 8.10.2021

9 am – 10 am	**Physics, Gravity & Vascular Physiology** **Dr.V.Suganthi** Professor and Head Department of Physiology Kirupananda Variyar Medical College Salem
10 am – 11 am	**Physics & Neurodiagnostics** **Dr. Bhuvaneswari Rajendran** Consultant Neurologist Kauvery hospital, Chennai
11.15 am – 12.15 pm	**Physics & Physiology instruments** **Dr. Naveen Kotur** Associate Professor Department of Physiology ESI – PGIMSR Bangalore
1.15 pm – 4.15 pm	**Post graduates Seminar competition**
4.30 pm	**Valediction**
4.50 pm	**Vote of Thanks** **Dr.John Rajpathy** Professor Department of Physiology VMCHRI



States of Matter
Potential energy and Kinetic energy
Physical properties of Solid, Liquid and Gas
Phase Change
Pressure
Pascal's law
Cohesion and adhesion
Humidification
Critical temperature
Critical Pressure
Surface Tension
Gas pressure
    - Gas Laws
    - Boyle’s Law – Application
    - Gay-Lussac’s Law
    - Combined gas law
    - Graham’s Law
    - Henry’s Law
    - Fick’s Law
    - Poiseuille’s Law
The Bernoulli Principle
Reynolds Number
    - Fluid density
    - Viscosity
    - Linear velocity
    - Tubing length

Certificate Course on

Physics and Physiology

7 and 8.10.2021

Department of Physiology

Velammal Medical College Hospital and Research Institute

Madurai

Circular

Department of Physiology

Velammal Medical College Hospital and Research Institute

Madurai

VMCH/Physio/CC/2021/05

CIRCULAR

To First MBBS students of 2020-21 batch

30.9.2021

There will be a certificate course on **Physics and Physiology** for first MBBS students on 7th and 8th, October 2021. All the students are expected to attend the course without fail.

Date: 7 and 8, October 2021

Time: 8 am onwards

Venue: Lecture Hall 1, Velammal Medical College

Dr.S.Anu

Professor and Head

Department of Physiology

Students Enrolled

Department of Physiology
Velammal Medical College Hospital and Research Institute
Madurai

8.10.2021

The following 144 first MBBS students of 2020-21 batch were present during the certificate course on Physics and Physiology organised by the Department of Physiology on 7 and 8.10.2021.

Roll no.	Student Name
1	Aarthi Rajasekaran
2	Aarthy Zen M R
3	P.Abishek Raj
4	Afrah Abdul Malick
5	AJAY KUMAR M
6	Ajay Perumal M S
7	R.B.Ajaybarath
8	akhshara
9	Aksayakeerthi
10	Akshaya Amudan M
11	Anish John R
12	Anitha S
13	Arthi J
15	Ashikaa S V
16	R Ashwitha
17	S.ASWIN
19	G Balaji
20	Balavarshini.S
21	Blessy A
22	Brindhavan DP
23	Devaprakaash R
24	Devishree . S
25	Dhaneswar.C.N
26	Dharshini S
27	S.Dharshini
28	DHIVYA.S
29	Divyadharshini N J
30	Elaijah Joseph
32	Faris Mohamed
33	Farzees Fathima j
34	N.K Fathil Ahamed
35	Freddie Paul C
36	Ganesh Srinivasan

37	Gokilavani M
38	Gomathy Thejashvini R
39	Hanushiya Jayaprabahar
40	Harieni G
41	Hariprasant.S.V
42	Haripriya M
43	James karun anto M
44	R.Janani
45	Janani R S
46	Jananie D
47	D. JEEVA SIDDARTH
48	Jenita Jeba Roslyn J
50	John Davidson
51	Jothirmai.R
52	Juhi Janofar M.S.
53	Kalaivendan U
54	Kamesh
55	Karthik Saran s
56	Keerthinivas
58	S I KIRAN ADITYA
59	Kishore PANNEER selvam
60	Kishore Ramu
61	Leni
62	Lokesh
63	Mariann Diana A
64	Masilamani K
65	Meenatchi U
66	Meghadharsini K S
67	Meka Senthilkumar
68	Mohamed Jameel sultan
69	Mohammed Ashik H
70	Mridula S
71	Mujahetha.J
72	Mukhil P
73	MukileshM
75	M.Nandesh Kumar
76	NIRANJANA KRISHNAKUMAR
77	Nisha Margret
78	Nithishaa T
79	Nivethitha S.
80	Padmapriya.p
82	Pooranisha A

83	Poorvika Maniyarasu
84	P Poovizhi
85	Praisy Punita A
86	PREETHA VAISHNAVI P
87	S S Priyadarshan
88	Priyadharshni
89	Priyanka.P
90	RAJAHARINI.S
91	Ranjitha S
92	Rasmika
93	Raveendran Palaniyappan
94	Reethika Devi S
96	V. M. Rithickvasan
97	Rubasree E
98	Sangamitraa P
99	Sangeerthana R M
100	Sanjana Devi
101	Sanjay P
102	B.Saran
103	Shakthi Abhirami Senthilnathan
104	Shalini S.k
106	SHANMUGA ARIYA S
107	V.Shanmuga Priya
108	MR.SHANMUGA SUNDARAM
109	Sheriff Abdul Malick N
110	Sherly Rinitta.S
111	Shree Varshini S
112	SHRI HAREESH K
113	Shricharan . M
114	SHRINATH A A
115	Shruthika M
116	SIBIRAJ.K
117	Sibiya S
118	Siddharth M
119	P.Sindhukavi
120	Sivakumar Anand
121	Sneha P
122	Sowmiya S S
123	Sree Prassitha S
124	M Sree Ranjane
125	Sriajay K
126	Srinidhi. M

127	SRINITHI J
128	Sriram S
129	SRIRAM S
130	Srish Akshay V
131	Sruthi R
132	Subhalakshmi C S
134	Sujitha M
135	Sundaresan M
136	Surya Malarvasagam
138	M Swetha
139	Tamizhanban X
140	Tanvi Kothari
141	Thanga Regila
142	Thirumurugan
143	VAISHNAVI N B
144	Varun Velavan Ponnusamy
145	Vasanthan Anbazhagan
146	Vigneshawar
147	Vishnu n subramanian
148	Vishnu P
149	Vishnuprabha K
150	Yogitha M

Dr.S.Anu
Professor and Head
Department of Physiology

Brochure

La Physique

Physics and Physiology

National Online Conference (& PG seminar competition)

7th and 8th October 2021

Organized by

DEPARTMENT OF PHYSIOLOGY

Velammal Medical College Hospital and Research Institute

Madurai, Tamilnadu

(Under the auspices of

Association of Physiologists of Tamilnadu)

Tamilnadu Medical Council

4

Credit hours

La Physique 2021

(Physics and Physiology)

National Online Conference (& PG seminar competition)

7th and 8th October 2021

Organized by

DEPARTMENT OF PHYSIOLOGY

Velammal Medical College Hospital and Research Institute

Madurai, Tamilnadu

Under the auspices of Association of Physiologists of Tamilnadu

PATRON

Honourable Chairman

Shri M.V.Muthuramalingam

ADVISORS

Dean

Dr. T. Thirunavukkarasu

Med. Superintendent

Dr. S.R. Dhamodharan

Vice Principal

Dr. P.K. Mohanty

Chief Administrative Officer

Mr.R.Manivannan

ORGANISING SECRETARY

Dr.S.Anu,

Professor and Head

ORGANISING COMMITTEE

Academic support

Dr .S. John Rajpathy, Professor

Treasurer and Technical support

Dr.M.Saravanan,

Associate Professor

(9842185430)

Scientific committe

Dr.M.Shanthi, Professor

Dr.K.Rekha,

Associate Professor

(8870224027)

Student coordination

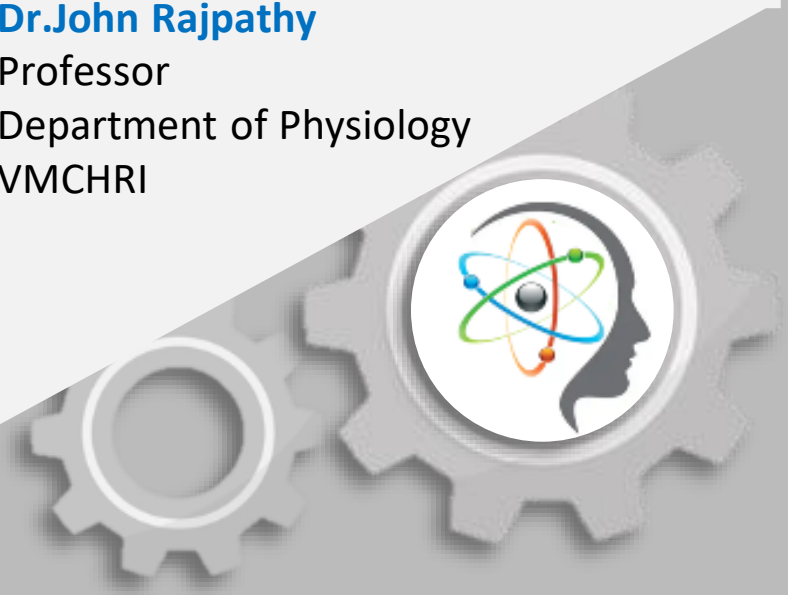
Dr.S.P.Kausikan, Post graduate

Day 1 – 7.10.2021

8.30 am	**Inauguration**
8.35 am	**Welcome Address** **Dr.S.Anu,** Professor and Head Department of Physiology, VMCHRI
8.40 am	**Address by Dean**, VMCHRI
8.42 am	**Address by Vice Principal**, VMCHRI
8.45 am	**Presidential Address** **Dr.Viji Devanand,** President Association of Physiologists of Tamilnadu
8.50 am	**Key note address** **Dr. B. Vishwanath Rao,** Professor Panimalar Medical College, Chennai
9 am – 10 am	**Physicist perspective of Physiology** **Dr. R. Rajesh** Asst. Professor, Department of Physics Velammal College of Engg. And Tech. Madurai
10 am – 11am	**Physics & Respiratory Physiology** **Dr.K.N.Maruthi,** Professor and Head Department of Physiology Sri Narayana Medical College, Nellore, AP
11.15 am – 12.15 pm	**Physics & Cardiovascular Physiology** **Dr. M. Anbarasi,** Professor Department of Physiology Chettinad Hospital and Research Institute Chennai
12:15 pm – 1.15 pm	**Physics & Special senses** **Dr. Biju Bahuleyan** Professor and Head Department of Physiology Jubilee Mission Medical College and RI. Thrissur, Kerala
2 pm – 5 pm	**Post graduates Seminar competition**

Day 2 – 8.10.2021

9 am – 10 am	**Physics, Gravity & Vascular Physiology** **Dr.V.Suganthi** Professor and Head Department of Physiology Kirupananda Variyar Medical College Salem
10 am – 11 am	**Physics & Neurodiagnostics** **Dr. Bhuvaneswari Rajendran** Consultant Neurologist Kauvery hospital, Chennai
11.15 am – 12.15 pm	**Physics & Physiology instruments** **Dr. Naveen Kotur** Associate Professor Department of Physiology ESI – PGIMSR Bangalore
1.15 pm – 4.15 pm	**Post graduates Seminar competition**
4.30 pm	**Valediction**
4.50 pm	**Vote of Thanks** **Dr.John Rajpathy** Professor Department of Physiology VMCHRI



Curriculum

States of Matter
Potential energy and Kinetic energy
Physical properties of Solid, Liquid and Gas
Phase Change
Pressure
Pascal's law
Cohesion and adhesion
Humidification
Critical temperature
Critical Pressure
Surface Tension
Gas pressure
    - Gas Laws
    - Boyle’s Law – Application
    - Gay-Lussac’s Law
    - Combined gas law
    - Graham’s Law
    - Henry’s Law
    - Fick’s Law
    - Poiseuille’s Law
The Bernoulli Principle
Reynolds Number
    - Fluid density
    - Viscosity
    - Linear velocity
    - Tubing length

Certificates

Report

Department of Physiology
Velammal Medical College Hospital and Research Institute
Madurai
Report

Topic:	**Certificate course: Physics and Physiology**
Date:	**7 and 8.10.2021**
Venue:	**Lecture Hall 1, Velammal Medical College**
Target Audience:	**First MBBS students 2020-2021 batch**
Number of participants:	**144**

Report:

Department of Physiology, Velammal Medical College Hospital and Research Institute, Madurai along with Association of Physiologists of Tamilnadu organized a two day Online National Conference La Physique 2021 - on Physics and Physiology & PG seminar competition on 7 and 8.10.21. Undergraduate students were physically present in the lecture hall 1 and witnessed the projection of the entire two day event via zoom.

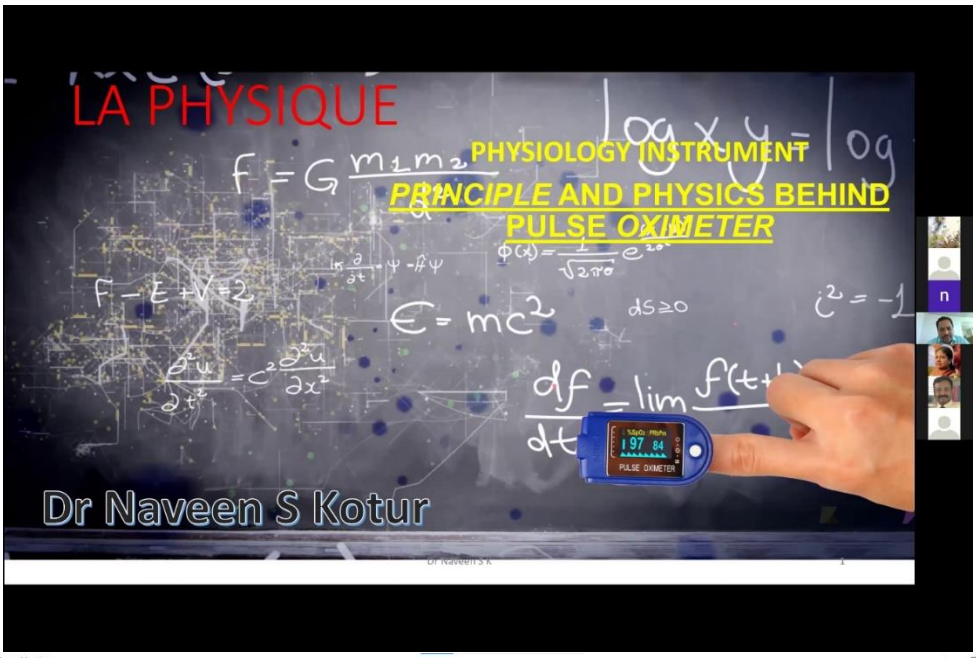
The conference began with welcome address by Dr.S.Anu, Professor and Head, Department of Physiology followed by inaugural address of Dr.Mohanty, Vice Principal, VMCHRI. Dr.R.Rajesh, Assistant Professor, Department of Physics from Velammal Engineering college, Madurai spoke on Physicist perspective of Physiology. This was followed by Dr.K.N.Maruthi, Professor and Head, Department of Physiology, Sri Narayana Medical College, Nellore, AP who lectured on Physics & Respiratory Physiology. Then Dr.M.Anbarasi , Professor, Department of Physiology, Chettinad Hospital and Research Institute, Chennai lectured on Physics & Cardiovascular Physiology and Dr. Biju Bahuleyan, Professor and Head, Department of Physiology, Jubilee Mission Medical College, Thrissur spoke on Physics & Special senses. Postgraduates seminar competition followed in afternoon session. The competition was judged by Dr.Vadivelu, Consultant Cardiologist, VMCHRI, Dr.K.N.Maruthi from Andhra, Dr.Ashwin Dutt, Academic Dean, Yenepoya Medical College, Mangalore.

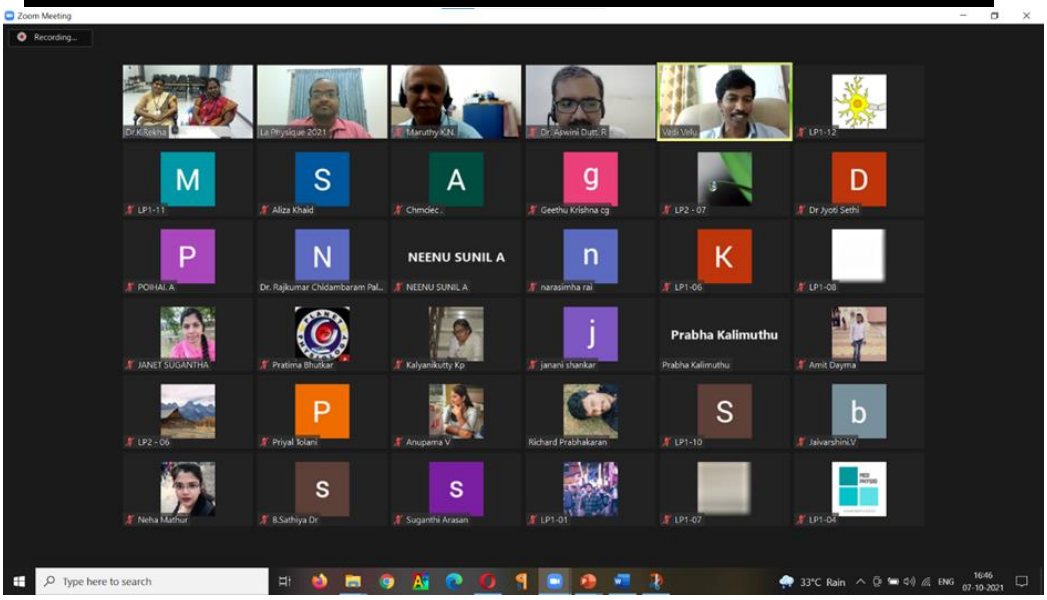
In the second day of the conference, Dr.V.Suganthi, Professor and Head, Department of Physiology, Vinayaka Missions Kirupananda Variyar Medical

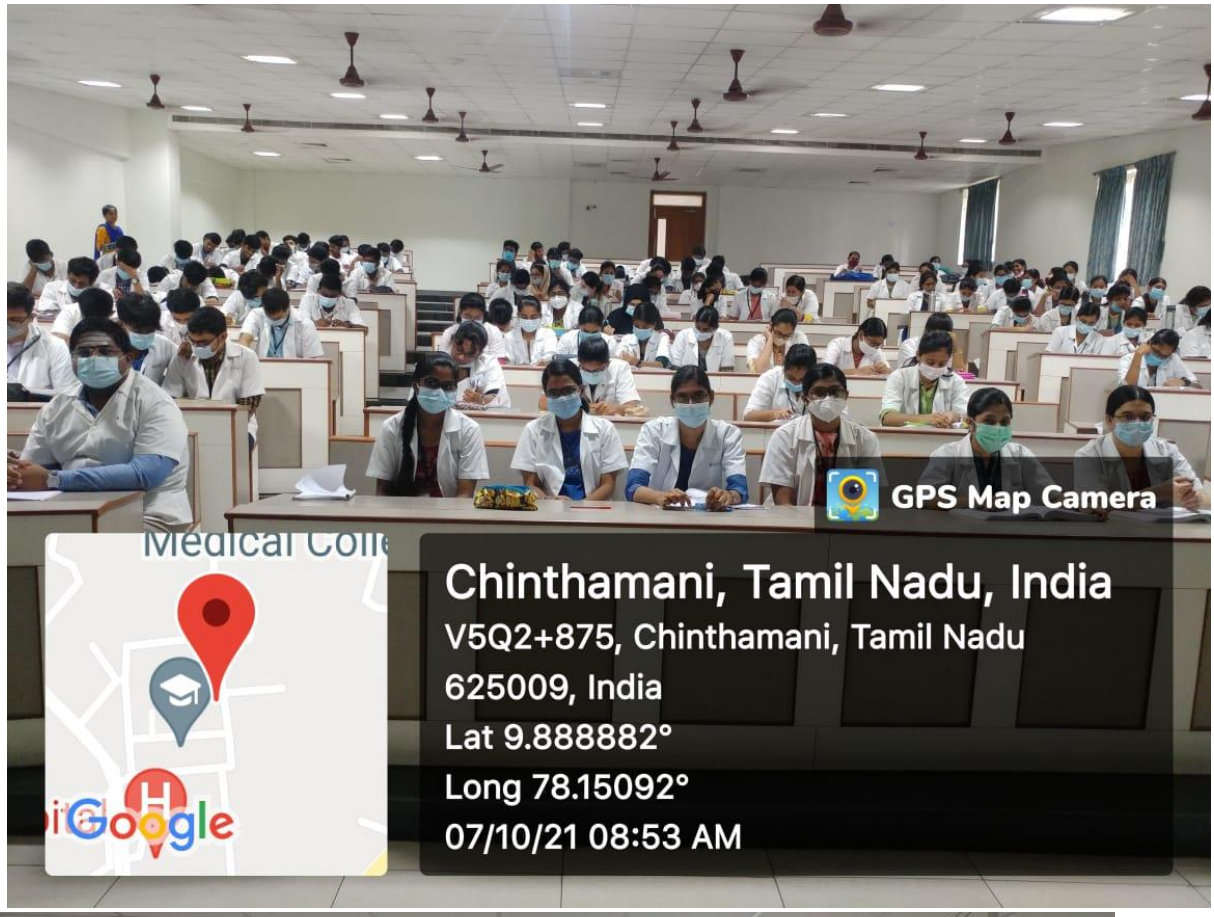
Prof. T. THIRUNAVUKKARASU, M.D.,D.A.,
Dean
Velammal Medical College Hospital
and Research Institute
"Velammal Village"
Madurai-Tuticorin Ring Road

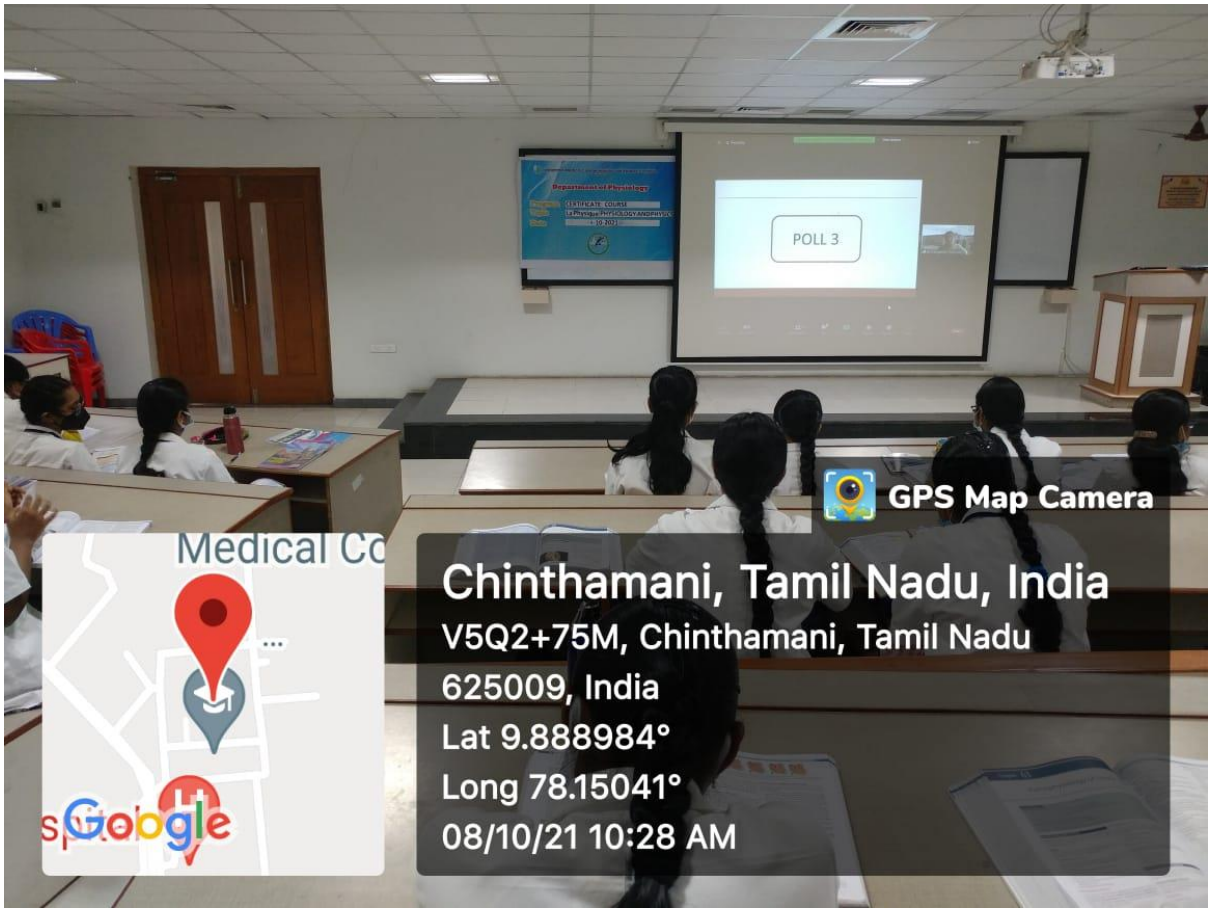
College, Salem lectured on Physics, Gravity & Vascular Physiology. Dr.Bhuvaneswari Rajendran, Consultant Neurologist, Kauvery hospital, Chennai spoke on Physics & Neurodiagnostics. Dr.Naveen Kotur, Associate Professor, Department of Physiology, ESI, PGIMSR Bangalore spoke on Physics & Physiology instruments. Second day post graduates seminar competition followed in afternoon session and was judged by Dr.Ramesh, Professor of General Medicine, VMCHRI, Dr.Kalyani Kutti, Professor of Physiology, MES Medical College, Perinthalmanna, Kerala, Dr.Ravi Kiran, Professor of Physiology, Govt. Medical College, Koorg. The program concluded with Vote of Thanks by Dr.John Rajpathy, Professor, Department of Physiology.

Photos:

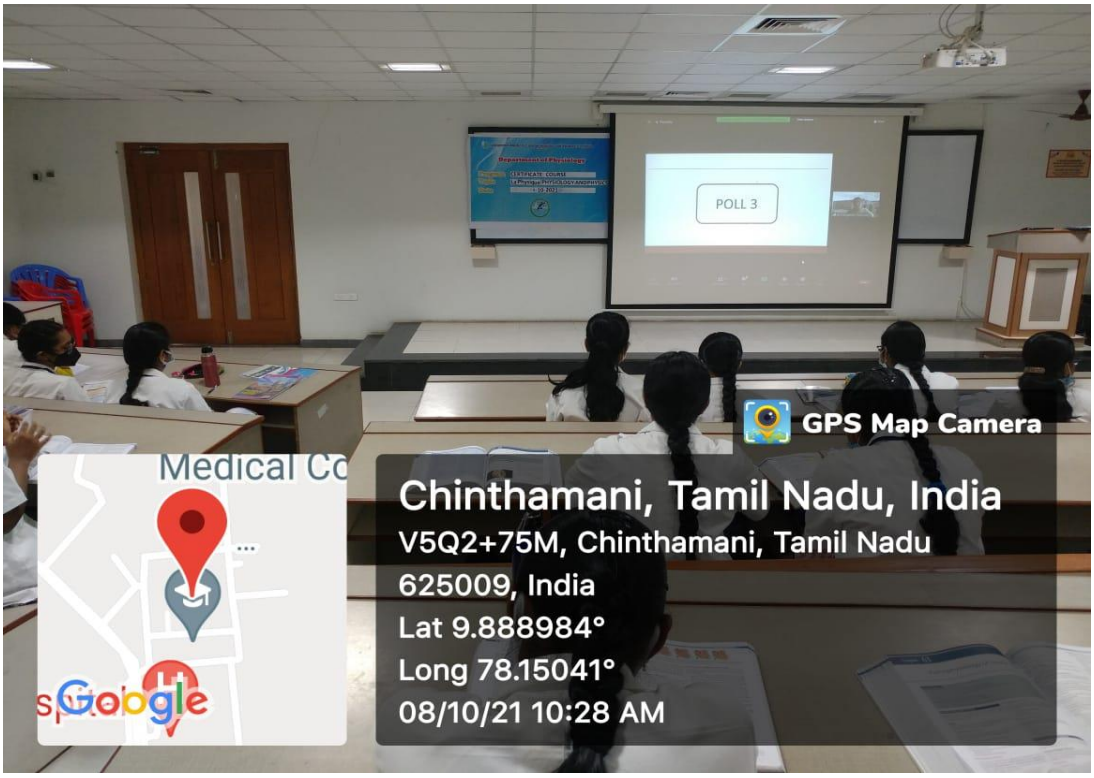




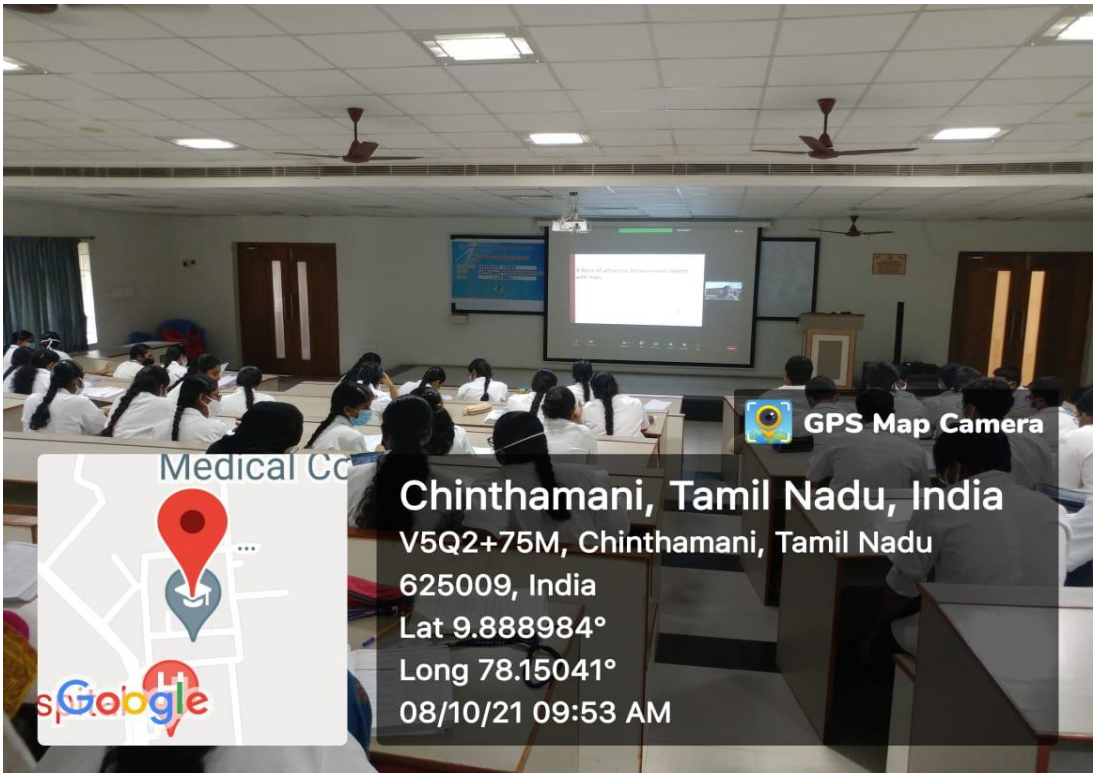

GPS Map Camera
Chinthamani, Tamil Nadu, India
V5Q2+875, Chinthamani, Tamil Nadu
625009, India
Lat 9.888882°
Long 78.15092°
07/10/21 08:53 AM


POLL 3
GPS Map Camera
Chinthamani, Tamil Nadu, India
V5Q2+75M, Chinthamani, Tamil Nadu
625009, India
Lat 9.888984°
Long 78.15041°
08/10/21 10:28 AM

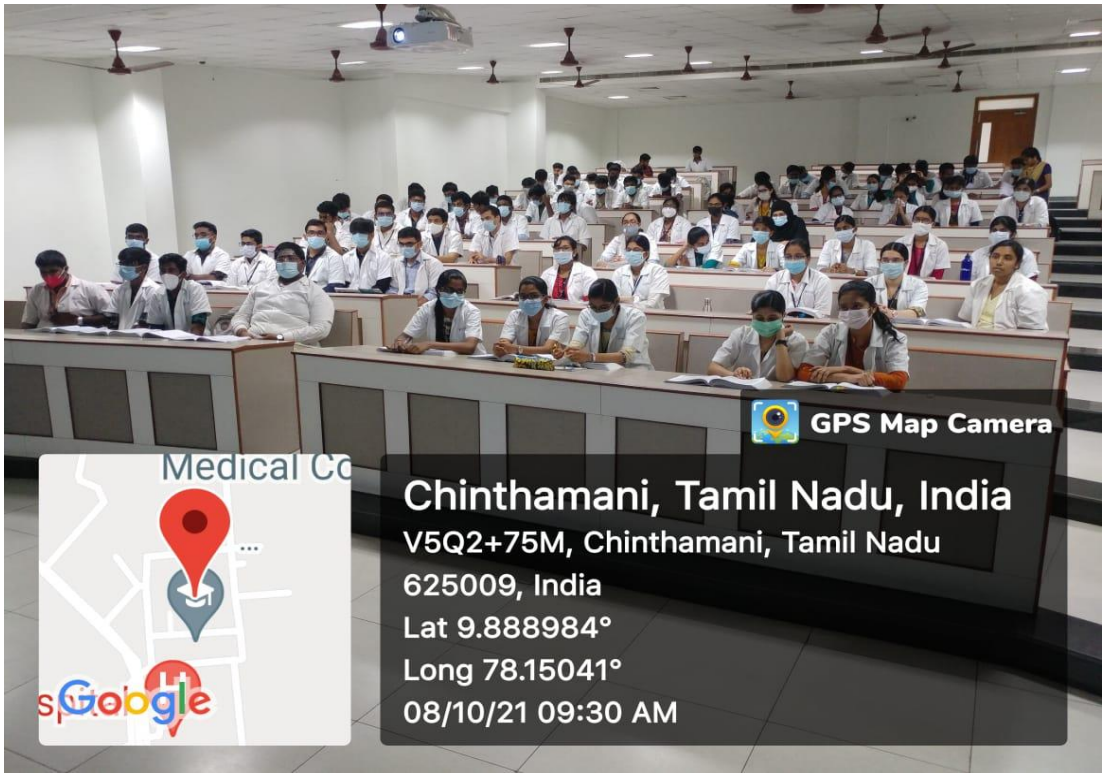
VELAMMAL MEDICAL COLLEGE
HOSPITAL AND RESEARCH INSTITUTE
MADURAI - 625009



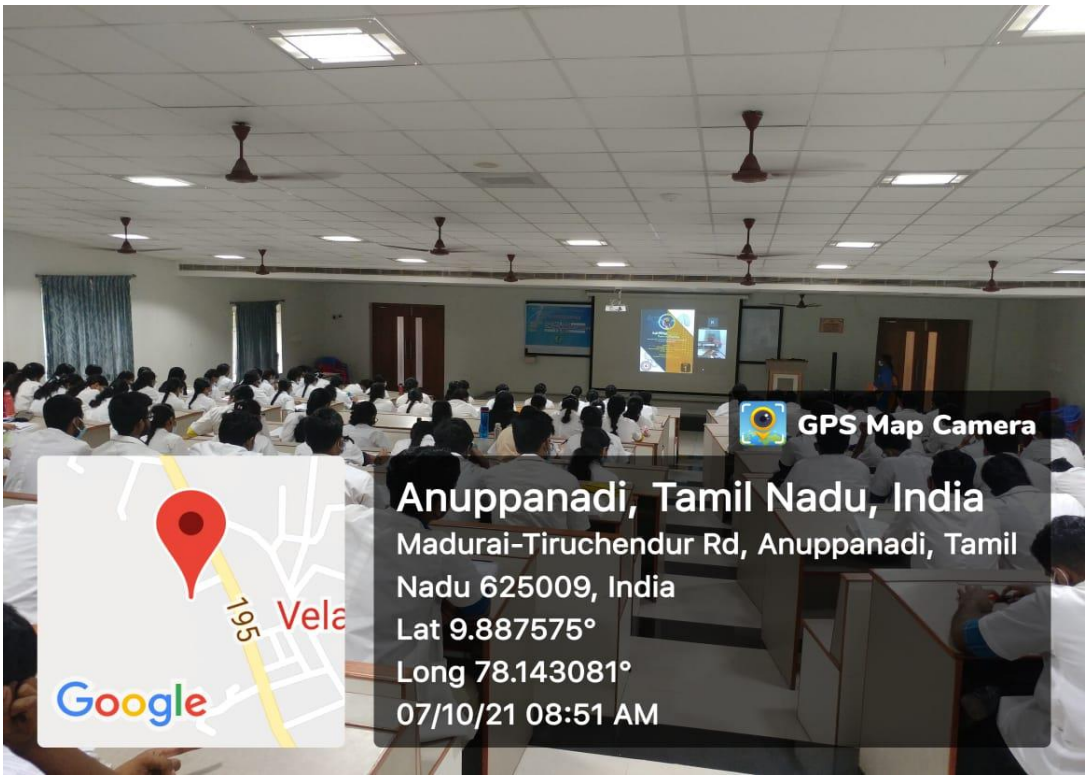
VELAMMAL MEDICAL COLLEGE
HOSPITAL AND RESEARCH INSTITUTE
MADURAI - 625009



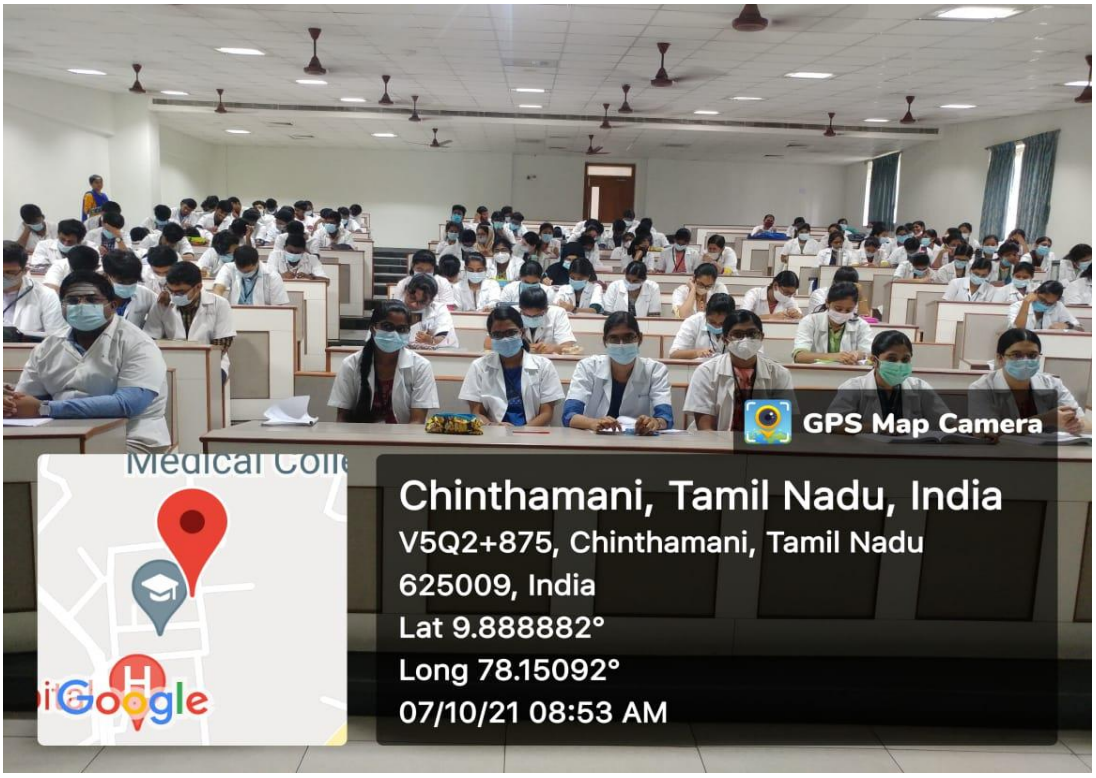
VELAMMAL MEDICAL COLLEGE
HOSPITAL AND RESEARCH INSTITUTE
MADURAI - 625009

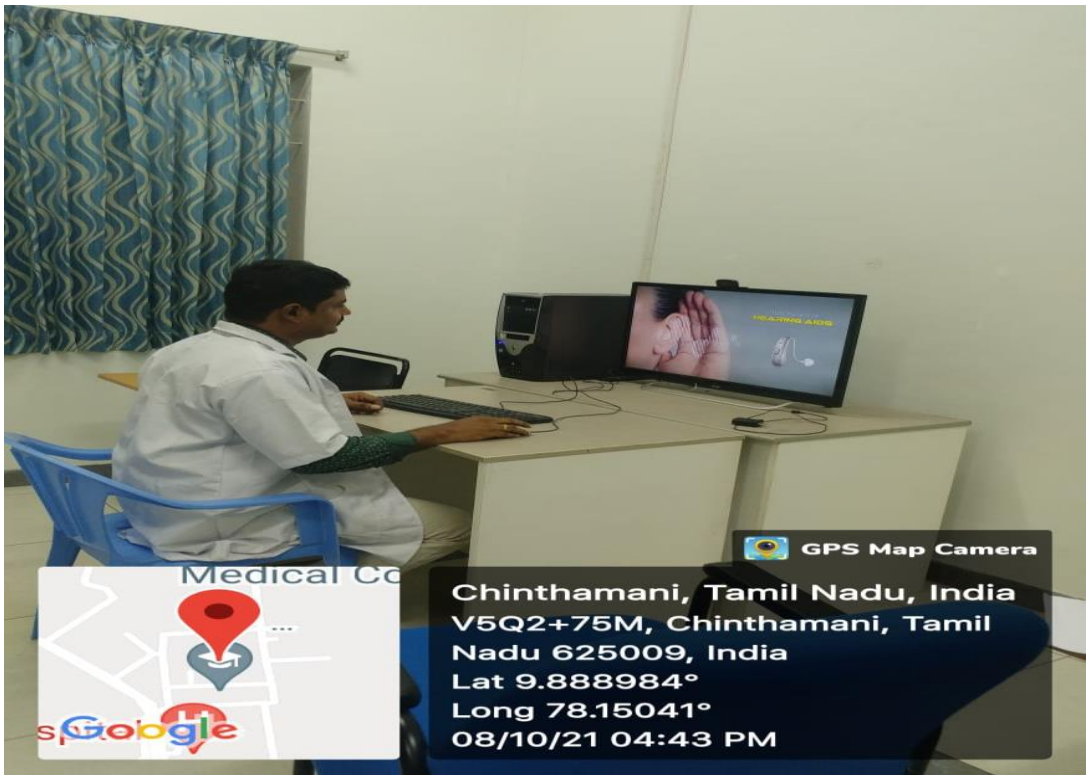


VELAMMAL MEDICAL COLLEGE
HOSPITAL AND RESEARCH INSTITUTE
MADURAI - 625009



VELAMMAL MEDICAL COLLEGE
HOSPITAL AND RESEARCH INSTITUTE
MADURAI - 625009





Department of Physiology

Velammal Medical College Hospital and Research Institute

Madurai

VMCH/Physio/CC/2021/04

CIRCULAR

To First MBBS students of 2020-21 batch

17.7.2021

There will be a certificate course on **Yoga on Physical and Mental health** for first MBBS students from 9am to 11am on Thursday, 19-8-2021. All the students are expected to attend the course without fail.

Date: Thursday, 19th August 2021

Time: 9am to 11am

Venue: Lecture Hall 1, First floor
Velammal Medical College

Dr.S.Anu

Professor and Head

Department of Physiology

Department of Physiology
Velammal Medical College Hospital and Research Institute
Madurai – 625009, Tamilnadu

Invites you to

Certificate course in

Yoga on Physical and Mental Health

to First MBBS Students 2020-21 batch

on 19.08.2021

9 to 11 am

Organized by
Department of Physiology

Venue: Lecture Hall 1

Velammal Medical College

Agenda

9.00am	**Welcome address** **Dr.M.Saravanan** Associate Professor, Physiology
9.05am	**Yoga on Physical health** **Dr.S.Anu** Professor and Head Physiology
9.50am	**Demo session 1** **Dr.M.Saravanan** Associate Professor Physiology
10.05am	**Yoga on Mental health** **Dr.K.Rekha** Associate Professor Physiology
10.40am	**Demo session 2** **Dr.M.Saravanan** Associate Professor Physiology
10.55am	**Vote of thanks** **Dr.K.Rekha** Associate Professor Physiology

Yoga on physical and mental health

- Regarded in the Western world as a holistic approach to health
- Classified by the National Institutes of Health as a form of Complementary and Alternative Medicine (CAM)
- Yoga- union(direct &concentrate attention)
- of yoga promotes strength, endurance, flexibility and facilitates characteristics of friendliness, compassion, and greater self-control, while cultivating a sense of calmness and well-being
- Yoga is a form of mind-body fitness integrates an individual's physical, mental and spiritual components to improve aspects of health, particularly stress related illnesses.

- by Patanjali - *Yoga Sutras*

- asana is just one of the many tools used.
- only three of the 196 sutras mention asana
- Conscious breathing
- Meditation
- Lifestyle and diet changes
- Visualization
- Use of sound

- Yogic Asanas are bodily postures which stretch, strengthen, and relax different muscles and the various parts of body.
- Asana as a comfortable posture
- In the Yogic tradition, next to *Asana* (posture) is regulation of breath (Pranayama). It is considered as a mainstay for the regulation of mental processes. In this technique, a variety of methods of inhalation of air, expelling it out and holding the air inside or outside the lungs are prescribed. In some highly advanced kinds of Pranayama (breath-regulation) mere conscious visualization of receiving vital energy without any actual breathing is undertaken.
- Chanting of mantras has been an age-old tradition in the different religious om,gayathri mantra -curative power of mantras for depression, stress responses[8] and promoting cognitive functioning including improvement in attention-span, memory and self-concept.[9]
- Yoga Nidra has been found to be effective in reducing symptoms of hypertension more than other types of relaxation

- of the hippocampus, amygdala, prefrontal cortex, cingulate cortex and brain networks including the default mode network
- conventionally assessed cognitive functions including attention, memory, and higher-order executive functions
- . Yoga may well be effective as a supportive adjunct to mitigate some medical conditions,
- as a beneficial supportive/adjunct treatment that is relatively cost-effective, may be practiced at least in part as a self-care behavioral treatment, provides a life-long behavioural skill, enhances self-efficacy and self-confidence

- meditative techniques including focusing attention on present moment or a fixed stimulus such as one's breathe, some use imagery, or observe own thoughts rather than suppressing or engaging with them. Meditation has been found to yield positive effect on well-being among healthy as well as patients of severe disorders
- effects of anxiety, stress and depression.[1] In view of positive effect on feel-good neurotransmitters, alpha-wave activity, vagal tone, serum prolactin, but reducing oxidative stress, level of lipids, serum cortisol, down regulation of the hypothalamic-pituitary-adrenal axis and alkalinity,
- including laughing, socializing, playing enjoyable game or shopping can calm our mental state to a greater extent than yoga because all these engagements need certain degree of stimulation of nervous system
- Irritations which are part of daily life can be reduced
- By developing mindfulness, Yoga reduces automatic reactive tendency and increases pro activity in difficult situations impelling anger or fear

- the most common aspects of yoga practiced are the physical postures and breathing practices of Hatha yoga and meditation.[4] Hatha yoga enhances the capacity of the physical body through the use of a series of body postures, movements (asanas), and breathing techniques (pranayama)
- Therapeutic yoga is defined as the application of yoga postures and practice to the treatment of health conditions
- Reduces fatigue,stress
- Autonomic balance-short term effect
- “yoga was no better than Mindfulness-based Stress Reduction at reducing anxiety in patients with cardiovascular diseases” [30].
- Pulmonary function
- Blood glucose regulation
- Menopausal symptoms???
- back pain (6 studies), rheumatoid arthritis (2 studies), headache/migraine (2 studies), and other indications (i.e., hemodialysis, irritable bowel syndrome, labor pain
- Cancer,epilepsy

- reduce anxiety and depression in persons suffering with gastrointestinal disorder[20] and alienation and negative body image among normal adolescents [1].
- Motivation might be a crucial point. To overcome this, shorter time interventions might be an option for some specific indications (i.e., pain and depressive symptoms), while the cardiovascular and fitness effects might require long-term practices. In fact, some pain studies suggest that short-term interventions might be more effective than longer durations of practice

- thus adherence might be a crucial point

- 4 basic principles underlie yoga teaching:

1st principle:

human body is a holistic entity comprised of various interrelated dimensions inseparable from one another and the health or illness of any one dimension affects the other dimensions

2nd principle:

individuals and their needs are unique &their practice must be tailored accordingly

3rd principle:

is yoga is self-empowering; the student is his or her own healer

4th principle:

quality and state of an individuals mind is crucial to healing. When the individual has a positive mind-state healing happens more quickly, whereas if the mind-state is negative, healing may be prolonged.

Physical health

- Improved flexibility is one of the first and most obvious benefits -associated with reduced aches and pains
- to build muscle mass and/ or maintain muscle strength, which protects from conditions such as arthritis, osteoporosis and back pain.
- the joints are taken through their full range of motion, squeezing and soaking areas of cartilage not often used and bringing fresh nutrients, oxygen and blood to the area
- reduced pain in people with arthritis, Carpel Tunnel syndrome, back pain and other chronic conditions
- Improves posture and balance

- Yoga increases blood flow ,RBCS ,Hb ,thins blood –prevents heart attack and stroke
- Twisting poses wring out venous blood from internal organs and allow oxygenated blood to flow in when the twist is released. Inverted poses encourage venous blood flow from the legs and pelvis back to the heart and then pumped through the lungs where it becomes freshly oxygenated
- maximum uptake and utilization of oxygen du
- Yoga, breathing exercises, and meditation can reduce stress, promote healing, and enhance quality of life for patients with cancer.[
- Reduces physical and mental fatigue
- The postures precisely address the tension, holding, and blockage of energy in any particular joint or organ. As this tension is released, energy flows more readily throughout the body and allows patients to experience a sense of increased well-being and strength as well as a balance of mind, body and spirit.

- Restorative postures, savasana, pranayama, and meditation encourage pratyahara, a turning inward of the senses which enables downtime for the nervous system, the byproduct often being improved sleep.
- into three categories: behavioral based educative methods (e.g. avoiding caffeine or other stimulants before bedtime), relaxation techniques (e.g. progressive muscular relaxation, yoga, and meditation) and formal psychotherapy
- that a purely medical approach is far less effective in healing the emotional, intellectual, and personality layers of the human entity
- Yoga suspends the fluctuations of the mind and by acting consciously, we live better and suffer less.

- when adopted as a way of life, yoga improves physical, mental, intellectual and spiritual health. Yoga offers an effective method of managing and reducing stress, anxiety and depression and
- . Yoga, a form of mind-body exercise, has become an increasingly widespread therapy used to maintain wellness, and alleviate a range of health problems and ailments. Yoga should be considered as a complementary therapy or alternative method for medical therapy in the treatment of stress, anxiety, depression, and other mood disorders as it has been
- well-being, increase feelings of relaxation, improve self-confidence and body image, improve efficiency, better interpersonal relationships, increase attentiveness, lower irritability, and encourage an optimistic outlook on life.
- need to be aware of the potential of yoga as an important component of a personal wellness plan.
- While no concrete guidelines exist regarding the frequency of practice, the more you practice the more you benefit. Yoga is a personalized practice and as such, frequency and duration are personal questions with individual answers. Practice should happen with wisdom and should be modified to meet individual needs and goals.

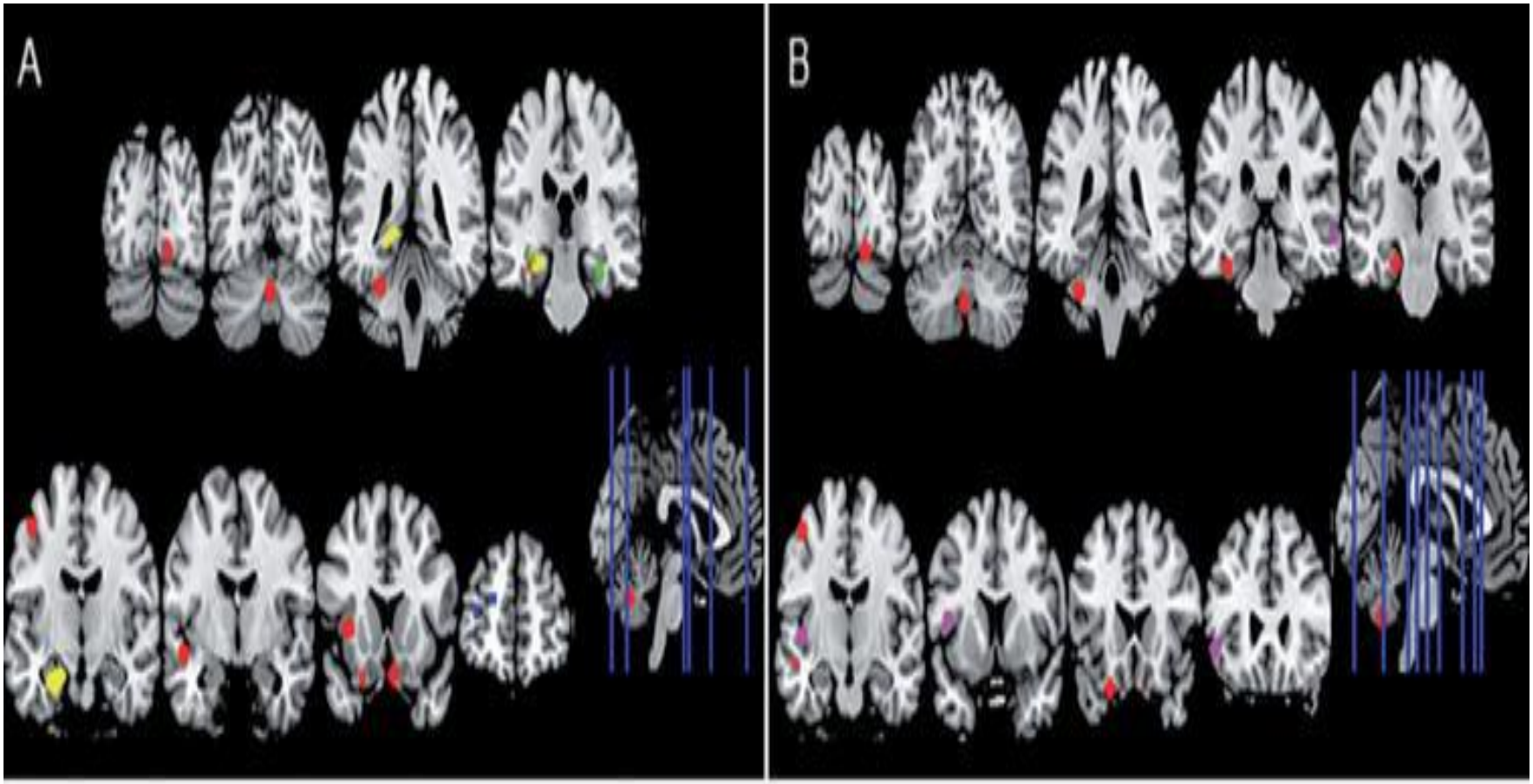
- decrease in post-chemotherapy-induced nausea frequency, nausea intensity, intensity of anticipatory nausea, and anticipatory
- healing, increase energy, decrease adverse treatment effects, and enhance quality-of-life for patients with cancer.[
- Sleep:
- Regular practice of yoga resulted in a significant decrease in the time taken to fall asleep, an increase in the total number of hours slept, and in the feeling of being rested in the mornin(especially in elderly,lymphoma patients)
- the roots of addiction are in the mind
- addicts shift from self-inflicted harm and disrespect toward their bodies to more respectful, caring, and loving behaviors.
- Eating disorders are a specific type of addiction and yoga appears to be beneficial in improving body image disturbances and useful in the recovery from eating disorders.[34] One study found that female yoga practitioners attribute their positive feelings and sense of well-being to yoga practice and report less self-objectification, greater satisfaction with physical appearance and fewer disordered eating attitudes compared

- plasma melatonin levels and also significantly reduced systolic blood pressure, diastolic blood pressure, mean arterial pressure, and orthostatic tolerance.[16
- autonomic balance, respiratory performance
- aid in regression of coronary lesions as well as to improve myocardial perfusion in patients with CAD.
- deteriorations in cardiovascular functions are slower in persons who practice yoga regularly as yoga practitioners had lower heart rate as well as lower systolic and diastolic blood pressure than matched controls
- , in some cases use of pain medication was reduced or eliminated completely. Yoga was also shown to improve gait function and reduce age-related changes in gait among a group of healthy, non-obese elders

Yoga on mental health

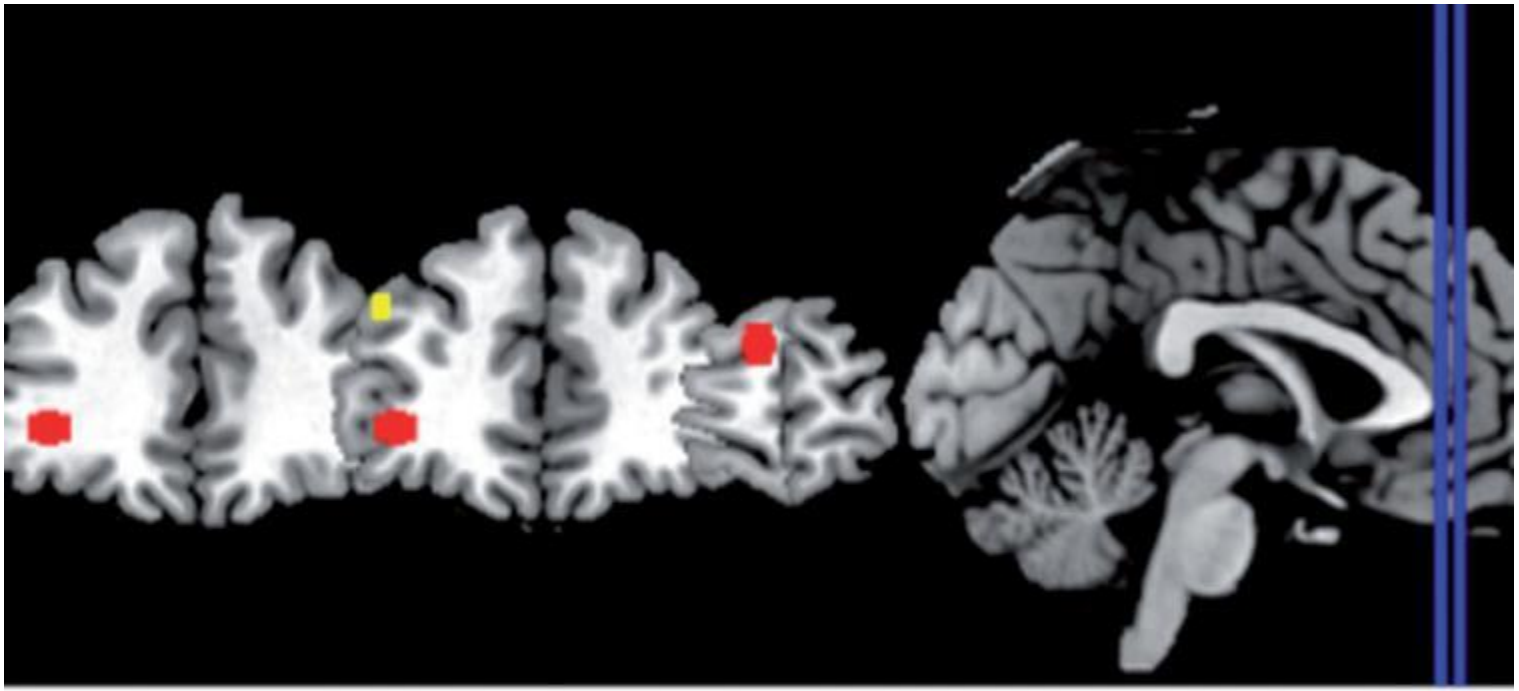
- Mental health problems such as depression, anxiety, stress, and insomnia are among the most common reasons for individuals to seek treatment with complementary therapies such as yoga.[18] Yoga encourages one to relax, slow the breath and focus on the present, shifting the balance from the sympathetic nervous system and the flight-or-fight response to the parasympathetic system and the relaxation response.[5]
- balanced energy which is vital to the function of the immune system
- Yogic practices inhibit the areas responsible for fear, aggressiveness and rage, and stimulate the rewarding pleasure centers in the median forebrain and other areas leading to a state of bliss and pleasure
- significant increases in serotonin levels coupled with decreases in the levels of monamine oxidase, an enzyme that breaks down neurotransmitters and cortisol.[5]

- Yoga is currently blooming worldwide. It is being practiced by citizens of all the continents of the world
- Can it replace traditional psychotherapy
- the seekers of self-realization
- Yoga can induce harmony in mind-body functioning



Red, Yellow, and Green: Gray matter volume (Froeliger et al., 2012b; Gothe et al., 2018; Hariprasad et al., 2013 respectively)
Blue: Cortical thickness (Afonso et al., 2017)
Pink: Gray matter density (Santaella et al., 2019)

Red and Pink: Gray matter volume with years of yoga practice (Froeliger et al., 2012b; Villemure et al., 2015, respectively)



Red: Affective Stroop task (Froeliger et al., 2012a)
Yellow: Encoding phase of Sternberg Working Memory task (Gothe et al., 2018)

- anxiety., depression and mood disorders
- Yoga practitioners exhibited greater cortical thickness, gray matter (GM) volume, and GM density than non-practitioners in a variety of regions. Among yoga-practitioners, a positive relationship between the years of yoga practice and GM volume was also observed in a number of areas.
- The yoga-practitioners exhibited greater cortical thickness in an area of the left prefrontal cortex that included part of the middle frontal and superior frontal gyri.
- volume of the left hippocampus to be significantly greater among yoga-practitioners compared to age- and sex- matched controls with similar physical activity and fitness levels
- A number of additional frontal (bilateral orbital frontal, right middle frontal, and left precentral gyri), temporal (left superior temporal gyrus), limbic (left parahippocampal gyrus, hippocampus, and insula), occipital (right lingual gyrus), and cerebellar regions were also larger among yoga-practitioners than non-practitioners
- Greater resting-state anteroposterior functional brain connectivity between the medial prefrontal cortex and right angular gyrus was observed among yoga practitioners

- , activation was greater during meditation in the right prefrontal cortex, sensorimotor cortex, inferior frontal lobe, superior frontal lobe and the right and left dorsal medial frontal lobes following yoga training.
- Following yoga training, laterality preference for the left over the right during meditation compared to baseline also became more pronounced
- Exerting cognitive control over emotional processes leads to increased activation in the dlPFC, with corresponding reciprocal deactivation in the amygdala [50, 51]. The studies suggest that when emotional experience occurred within the context of a demanding task situation, yoga practitioners appeared to resolve emotional interference via recruitment of regions of the cortex that subserve cognitive control
-). Yoga practitioners also showed less activation than non-practitioners in the right dorsolateral prefrontal cortex and right superior frontal gyri, but more activation in the left ventrolateral prefrontal cortex during various aspects of an Affective Stroop task

Department of Physiology
Velammal Medical College Hospital and Research Institute
Madurai
Report

Topic:	**Certificate course: Yoga on Physical & Mental health**
Date:	**19-8-2021**
Venue:	**Lecture Hall 1, Velammal Medical College**
Target Audience:	**First MBBS students 2020-2021 batch**
Number of participants:	**145**

Report:

A certificate course on Yoga on Physical and Mental Health was organized by the Department of Physiology, Velammal Medical College Hospital and Research Institute, Madurai, Tamilnadu for first MBBS students 2020-21 batch on 19.08.2021 from 9 am to 11 am.

The program began with the welcome address by Dr.M.Saravanan, Associate Professor, Department of Physiology, Velammal Medical College, Madurai. It was followed by an informative talk on Yoga on Physical health by Dr.S.Anu, Professor and Head, Department of Physiology, Velammal Medical College, Madurai. After this session, a relevant video demo was played to the students for better understanding of the covered topic.

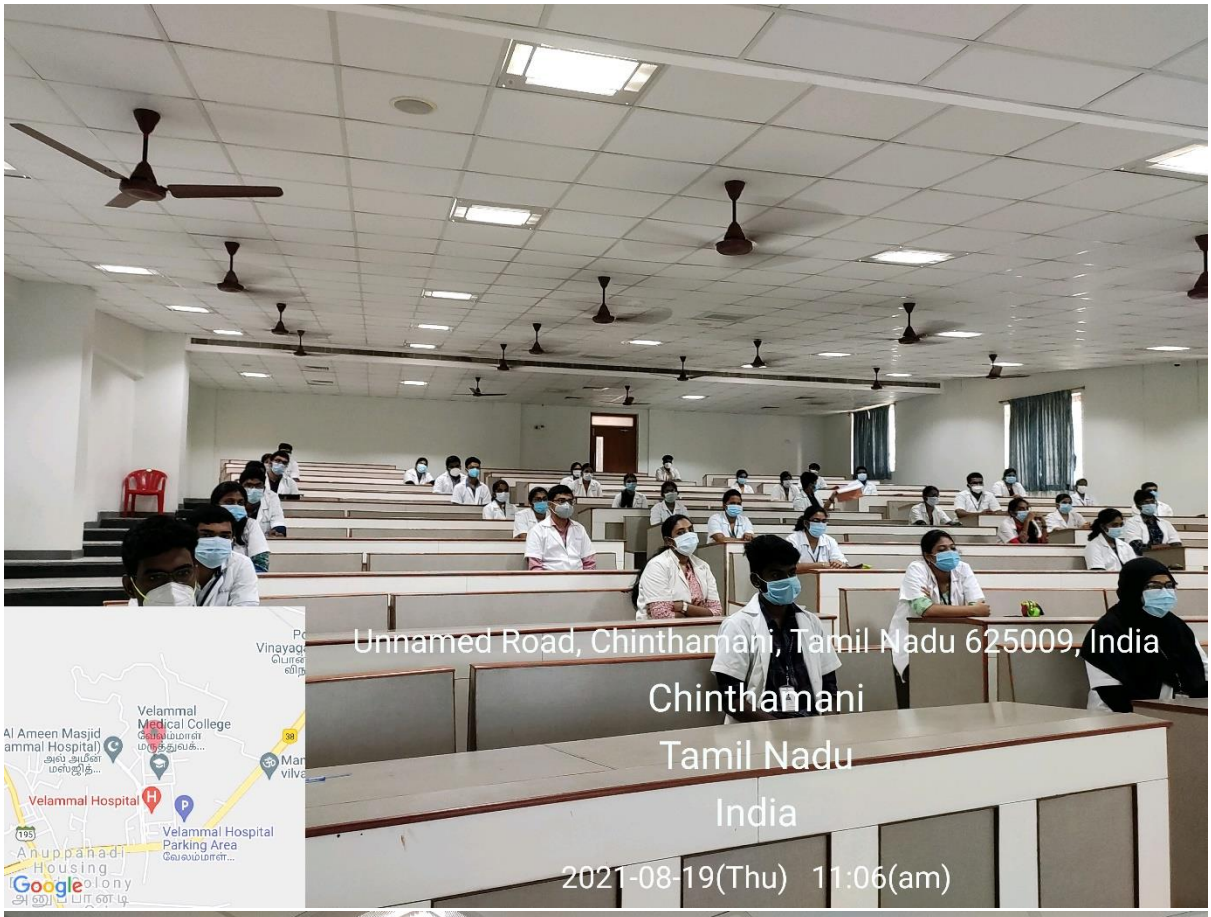
Following this, another session on Yoga on Mental health was delivered by Dr.K.Rekha, Associate Professor, Department of Physiology. The target audience came with questions and the doubts were immediately and appropriately cleared by the resource persons. The program concluded by the Vote of thanks delivered by Dr.S.Anu, Professor and Head, Department of Physiology, Velammal Medical College Hospital and Research Institute, Madurai.

Outcome:

The program was well received the first MBBS students 2020-21 batch of Velammal Medical College Hospital and Research Institute, Madurai. Students got benefitted by knowing yoga that could improve their health both physically and mentally.

Prof. T. THIRUNAVUKKARASU, M.D.,D.A.,
Dean
Velammal Medical College Hospital
and Research Institute
"Velammal Village"
Madurai-Tuticorin Ring Road
Anuppanadi, Madurai-625 009.

Photos:


Unnamed Road, Chinthamani, Tamil Nadu 625009, India
Chinthamani
Tamil Nadu
India
2021-08-19(Thu) 11:06(am)
Velammal Medical College
Velammal Hospital
Velammal Hospital Parking Area
Anuppanadi Housing Colony
Google


Velammal Medical College Hospital and Research Institute
Department of Physiology
Program
CERTIFICATE COURSE
Topic
YOGA ON PHYSICAL AND MENTAL HEALTH
Date
19.08.2021
Unnamed Road, Chinthamani, Tamil Nadu 625009, India
Chinthamani
Tamil Nadu
India
2021-08-19(Thu) 09:13(am)
Velammal Medical College
Velammal Hospital
Velammal Hospital Parking Area
Google

Velammal Medical College Hospital and Research Institute

Ref. No:VMCHRI/BIOCHEM/CC-9 Date:01.08.2021

CIRCULAR

To

All Doctors

Certificate Course on ELISA Technique

Department of Biochemistry is organizing a certificate course on ELISA techniqueson 11.08.2021(Wednesday) between at2.00 – 4.00 PM.

All Faculties are invited.

VICE PRINCIPAL

Dr. P.K. MOHANTY
Vice Principal
Velammal Medical College Hospital
and Research Institute
Madurai-625 009

Copy submitted to:

The Hon. Chairman

Copy to:

The Dean

Medical Superintendent

Chief Administration Officer

HOD, Biochemistry

All Clinical and Non-Clinical HODs

Velammal Medical College Hospital & Research Institute

Anuppanadi, Madurai - 625009

Department of Biochemistry

Certificate course on

ELISA Technique

Venue: Biochemistry Demonstration Room

Date: 11.08.2021

Time: 2.00 – 4.00 PM

For Faculties, M.B.B.S., Post graduates, AHS, DMLT and BSc MLT

PATRON

Chairman: Shri.M.V.Muthuramalingam

Advisors:

Dean: Dr.T.Thirunavukarasu

MS: Dr. S.R.Damodaran

DR.Mamatha T Shenoy
Course coordinator
Assistant Professor
Biochemistry

DR.P.K.Mohanty
Vice Principal
Prof. HOD Biochemistry

Click here for registration

Agenda

Time	Topic	Speaker
2.00 – 2.15 PM	Welcome address	DR.P.K.Mohanty
2.15 – 2.45 PM	Pre test ELISA – Principle and types	DR.Mamatha T Shenoy
2.45 – 3.45 PM	Demonstration: ELISA – ANA estimation	DR.Mamatha T Shenoy & Resource persons
3.45-4.00 PM	Post-test and feedback	DR.Mamatha T Shenoy
	Valediction	

Resource persons

Dr P.K. Mohanty
Vice Principal
Prof. HOD
Biochemistry

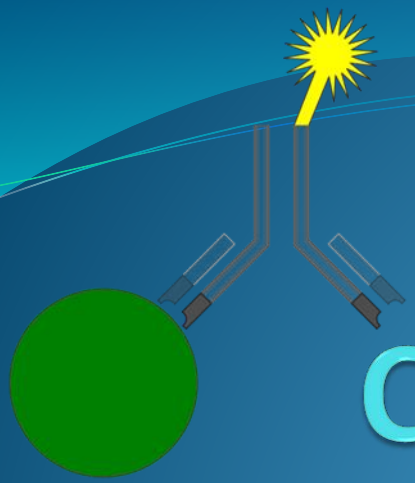
Dr K. Suganthy
Prof.
Biochemistry

DR.M.Jeyakumar
Assoc. Professor
Biochemistry

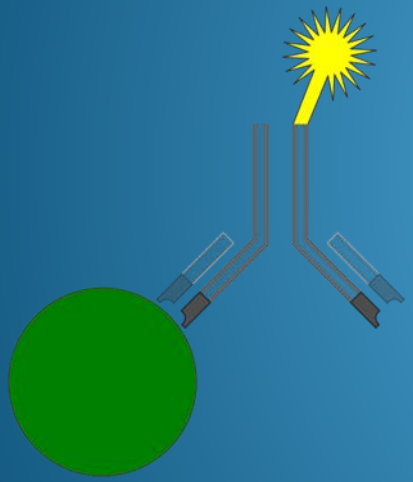
Dr Mamatha T Shenoy
Assistant Professor
Biochemistry

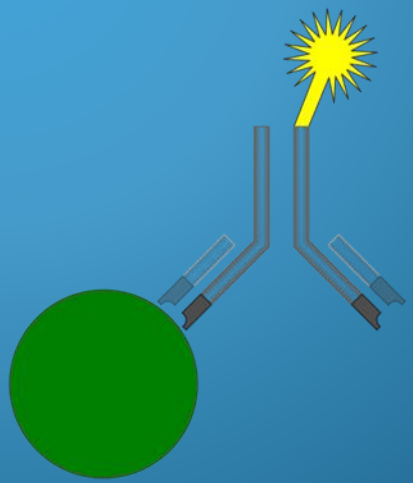
Dr.A. Hariharan
Assistant Professor
Biochemistry

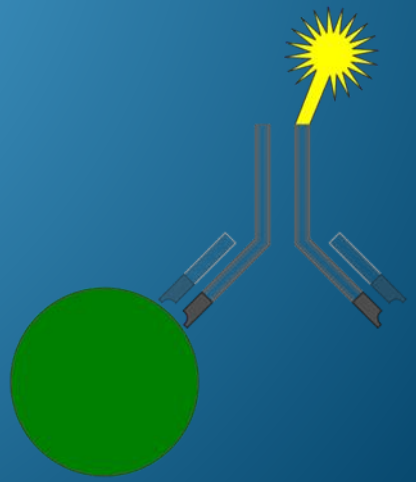
Dr.M. Viveka
Tutor
Biochemistry



CHEMILUMINESCENCE IMMUNO ASSAY







Introduction

- Definition of an immunoassay:
- An immunoassay is an analytical technique which uses naturally occurring reagents known as antibodies for the selective determination of sample components
- Immunoassays are commonly used in a wide variety of areas, especially in biochemistry and clinical chemistry

Application of immunoassay include:

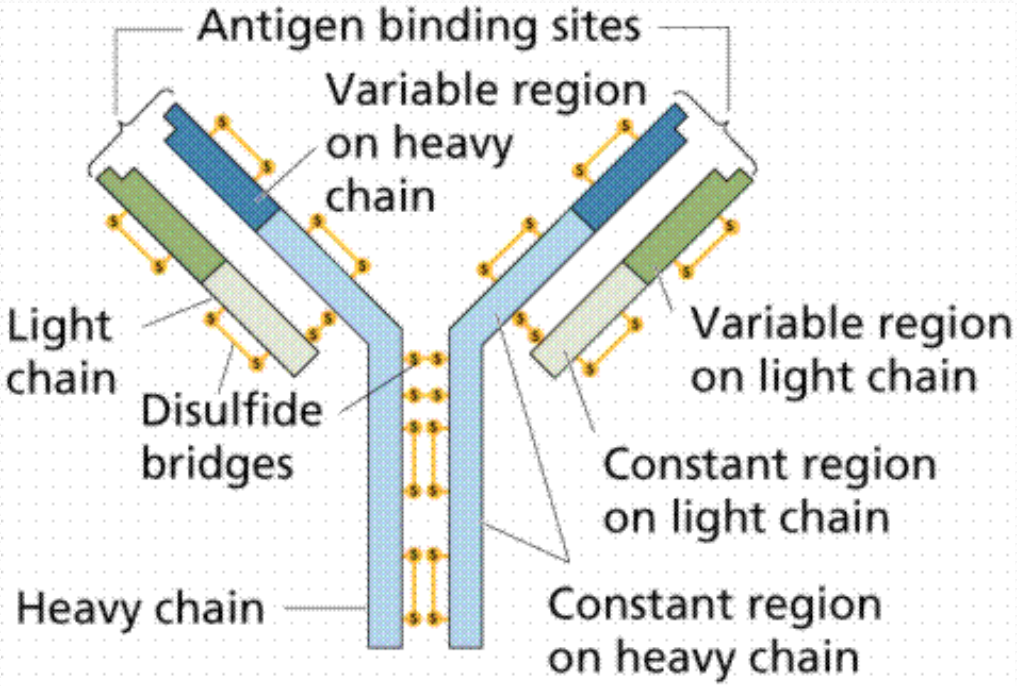
- Drug testing
- Hormone testing (insulin in diabetic patients)
- Bacterial or viral testing (AIDS, hepatitis)
- Environmental testing (herbicides, pesticides)

Advantages of immunoassays are:

- Inexpensive to perform
- Highly selective
- Low limits of detection
- Can have high-throughput. Often done in batch mode
- Applicable to the determination of a wide-range of compounds

Antibodies

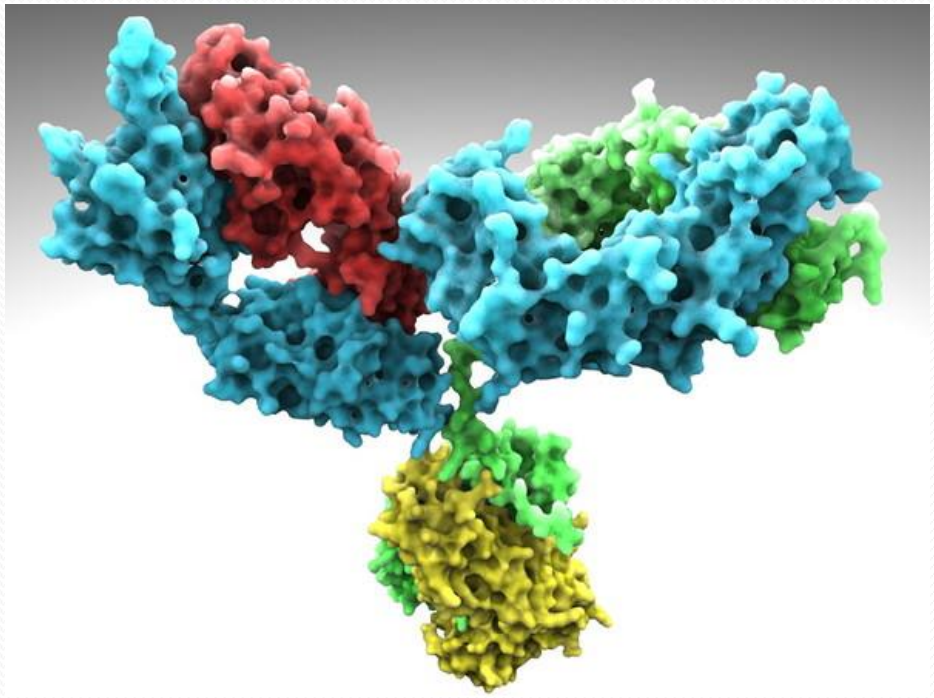
- Definition of an antibody:
- An antibody (Ab), or immunoglobulin (Ig), is a member of a family of glycoproteins that make up part of the body's immune system.
- Basic structure of an antibody:

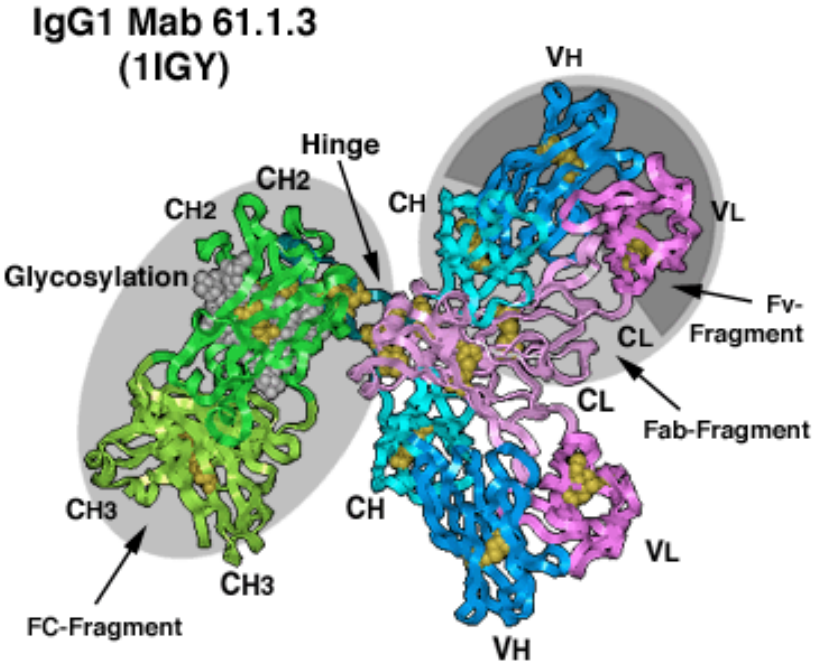


The above antibody consists of four polypeptides-two identical heavy chains (H) and two identical light chains (L) connected by disulfide bonds. These are arranged in a "Y"-shaped structure ending with two identical sites that recognize and bind a given foreign agent or antigen

IMMUNOASSAYS

- Antibodies
- II. Basic structure of an antibody:
- More realistic graphical representations of an antibody or Ig

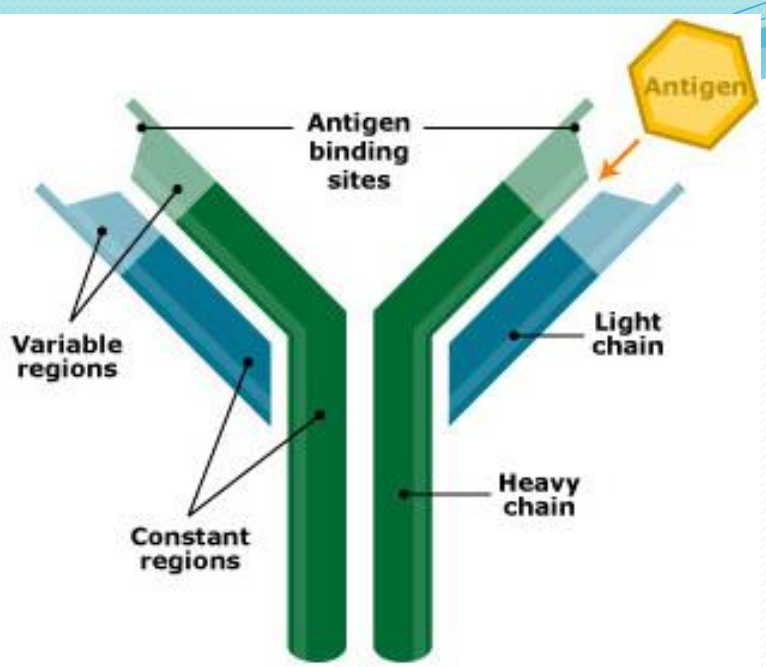




IMMUNOASSAYS

Introduction

IV. Antibody – Antigen Interactions:



- Each antibody has the ability to bind to a different foreign agent, or antigen (Ag)
- The ability of an antibody to recognize and bind a given antigen depends on the structure of its binding site
  - Determined by the amino acid sequence of the antibody near the N-terminal ends of the heavy and light chains

IMMUNOASSAYS

Introduction

IV. Antibody – Antigen Interactions:

- The general reaction between a single binding site on the antibody (Ab) and antigen (Ag) can be written as follows:

$$Ab + Ag \underset{}{\overset{K_a}{\longleftrightarrow}} Ab\text{-}Ag$$

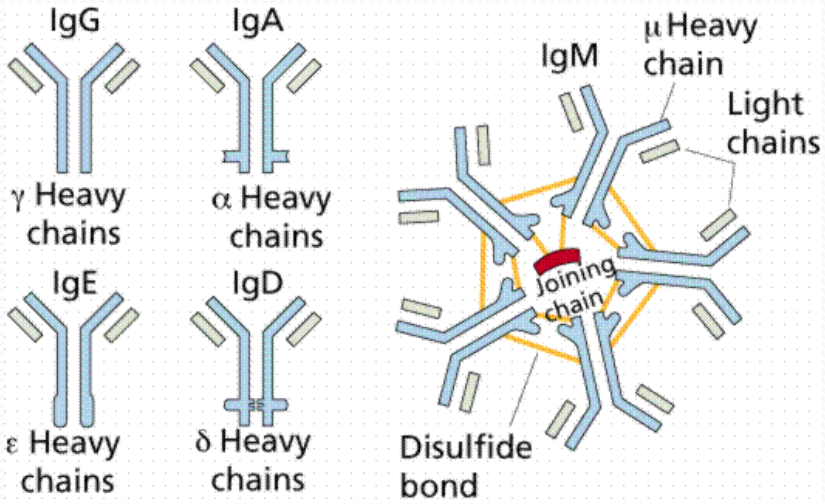
  - where K_a is the binding or association equilibrium constant

- The value of K_a is typically in the range of 10^6 to 10^{10} M^{-1}
- The binding is very selective and only occurs between *Ab* and *Ag*, or between *Ab* and molecules similar to *Ag* in their three-dimensional structure.

IMMUNOASSAYS

- Antibody Usage:
- The selectivity of Ab-Ag interaction makes antibodies useful as analytical reagents for the determination of specific components in mixtures
- Antibodies are useful as analytical reagents since they can be produced to a wide variety of substances:

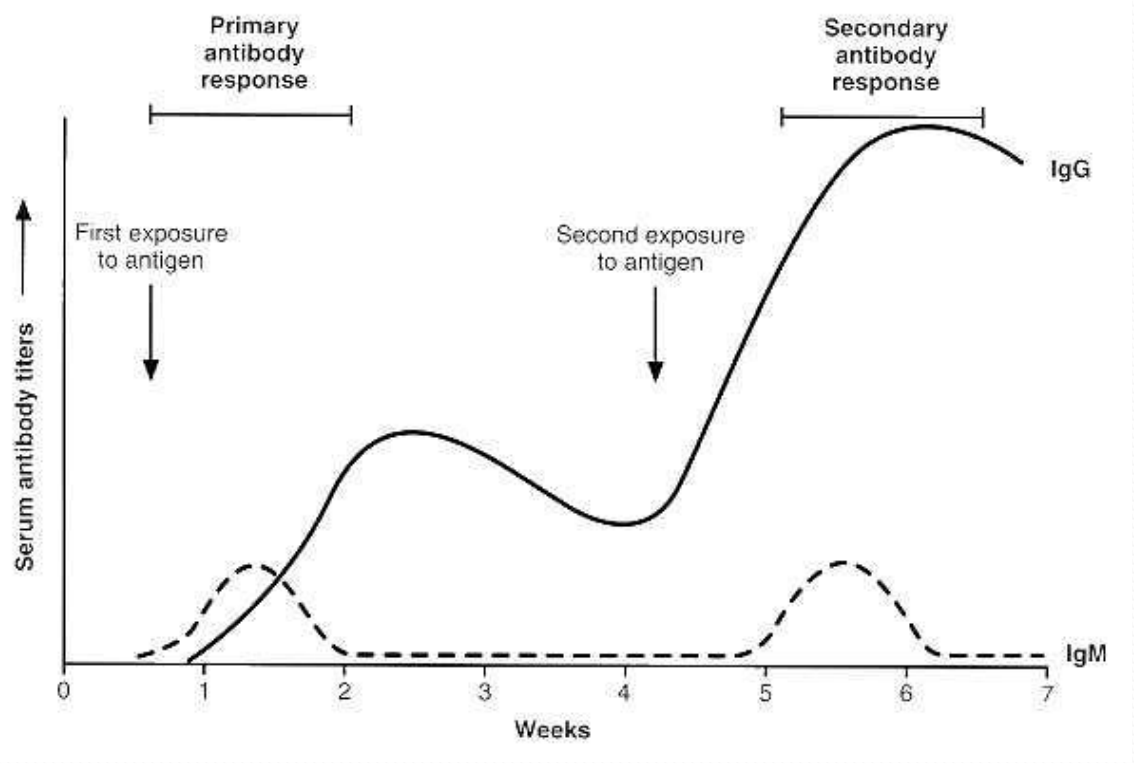
Five classes of antibodies



IMMUNOASSAYS

VI. Antibody Production - polyclonal antibodies :

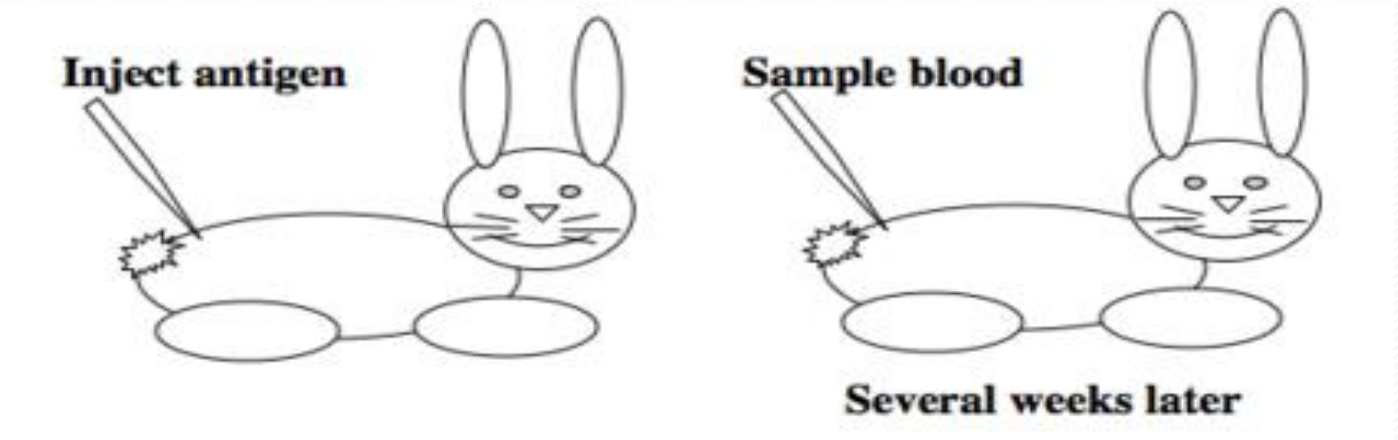
- One common method for making antibodies to a substance (antigen) is to inject the analyte or analyte-protein conjugate into an animal several times over a period of a few weeks to a few months



IMMUNOASSAYS

VI. Antibody Production – polyclonal antibodies:

- If the agent is a foreign to the animal, the animal will develop antibodies to the agent and release these antibodies into its blood.
- After a few months, blood is removed from the animal and the antibodies produced are collected for use

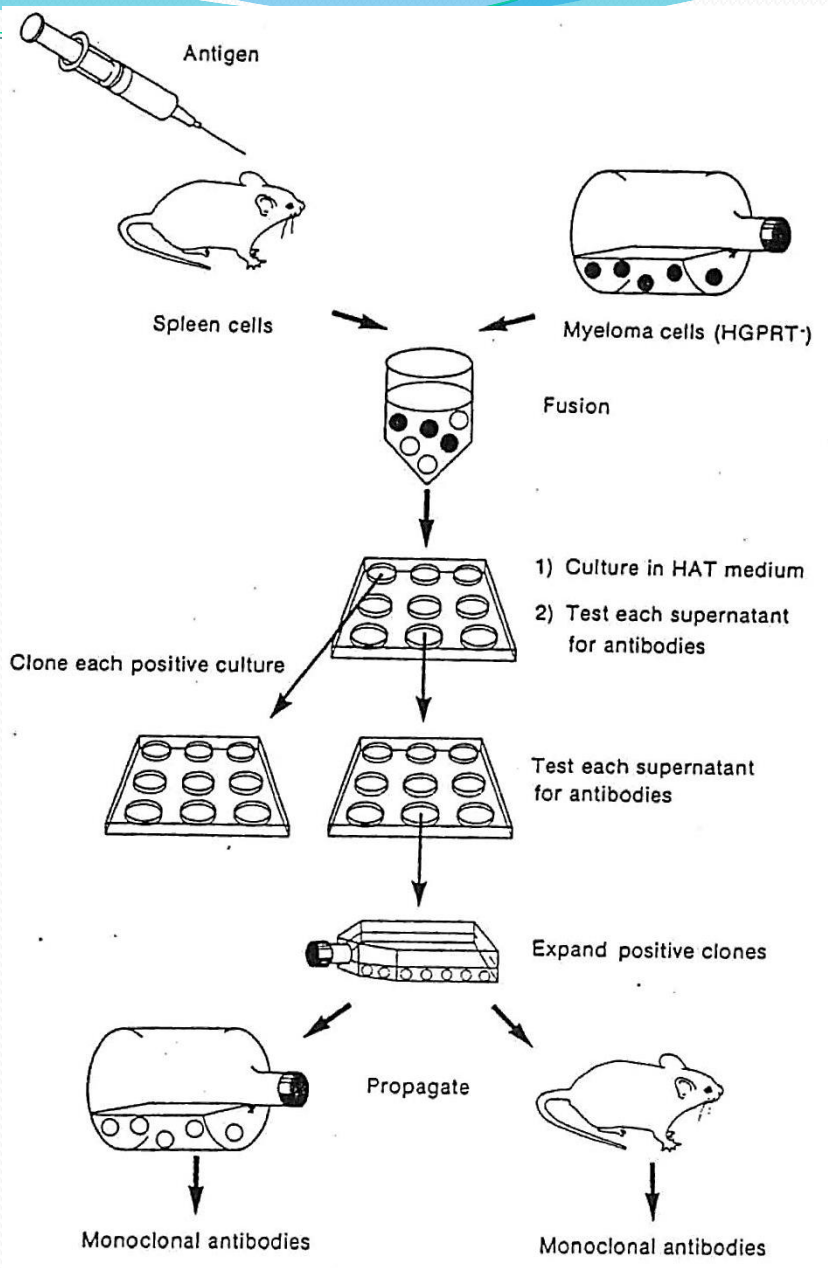


- Antibodies produced in this fashion are typically very heterogeneous
  - Recognize a number of different sites on the analyte
  - Binding with a range of affinities (Ka)
- Heterogeneous antibodies are known as polyclonal antibodies
  - Arise from several different lines of antibody-producing cells within the animal

IMMUNOASSAYS

Antibody Production - monoclonal antibodies (mAb):

- **Monoclonal antibodies differ from polyclonal antibodies in that they are produced by a single cell line within the body**
- **All monoclonal antibodies from the same cell line recognize the same site on an analyte and bind with an identical binding affinity (Ka)**



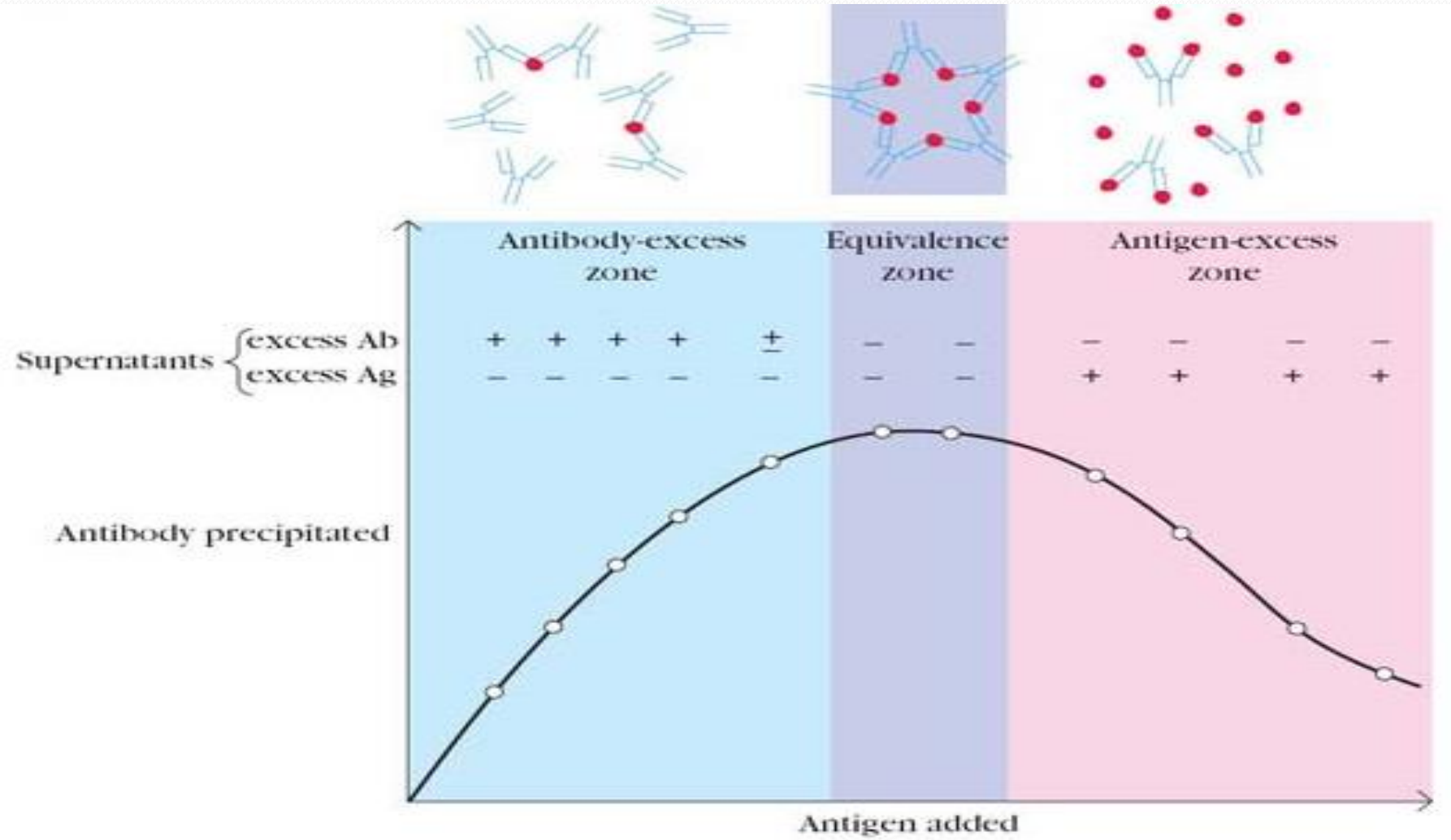
IMMUNOASSAYS

Types of Immunoassays

- **There are several different ways in which antibodies can be used in the detection or analysis of an antigen. Some common ways include:**
- **Precipitation-based immunoassay**
- **Competitive binding immunoassay**
- **Sandwich immunoassay**

IMMUNOASSAYS

Precipitation assays



LUMINESCENCE

- “ Cold light” that can be emitted at **lower temperature**
- Source kicks an electron of an atom out of its lowest energy “ground” state into a higher energy “excited” state
- Finally electron returns the **energy** in the form of **light** so it can fall back to its “ground” state

TYPES LUMINESCENCE

Excitation event		**process**
Chemicals	Luminol Isoluminol acridinium ester	**Chemiluminescence**
Biochemical	Luciferin aequorin	**Bioluminescence**
Electromagnetic	Ruthenium Tris (bipyridly) chelate	**Electroluminescence**
Photons	inorganic phosphors	**Photoluminescence**

CHEMILUMINESCENCE

Emission of light with limited emission of heat (luminescence), as the result of a chemical reaction.

[A] + [B] → [◊] → [*Products*] + *light*

[A], [B]: reactants

[◊]: excited intermediate

For example, if [A] is luminol and [B] is hydrogen peroxide in the presence of a suitable catalyst we have:

luminol + H2O2 →3-APA[◊] →3-APA + light

Where:

- 3-APA is 3-aminophthalate
- 3-APA[◊] **is the excited state** producing **light** as it decays to a lower energy level.

CHEMILUMINISCENCE

Luminol and peroxidase before adding H_2O_2

Chemiluminiscence after addition H_2O_2

Application of Chemiluminiscence

- **Chemiluminesence immunoassay**
- **DNA hybridization detection**
- **Western blotting**
- **Forensic science**
- **Food analysis**

CLIA has become very popular in clinical chemistry and environmental analysis, due to its high sensitivity, wide dynamic range and complete automation.

VITROS® Technologies

MicroSlide™

MicroTip™

MicroWell™

Intellicheck®

MicroSensor™

MicroWell™ Technology

VITROS® Systems

VITROS Systems ECi Immunodiagnostic

MicroWell™

integrity by intelli check

VITROS System 5600* Integrated

MicroSlide™ MicroTip™ MicroSensor™ MicroWell™

integrity by intelli check

VITROS System 3600* Immunodiagnostic

MicroSensor™ MicroWell™

integrity by intelli check

* Under Development

Microwell Technology is based on

Enhanced Chemiluminescence Technology

- High sensitive Labelled Immunoassay
- For the detection of either Antigen or Antibody based on
- Immunometric assay (Sandwich assay)
- Competitive Immunoassay

Immunoassay: Definition

- A measurement technique which uses an antibody (or antigen) in combination with a sensitive detection signal for the quantitive (or qualitative) determination of an antigen (or antibody) in a patients specimen.

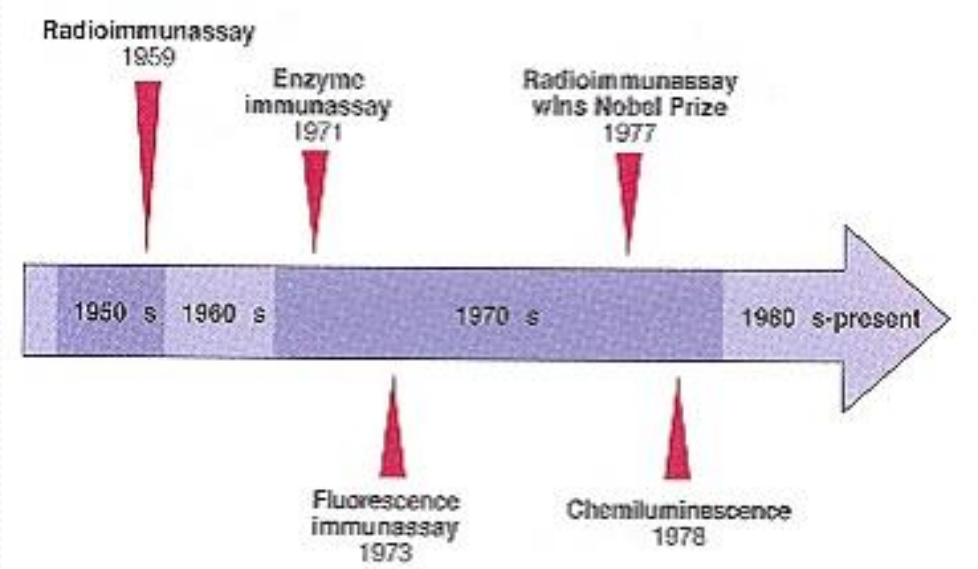
Types of immunoassays

Radioimmunoassay (RIA)

Enzyme immunoassay (ELISA)

Fluorescence immunoassay

Chemiluminescence's immunoassay



Timeline of development of immunoassays

Classic Immunodiagnostics Detection Techniques

- **Radiolabels: RIA**
  - Slow processes
  - Difficult to automate
  - Short shelf life
  - Regulatory scrutiny and disposal hazard

- **Colorimetric: ELISA**
  - Limited sensitivity

- **Fluorescence: FPIA (i.e.: AxSYM, TDx)**
  - Can suffer from background interference
  - Limited sensitivity
  - Limited to small molecules

Chemiluminescence Immunoassay

- Chemiluminescence technology – based on the emission of light (luminescence) as a result of chemical reaction.
- [**A**] + [**B**] → [*Products*] + light
- For example, if [A] is luminol and [B] is hydrogen peroxide in the presence of a suitable catalyst we have:
- Luminol + H_2O_2 → 3-APA[◊] → 3-APA + Light :
- where 3-APA is 3-aminophthalate & 3-APA[◊] is the excited state fluorescing as it decays to a lower energy level.

The Chemiluminescence Advantage

- **Chemiluminescence: Two primary types**
  - **Direct "Flash" (ACS:180, Architect)**
  - **Indirect "Glow" (ECi, Immulite, access)**
- **Enhanced Chemiluminescence**
  - Chosen technology for *Vitros* ECi
  - Horseradish Peroxidase (HRP) is the label
  - Luminol is the substrate: Together with H_2O_2,
  - Enhancer (acetanilide) act as catalysts
  - Enhancers speed the oxidation of the luminol by HRP by as much as 1,000 times.
  - Enhancer enhances the light intensity of each luminol molecule and sustains light production so that resulting light output is transformed from flash to glow

Enhanced Chemiluminescence Immunoassay

Immunodiagnostic

-based on the reaction : antibody - antigen
-sensitivity : up to picomol/L (0.000000000001 mol)
-specificity: based on antibodies recognising the analyte

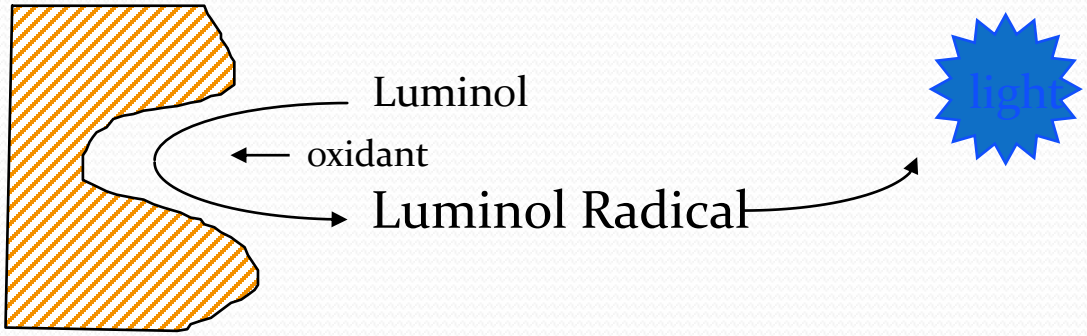
Chemiluminescence

-detection and measurement of the immunological reaction : oxidation of *luminol* and photoemission at 410 nm

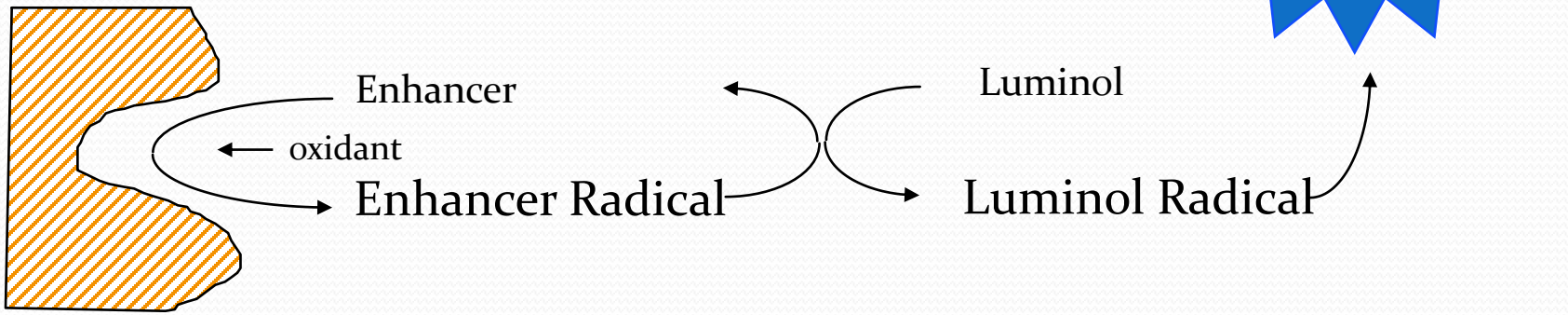
Enhanced

-Photons react with an *enhancer* which amplifies the lasting and the intensity
of the signal. The signal is read by the *luminometer*
-sensitivity : * 1000000 compared to the clinical chemistry
ex: Fe: 0.4 µmol/L - E2: 2.7 pmol/L = 40 000 times
1 gramme of component in 40 Olympic swimming pools !

Unenhanced and Enhanced Luminescence



UNENHANCED



ENHANCED

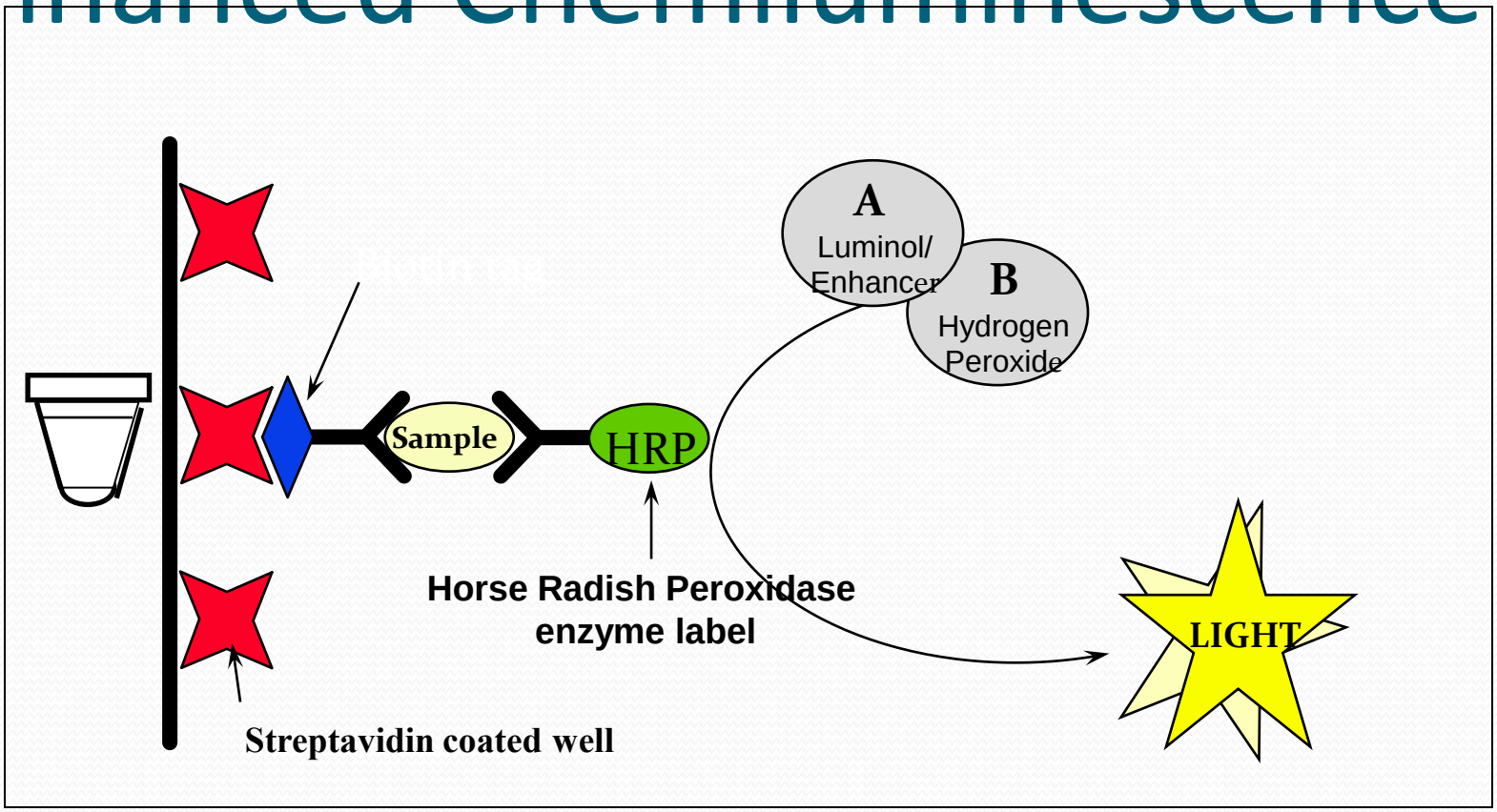
The Basic Principles of ECLIA Technology

- ECLIA
  - *Enhanced Chemiluminescence Immuno Assay*
- The technique utilises the relationship between Antigen (Ag) and the associated Antibody / Antibodies (Ab)
- The presence of Ag or Ab can be Quantified / Qualified by using a detection system using the enzyme Horse Radish Peroxidase.

The Basic Principles of ECLIA Technology

- ECLIA
  - The Enzyme HRPO oxidises Luminol in the presence of Hydrogen Peroxide.
  - The oxidized Luminol produces a glow of light.
  - The light generated is enhanced by the enhancer 4 Chloro 3 Hydroxy Acetanilide.
  - The enhanced light is measured using Luminometer.

Enhanced Chemiluminescence



Signal Generation with Peroxidase

Traditional ELISA

$$\underset{\text{colorless}}{OPD} + H_2O_2 \xrightleftharpoons{POD} \underset{\text{colored}}{Dye_{OX}} + H_2O$$

Chemiluminescence Chemistry

$$Luminol + H_2O_2 \xrightleftharpoons{POD} Dye_{OX} + H_2O + Light$$

Signal Generation with Peroxidase

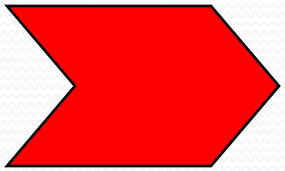
Chemiluminescence Chemistry :

$$H_2O_2 + POD \rightleftharpoons H_2O + O$$

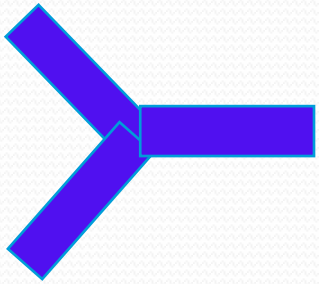
$$\text{Luminol} + O \rightarrow \text{Oxidized Luminol} \rightarrow \text{Light}$$

$$\text{Light} + 4Cl3HA \rightleftharpoons \text{Enhanced Glowing Light}$$

Basic Principle of Chemiluminescence Sandwich Assay



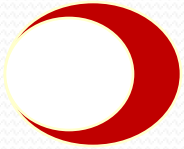
Antigen



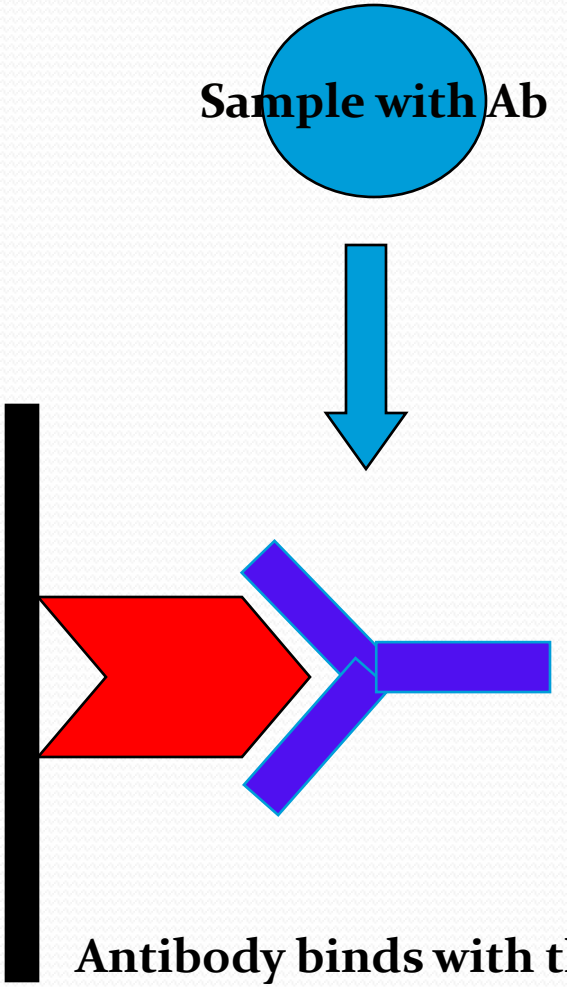
Antibody

HRP

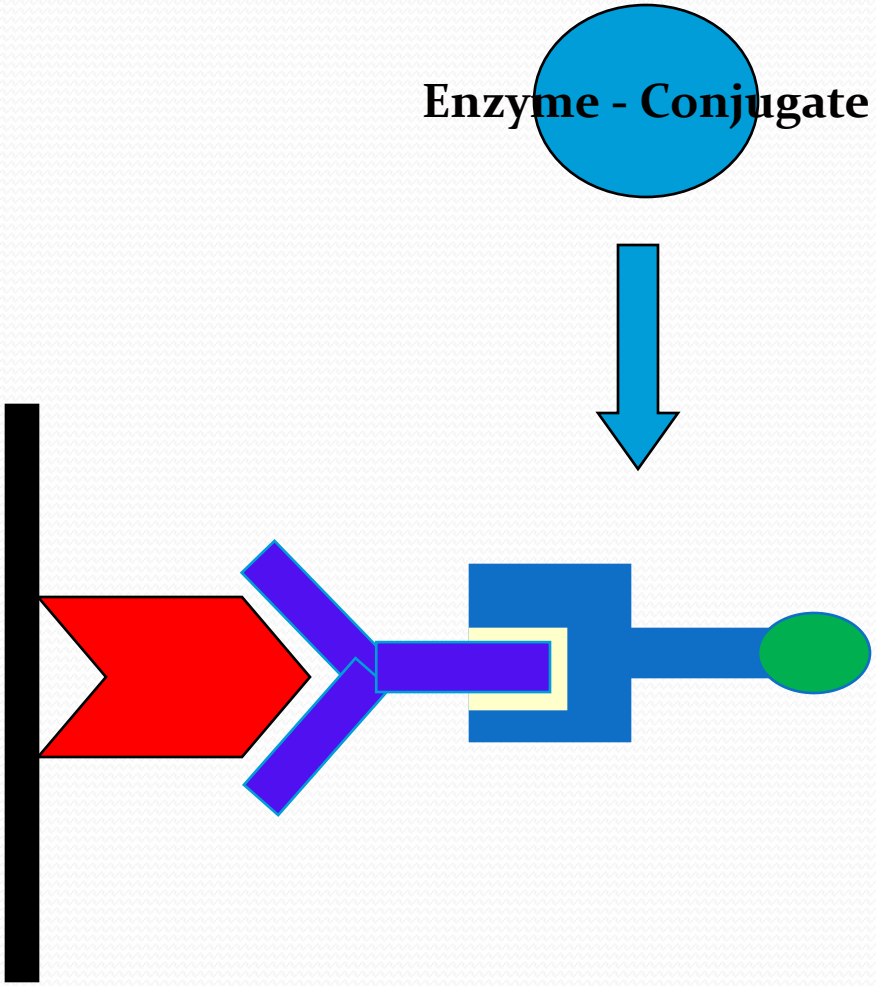
Conjugate (antibody tagged to HRP)



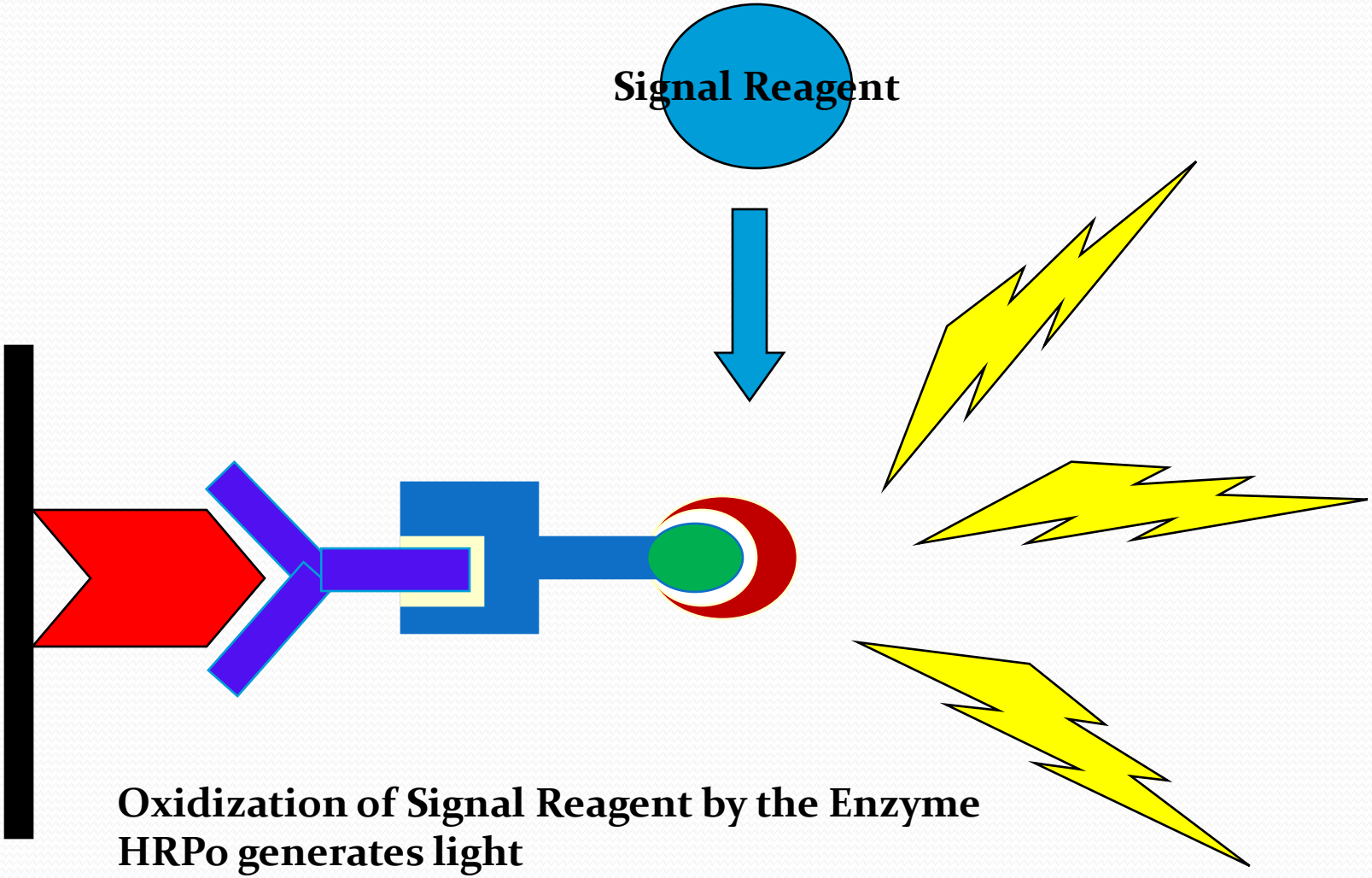
Signal Reagent



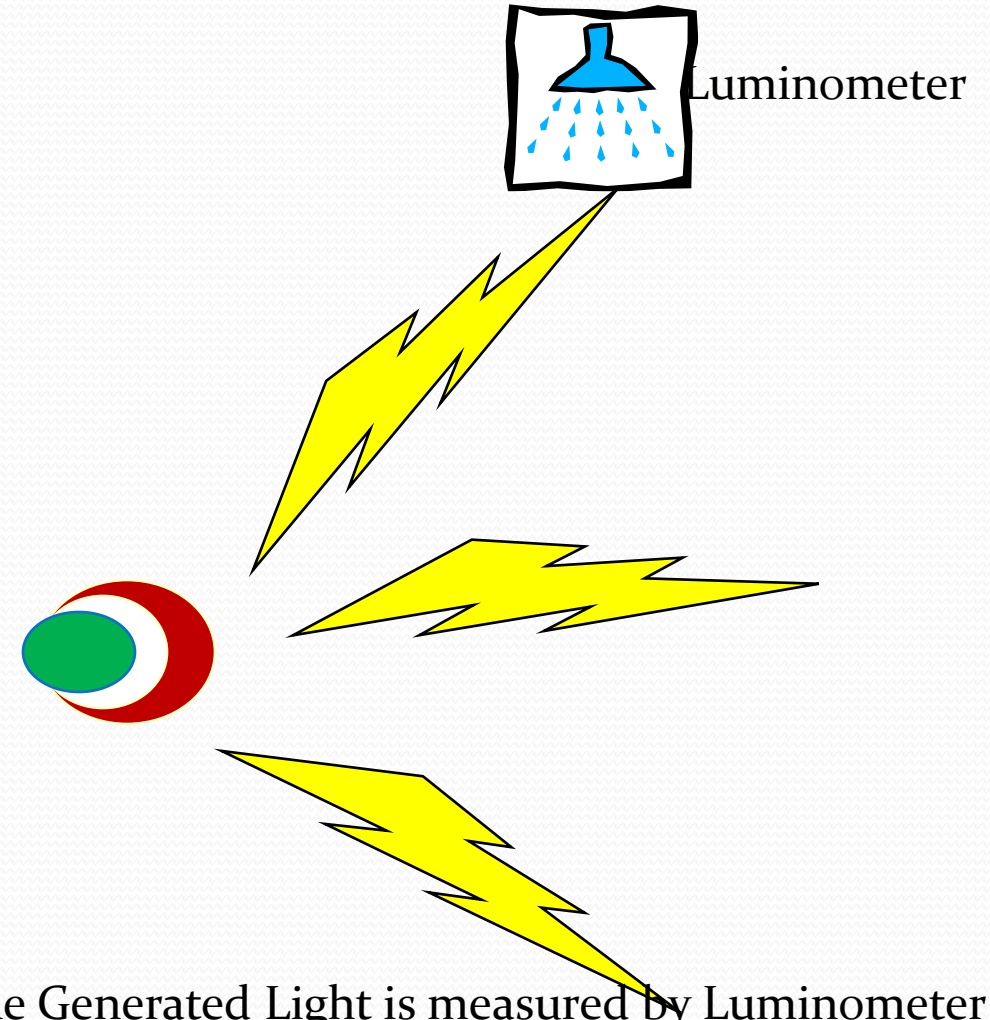
Antibody binds with the coated antigen on the well



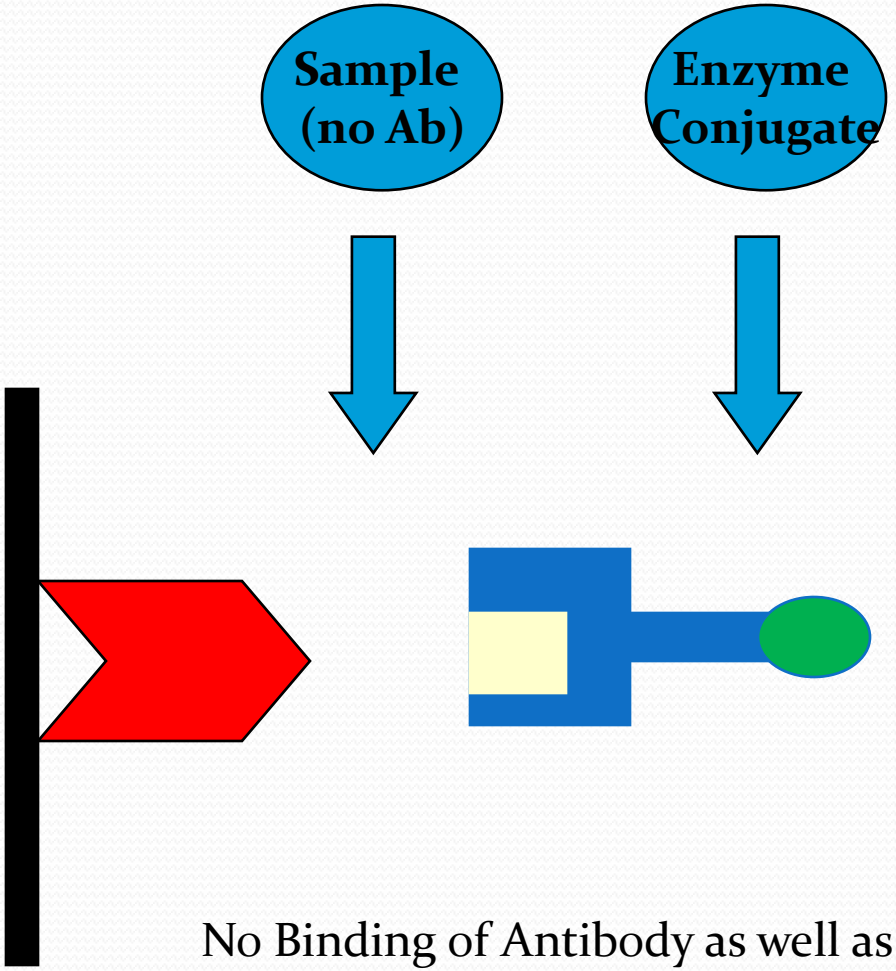
The Enzyme Conjugate binds with the Antibody



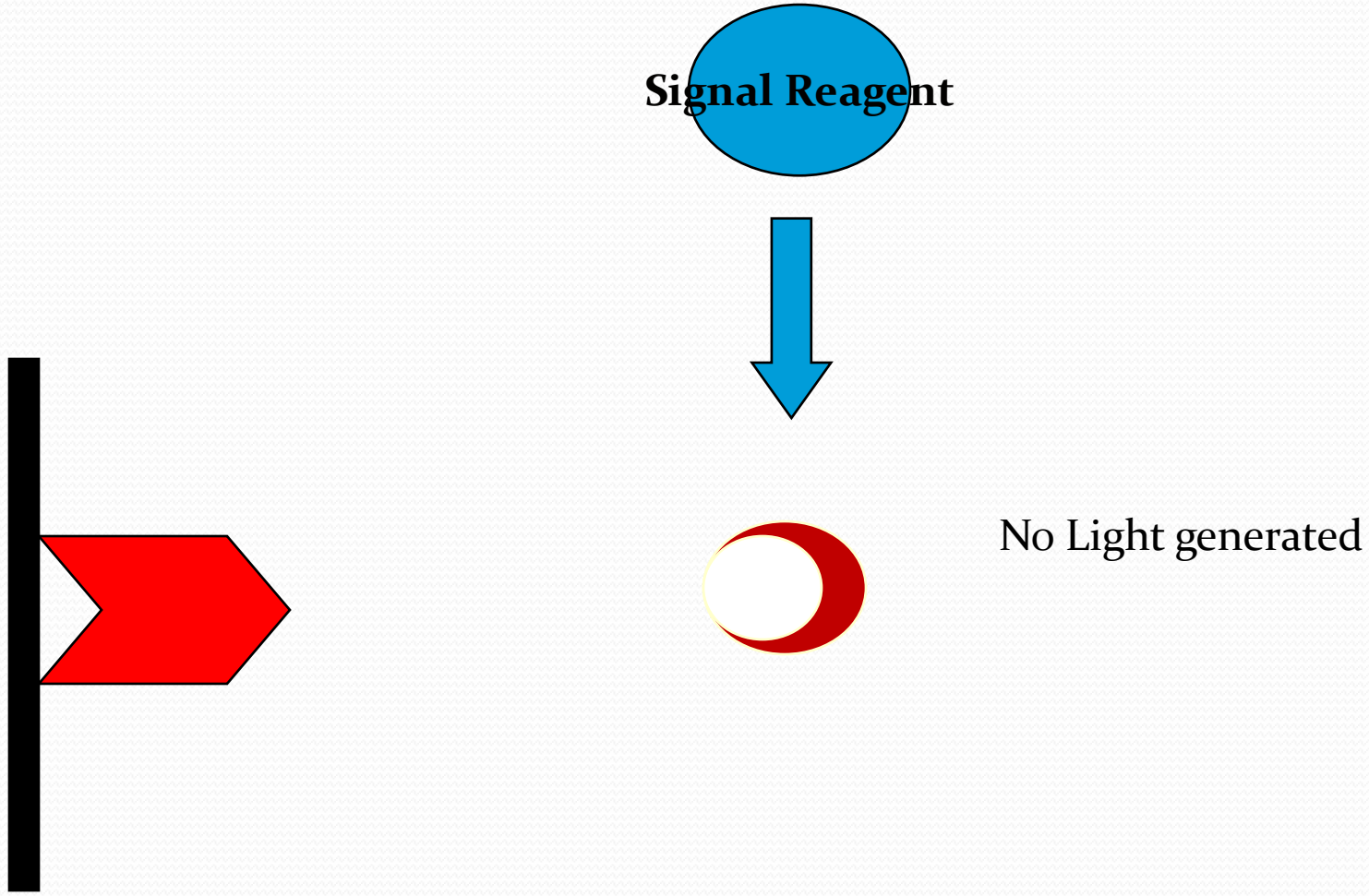
Oxidization of Signal Reagent by the Enzyme HRPo generates light



The Generated Light is measured by Luminometer

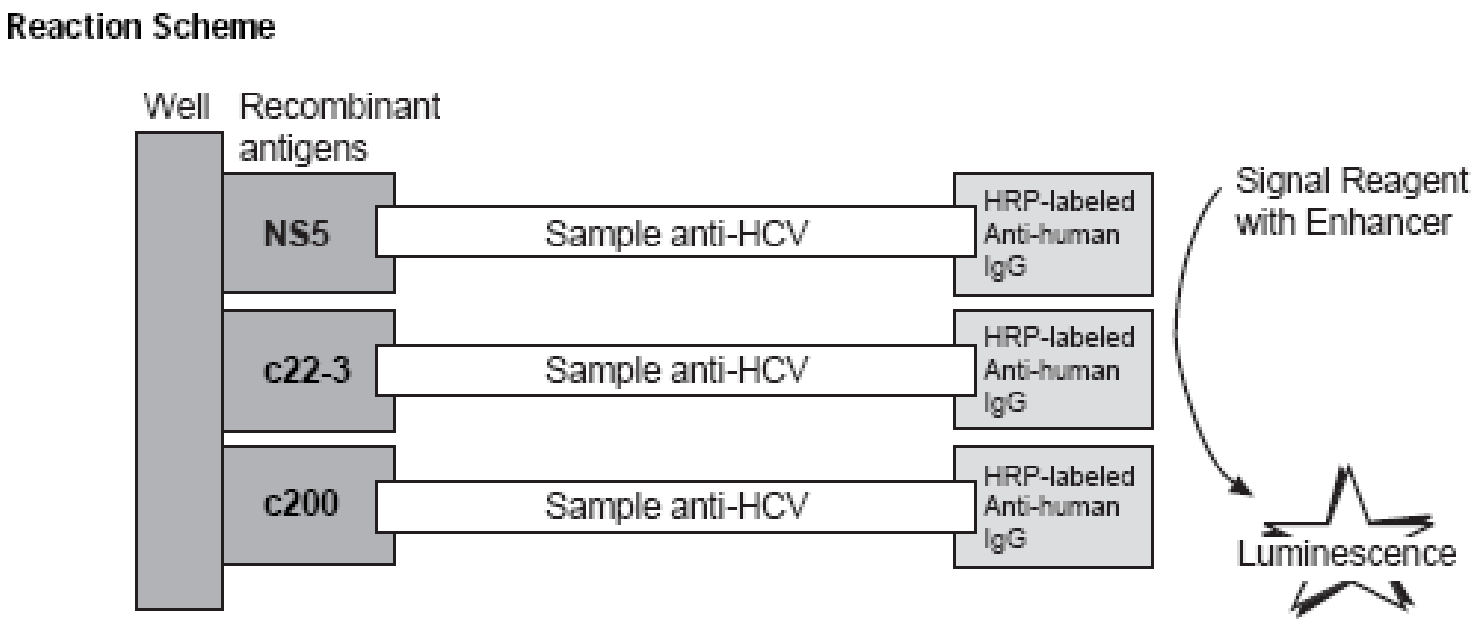


No Binding of Antibody as well as Conjugate

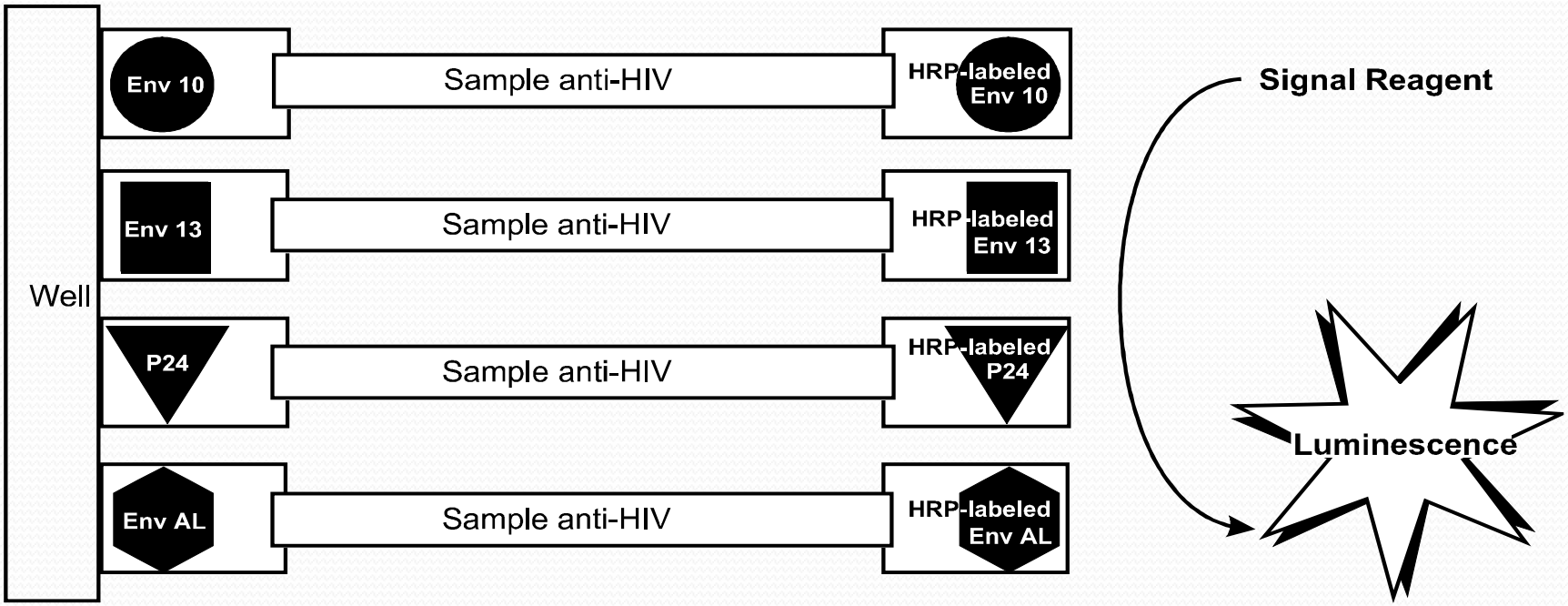


Negative reaction

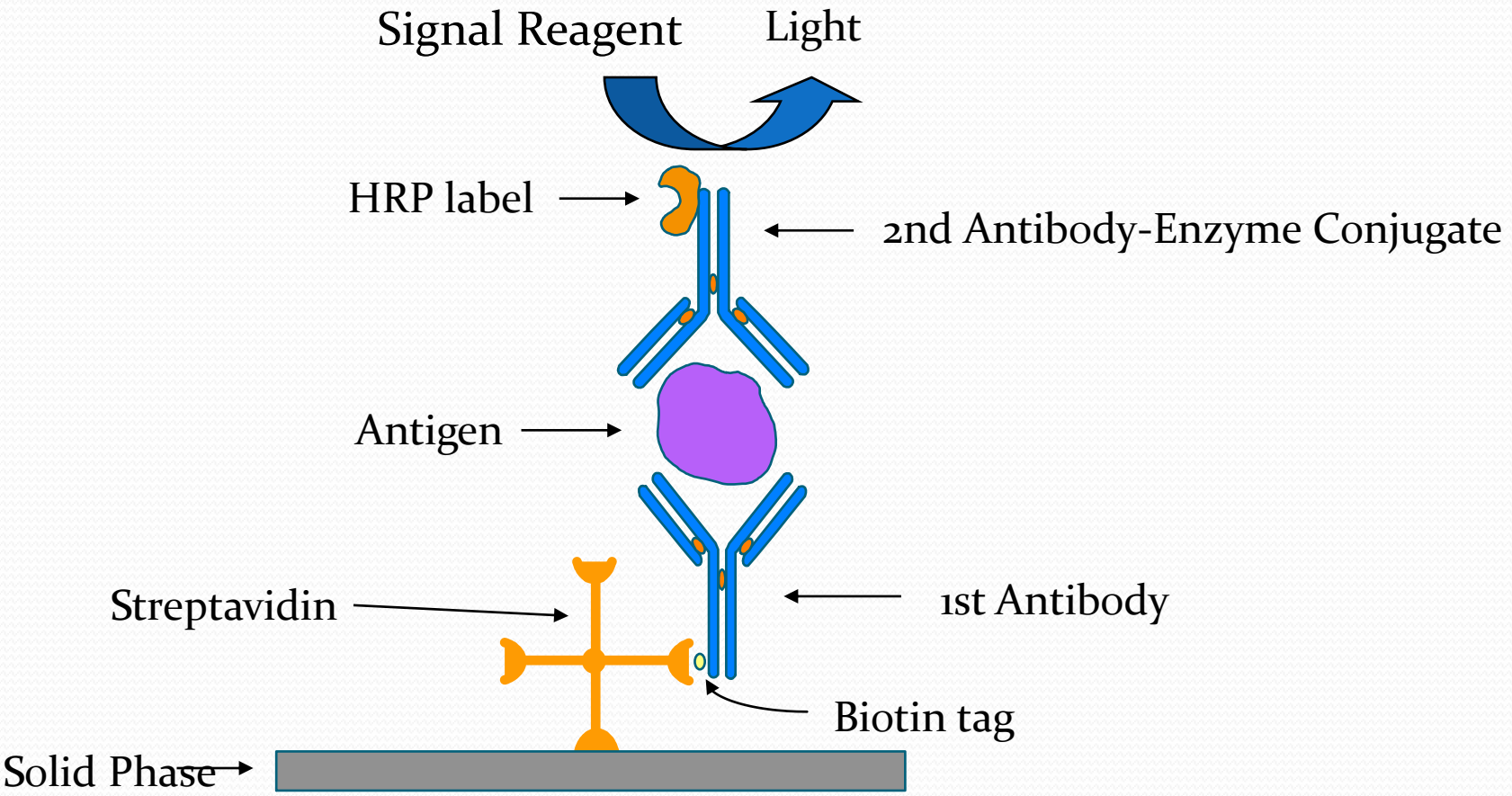
Vitros HCV –
Antigen – Anti antibody- Sandwich Assay



Vitros HIV – Antigen Sandwich Assay

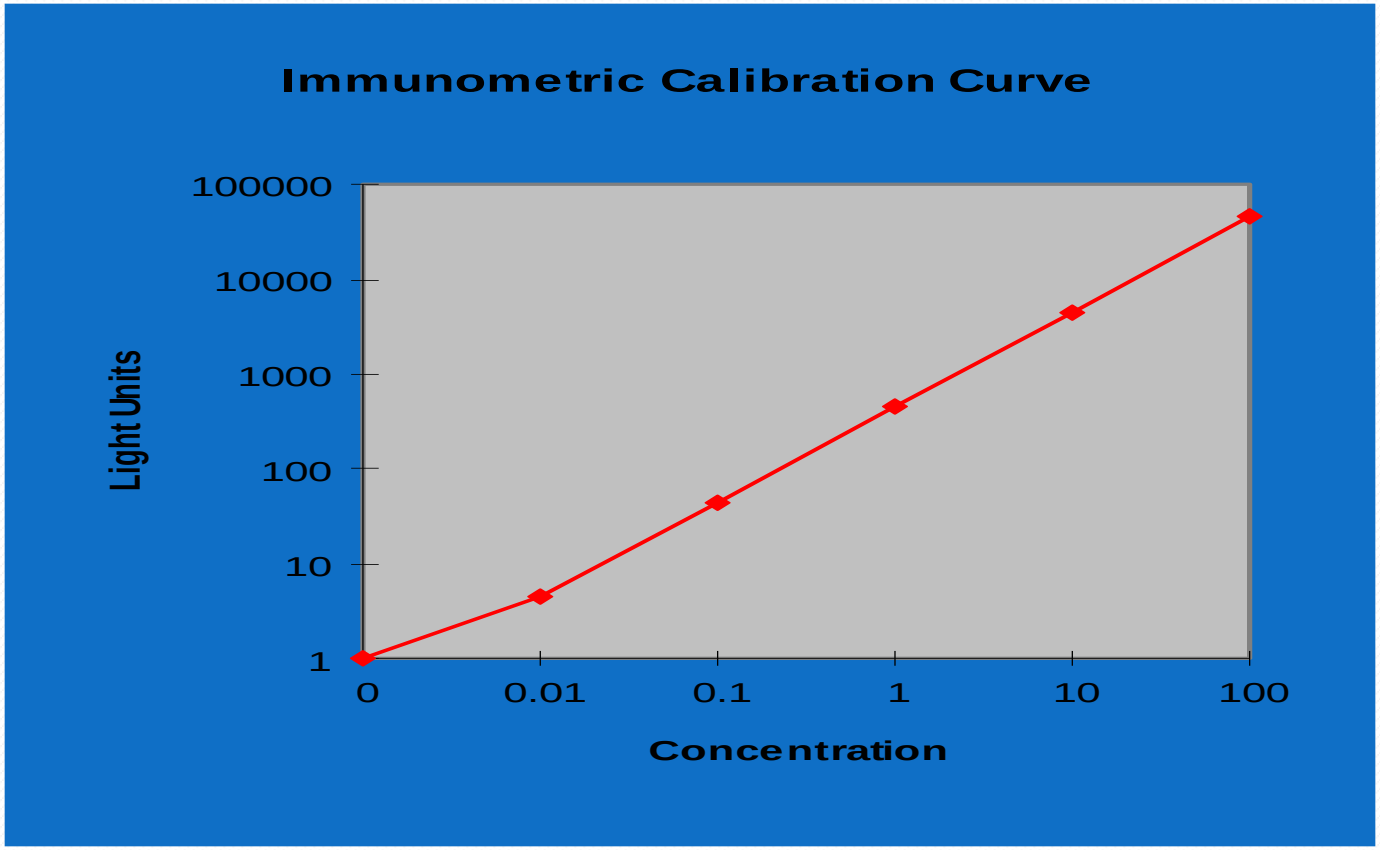


Immunometric Assay for the detection of antigen on Streptavidin Coated Well

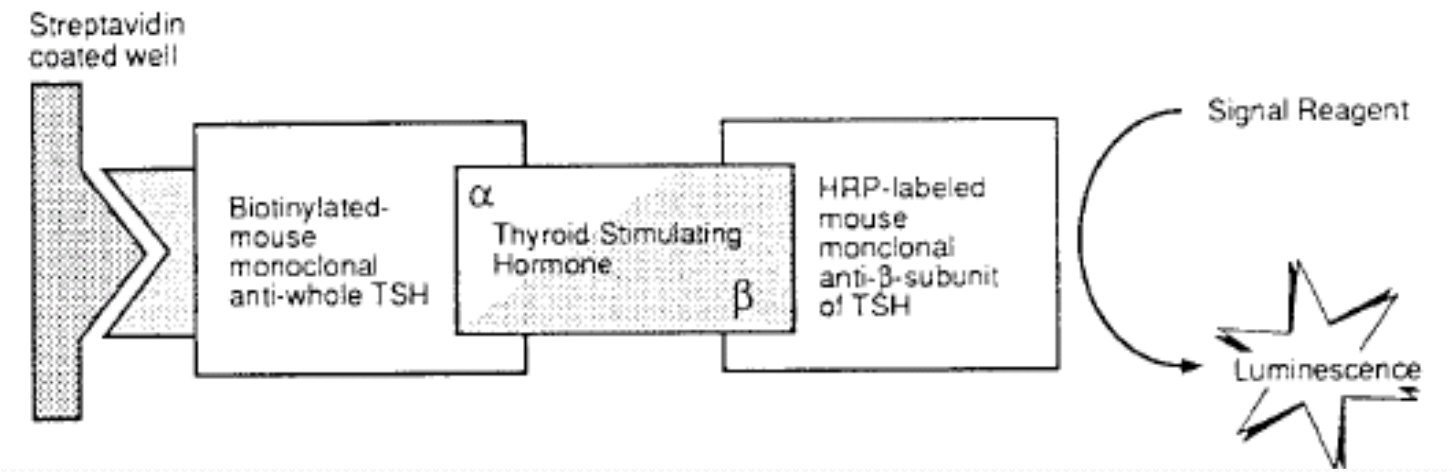


Quantitative Assay

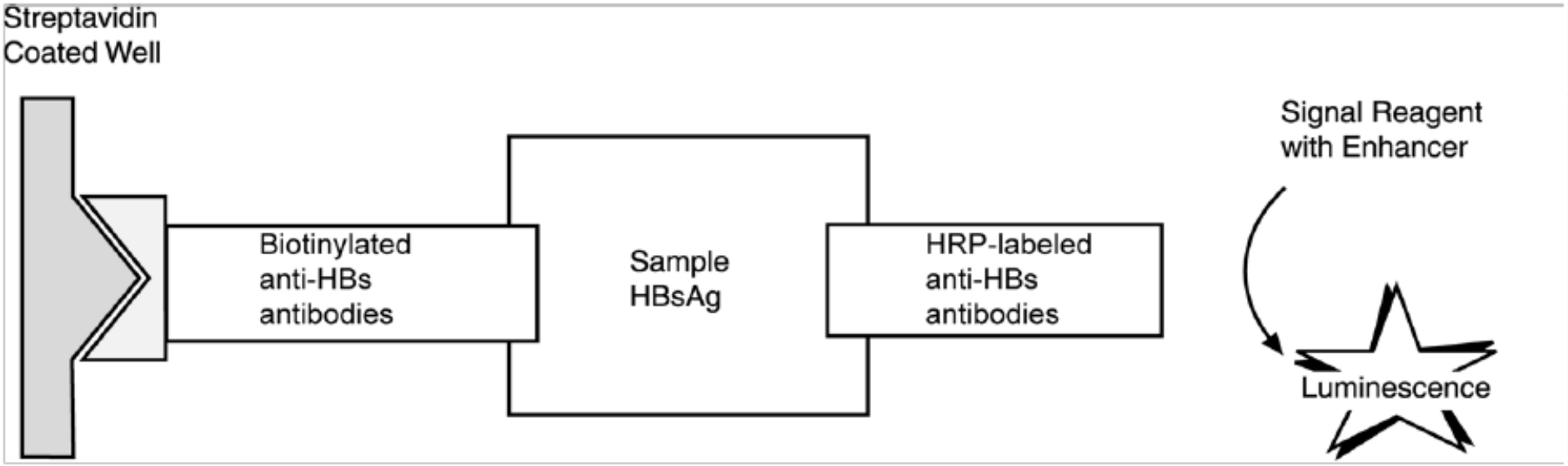
The amount of labeled antibody binding will be *proportional* to the total amount of analyte present in the patient sample.



Vitros TSH – An example of Immunometric assay



VITROS® HBsAg ES



Principles of the Procedure

Antibody – Antigen – Antibody Sandwich assay
with Streptavidin – biotin complex incorporation

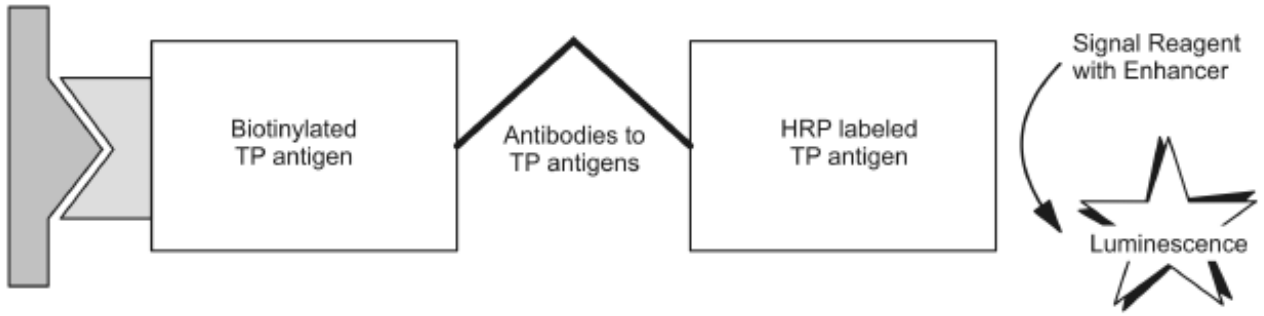
VITROS Syphilis Assay –

Double antigen Sandwich assay

Test Type	System *	Incubation Time	Time to first result	Test Temperature	Reaction Sample Volume
Immunometric	ECi/ECiQ, 3600, 5600	16 mins first incubation 8 mins second incubation	35 minutes	37 °C	25 µL

* Not all products and systems are available in all countries.

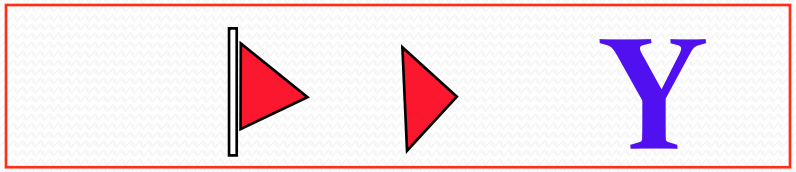
Reaction Scheme



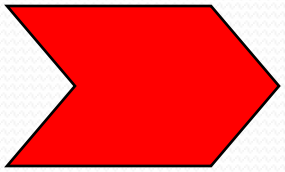
Tp Specific IgM antibody – Second week of infection
Tp Specific IgG antibody – Fourth week of infection

Competitive Assay

- Competitive Assay ?
- For the detection of antigen which are small molecule.

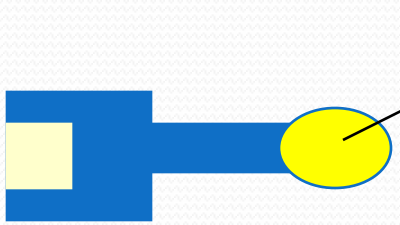


Basic Principle of Competitive Assay

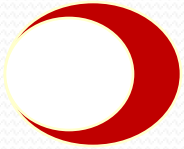


Antigen

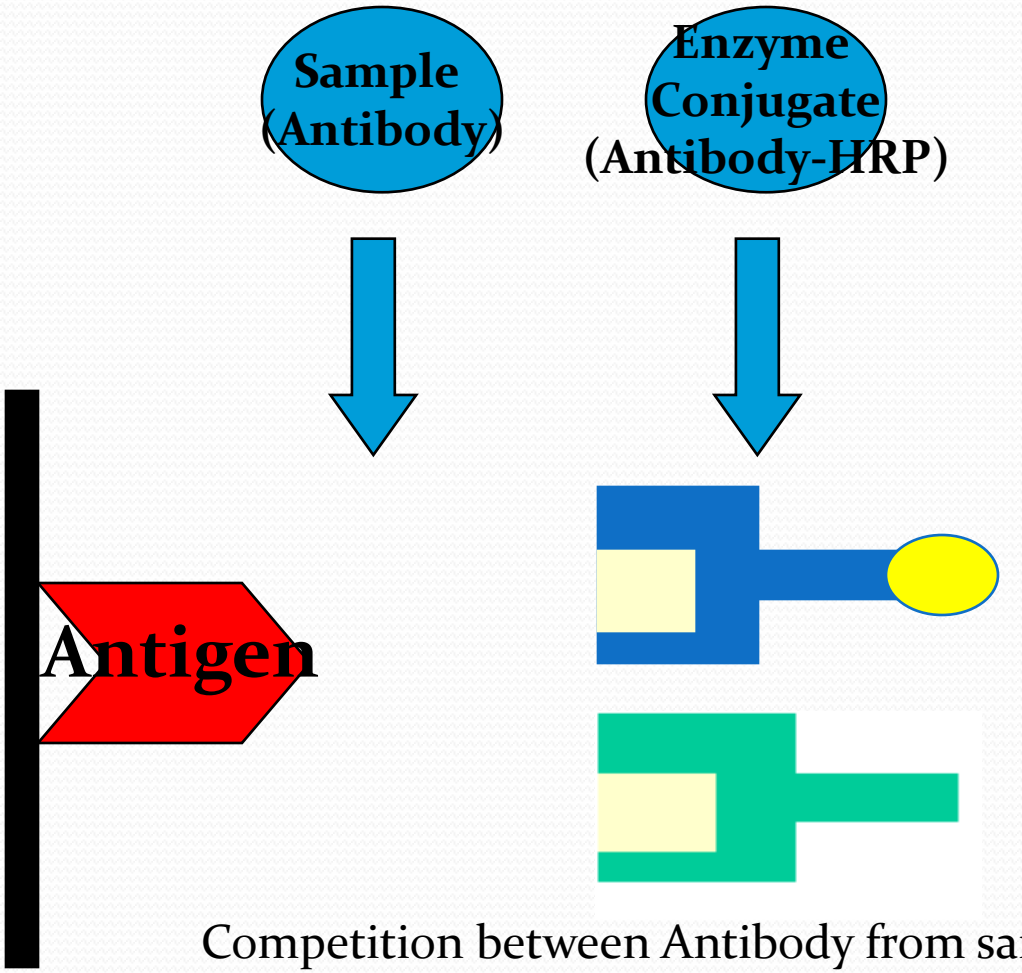
Antibody



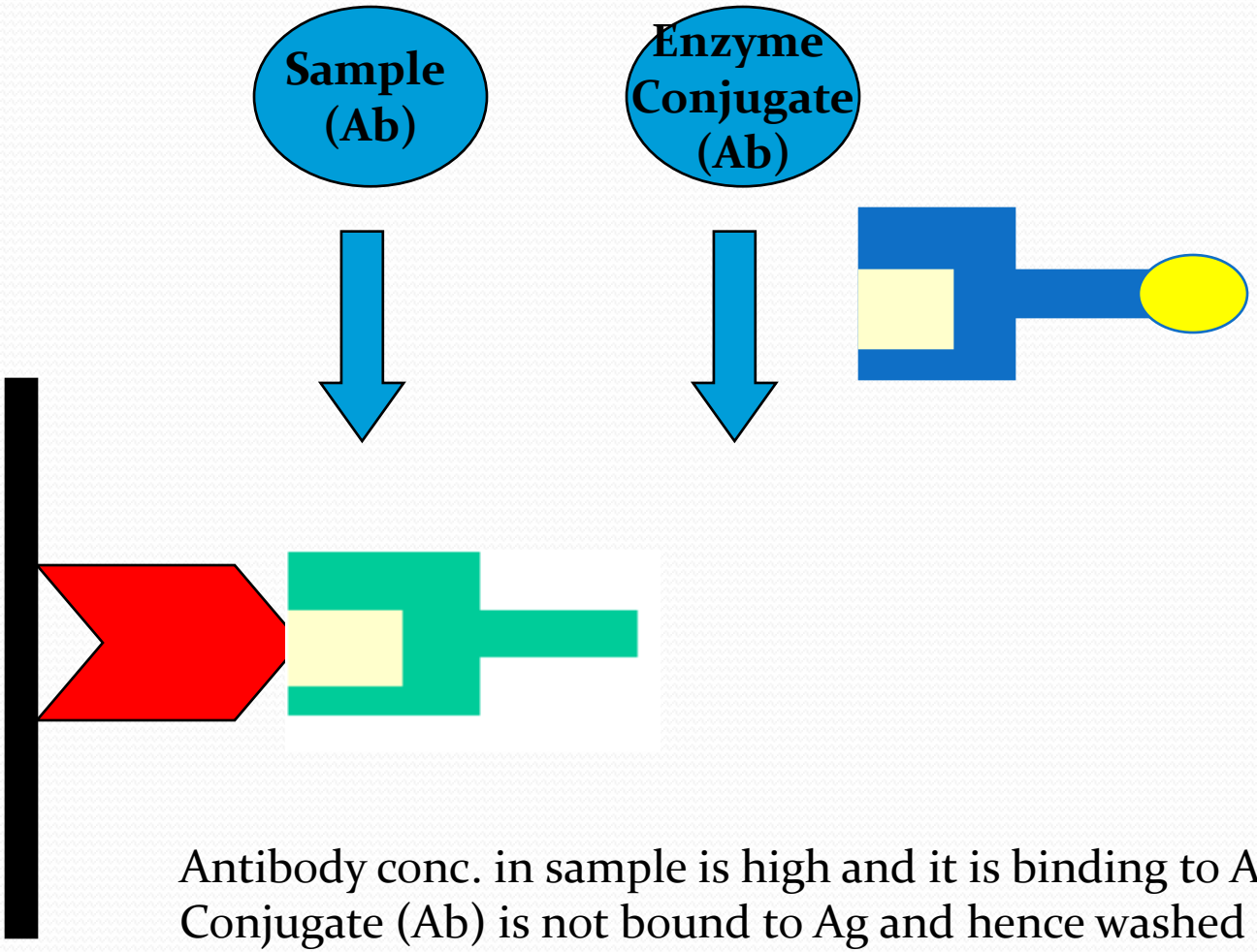
Conjugate (Antibody tagged to HRP)



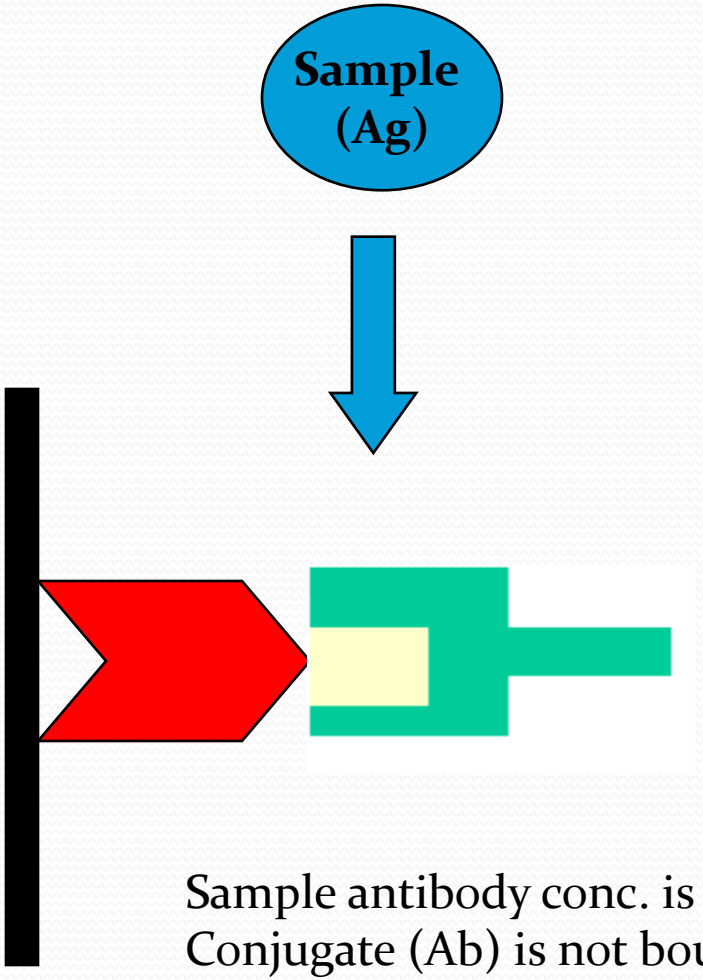
Signal Reagent



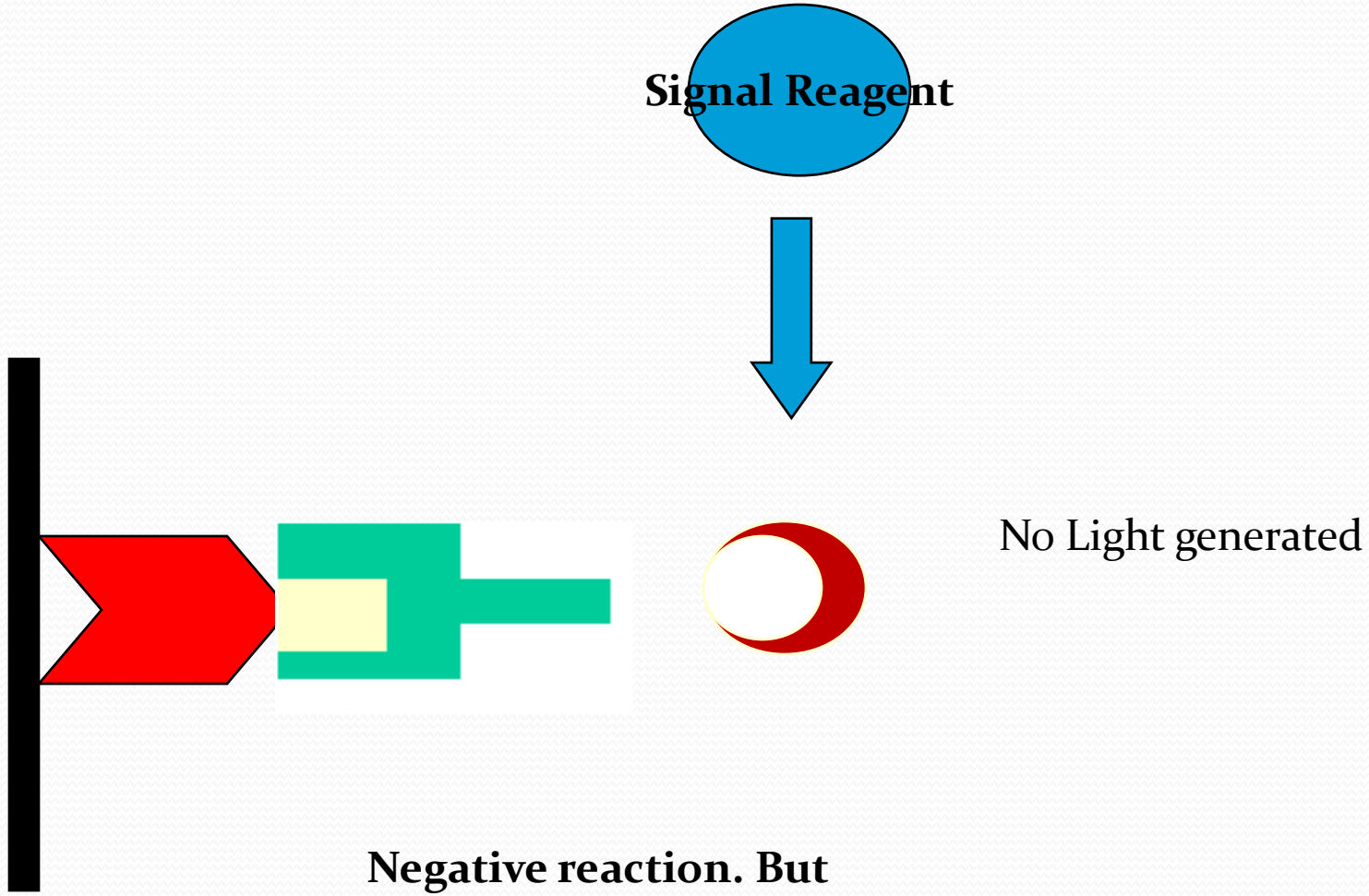
Competition between Antibody from sample and Antibody from conjugate for the limited Ag



Antibody conc. in sample is high and it is binding to Ag.
Conjugate (Ab) is not bound to Ag and hence washed away



Sample antibody conc. is high and it is binding to Antigen.
Conjugate (Ab) is not bound to Ag and hence washed away



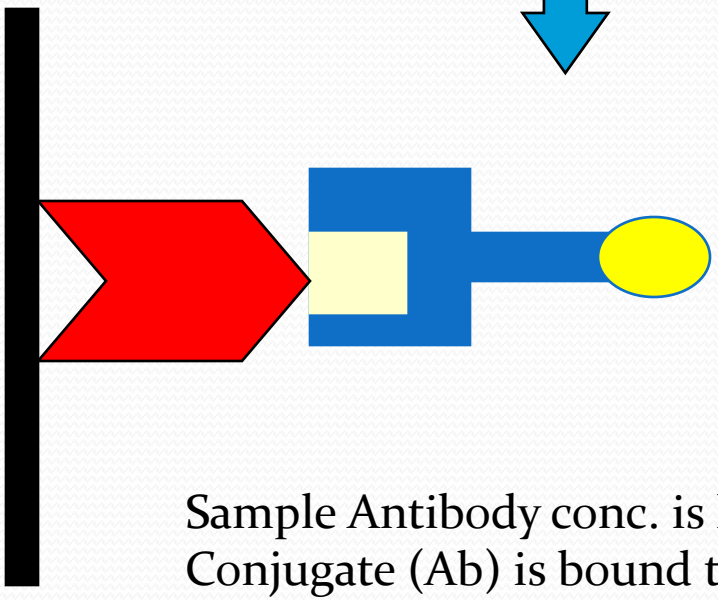
Negative reaction. But

Positive for Antibody presence.

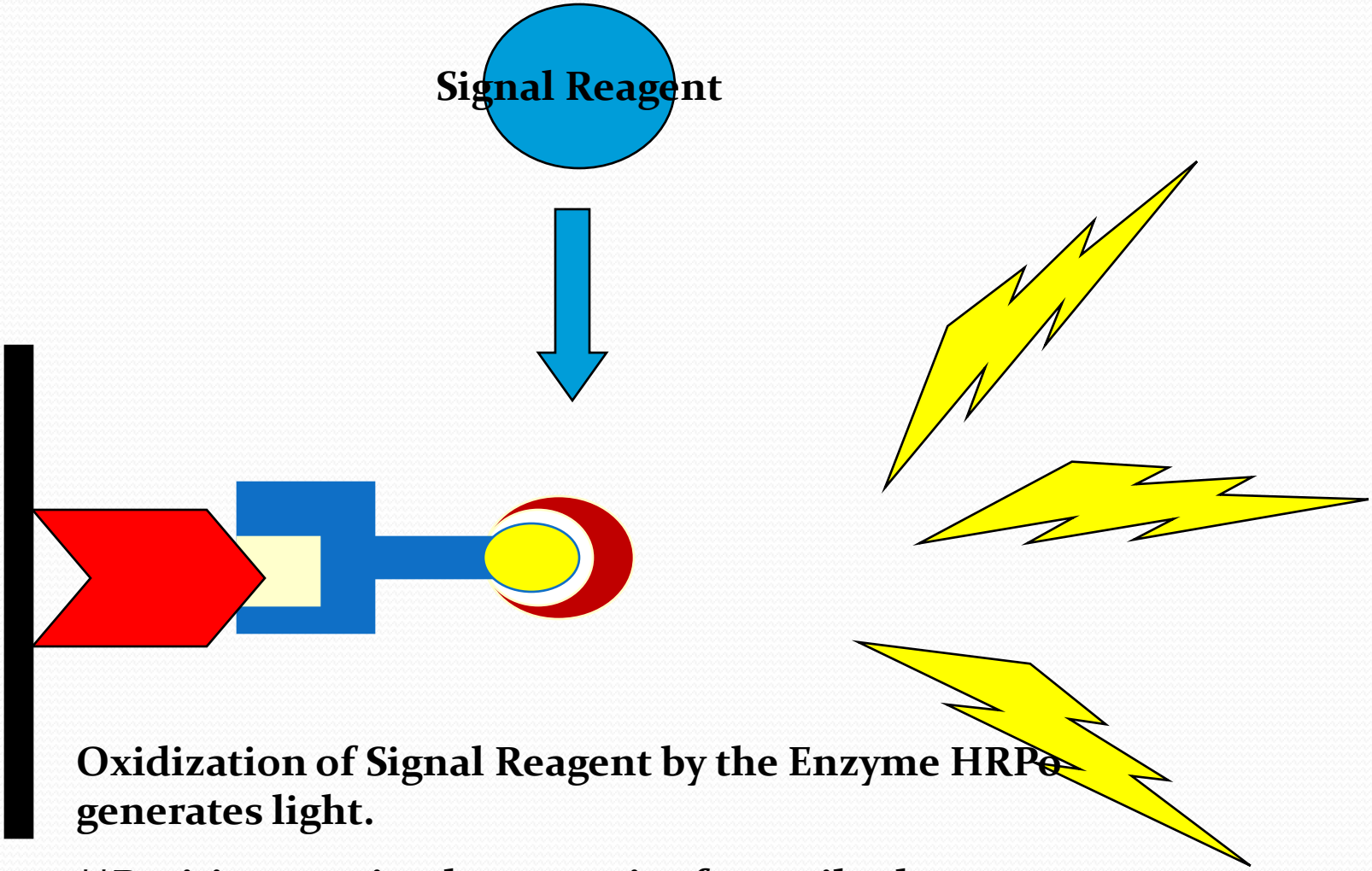
Sample (Ag)

Enzyme Conjugate (Ag)

Low conc.



Sample Antibody conc. is low or nil and it is not binding to Ag.
Conjugate (Ab) is bound to Ag.

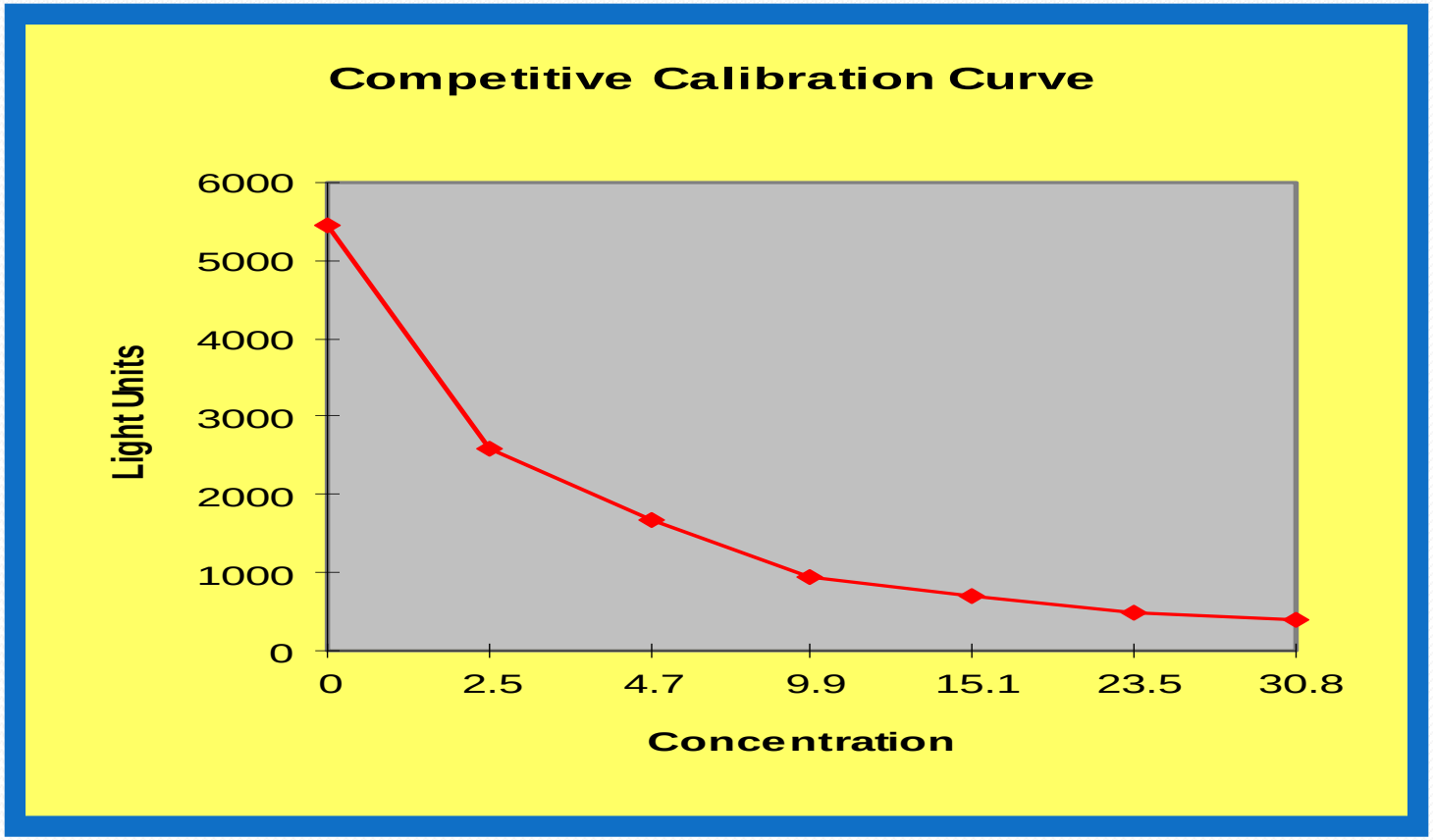


Oxidization of Signal Reagent by the Enzyme HRPo generates light.

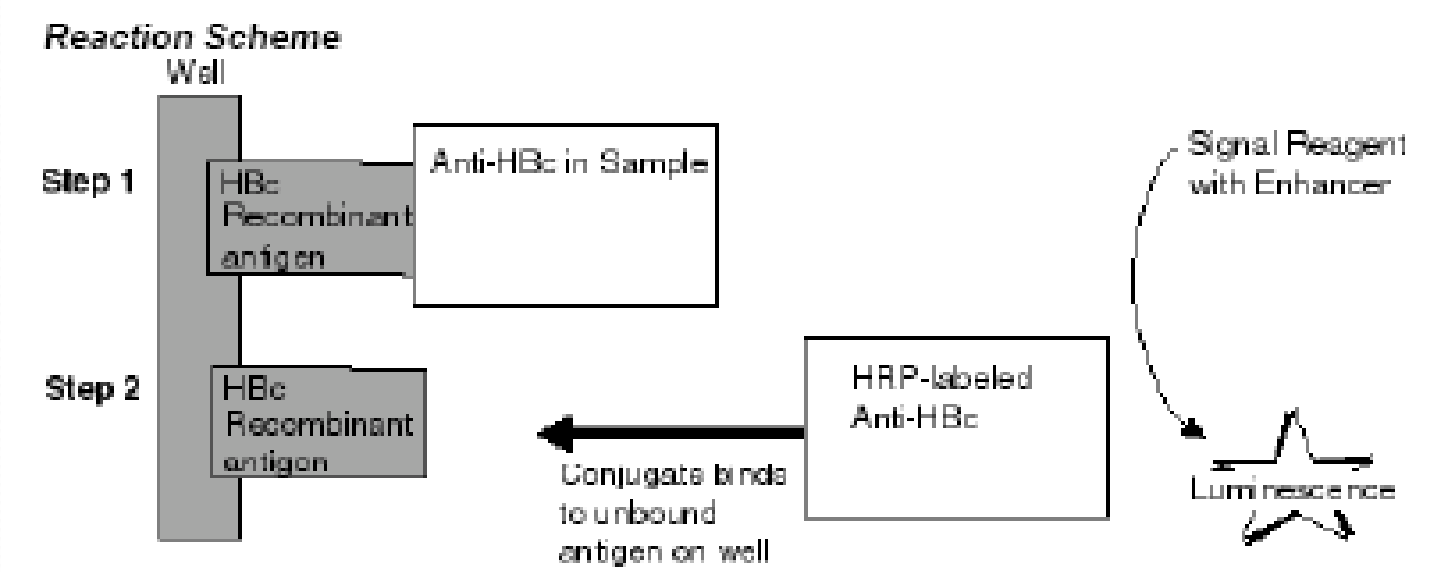
****Positive reaction but negative for antibody**

Quantitative assay – Competitive format

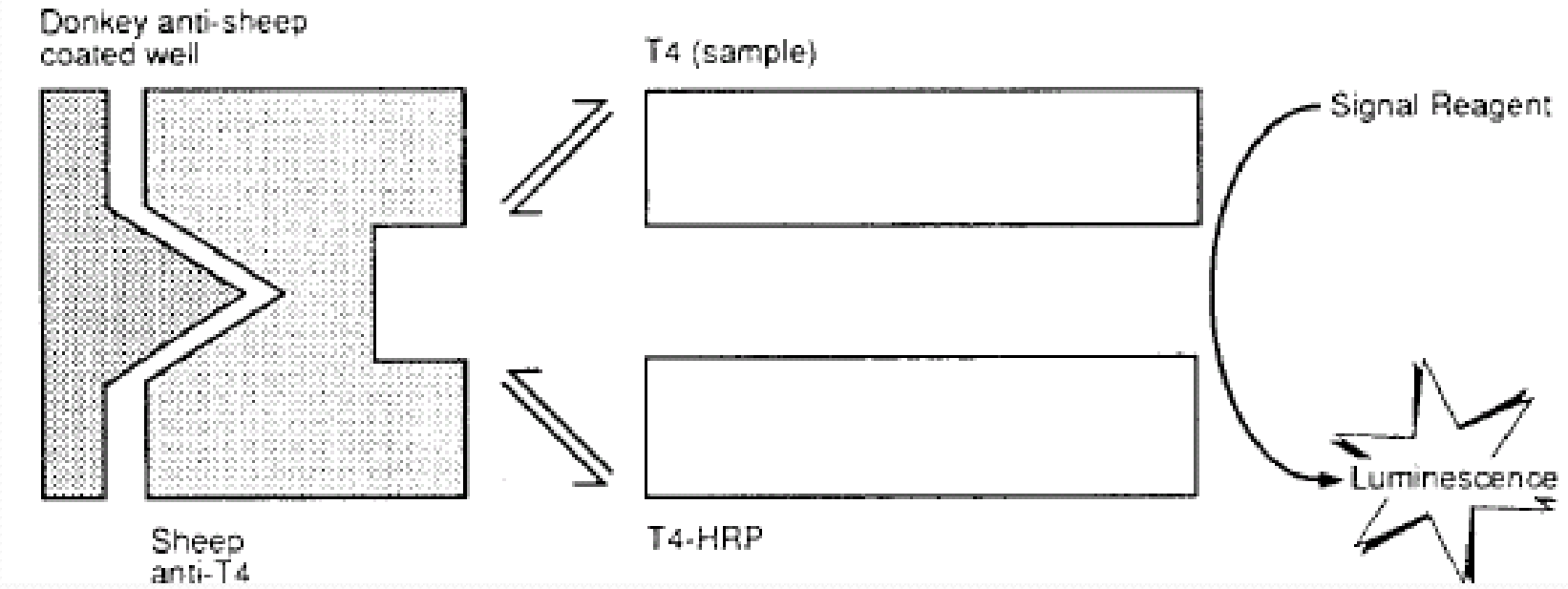
The amount of labeled analyte bound to the antibody is *inversely proportional* to the concentration of the unlabeled analyte in a patient sample.



Vitros Anti HBc Ab – Competitive assay for the detection of Antibody



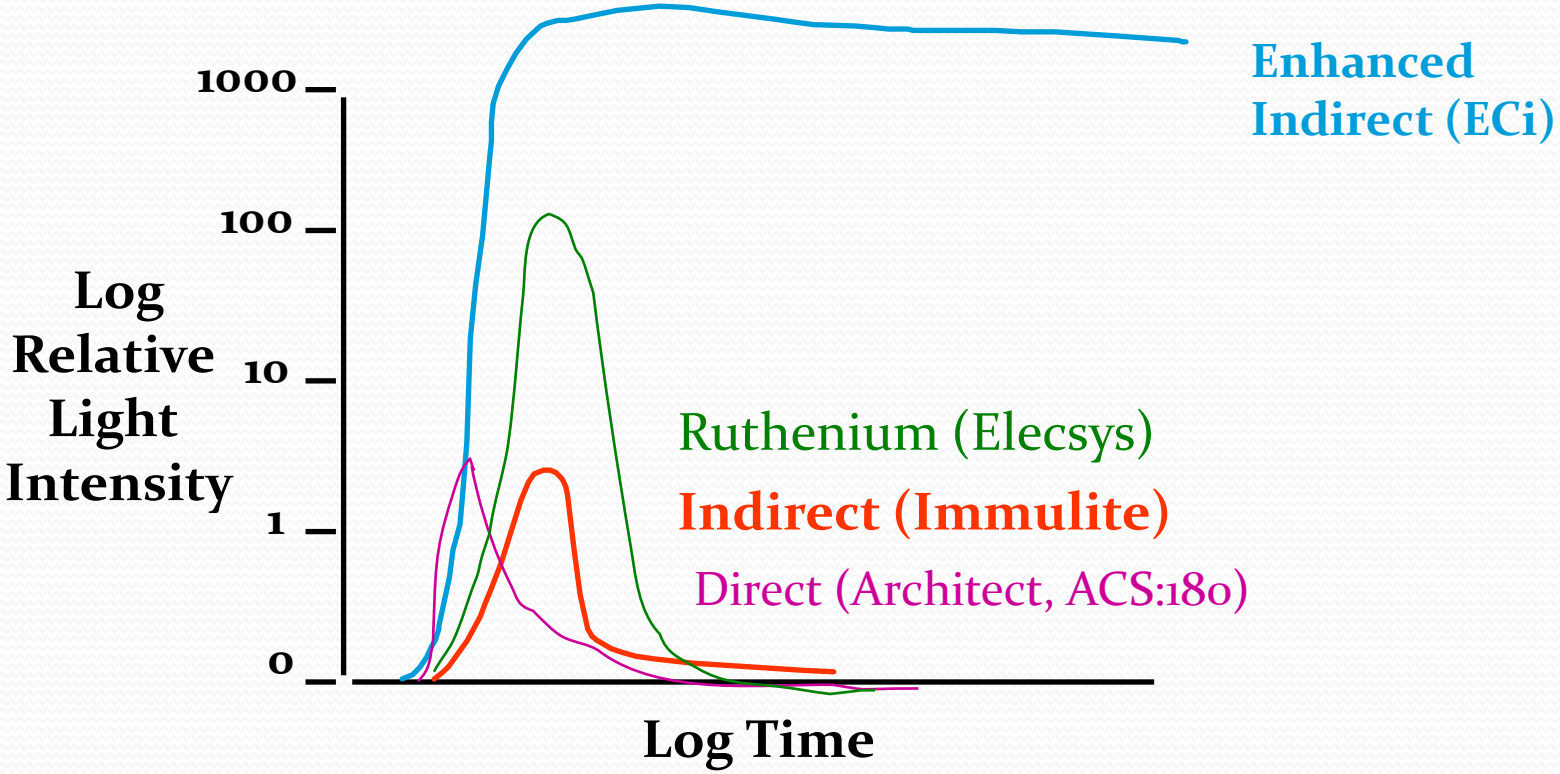
Vitros T4 – an example for Competitive Assay for Antigen detection



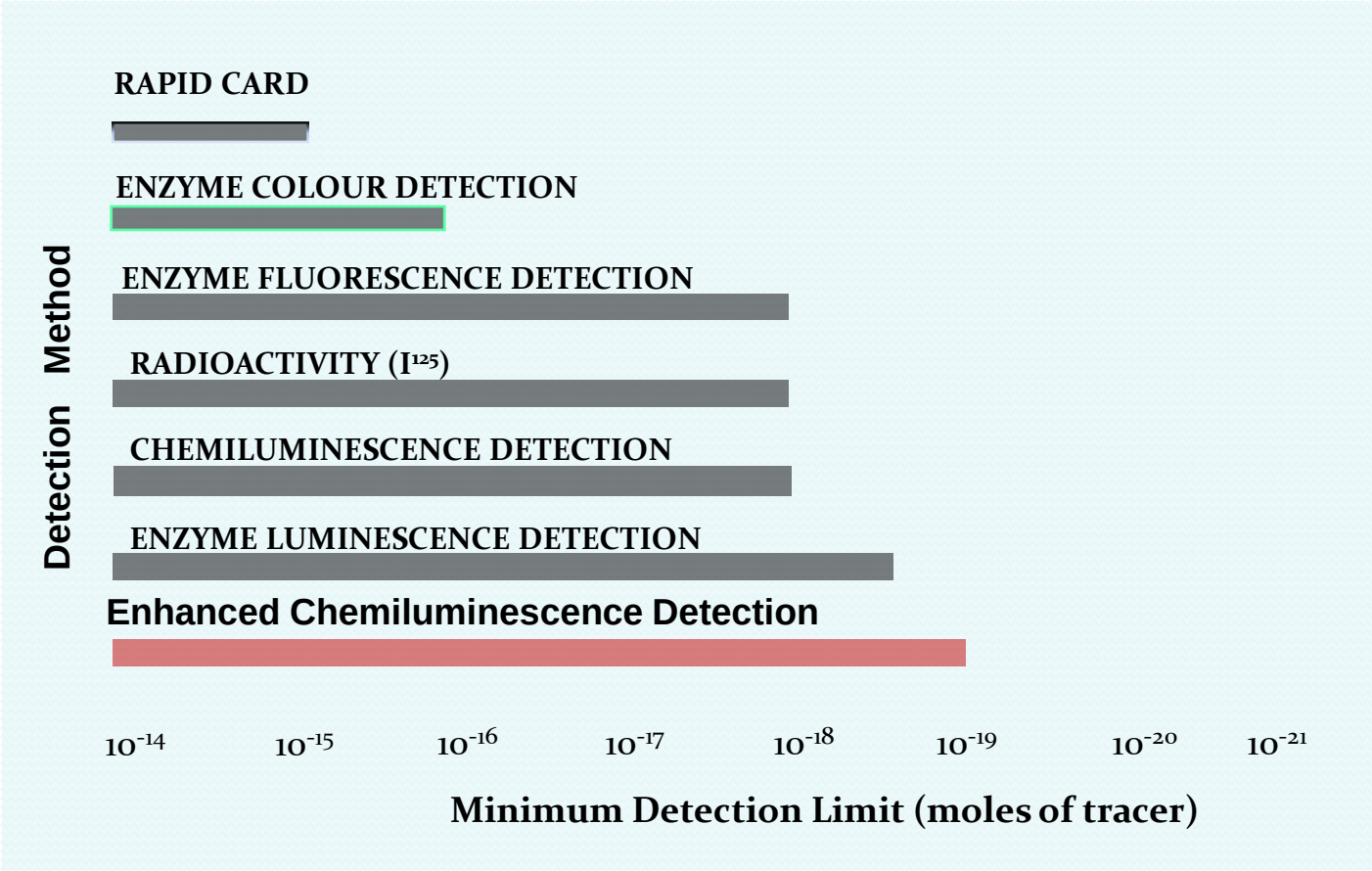
Enhanced Chemiluminescence

- **Significantly improved signal output (light) compared to conventional direct and indirect chemiluminesence provides for:**
  - **Superior analytical sensitivity and precision**
  - **Broader assay dynamic range**
  - **Small sample volume requirements**

Enhanced Chemiluminescence



Enhanced Chemiluminescence – Comparison with other techniques



Chemiluminescence (CLIA)

- Enhanced chemiluminescence enables earlier detection than other existing immunoassay methods
- Enhanced sensitivity – narrow window period
- Uncompromised specificity
- Quick TAT helps in emergency situation.
- Automation & Ease of use is an overt advantage


integrity by
intelli check™

Challenge in the Laboratory…

….Reduce errors

- Pre and Post analytical variables
  - **Primary tube sampling**
  - **No sample splitting**
  - **Sample Integrity verification**
  - **Bi-directional interfacing with LIS for sample programming and reporting**
  - **Auto-verification for standardized reporting**
- Analytical variables
- **Process Review and releasing Report**

Preventable Errors Abound…

June 14, 2006

Hospitals Move to Cut Dangerous Lab Errors

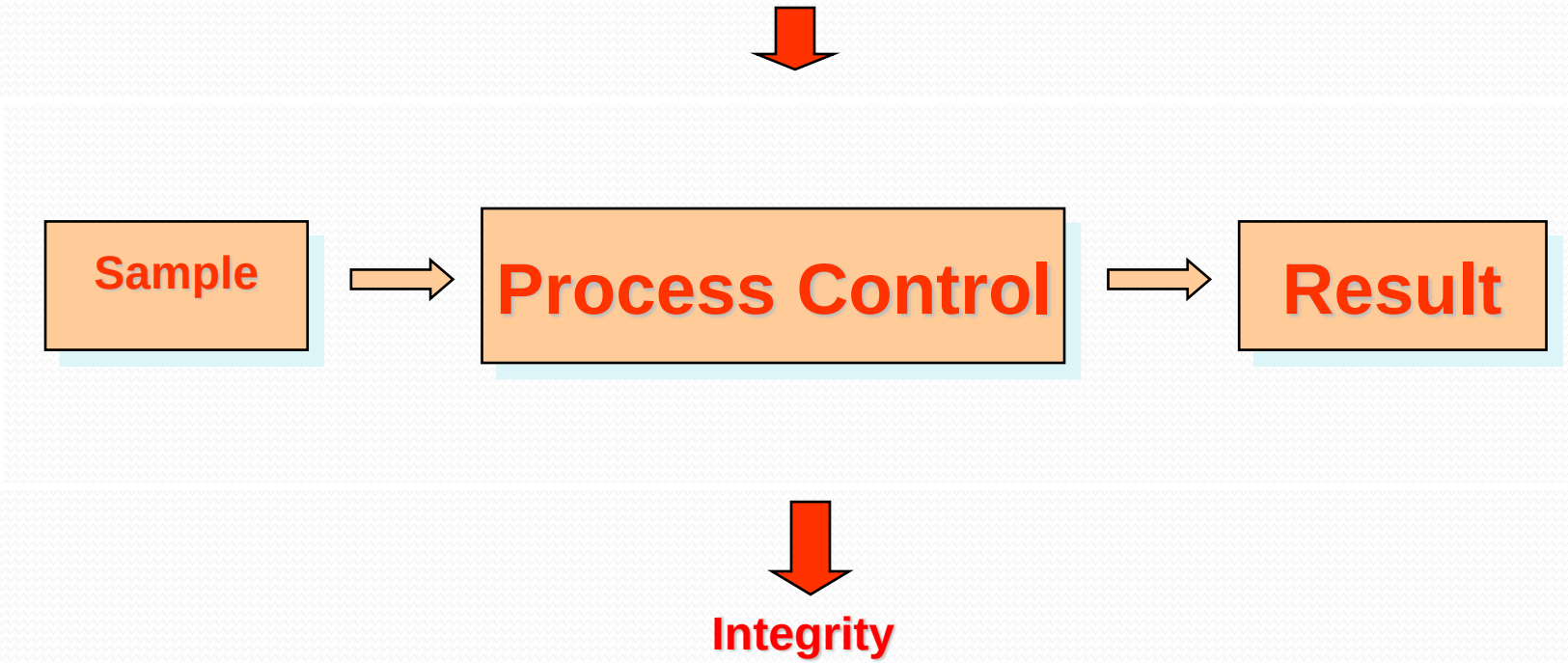
Improved Specimen Collection And Efficiency Help Increase Accuracy of Medical Testing

June 14, 2006; Page D1

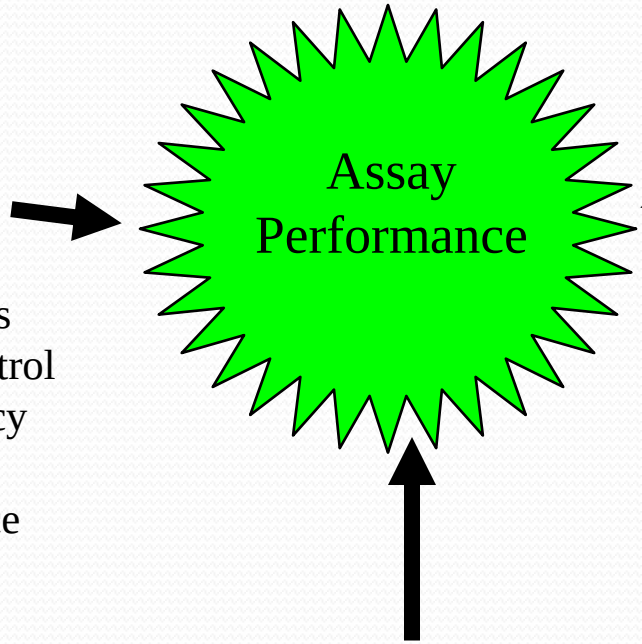
Diagnosed with a deadly neuroendocrine cancer at age 34, Kim Tutt was told she might have just months to live. After five surgeries to excise a cyst under her gum, remove her lower jaw and teeth, and reconstruct her face with bone taken from her lower leg, the Tyler, Texas, mother of two heard some shocking news: The slides from the biopsy of her cyst had been contaminated by cells from another patient, and she had never had cancer in the first place.

"… 3 to 5% of specimens taken each year are defective… blood that isn't drawn correctly… mix-up with another patient's sample"

- Science based Innovative technological advancements contribute to medical error reduction



VITROS System: Bringing it all together



SYSTEM

- Incubation Times
- Flexible Protocols
- Temperature Control
- Metering Accuracy
- Reliability
- Wash Performance

MEASURING TECHNOLOGY

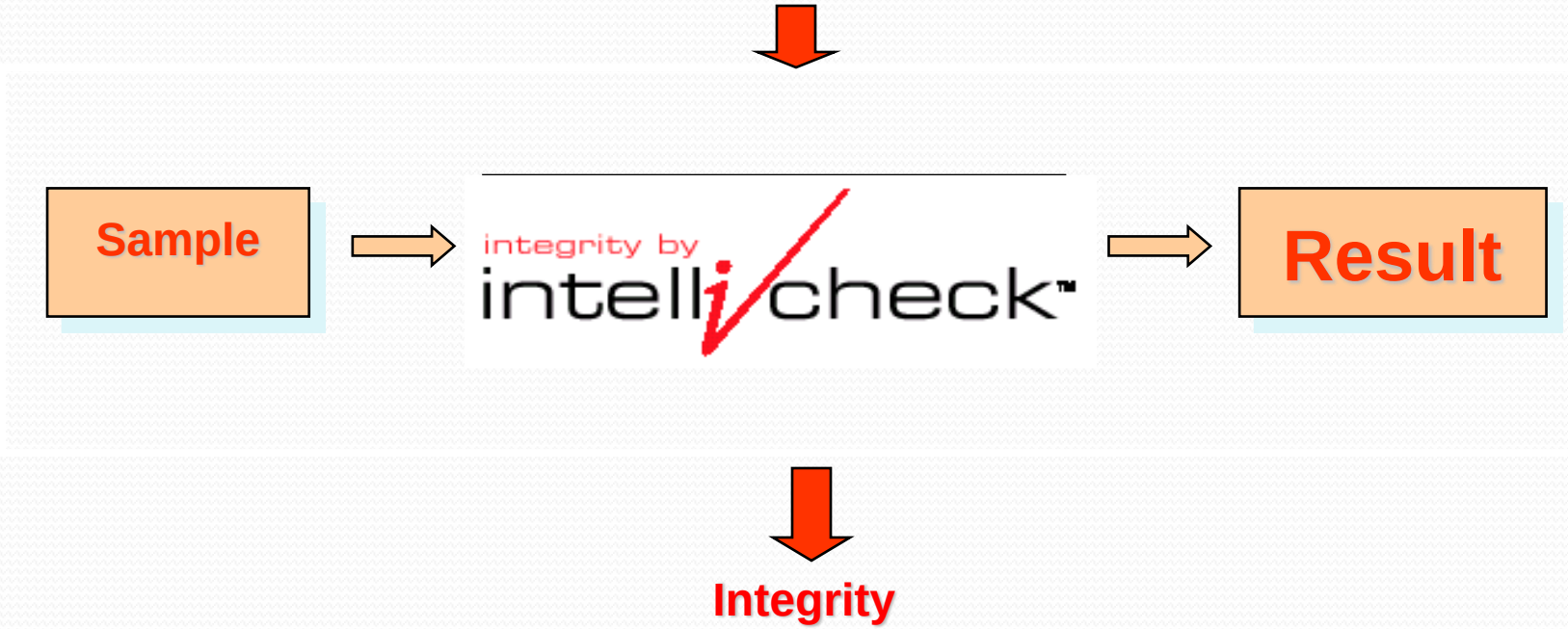
- Enhanced Chemiluminescence
- Micro-Wells
- Range
- Sensitivity
- Precision

ASSAY DESIGN

- Antibody Selection
- Quality
- Purity of Antigen
- Buffer Formulation

To enhance the Laboratory process .....

Ortho-Clinical Diagnostics is set to the challenge of reduction of error in the process?



What is Intellicheck™ Technology?

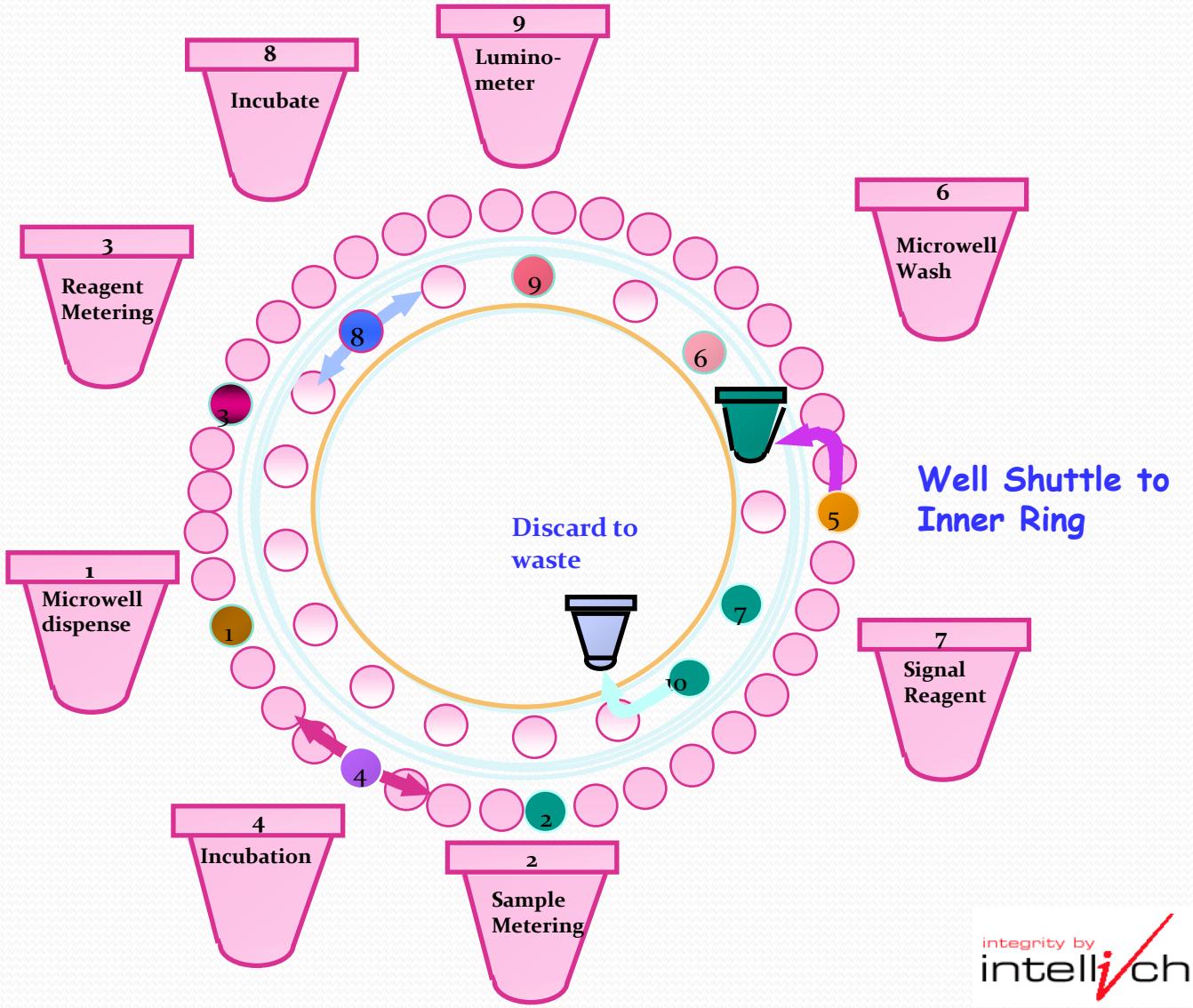
"Intellicheck Technology" is a series of unique and patented technologies that provide integrated Process Control

- performs, monitors and verifies diagnostic checks throughout sample and assay processing

Intellicheck Technology for Microwell assay

- Sample Metering
- Sample Indices
- Sample Dilution
- Reagent Metering
- Signal Reagent Metering
- Well Wash
- Luminometer

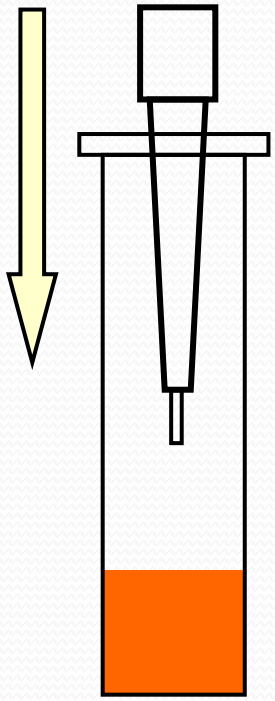
Steps - "Journey of the Well"



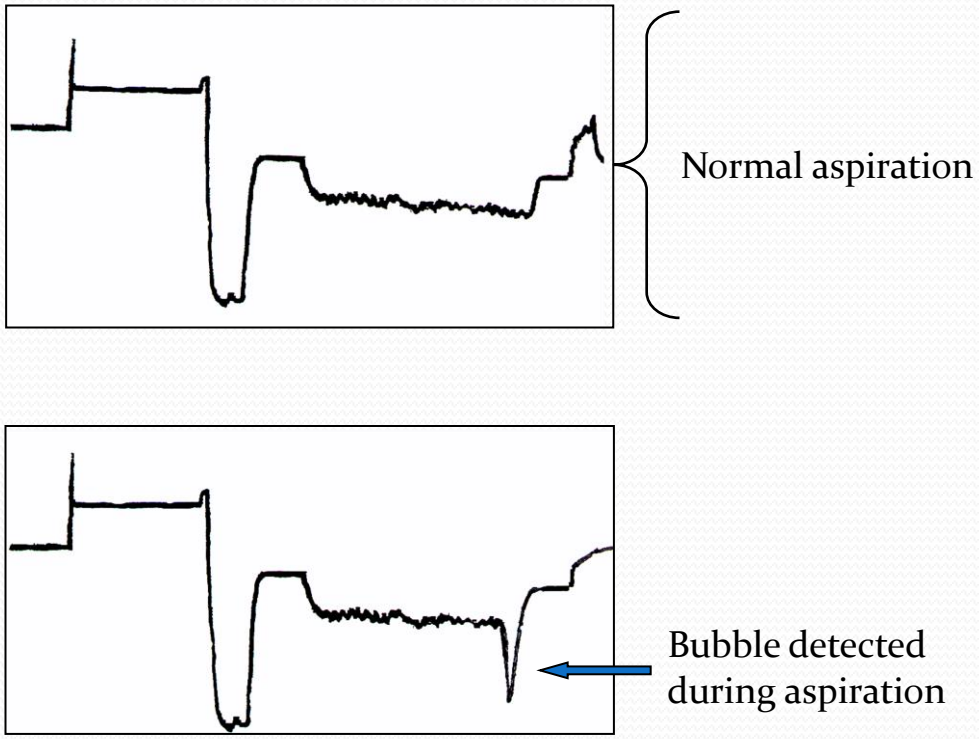
Sample Metering

Disposable Tip Sample Metering

Patented Pressure/Level Sensing Technology



Aspiration Pressure Profiles

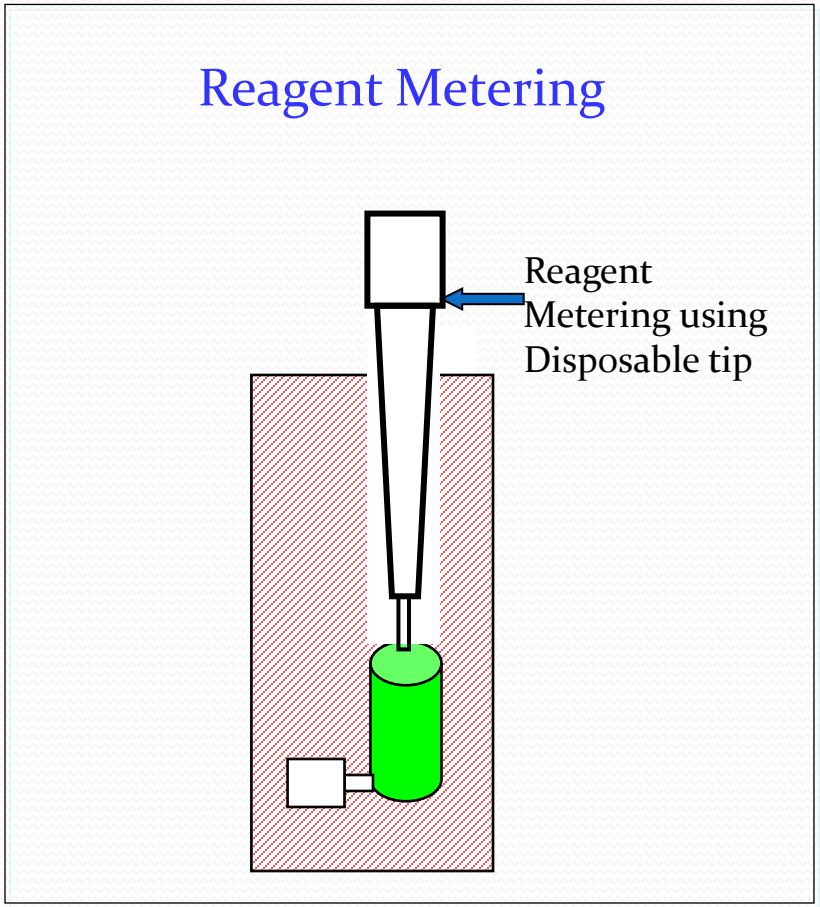


integrity by intelli check™

Reagent Metering

Reagent Metering Verification

- Verifies subsystem performance before aspiration and dispense
- Patented process
- Eliminates the potential for a misreported result by not processing an assay when an exception is detected
- Ensures result integrity

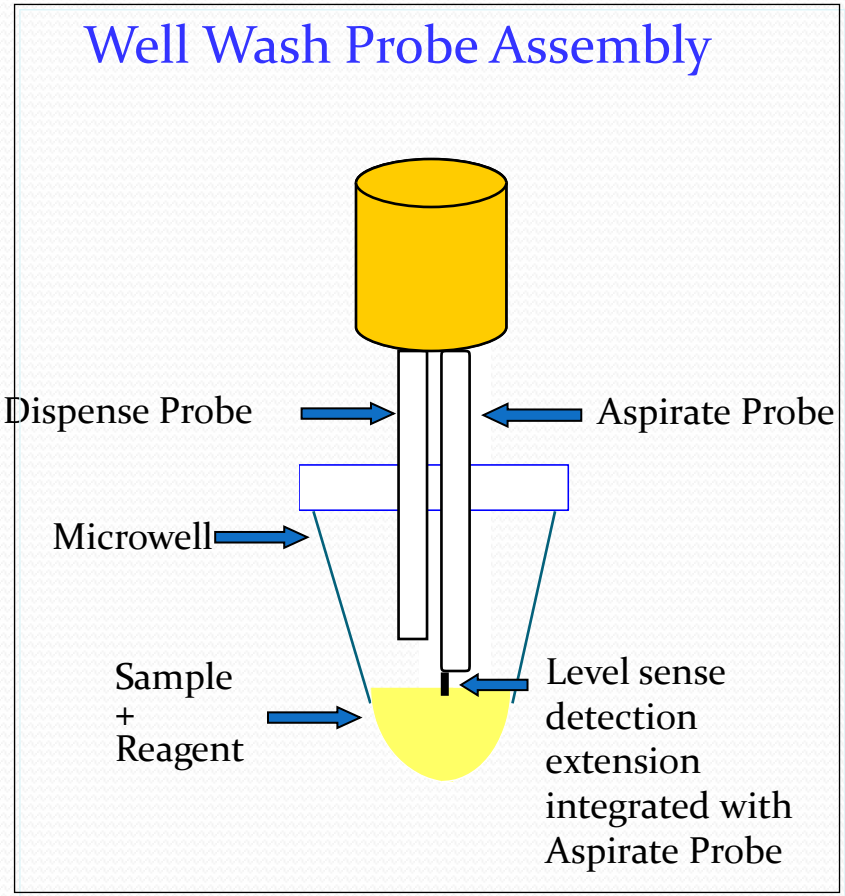


integrity by intelli check™

Reagent Metering

Sample + Reagent Verification

- **Sample + Reagent volume verification**
  - **Ensures results integrity**

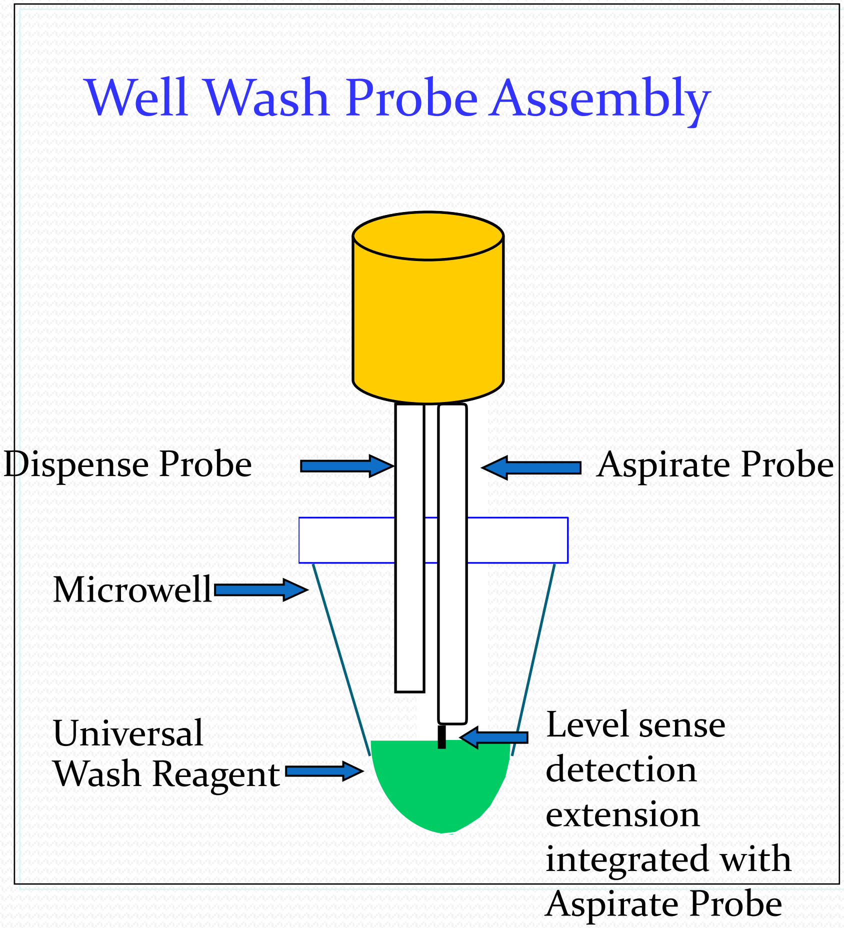


integrity by intelli check™

Well Wash

Well Wash Dispense Verification

- **Verification of proper Universal Wash Reagent volume dispensed and removed from the Microwell**
- **Level sensing technology**
- **Eliminates the potential for a misreported result by not processing an assay when an exception is detected**
- **Detection with automatic recovery including maintaining continuous, walkaway operation**
- **Ensures result integrity**



Signal Reagent

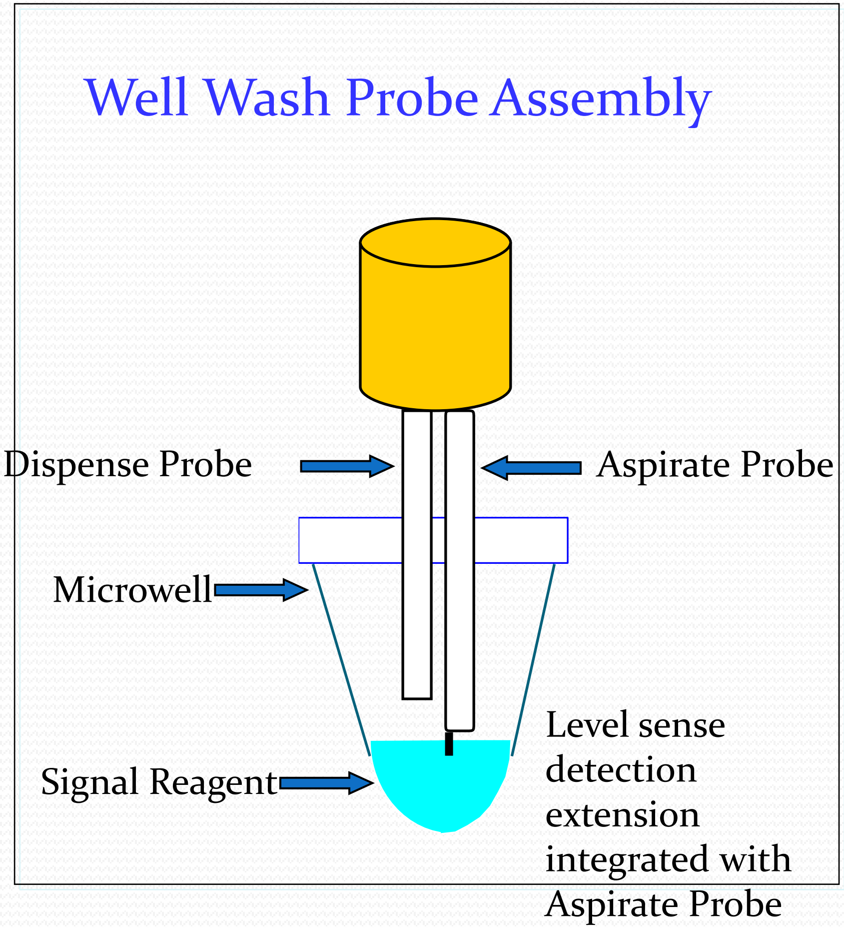
Signal Reagent Dispense Verification

Signal Dispense Verification

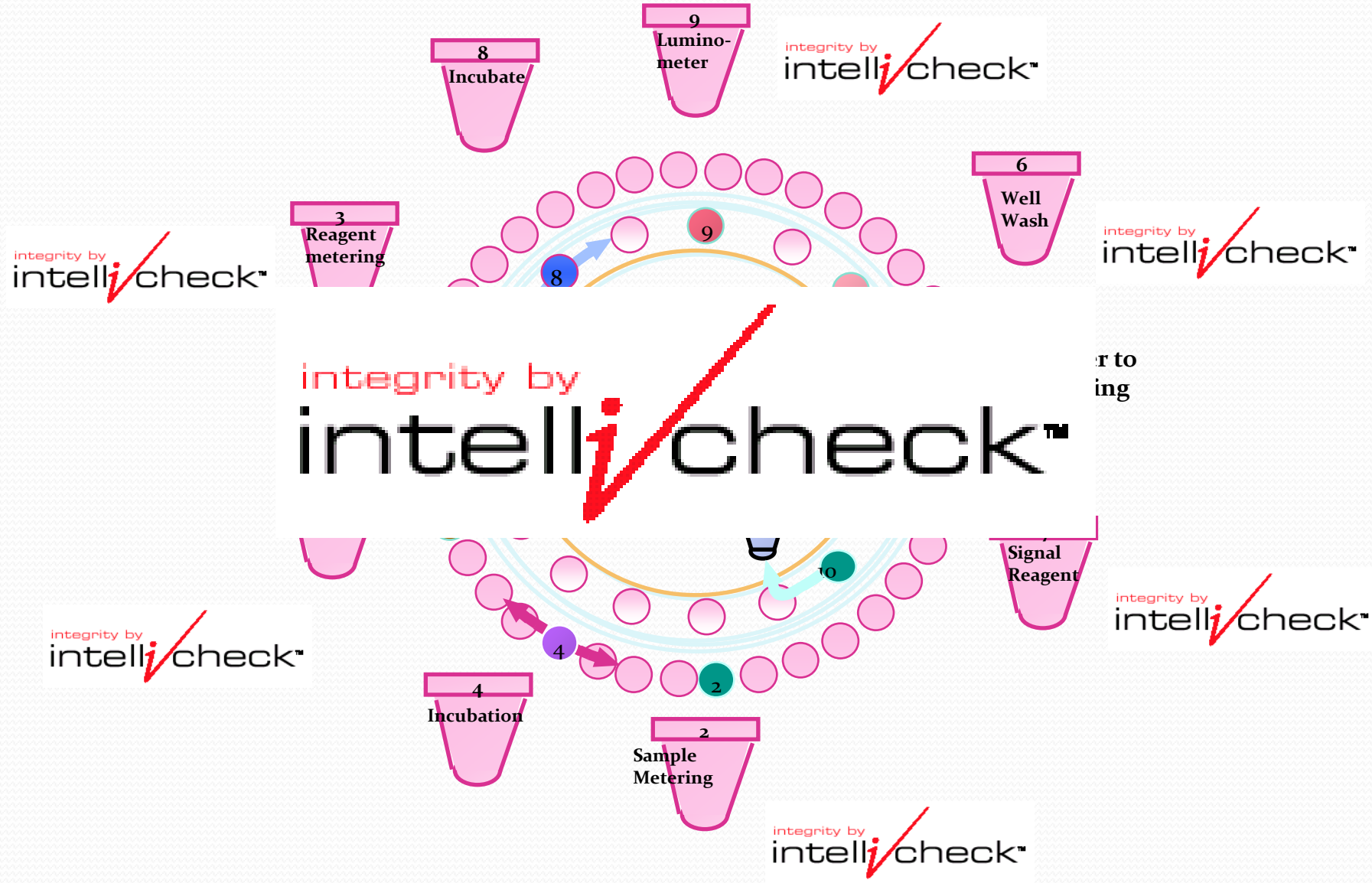
- Verification of proper Signal Reagent volume dispense into the Microwell
- Level sensing technology

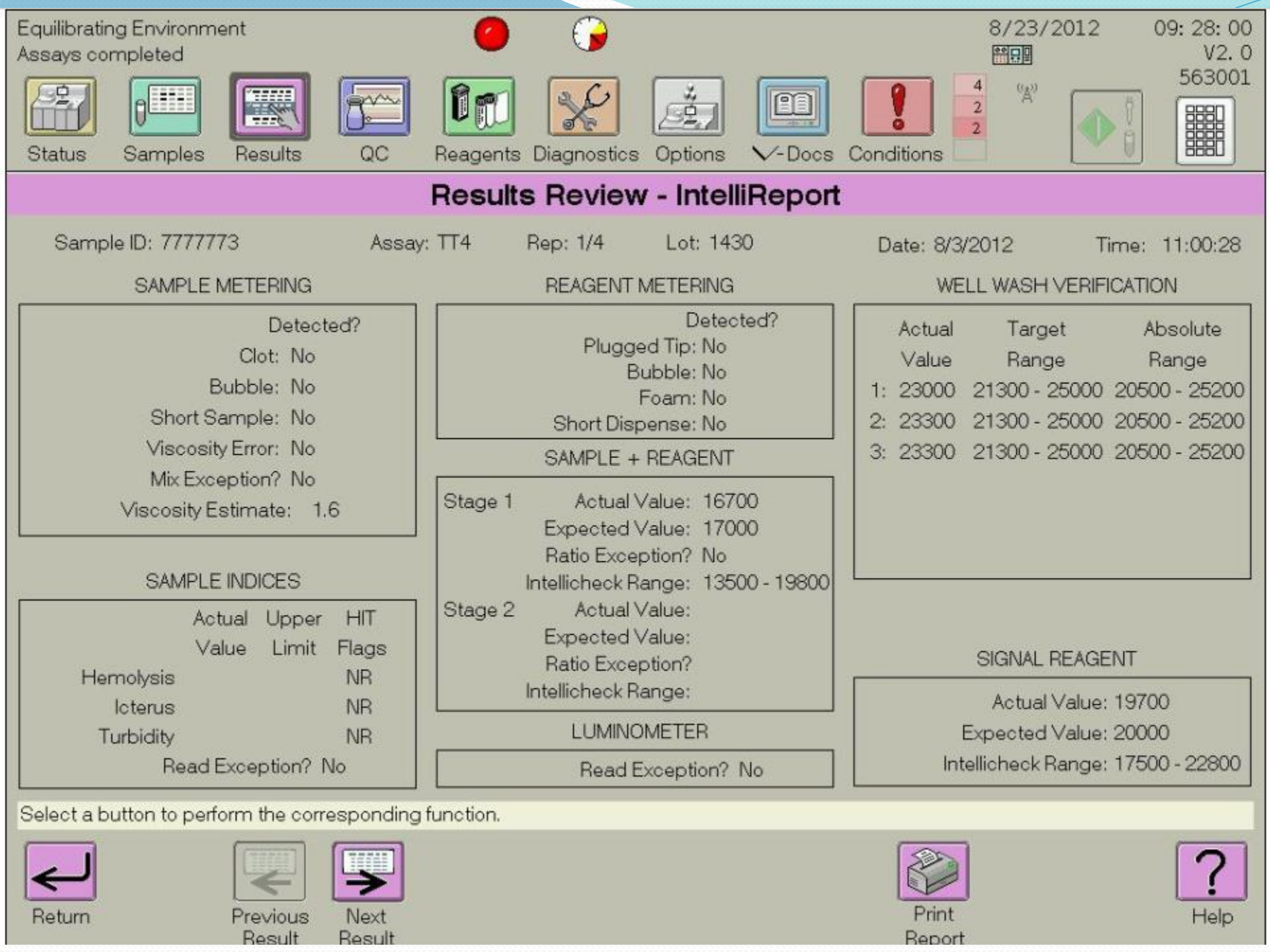
Luminometer

- Self-calibration before measurement



Journey of the Well

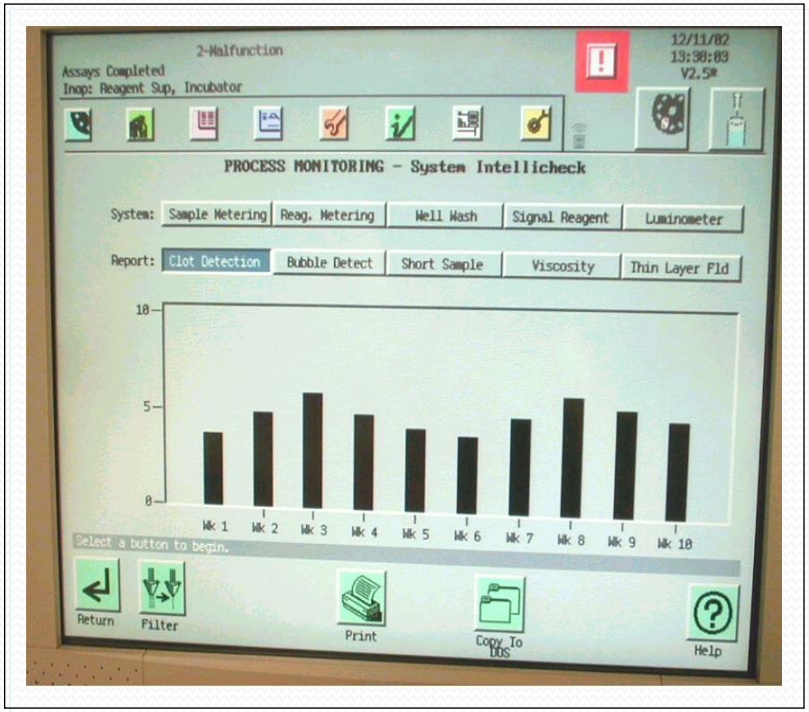



Equilibrating Environment
Assays completed
8/23/2012
09: 28: 00
V2. 0
563001
Status
Samples
Results
QC
Reagents
Diagnostics
Options
Docs
Conditions
Results Review - IntelliReport
Sample ID: 7777773
Assay: TT4
Rep: 1/4
Lot: 1430
Date: 8/3/2012
Time: 11:00:28
SAMPLE METERING
Detected?
Clot: No
Bubble: No
Short Sample: No
Viscosity Error: No
Mix Exception? No
Viscosity Estimate: 1.6
SAMPLE INDICES
Actual Value
Upper Limit
HIT Flags
Hemolysis NR
Icterus NR
Turbidity NR
Read Exception? No
REAGENT METERING
Detected?
Plugged Tip: No
Bubble: No
Foam: No
Short Dispense: No
SAMPLE + REAGENT
Stage 1
Actual Value: 16700
Expected Value: 17000
Ratio Exception? No
Intellicheck Range: 13500 - 19800
Stage 2
Actual Value:
Expected Value:
Ratio Exception?
Intellicheck Range:
LUMINOMETER
Read Exception? No
WELL WASH VERIFICATION
Actual Value
Target Range
Absolute Range
1: 23000 21300 - 25000 20500 - 25200
2: 23300 21300 - 25000 20500 - 25200
3: 23300 21300 - 25000 20500 - 25200
SIGNAL REAGENT
Actual Value: 19700
Expected Value: 20000
Intellicheck Range: 17500 - 22800
Select a button to perform the corresponding function.
Return
Previous Result
Next Result
Print Report
Help

Intellicheck™ Technology

Traceability

- Intellicheck Monitoring
  - Displays subsystem Intellicheck Technology verifications performed throughout sample and assay processing
    - On-screen and print reports
    - Exception detection indication



integrity by intellicheck™

Increased Analyzer Intelligence - Can it Reduce Error?

- Study assessed
  - Intelligent, automated pre-analytical process control abilities
    - Newer generation analyzers compared to older analyzers (VITROS ECi, Elecsys 2010, Axsym)
    - Impact to error reduction
- Defined errors as a reported result exceeding 3SD from the mean of the analyte of the individual analyzer

Increased Analyzer Intelligence – Can it Reduce Error, Albert W. Jekelis, Ph.D., University of Medicine and Dentistry of New Jersey - University Behavioral HealthCare

Results

- **Intelligent error detection improves process:**
  - Reduces misreported results
  - May reduce repeats
  - May reduce operator intervention
  - May reduce reagent waste

Increased Analyzer Intelligence – Can it Reduce Error, Albert W. Jekelis, Ph.D., University of Medicine and Dentistry of New Jersey - University Behavioral HealthCare

High Quality—Intellicheck® Technology

- Proprietary technology provides unique results integrity

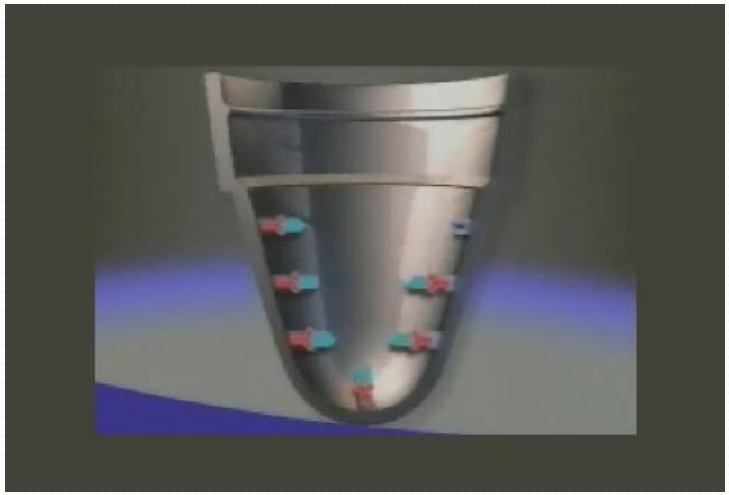
integrity by intelli check

- Designed to significantly reduce analytical errors
  - SMART Metering™
  - MicroSensor™
  - IntelliReport™
- Integrated Process Control
- Traceability with real-time documentation for exceptions
- Prevents reporting of results that may be affected by exceptions

Analytical control process for each test

High Quality—Assay Performance[1]

- MicroWell™ Technology
  - Enables excellent assay sensitivity and precision
  - Allows small sample volumes
  - Small MicroWell™ size minimizes waste



- Proprietary Enhanced Chemiluminescence Detection Technology**
  - Improved signal (light) output
  - Excellent sensitivity and precision
  - Broad dynamic range

***Compared to direct and other indirect chemiluminescence methods*

Proven VITROS® technology that provides high quality results in diverse patient settings

** Summers M et al. Luminogenic Reagent Using 3-Chloro 4-Hydroxy Acetanilide to Enhance Perioxidase/Luminol Chemiluminescence.*Clinical Chemistry*; 41.S73;1995

** Thorpe, Gary H.G.; Kricka, Larry J.; Moseley, Susan B.; Whitehead, Thomas P.; Phenols as Enhancers of the Chemiluminescent Horseradish Peroxidase-Luminol-Hydrogen Peroxide Reaction: Application in Luminescence-Monitored Enzyme Immunoassays; *Clinical Chemistry;* 31:8, 1985

[1] Based on VITROS® ECiQ Immunodiagnostic System

VITROS *System with Intellicheck*™

Broad Menu Range at the touch of a button

Thyroid
- TSH
- FT4
- FT3
- TT4
- TT3
- T3U
- iPTH

REP Endo
- E2
- LH
- FSH
- Prolactin
- Progesterone
- Total Beta HCG
- Testesterone

Oncology
- CA 125
- CA 15-3
- CA 19-9
- CEA
- AFP
- PSA
- B hCG II

Infectious Disease
- HBsAgES
- HBsAg Conf
- Anti-HBs
- Anti-HCV
- Anti-HIV 1+2
- Anti-HAV IgM
- Anti-HAV Total
- Anti-HBc IgM
- HBeAg
- Anti-HBe
- Anti-HBc
- HCV Ag*
- Toxo IgM
- Toxo IgG
- Rubella IgM
- Rubella IgG
- Anti HIV Combo*
- CMV IgG
- CMV IgM
- Syphilis

Anaemia
- Ferritin
- B12
- Folate
- Red Cell Folate

Cardiology
- CK-MB
- Troponin I
- Trop I ES
- Myoglobin
- Pro NT BNP

Bone
- NTx

Metabolism
- Cortisol
- Vitamin D

VELAMMAL MEDICAL COLLEGE
HOSPITAL AND RESEARCH INSTITUTE
MADURAI - 625009

Department of Biochemistry

Report on Certificate course on ELISA Technique

Topic: ELISA Technique

Date: 11.08.2021

Venue: Biochemistry Demonstration Room

Target audience: First year M.B.B.S., students

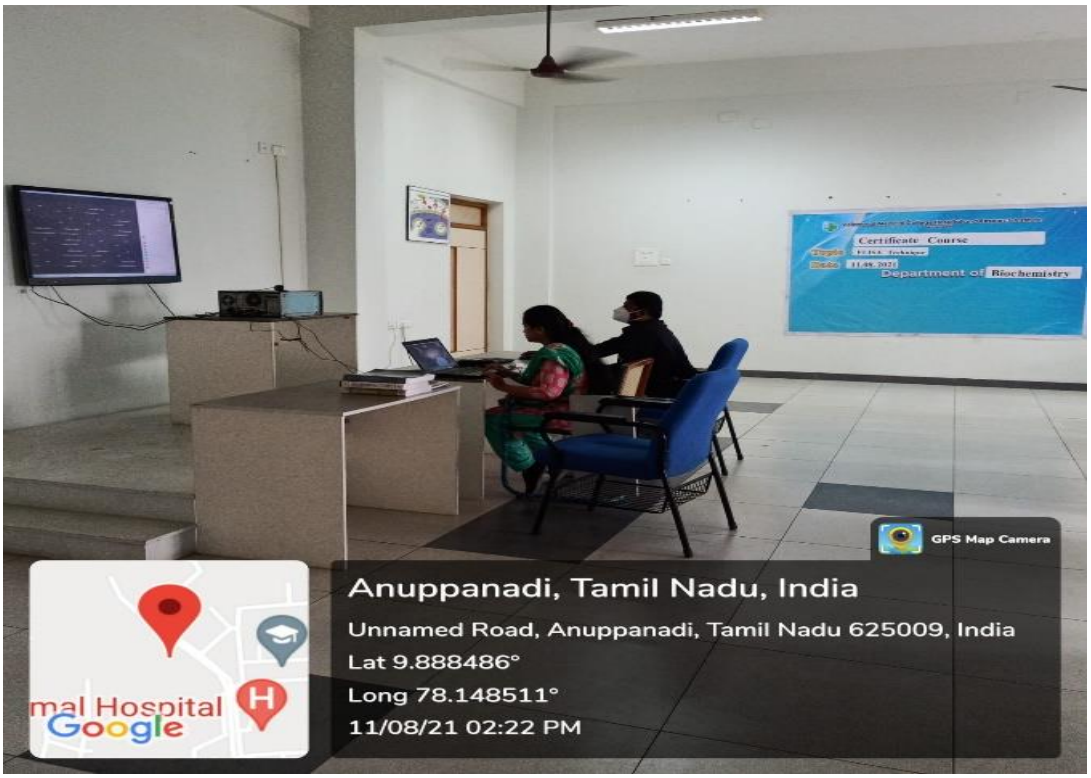
Number of Participants: 253

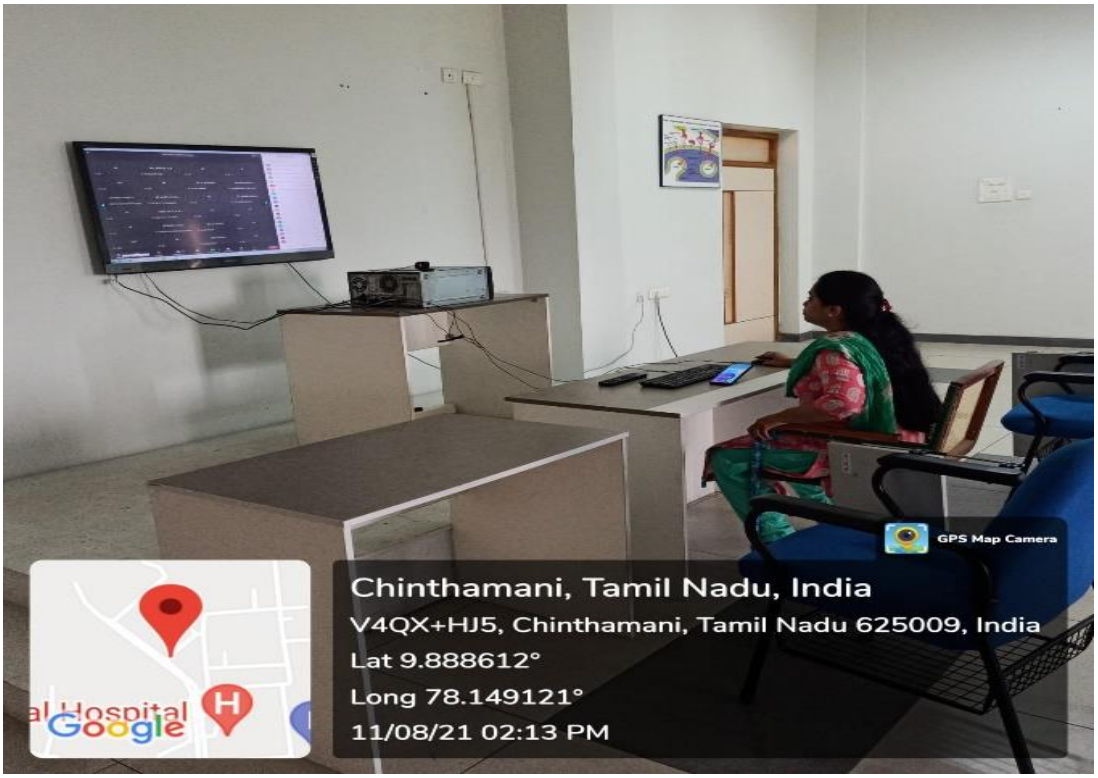
Event Report: The event started with the welcome address by Dr. P.K. Mohanty. Following that Dr.Mamatha T Shenoy started the lecture on ELISA. She explained the different types of ELISA with their principle and methods. She demonstrated the procedure for estimation of ANA by ELISA.

Outcome: Participants should know the different types of ELISA their principle and method and how to handle the ELISA instrument.

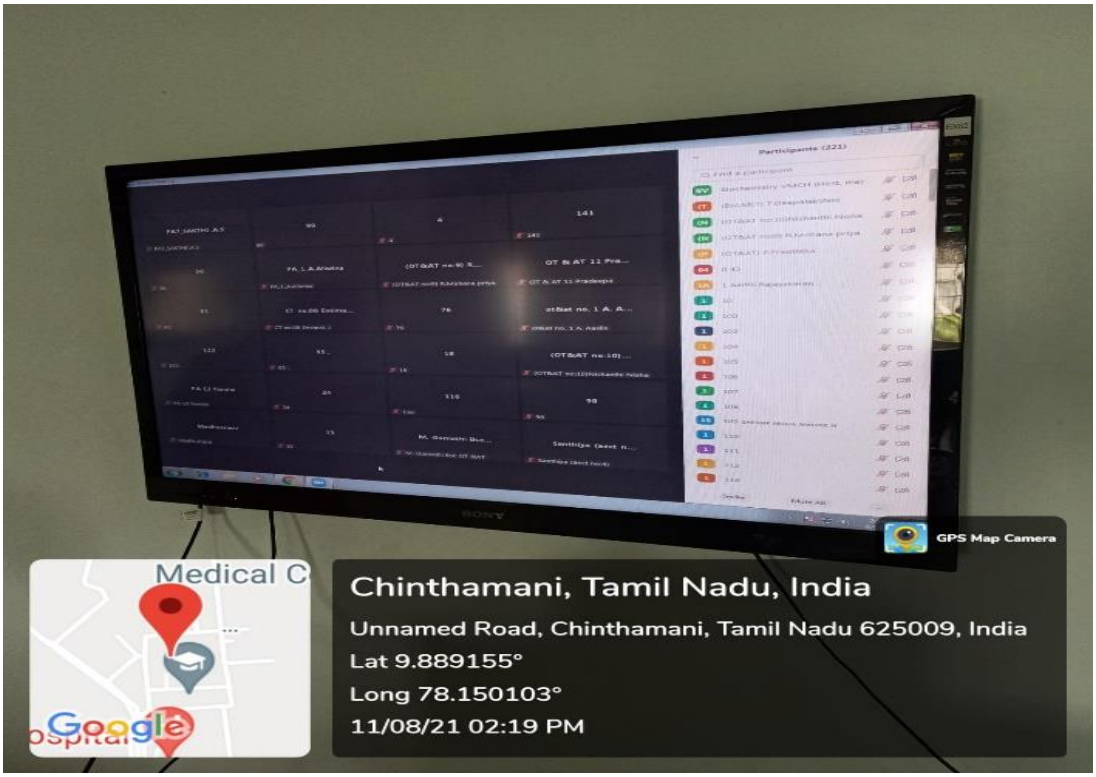
Prof. T. THIRUNAVUKKARASU, M.D.,D.A.,
Dean
Velammal Medical College Hospital
and Research Institute
"Velammal Village"
Madurai-Tuticorin Ring Road
Anuppanadi, Madurai-625 009, [illegible],

VELAMMAL MEDICAL COLLEGE
HOSPITAL AND RESEARCH INSTITUTE
MADURAI - 625009



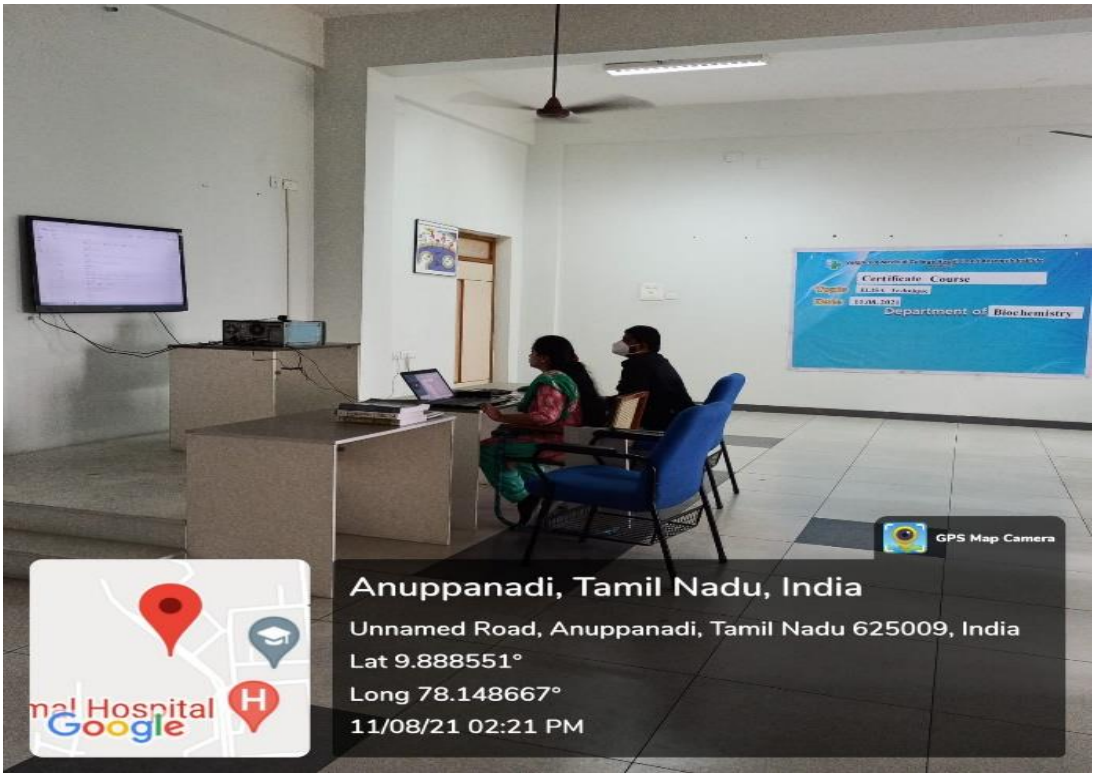


VELAMMAL MEDICAL COLLEGE
HOSPITAL AND RESEARCH INSTITUTE
MADURAI - 625009



VELAMMAL MEDICAL COLLEGE
HOSPITAL AND RESEARCH INSTITUTE
MADURAI - 625009

Resource Persons With Banner/ Projection:



Velammal Medical College Hospital and Research Institute

Ref. No:VMCHRI/BIOCHEM/CC-10 Date:05/07/2021

CIRCULAR

To

All Doctors

Certificate Course on Serum Protein Electrophoresis

Department of Biochemistry is organizing a certificate course on Serum protein electrophoresison 12/08/2021(Thursday) between at 2.00 PM to 4.00 PM.

All Faculties are invited.

VICE PRINCIPAL

Dr. P.K. MOHANTY
Vice Principal
Velammal Medical College Hospital
and Research Institute
Madurai-625 009

Copy submitted to:

The Hon. Chairman

Copy to:

The Dean

Medical Superintendent

Chief Administration Officer

HOD, Biochemistry

All Clinical and Non-Clinical HODs

Velammal Medical College Hospital & Research Institute
Anuppanadi, Madurai - 625009

Department of Biochemistry

Certificate course on

Serum Protein Electrophoresis

Venue: Biochemistry Demonstration Room

Date: 12.08.2021

Time: 2.00 – 4.00 PM

For Faculties, M.B.B.S., Post graduates, DMLT, AHS and BSc MLT

PATRON

Chairman: Shri.M.V.Muthuramalingam

Advisors:

Dean: Dr.T.Thirunavukarasu

MS: Dr. S.R.Damodaran

DR.M.Jeyakumar
Course Coordinator
Assoc. Professor
Biochemistry

DR.P.K.Mohanty
Vice Principle
Prof. HOD Biochemistry

Click here for registration

Agenda

Time	Topic	Speaker
2.00 – 2.15 PM	Welcome address	DR.K.Suganthy
2.15 – 2.45 PM	Pre test Electrophoresis – Basics	DR.Jeyakumar
2.45 – 3.45 PM	Demonstration: Serum protein electrophoresis	DR.Jeyakumar & Resource persons
3.45-4.00 PM	Post test and feedback	DR.Jeyakumar
	Valediction	

Resource persons

Dr P.K. Mohanty
Vice Principal
Prof. HOD
Biochemistry

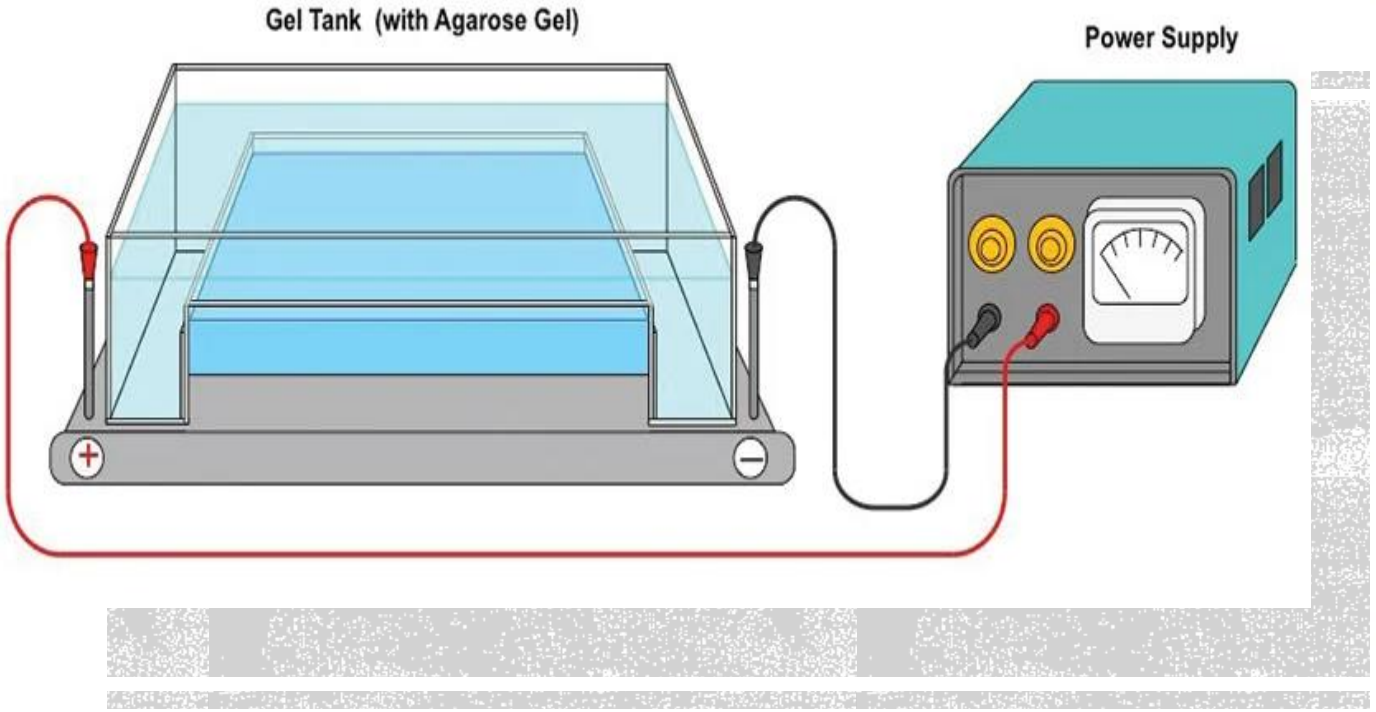
Dr K. Suganthy
Prof.
Biochemistry

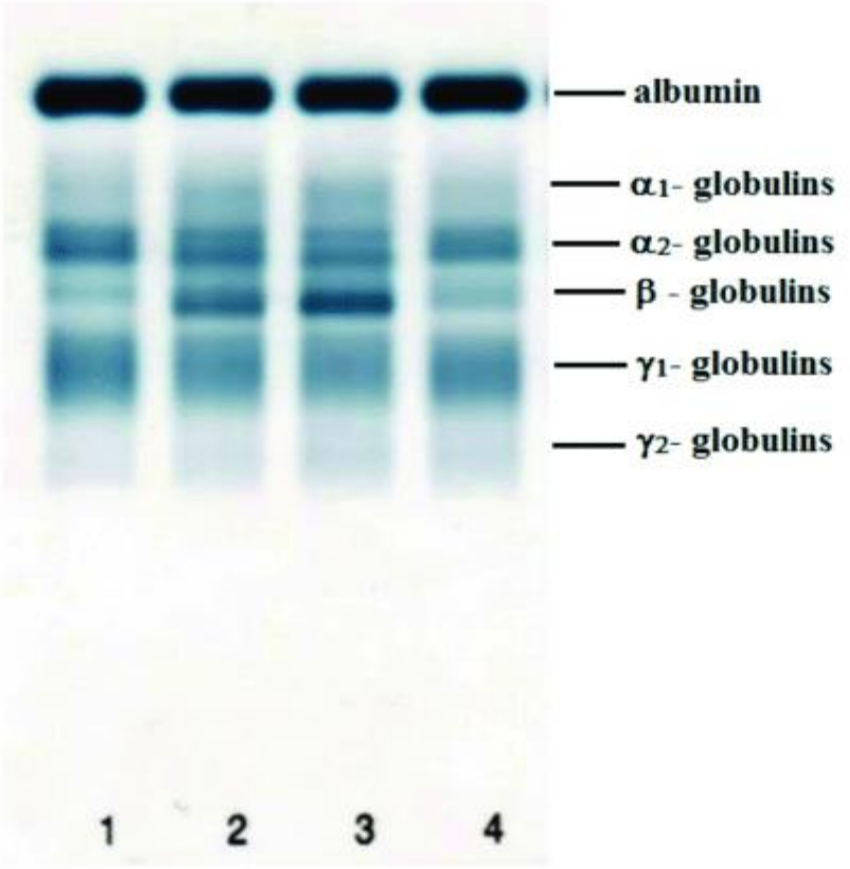
DR.M.Jeyakumar
Assoc. Professor
Biochemistry

Dr Mamatha T Shenoy
Assistant Professor
Biochemistry

Dr.A. Hariharan
Assistant Professor
Biochemistry

Dr.M. Viveka
Tutor
Biochemistry



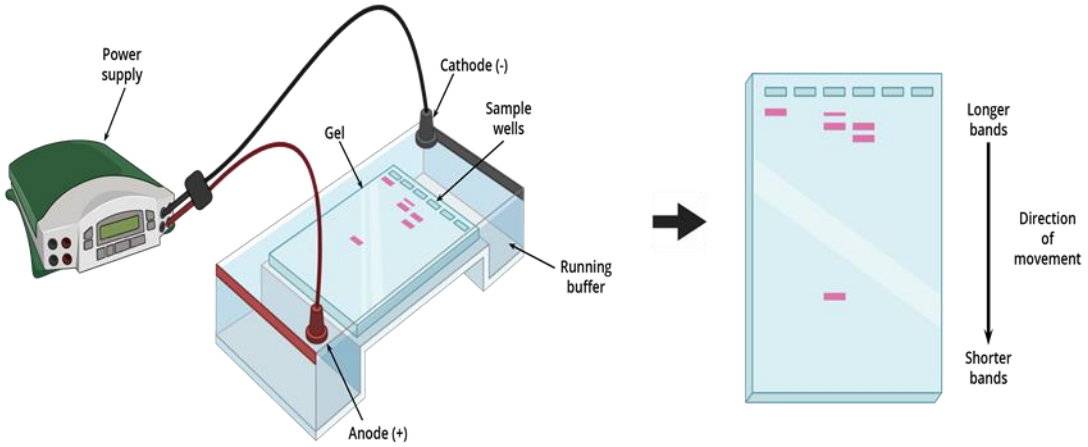


Serum protein electrophoresis

Dr. M. Jeyakumar

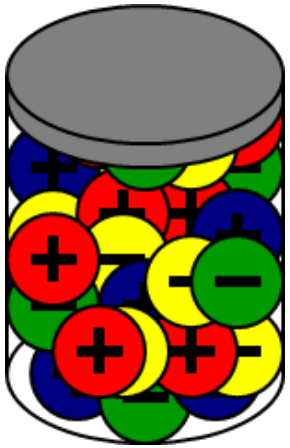
Contents

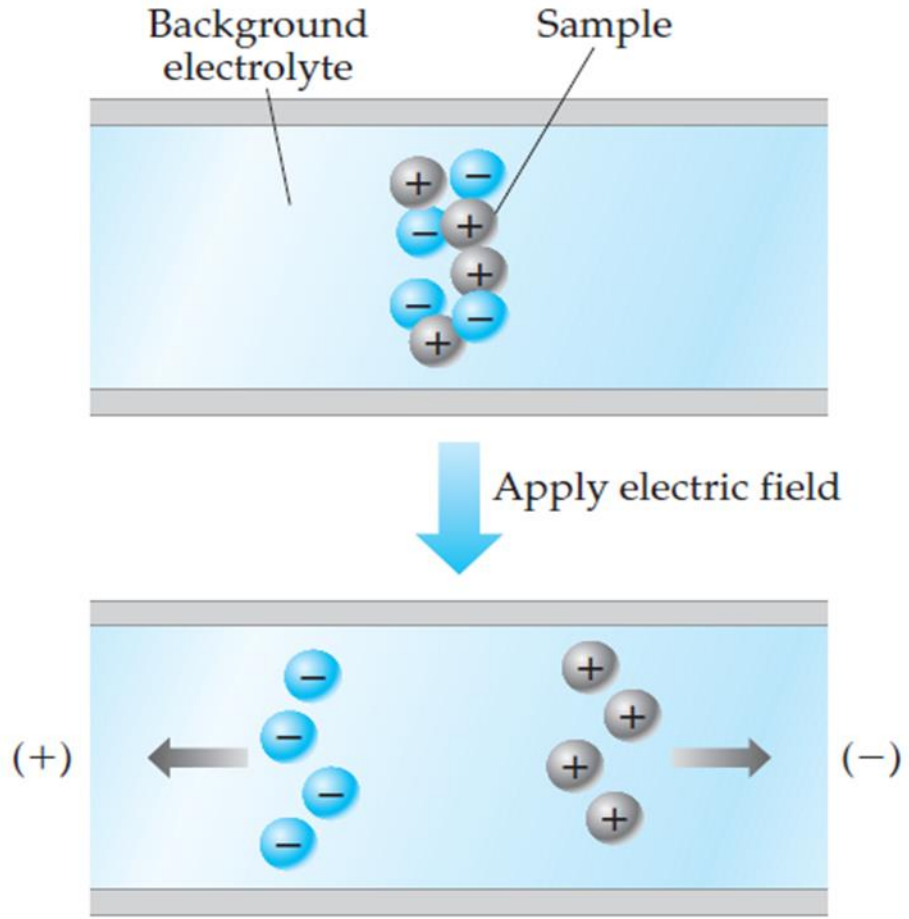
- Definition
- Principle of electrophoresis
- Requirements of agarose gel electrophoresis
- Procedure
- Electrophoretic pattern in various diseases



What is electrophoresis?

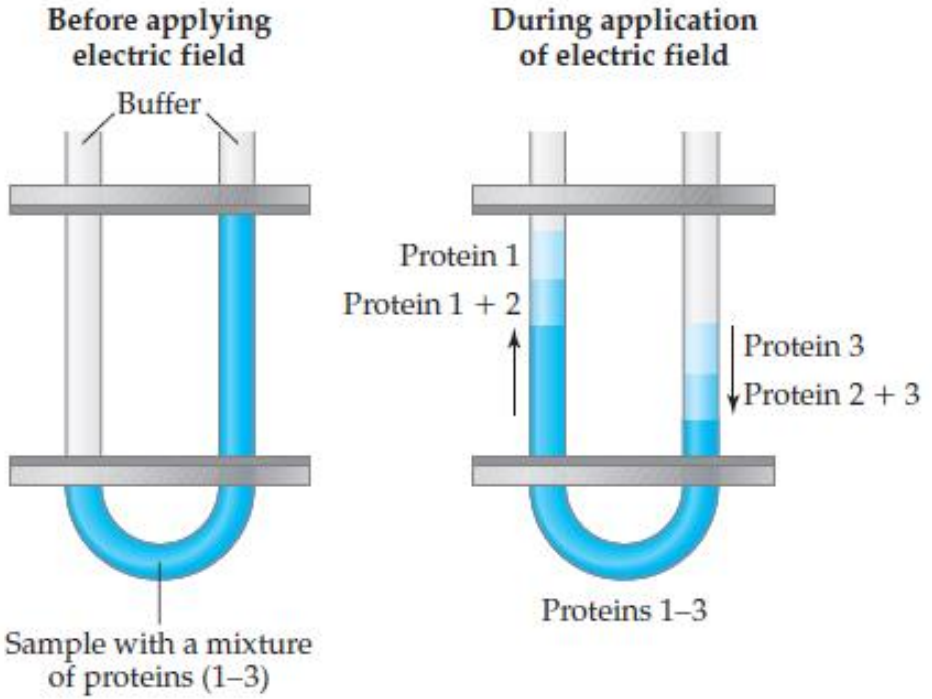
- Movement of charged particles through an electrolyte when subjected to an electrical field.





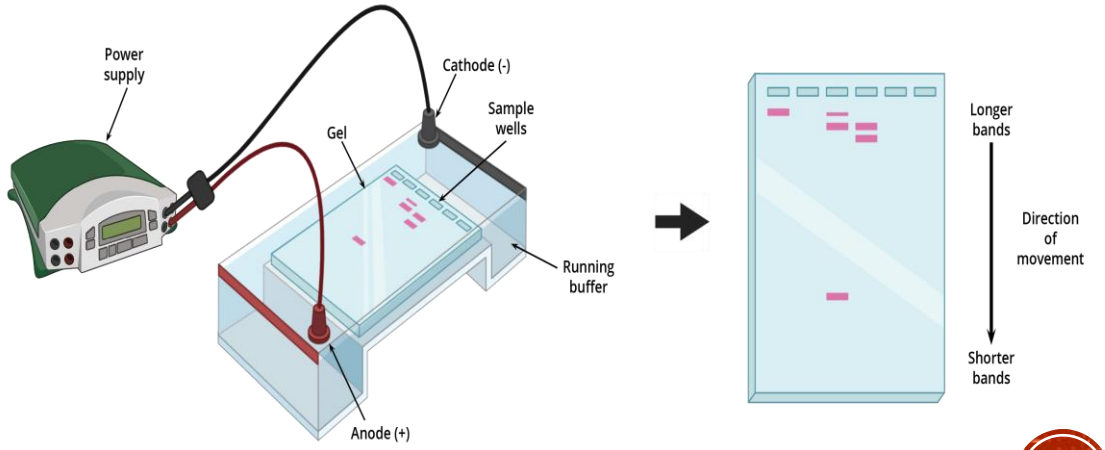
History

- Invented by Tiselius



Clinical applications of electrophoresis

- a separation technique
- Simple, rapid and highly sensitive
- used in clinical laboratories to separate charged molecules from each other in presence of electric field
    - Proteins in body fluids: serum, urine, CSF
    - Proteins in erythrocytes: haemoglobin
    - Nucleic acids: DNA, RNA
    - Lipoprotein analysis
    - Isoenzyme separation

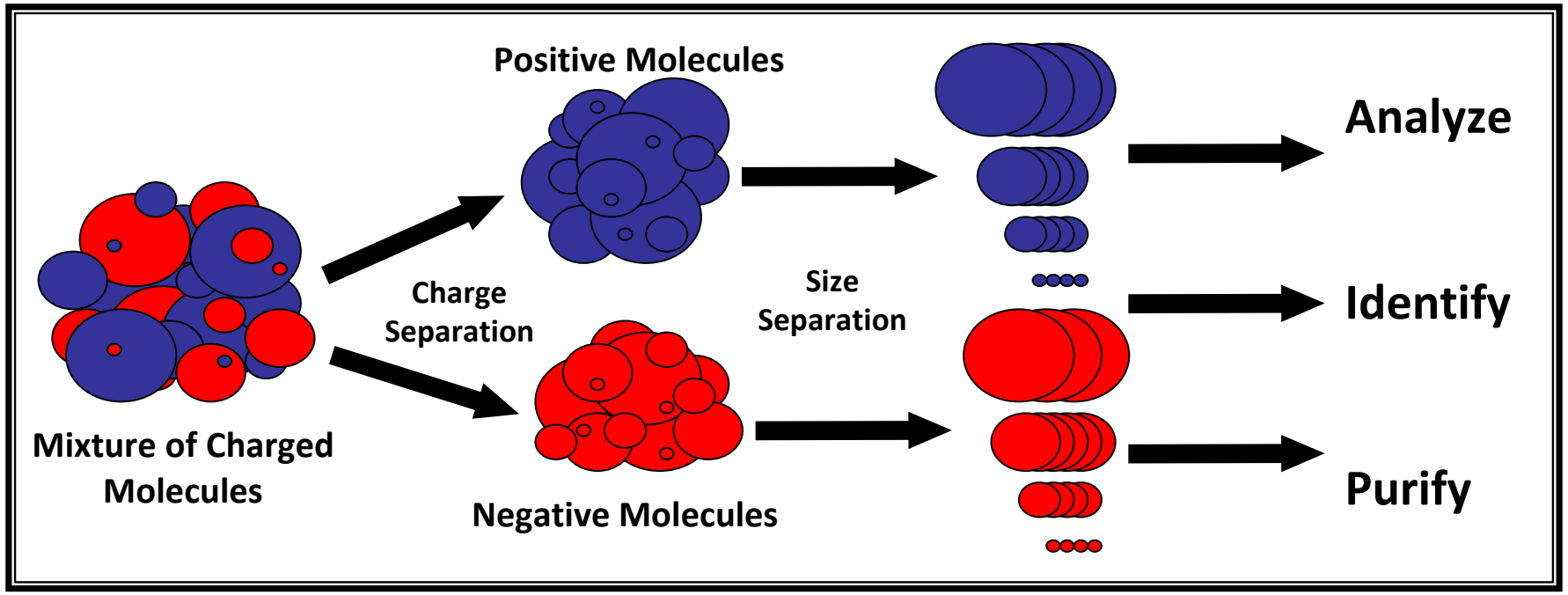


Principle

- Comprehensive term that refers to the migration of charged particle of any size in liquid medium under the influence of an electric field.
- Depending on kind of charge the molecule carry, they move towards either
    - To cathode
    - To Anode
- An ampholyte become positively charged in acidic condition and migrate to cathode, in alkaline condition they become negatively charge and migrate to anode.

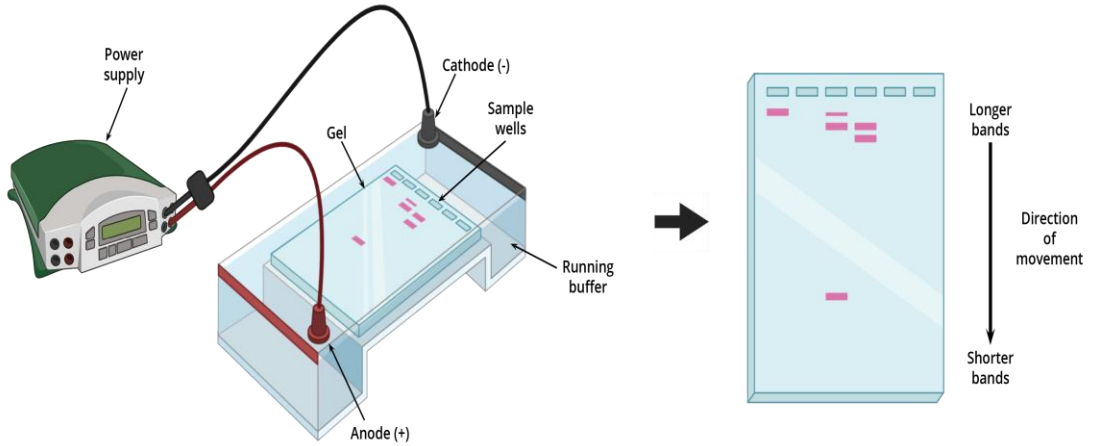
Types of separation

- Native : Charge/ Mass
- Denaturing : Mass



Factors affecting Electrophoresis

- Net charge
- Mass
- Shape
- pH of medium
- Strength of electrical field
- Viscosity of medium
- Temperature



Factors affecting Electrophoresis

- The Electrophoretic mobility is directly proportional to net charge and inversely proportional to molecular size/mass and viscosity of the electrophoresis medium
- The pH of solution affects the mobility of the ion by determining the amount and nature of charge

Electrophoresis of Biomolecules

- Proteins, nucleic acids, nucleotides and amino acids bear charged polar groups making them suitable groups for electrophoresis
- Carbohydrates carrying no charged groups are first bound to charged groups like Borate or Sulfite ions and then electrophoresis is carried out
- Lipids are not electrophoresed because electrophoretic current requires polar solvents in which most lipids are insoluble

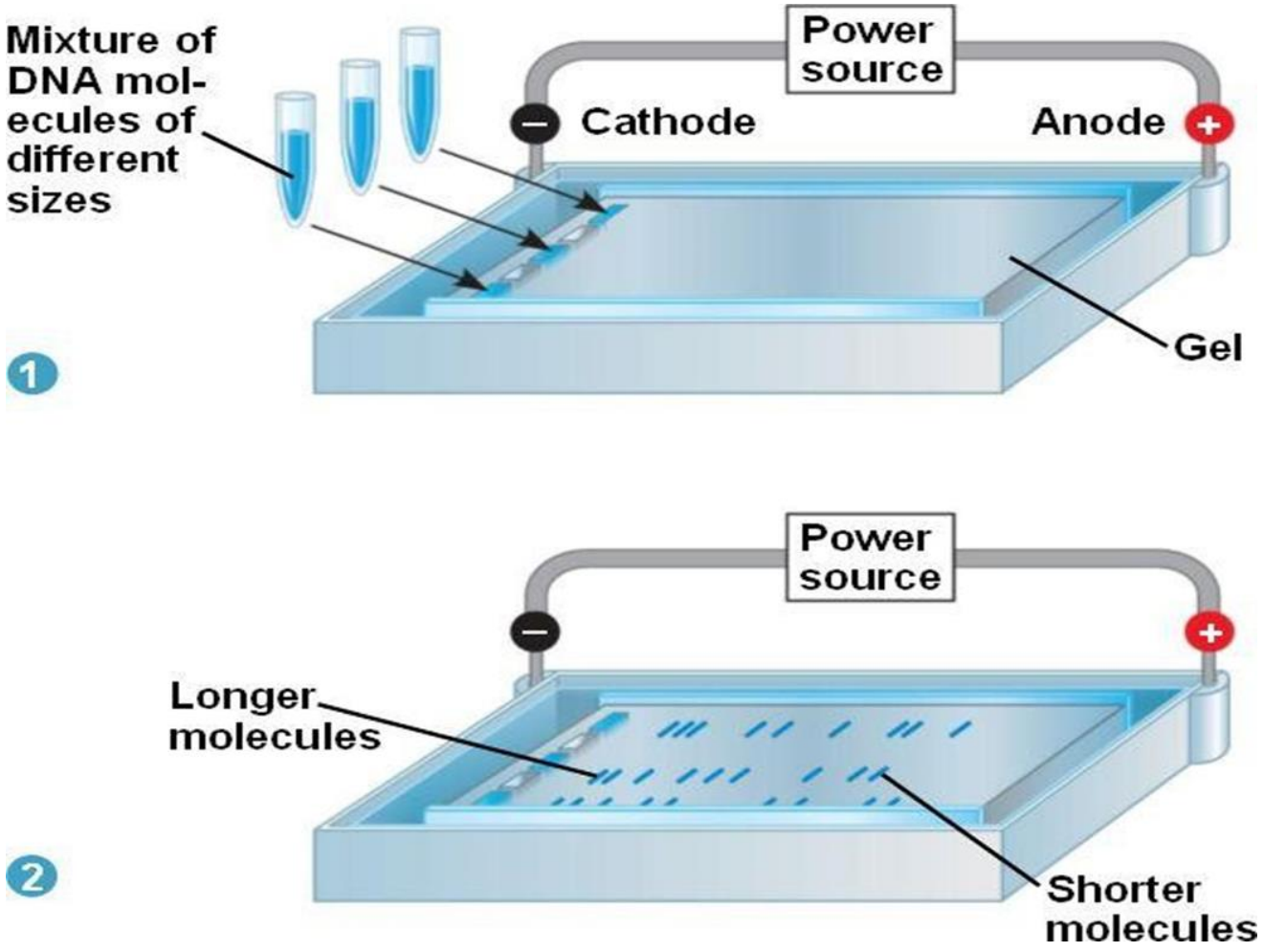
Factors affecting Electrophoresis

- The rate of migration depends on size, shape, net charge & the applied current

$$v = EqF$$

  - v= velocity
  - E= electric field (v/cm)
  - q=net charge
  - F= Frictional coefficient

- Charge – Higher the charge, greater the mobility
- Shape – rounded contour elicit less frictional and electrostatic retardation compared to sharp contour. Therefore globular proteins moves faster than fibrous proteins.

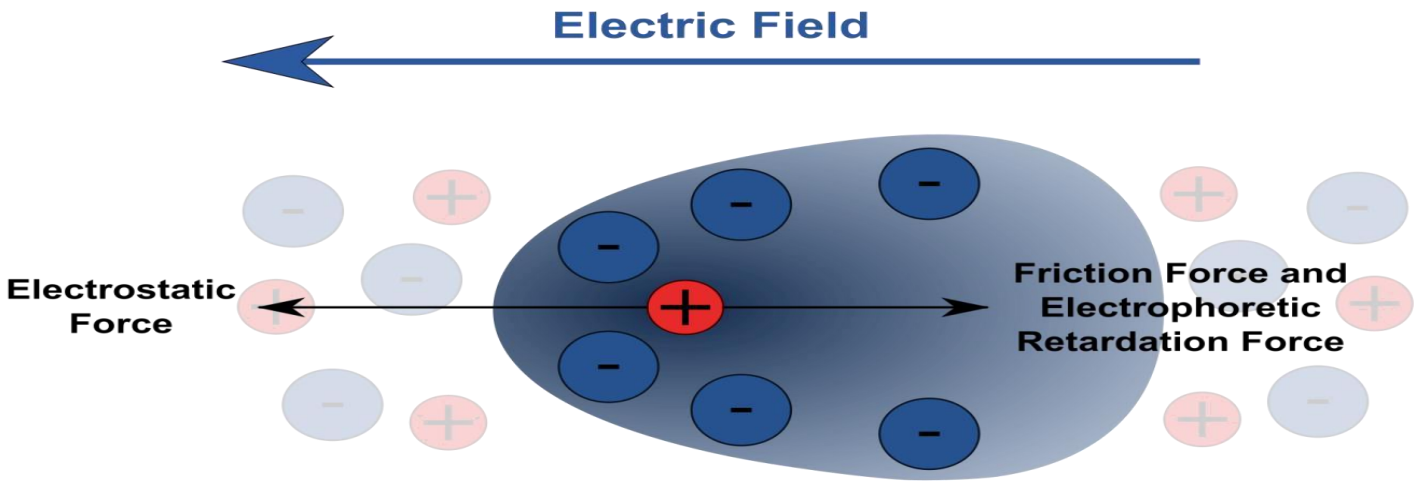

Mixture of DNA mol-ecules of different sizes
Power source
Cathode
Anode
Gel
1
Power source
Longer molecules
Shorter molecules
2

Strength of electrical field

- It determined by the force exerted on the particle, and the charge the particle carrying.

$$F=QV$$

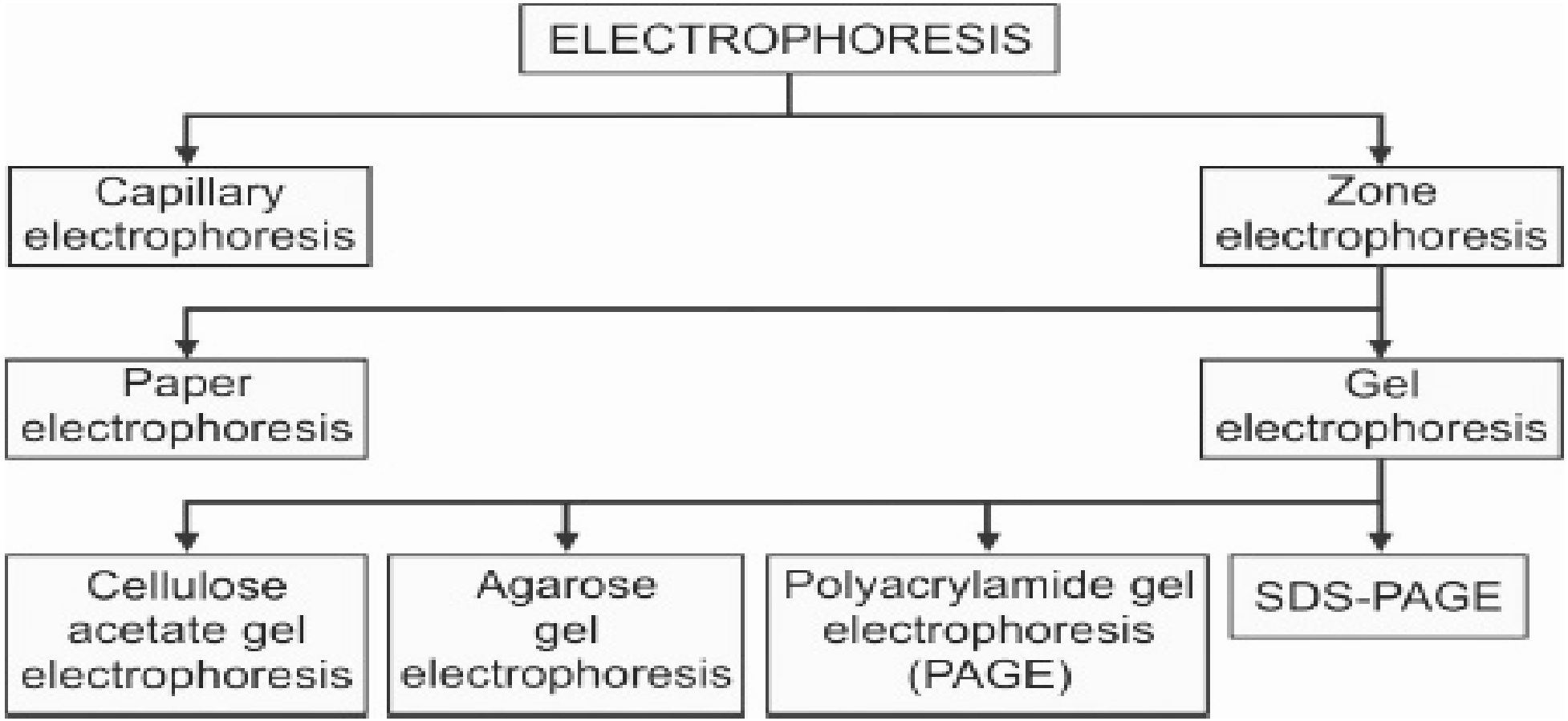
when force is exerted on the particle it start moving, however the moment is restricted by the experience of the frictional force because of the viscosity.



Effect of pH on Mobility

- As the molecule exist as amphoteric , they will carry the charges based on the solvent pH.
- Mobility is directly proportional to the magnitude of the charge, which is functional of the pH of solvent.
- The pH is maintained by the use of buffers of different pH.

Types of electrophoresis

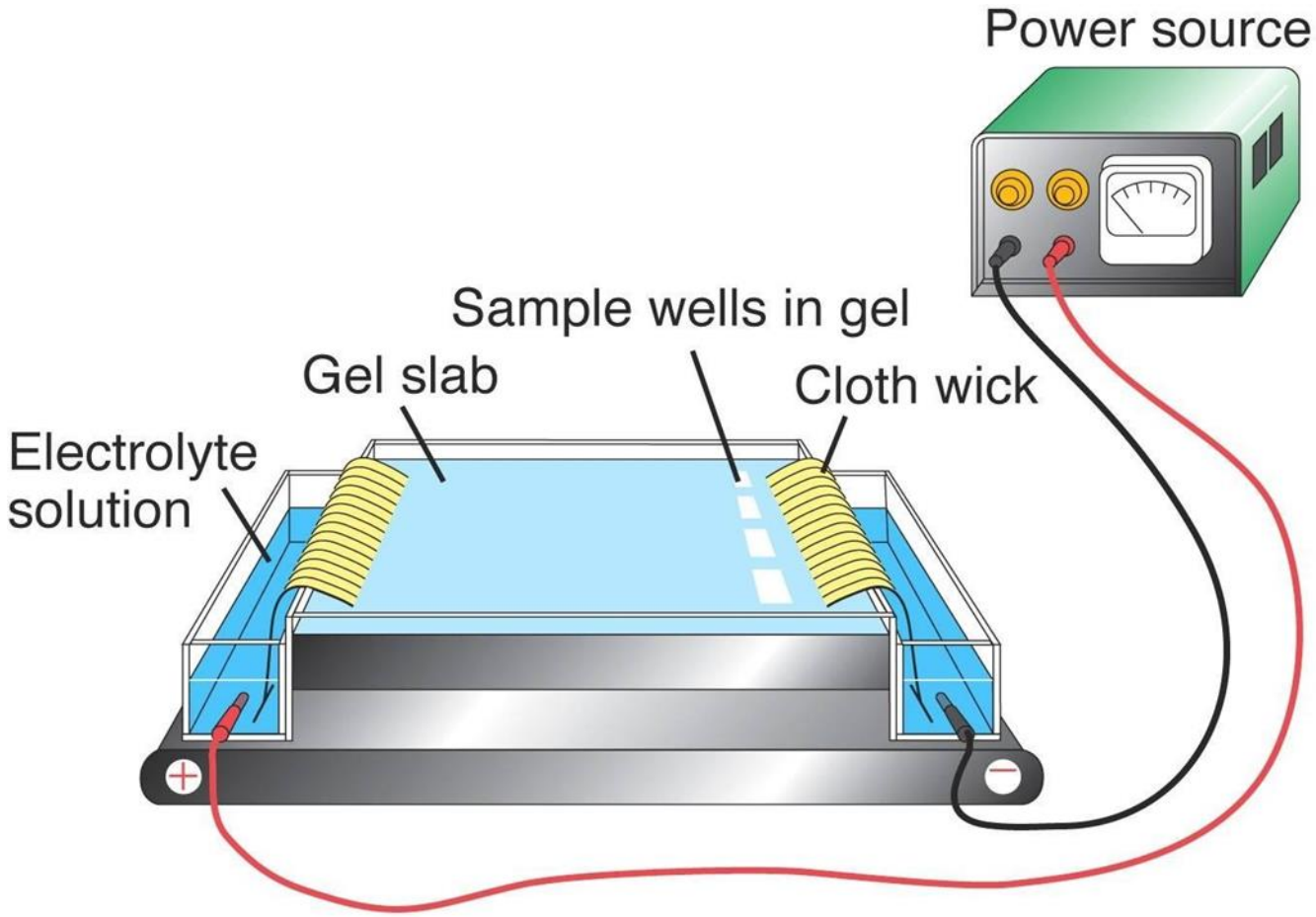


Gel Electrophoresis

- “Gel" is the matrix used to contain, and then separate the target molecules
- The gel is a cross linked polymer whose composition and porosity is chosen based on the specific weight and composition of material to be analyzed
- A gel block made of Polyacrylamide, Agarose or substituted starch gel is used in this method as the solid support
- *Agarose gel - separation of different types of protein mixtures*
- *Polyacrylamide is best suitable for separation of nucleic acids.*

Instrumentation

- Two reservoir for the buffer
- Power supply and Electrodes
- Supporting medium



Requisites for Agarose gel Electrophoresis

- Electrophoresis apparatus
- Supporting medium - Agarose
- Buffer
- Power pack to supply constant current and voltage
- Tracking dye
- Fixing solution
- Staining solution
- Destaining solution

Electrophoresis apparatus

Electrophoresis apparatus

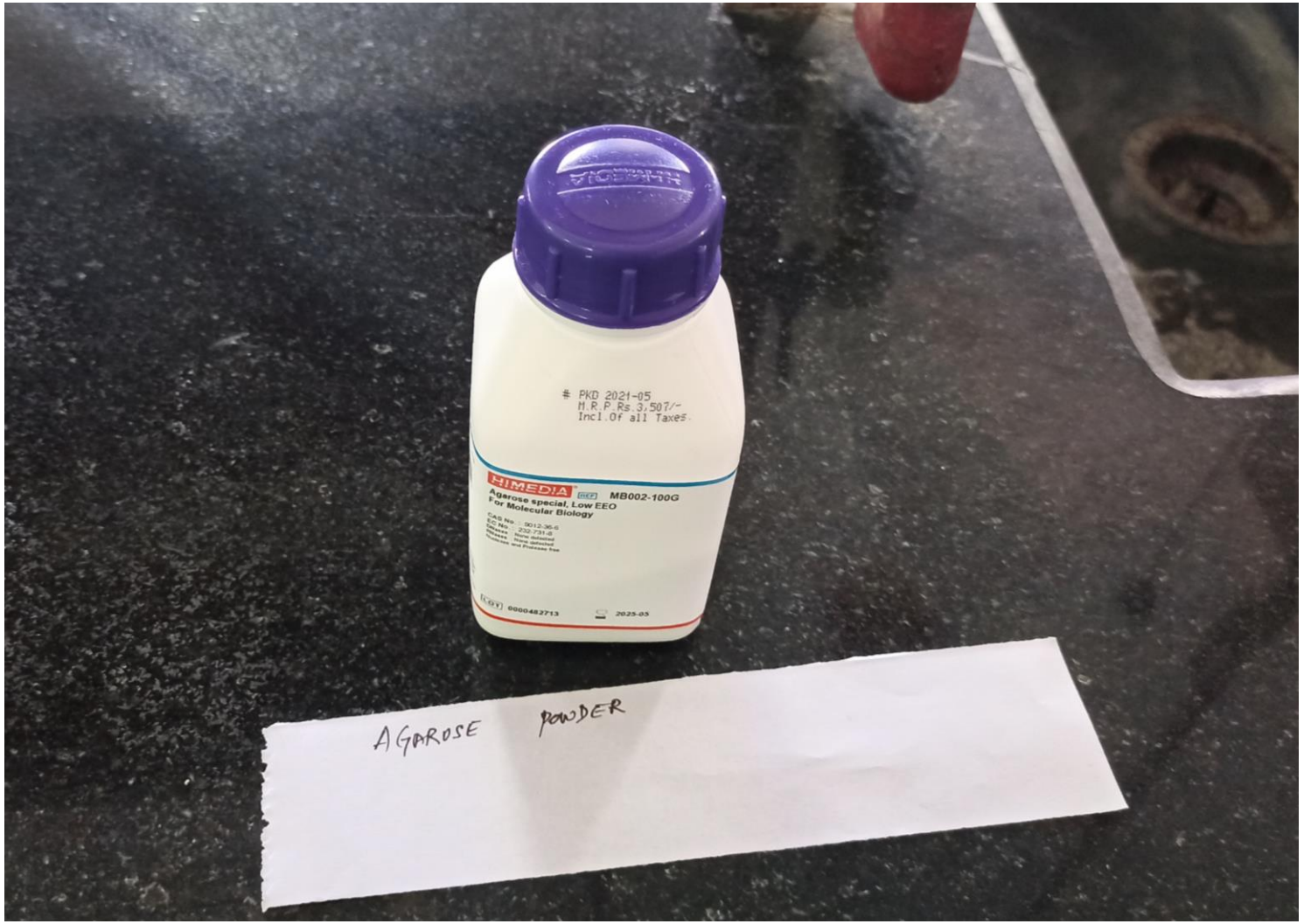
Supporting medium

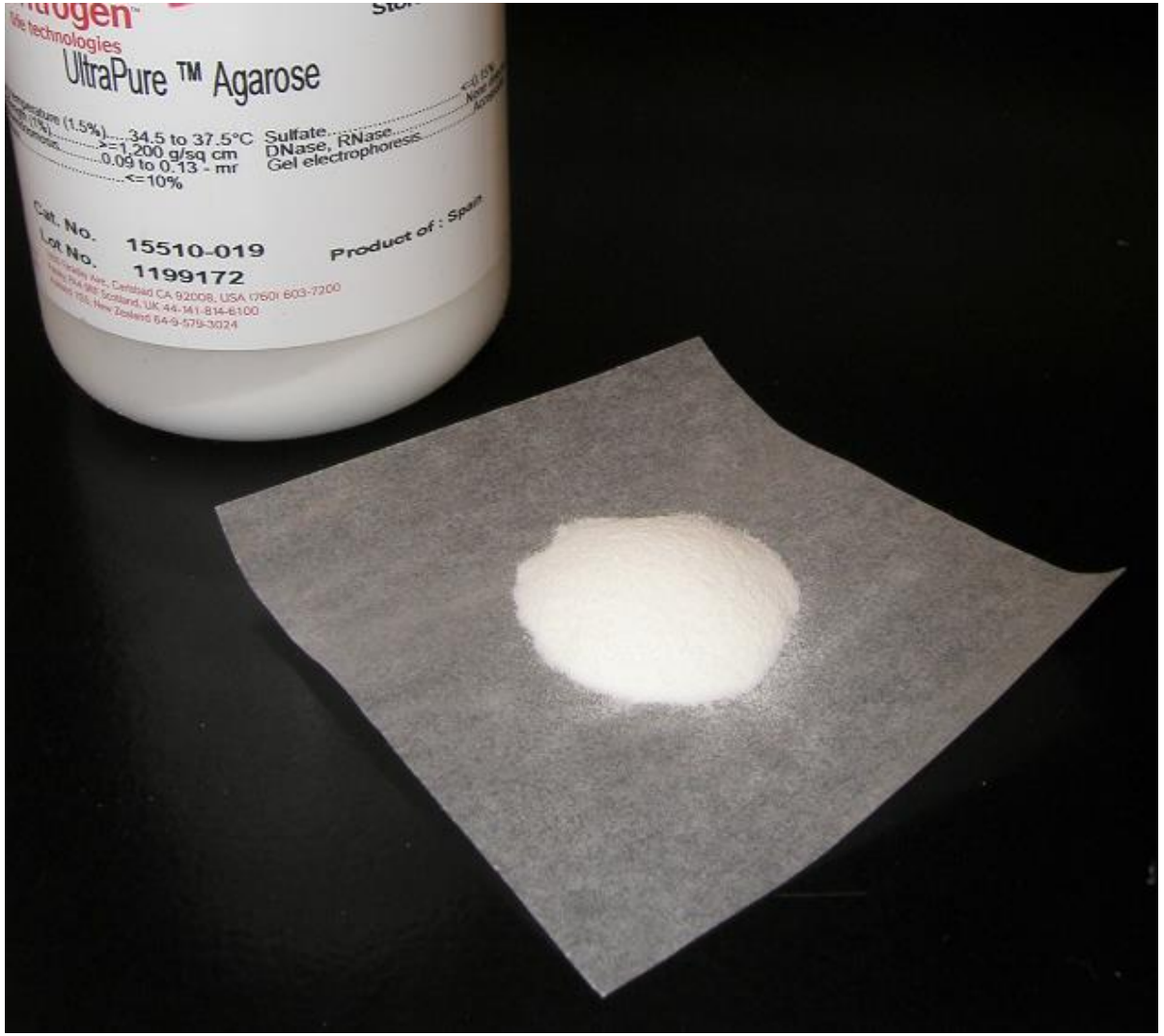
- Supporting medium is an matrix in which the protein separation takes place.
- Separation is based on to the charge to mass ratio of protein depending on the pore size of the medium, possibly the molecular size.
- Starch gel
- Cellulose acetate
- Agarose
- Polyacrylamide gel

Properties of supporting medium

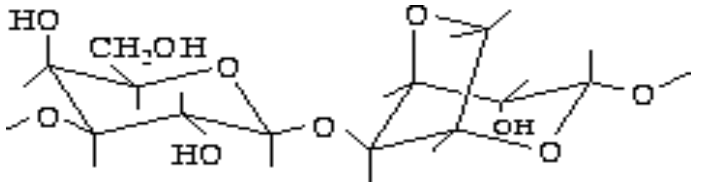
Chemical nature	inert
Availability	easy
Electrical conductivity	high
Adsorptivity	low
Sieving effect	controlled
Porosity	high
Electro-endosmosis (EEO)	low
Preservation	feasible
Toxicity	low
Preparation	easy

Agarose


HIMEDIA
MB002-100G
Agarose special, Low EEO
For Molecular Biology
AGAROSE
POWDER



Agarose



D-galactose 3,6-anhydro L-galactose

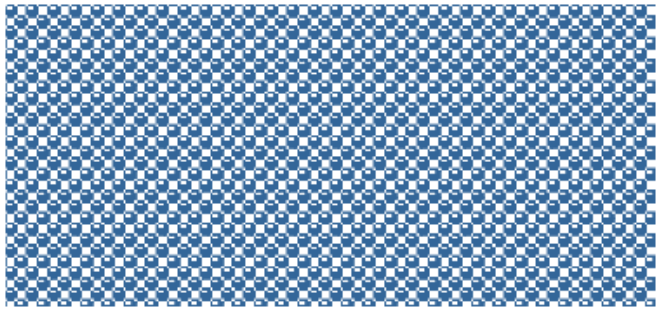
Agarose was first used in biology when Robert Koch* used it as a culture medium for Tuberculosis bacteria in 1882

***Lina Hesse**, technician and illustrator for a colleague of Koch was the first to suggest agar for use in culturing bacteria

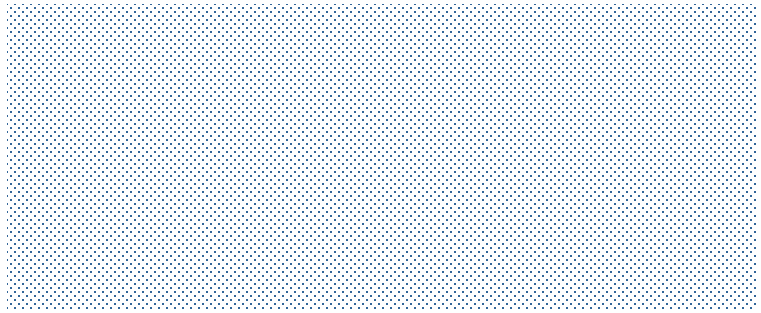
Agarose is a linear polysaccharide extracted from seaweed.

Agarose

- Used in conc as 1% and 3%.
- The gelling property are attributed to both inter-and intramolecular hydrogen bonding
- Pore size is controlled by the % of agarose used.
- Large pore size are formed with lower conc and vice versa.

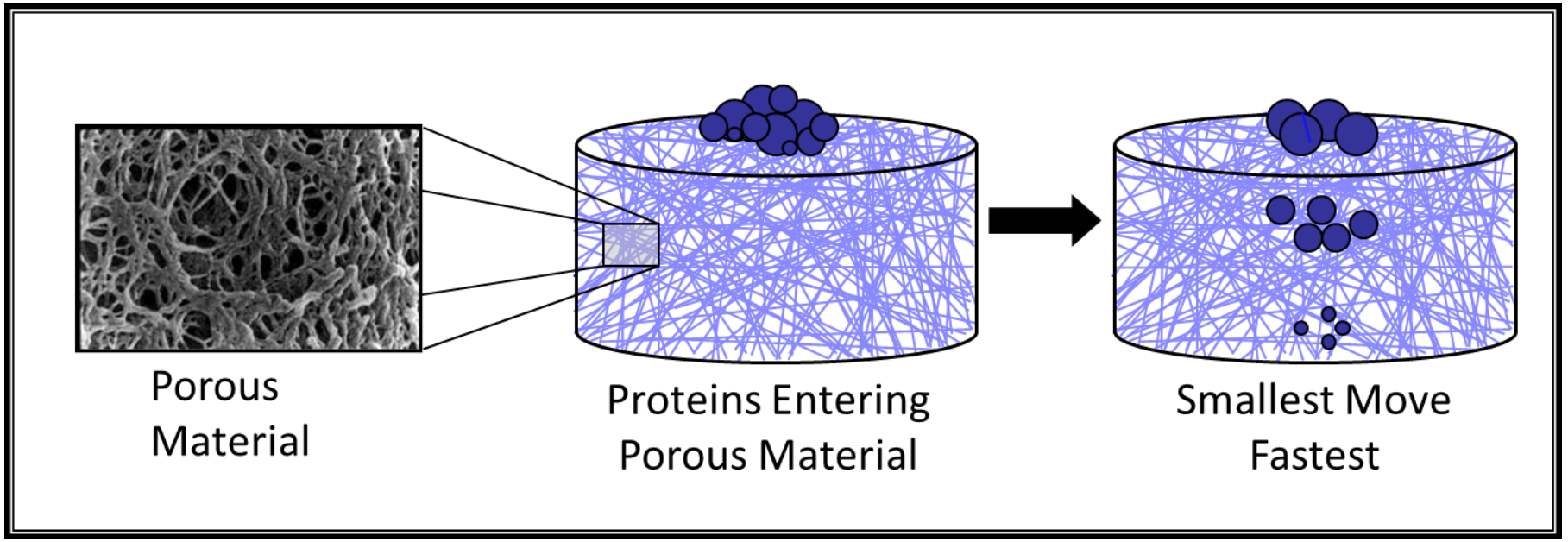


1% agarose

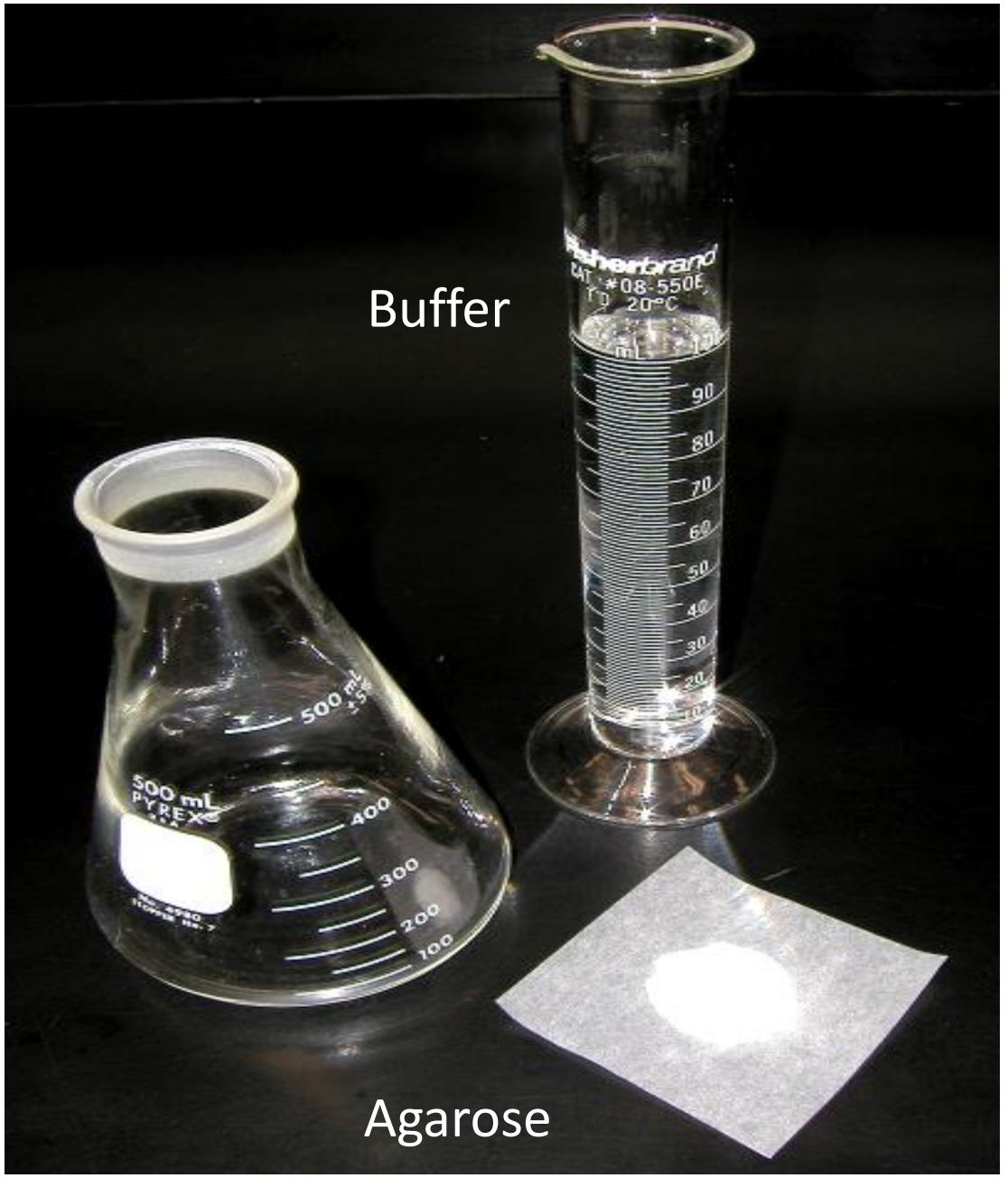


2% agarose

Acts as molecular sieve



An agarose gel is prepared by combining agarose powder and a buffer solution.

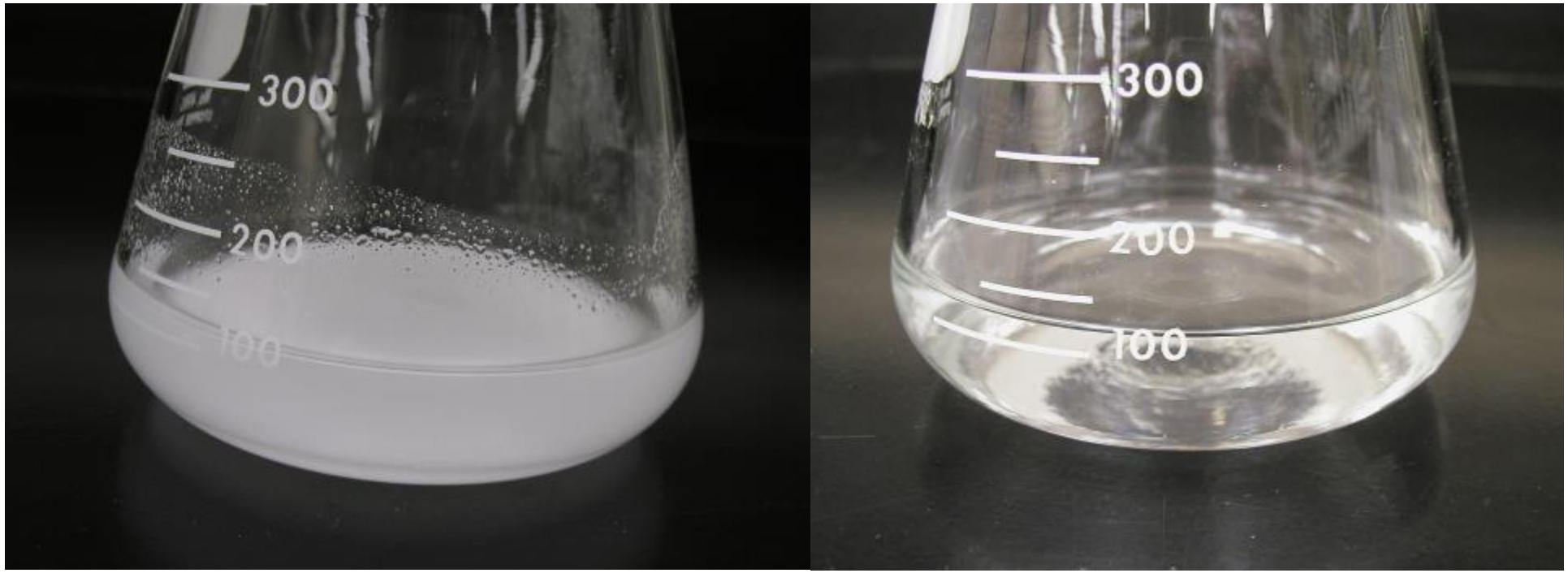


Agarose

Buffer Solution

Combine the agarose powder and buffer solution. Use a flask that is several times larger than the volume of buffer.

Melting the Agarose



Agarose is insoluble at room temperature (left).
The agarose solution is boiled until clear (right).

Gently swirl the solution periodically when heating to allow all the grains of agarose to dissolve.
***Be careful when boiling - the agarose solution may become superheated and may boil violently if it has been heated too long in a microwave oven.

Buffer

The buffer in electrophoresis has two purpose:

- Carry applied electrical current
- They set the pH as which electrophoresis is carried out.

Thus they determine;

- Type of charge on solute.
- Extent of ionization of solute
- Electrode towards which the solute will migrate.

The buffer ionic strength will determine the thickness of the ionic cloud.

Commonly used buffers

Commonly used buffers are,

- Phosphate buffer
- Tris-Borate-EDTA buffer (TBE)
- Tris-Acetate EDTA buffer (TAE)
- Tris -EDTA buffer (TE)
- Lithium Borate - buffer (LB)
- Tris -Citrate-EDTA buffer (TCE)

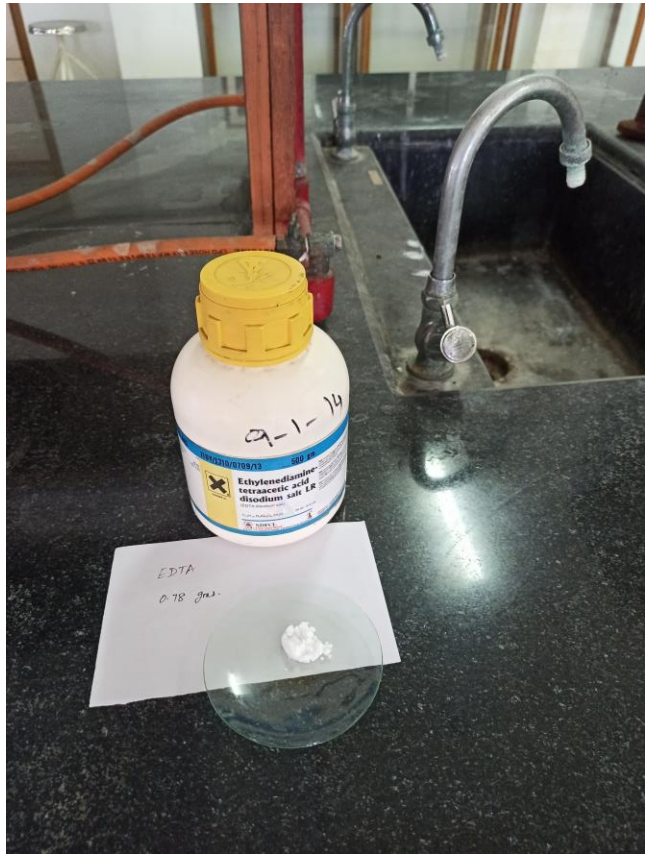
TBE Buffer

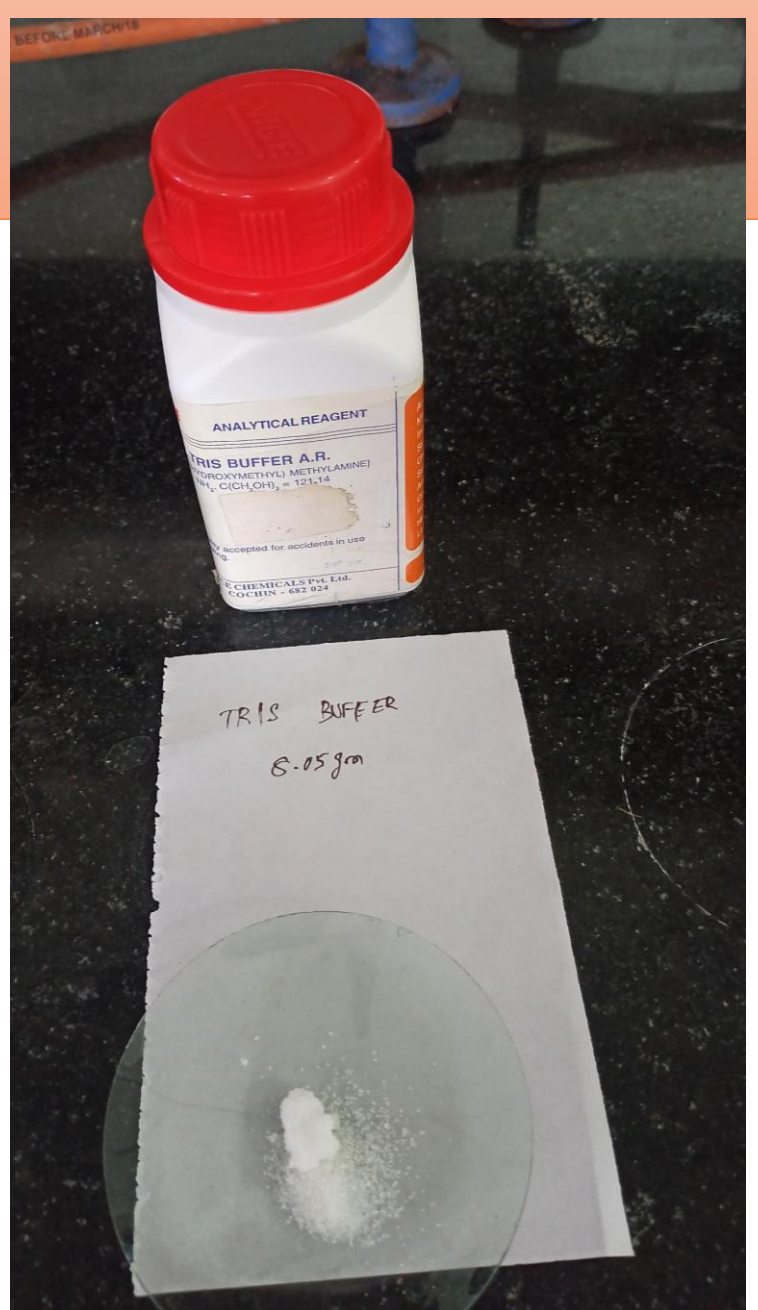
TAE (Tris -acetate-EDTA) and TBE (Tris-borate-EDTA) – pH buffer of 8.6

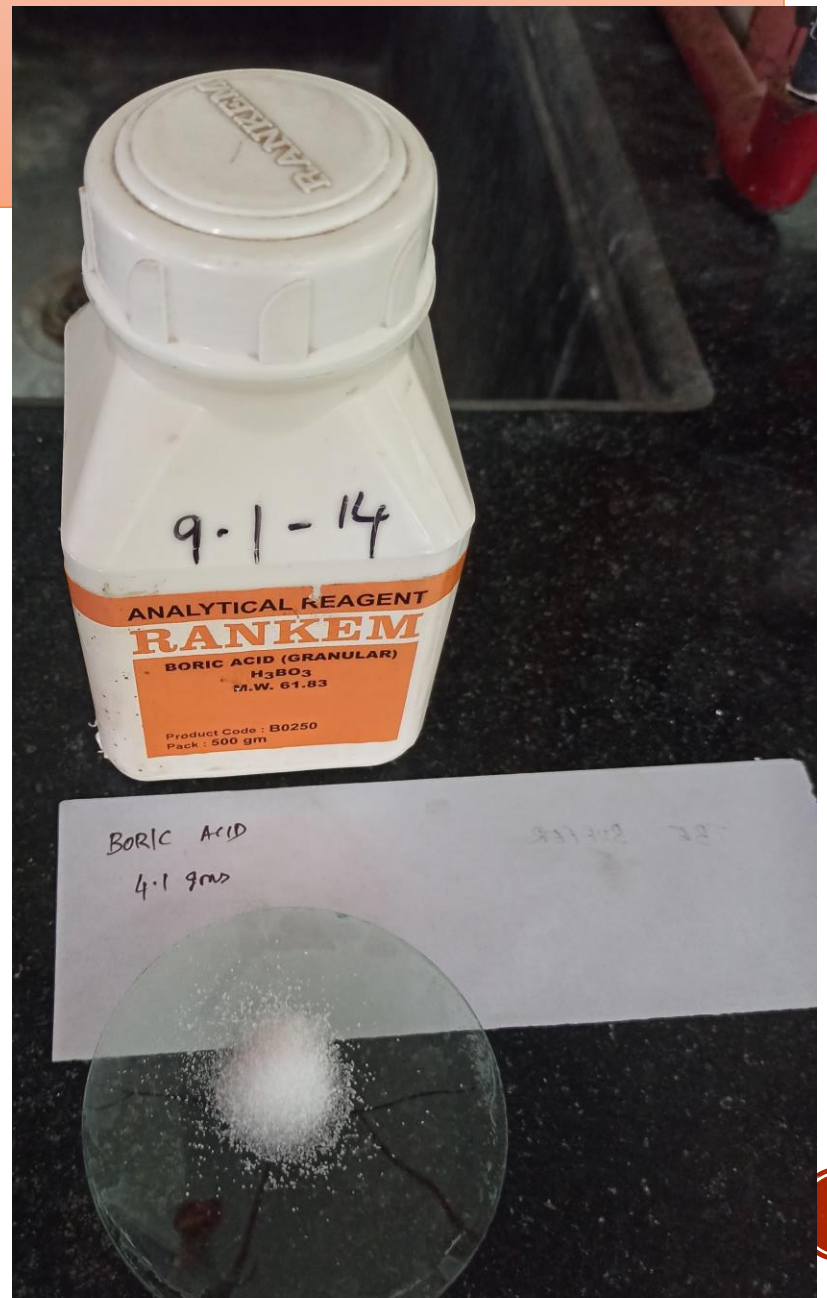
- Tris a pH buffer.
- Acetic acid provide ions to support conductivity and maintain pH.
- EDTA, prevent brake down of molecules.

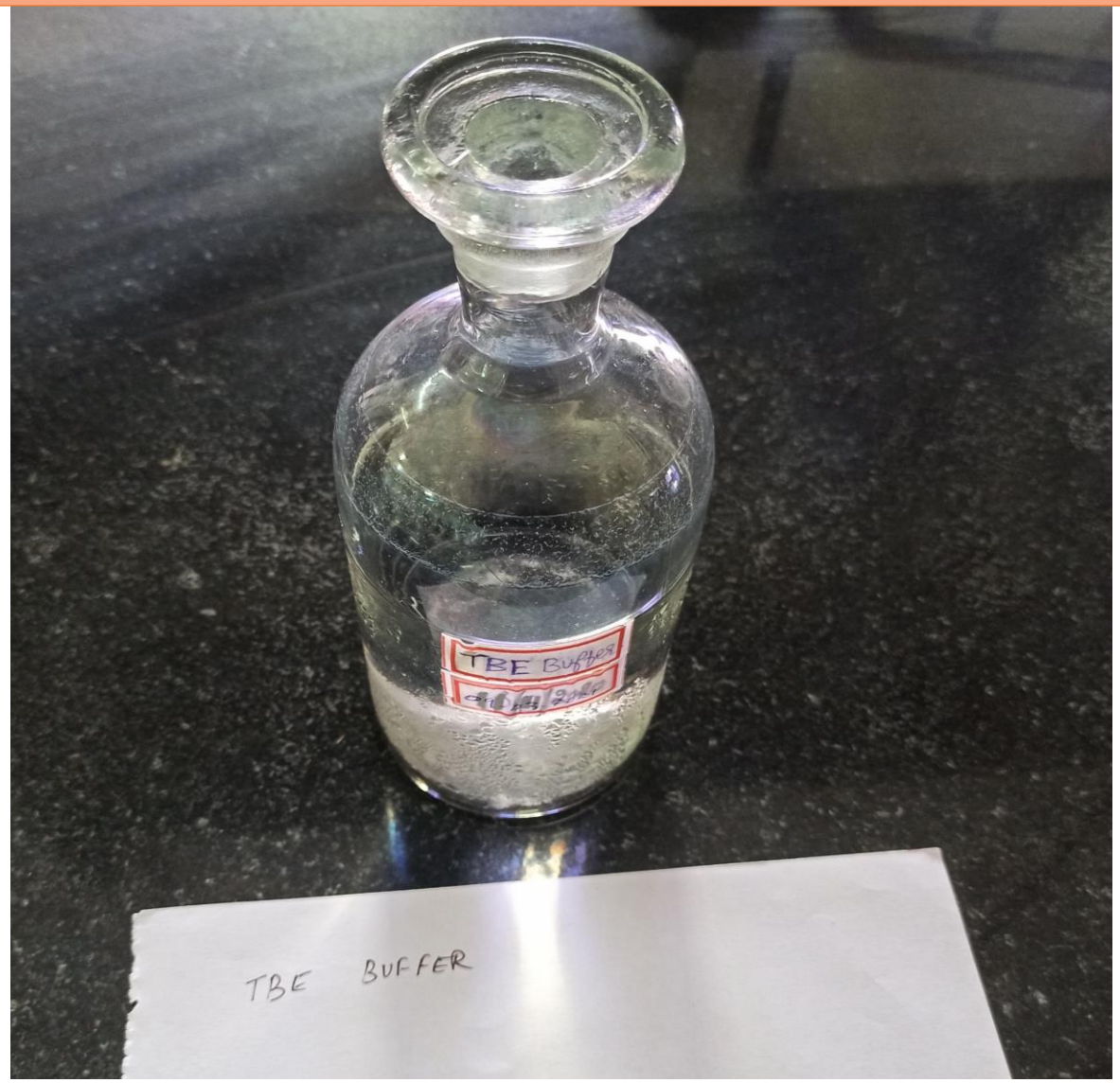
  “all dissolved in water”.

- The important feature of any buffer is that it contains an electrolyte so that it can conduct electricity.


9-1-14
Ethylenediamine-tetraacetic acid 1.5 disodium salt
EDTA
0.78 gms.

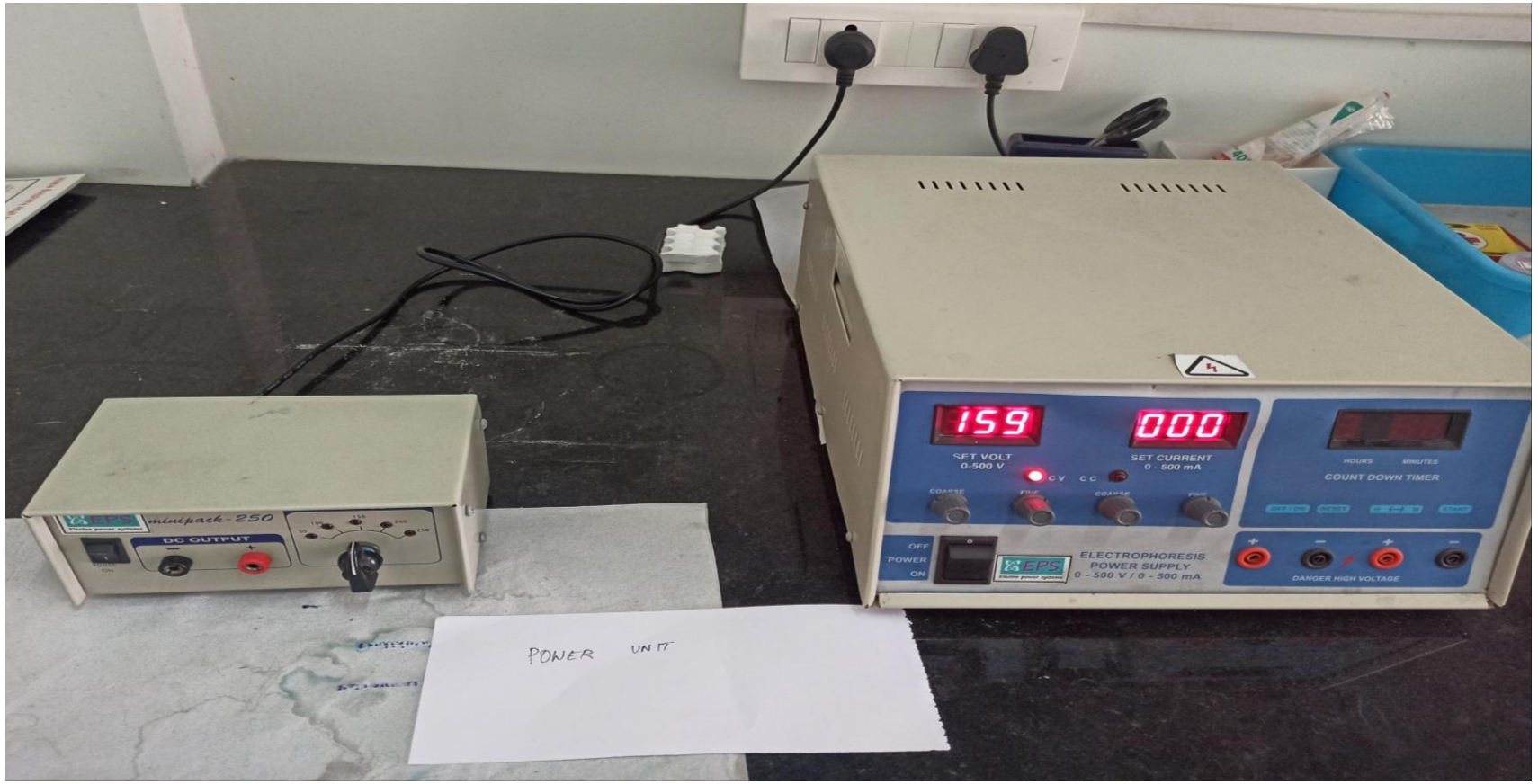

ANALYTICAL REAGENT
RIS BUFFER A.R.
CHEMICALS Pvt. Ltd.
COCHIN - 682 024
TRIS BUFFER
8.05 gm


9-1-14
ANALYTICAL REAGENT
RANKEM
BORIC ACID (GRANULAR)
H3BO3
M.W. 61.83
Product Code : B0250
Pack : 500 gm
BORIC ACID
4.1 gms


TBE Buffer
TBE BUFFER

Power supply

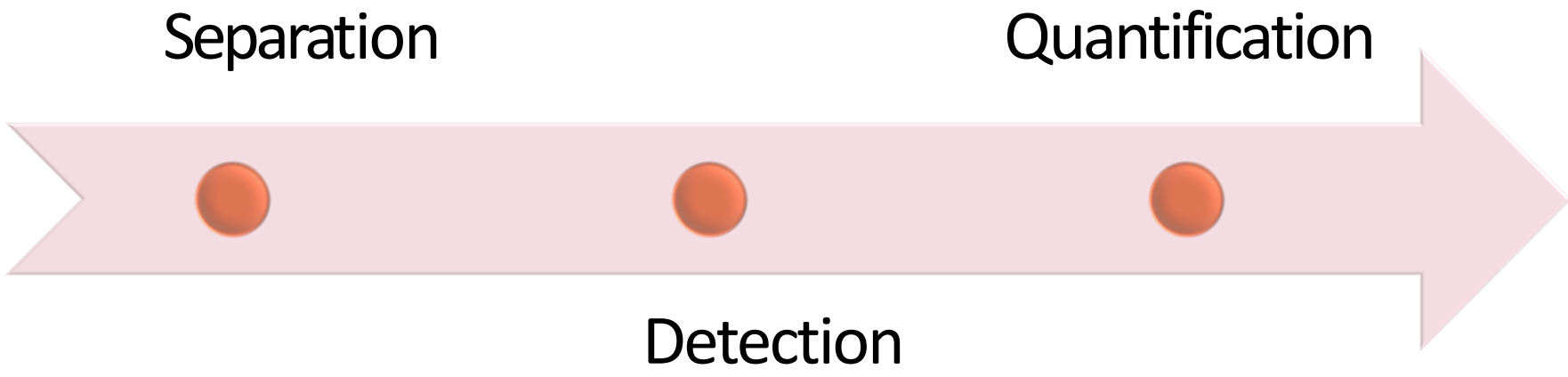
- Drives the moment of ionic species in the medium and allow the adjustment and control of the current or voltage.
- Constant delivery is required.



Power supply

- Flow of current -> Heat produced
  - increase in migration rate -> broadening of separated samples
  - formation of convection currents -> mixing of separated samples
  - thermal instability of heat sensitive samples
  - water loss -> concn of ions -> decrease of buffer viscosity -> decrease in resistance
- To minimize problems: use constant-current power supply

General operation

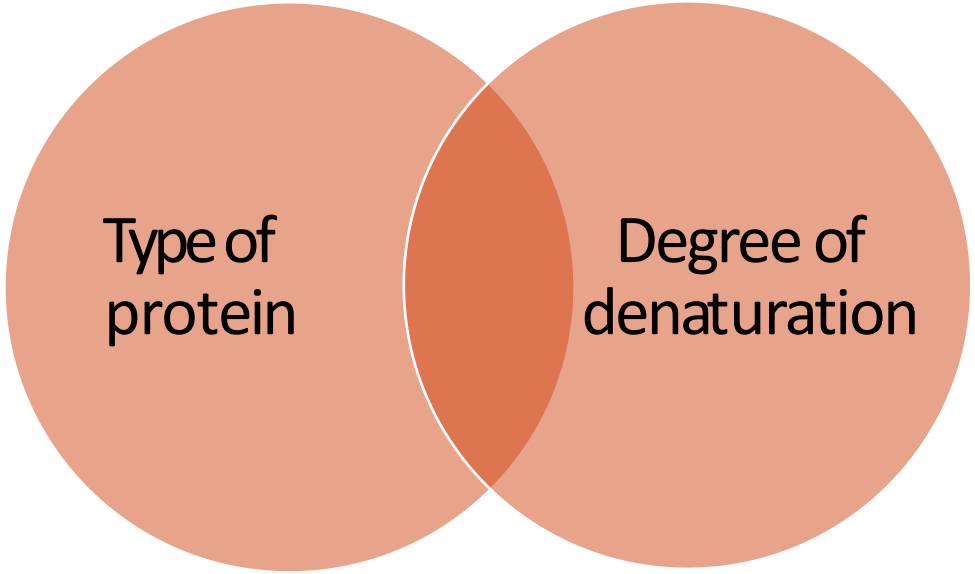


Steps performed:

- Buffer in buffer tank after pH check
- 5-7 µL sample with tracking dye
- Placed in electrode chamber
- Whatmann paper wick is applied
- Current application
- Gel is fixed and dried
- Stained and destained
- Scanned under densitometry

Staining

- Fixation of Protein - by using acetic acid or methanol (this will prevent diffusion of protein out of the gel when submerged in stain solution)
- Amount of dye taken by sample is affected by many factors,



Different stains of Electrophoresis

Plasma Proteins

- Amido black
- Coomassie Brilliant Blue
- Bromophenol Blue

Hemoglobin

- Amido black
- Coomassie Brilliant Blue
- Ponceau Red

Lipoproteins

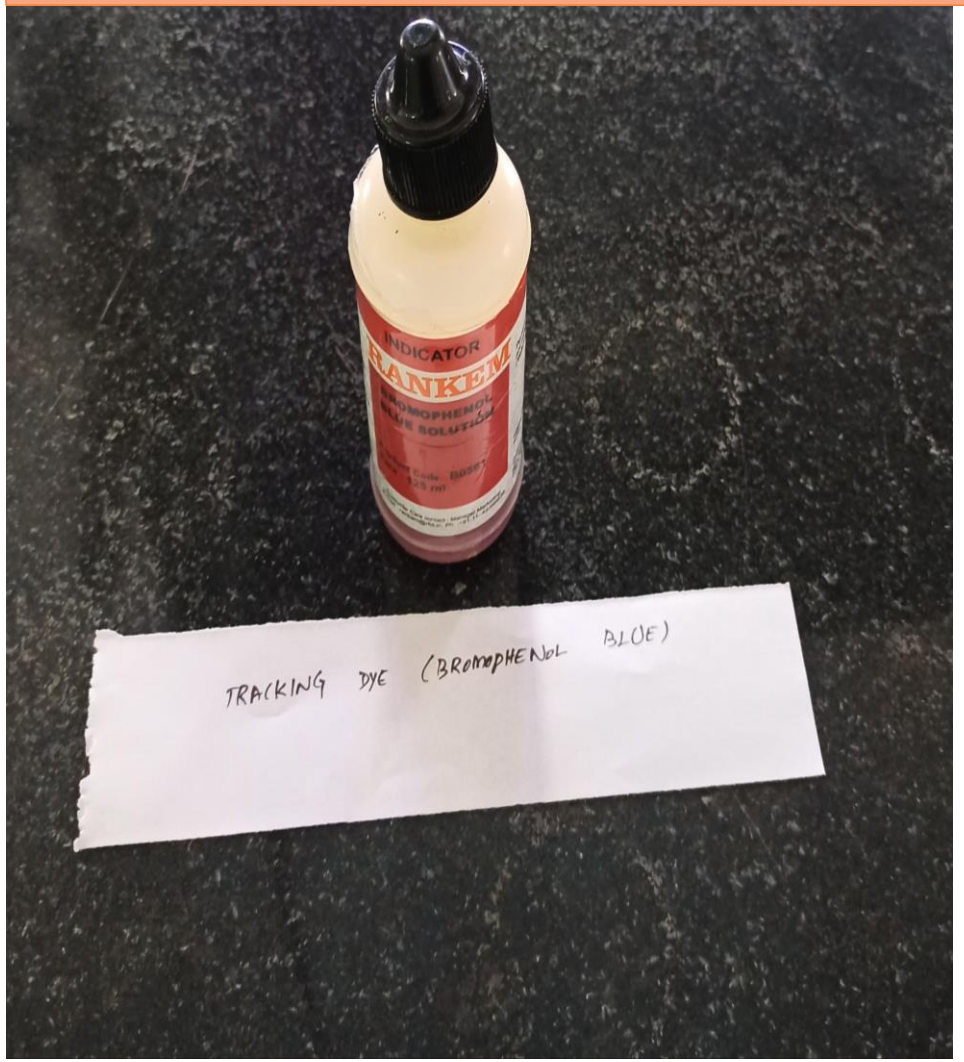
- Sudan Black
- Oil red O

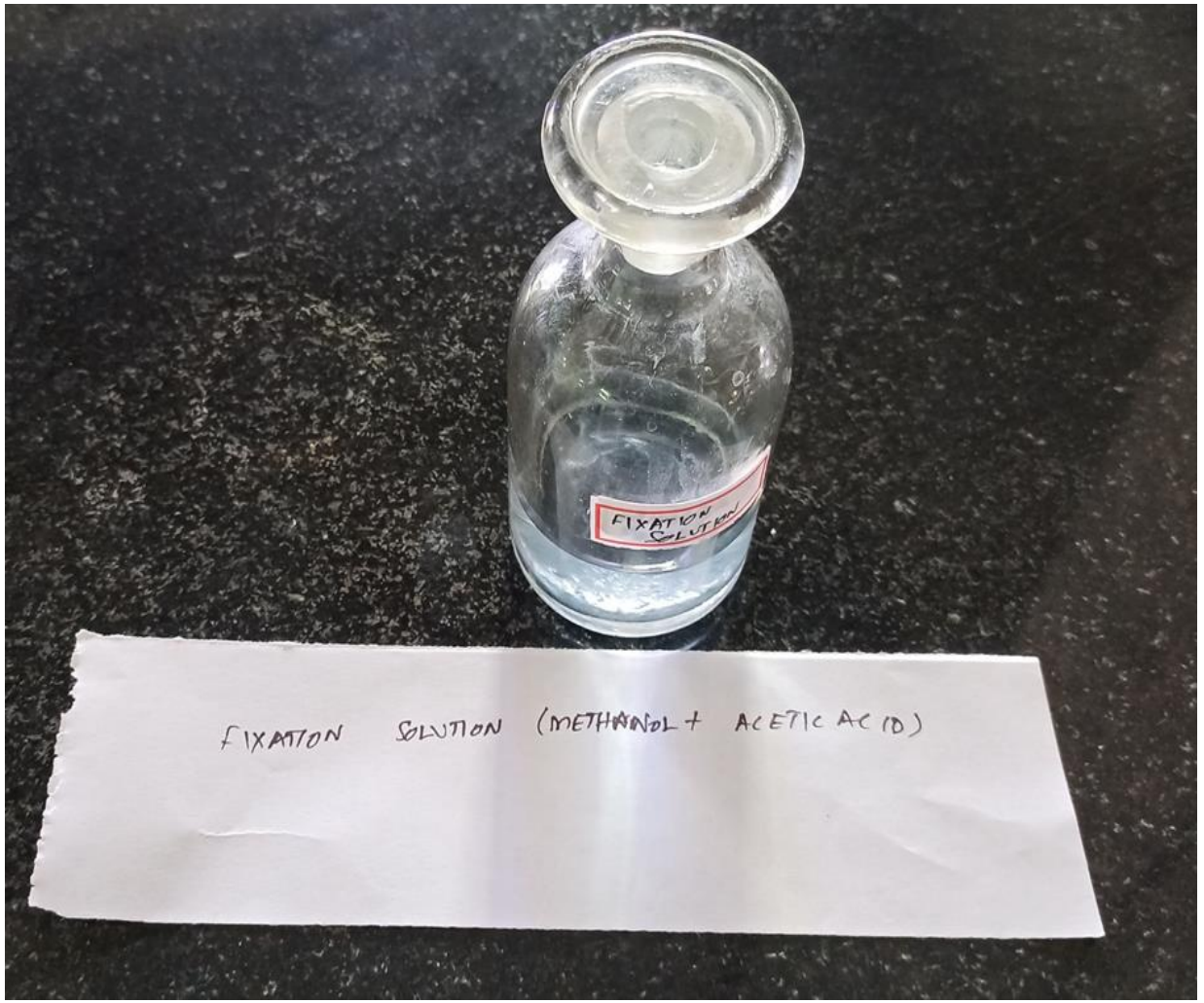
DNA (Fluorescent dyes)

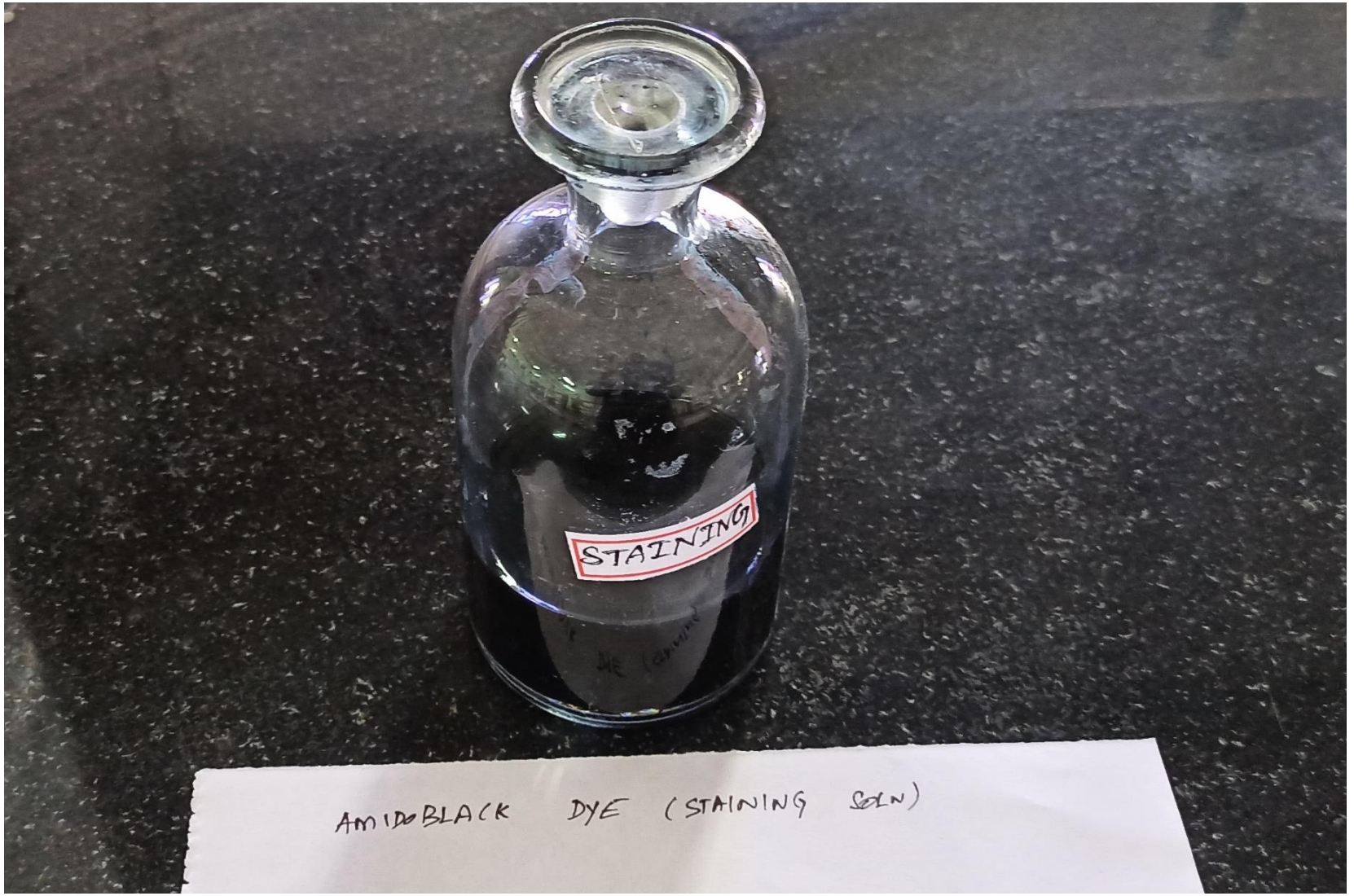
- Ethidium Bromide
- Sybr Green, Sybr Gold

Steps in running a sample

- Tracking the sample with bromophenol blue
- Fixing with methanol & acetic acid
- Staining with amido black
- Destaining with 5 % acetic acid


INDICATOR
RANKEM
TRACKING DYE (BROMOPHENOL BLUE)

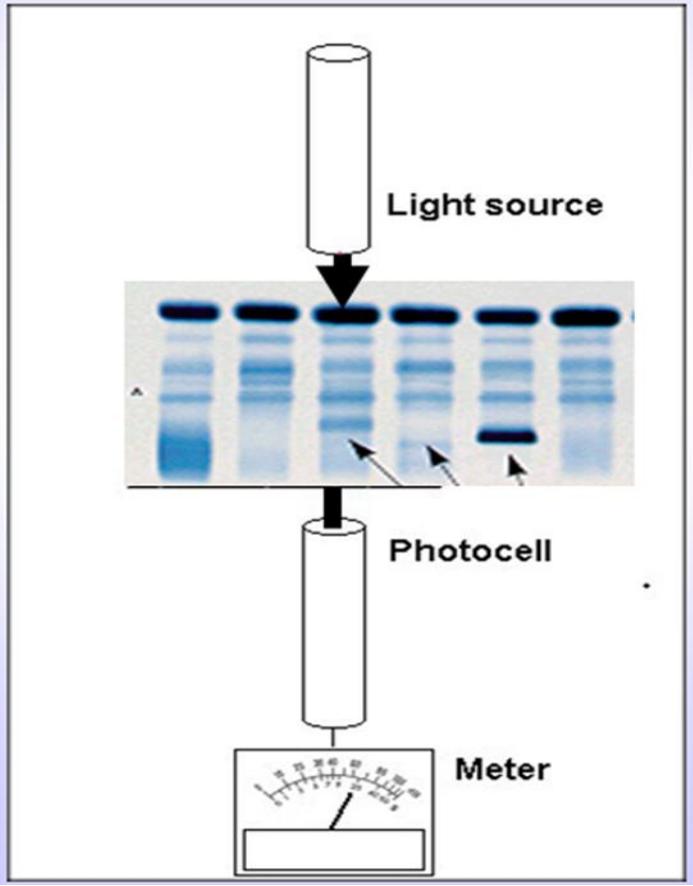

FIXATION SOLUTION
FIXATION SOLUTION (METHANOL + ACETIC ACID)


STAINING
AMIDO BLACK DYE (STAINING SOLN)

Detection and Quantification

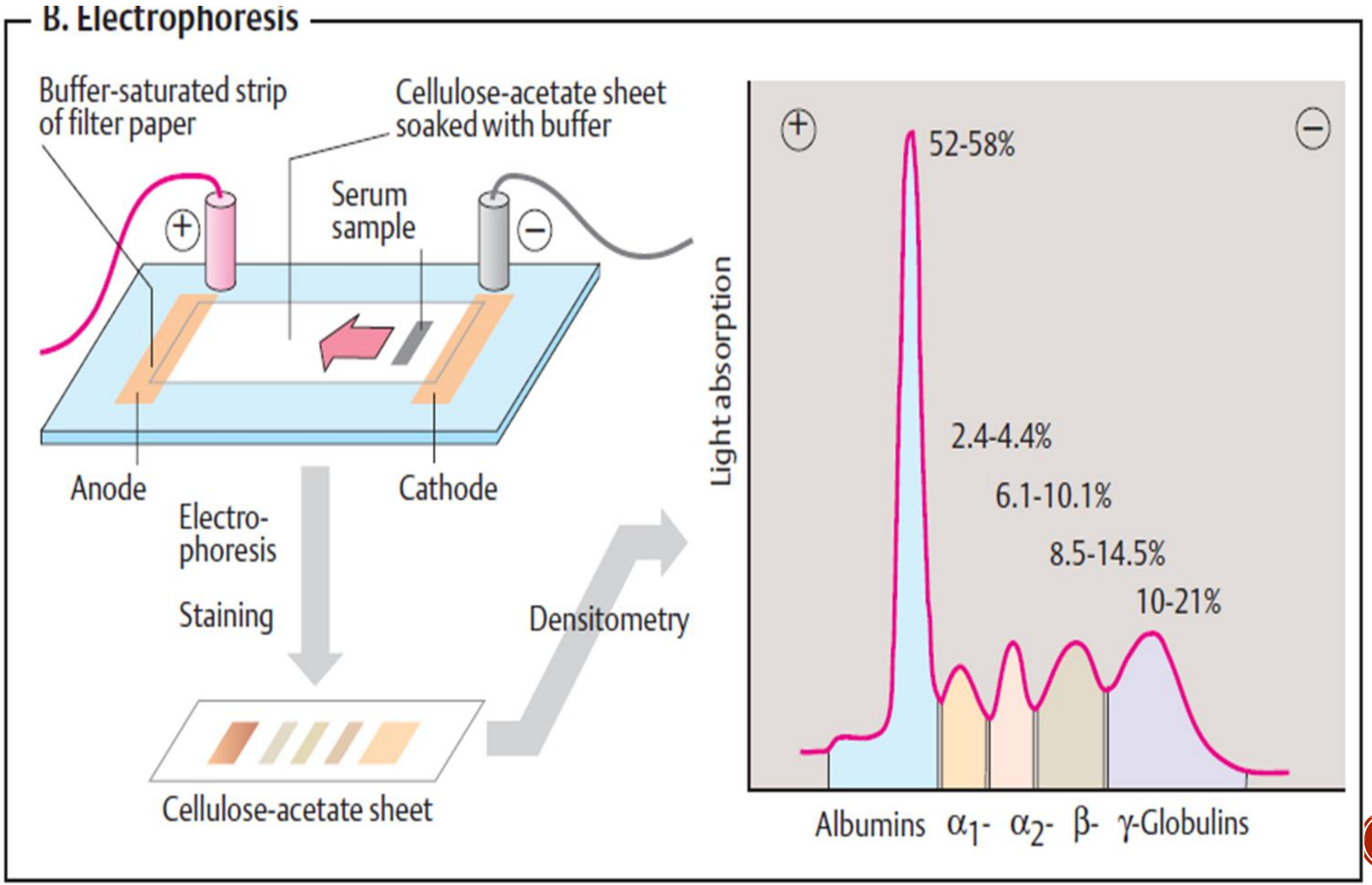
- Once separated, protein may be detected by staining followed by the quantification using the densitometer.

⌘ Densitometer is a device that measures the degree of darkness in photographic or semi-transparent material.



Common effect of variables on separation

pH	Changes charge of analyte, effective mobility; structure of analyte-denaturing or dissociating a protein.
Ionic strength	Changes in voltage; increased ionic strength reduces migration velocity and increase heating.
Ions present	Change migration speed; cause tailing of bands.
Current	Too high current cause overheating.
Temperature	Overheating cause denature protein; lower temp reduce diffusion but also migration; there is no effect on resolution.
Time	Separation of bands increases linearly with time, but dilution of bands increase with square root of time.
Medium	Major factors are endosmosis and pore size effect, which effect migration velocities.


B. Electrophoresis
Buffer-saturated strip of filter paper
Cellulose-acetate sheet soaked with buffer
Serum sample
+
−
Anode
Cathode
Electro-phoresis
Staining
Densitometry
Cellulose-acetate sheet
Light absorption
52-58%
2.4-4.4%
6.1-10.1%
8.5-14.5%
10-21%
Albumins α1- α2- β- γ-Globulins

Paper Electrophoresis

- The support medium is a filter paper
- 10µl serum is applied in the form of thin line on hydrated Whatman no1 filter paper
- Chamber are filled with buffer (pH 8.6) and constant current of 1-2 mA
- Time duration to run the test is 10-16 hrs
- Paper is then stained with Bromophenol blue to visualize individual bands
- Drawback- long time interval and blurring of margins

Cellulose Acetate Membrane Electrophoresis

- Preferred solid support media
- Less time consuming
- Excellent separation
- No blurring of margins
- Membranes can be stored for a longer time
- Widely used for separation of Proteins, lipoproteins and hemoglobin variants

Poly Acrylamide Gel Electrophoresis (PAGE)

- Most popular type
- Polyacrylamide is a polymer formed when acrylamide is heated with a variety of catalysts with or without cross linking agents
- It is thermostable, transparent, strong and relatively chemically inert
- Gels are uncharged and are prepared in a variety of pore sizes
- Proteins are separated on the basis of charge to mass ratio and molecular size, a phenomenon called Molecular sieving.
- PAGE is the backbone of blotting techniques

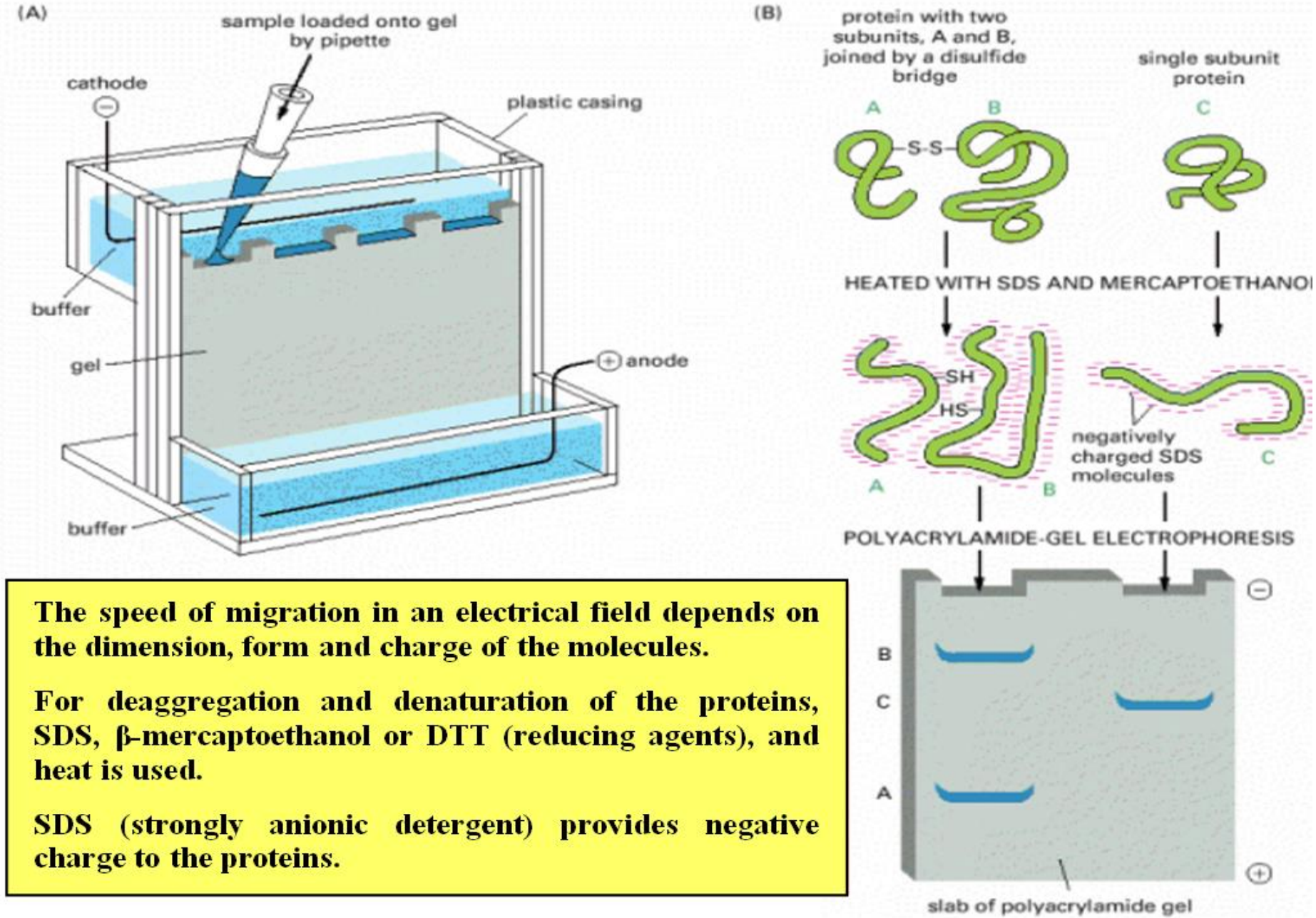
Types of PAGE

PAGE can be classified according the separation conditions into:

- *Native-PAGE: –* Separation is based upon charge, size, and shape of macromolecules. Useful for separation and/or purification of mixture of proteins – This was the original mode of electrophoresis.
- *Denatured-PAGE or SDS-PAGE* – Separation is based upon the molecular weight of proteins. The most common method for determining MW of proteins – Very useful for checking purity of protein samples.

PAGE-Procedure

- The gel of different pore sizes is cast in to a column inside a vertical tube, often with large pore gel at the top and small pore gel at the bottom.
- Microgram quantity of the sample is placed over the top of the gel column and covered by a buffer solution having such a p H so as to change sample components in to anions
- The foot of the gel column is made to dip in the same buffer in the bottom reservoir.
- Cathode and anode are kept above and below the column to impose an electric field through the column
- Rate of migration depends on the charge to mass ratio

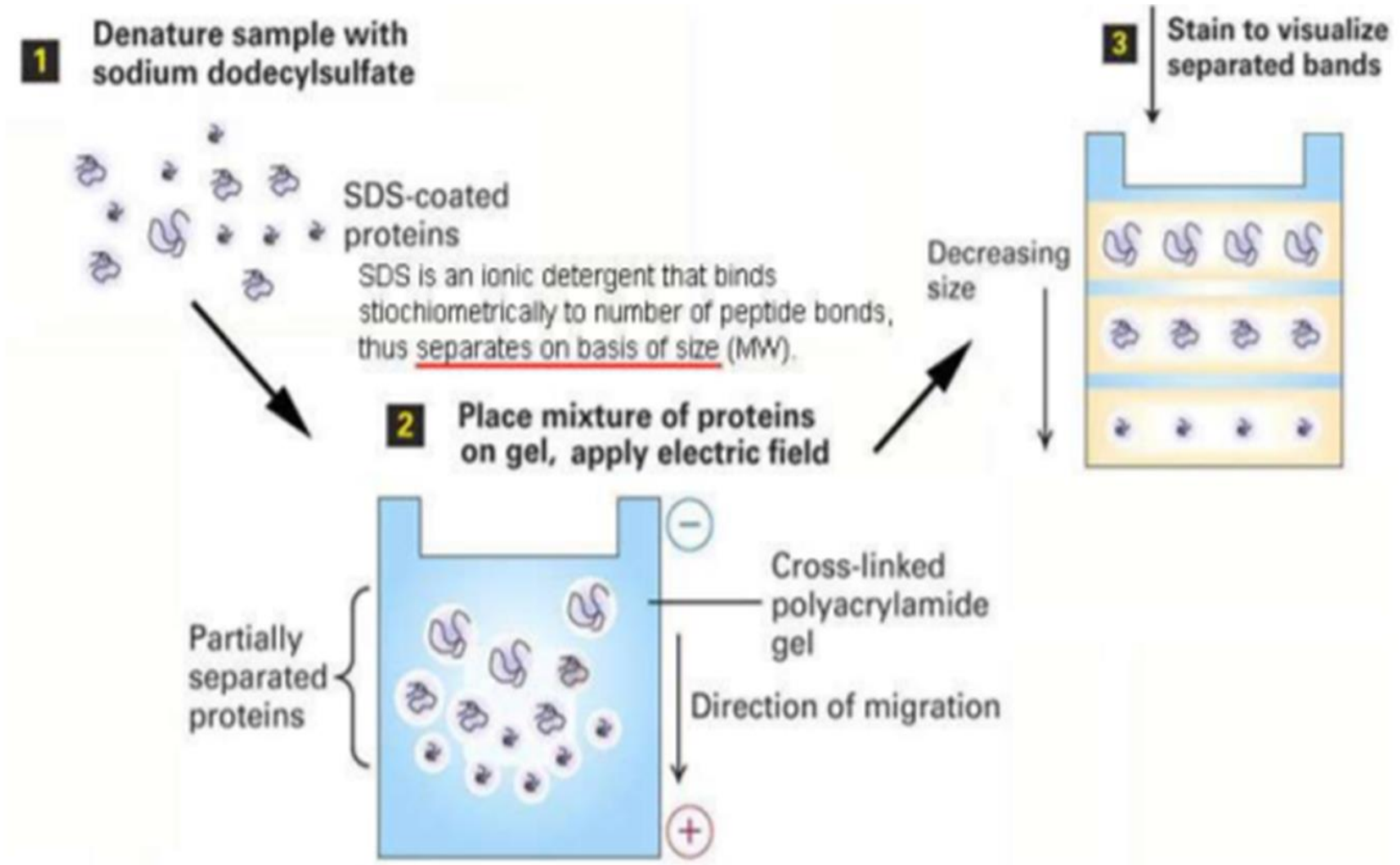


The speed of migration in an electrical field depends on the dimension, form and charge of the molecules.

For deaggregation and denaturation of the proteins, SDS, β-mercaptoethanol or DTT (reducing agents), and heat is used.

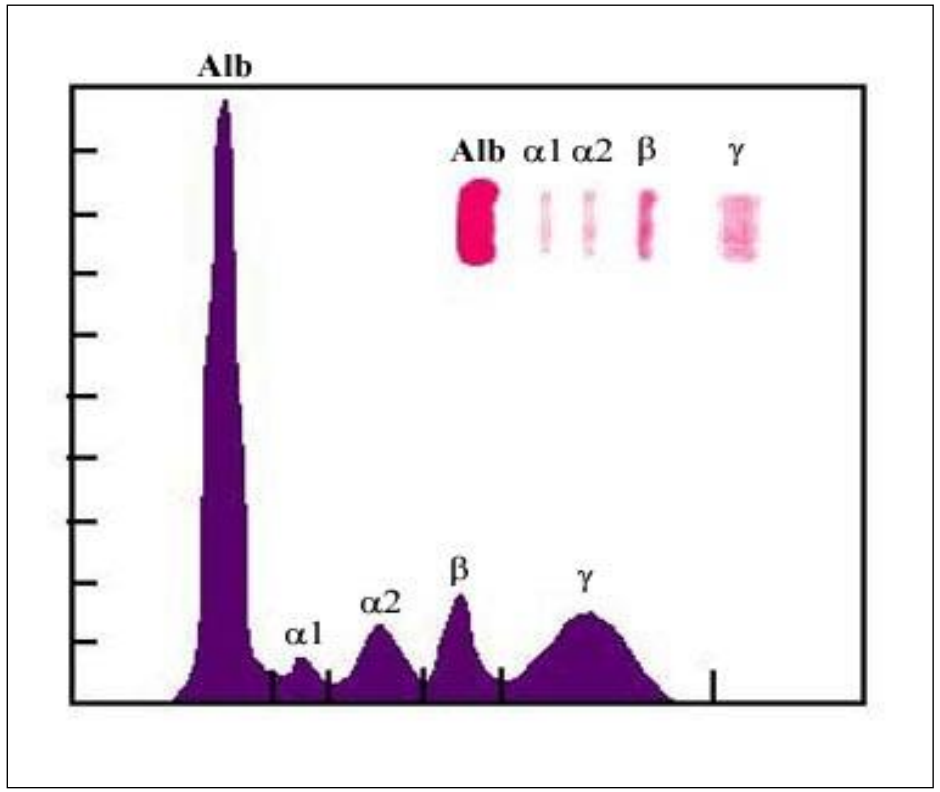
SDS (strongly anionic detergent) provides negative charge to the proteins.

SDS-PAGE


1
Denature sample with sodium dodecylsulfate
SDS-coated proteins
SDS is an ionic detergent that binds stiochiometrically to number of peptide bonds, thus separates on basis of size (MW).
2
Place mixture of proteins on gel, apply electric field
Partially separated proteins
Cross-linked polyacrylamide gel
Direction of migration
3
Stain to visualize separated bands
Decreasing size

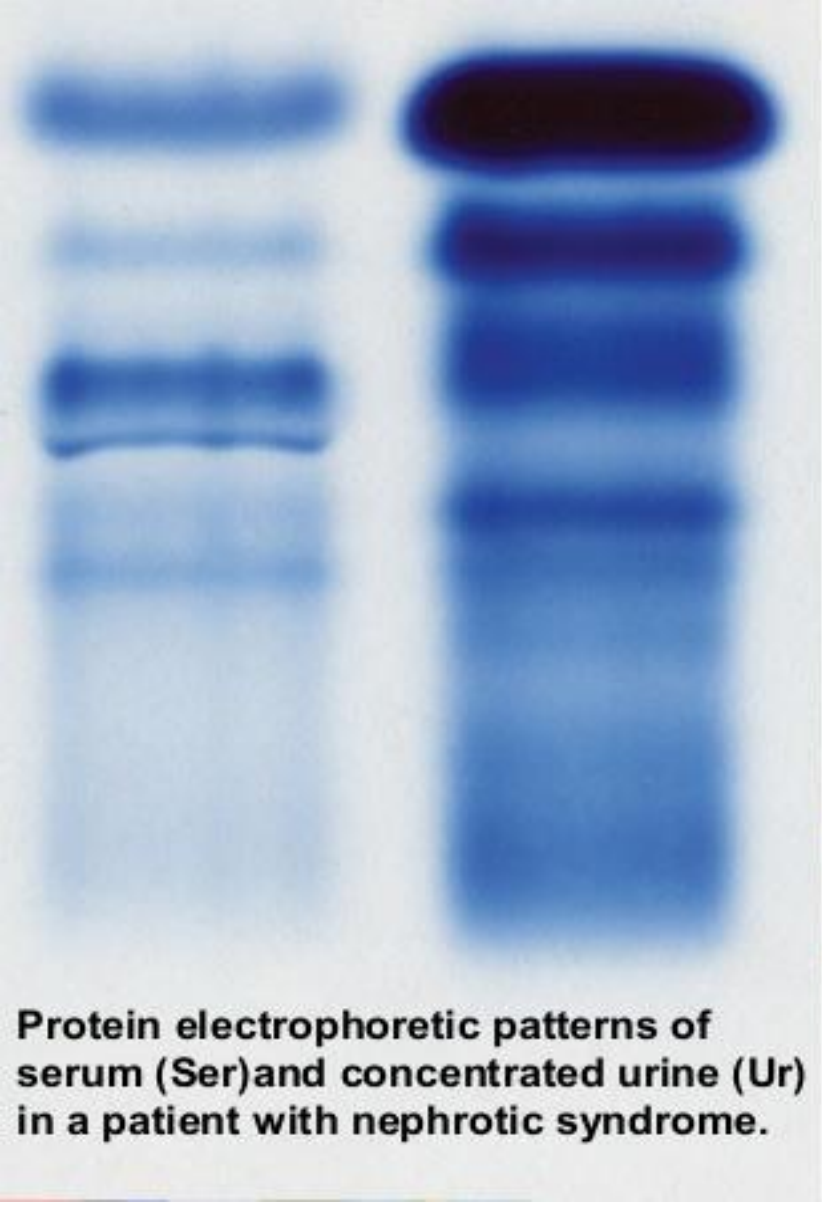
Serum proteins electrophoresis in diagnostics of diseases

Normal pattern

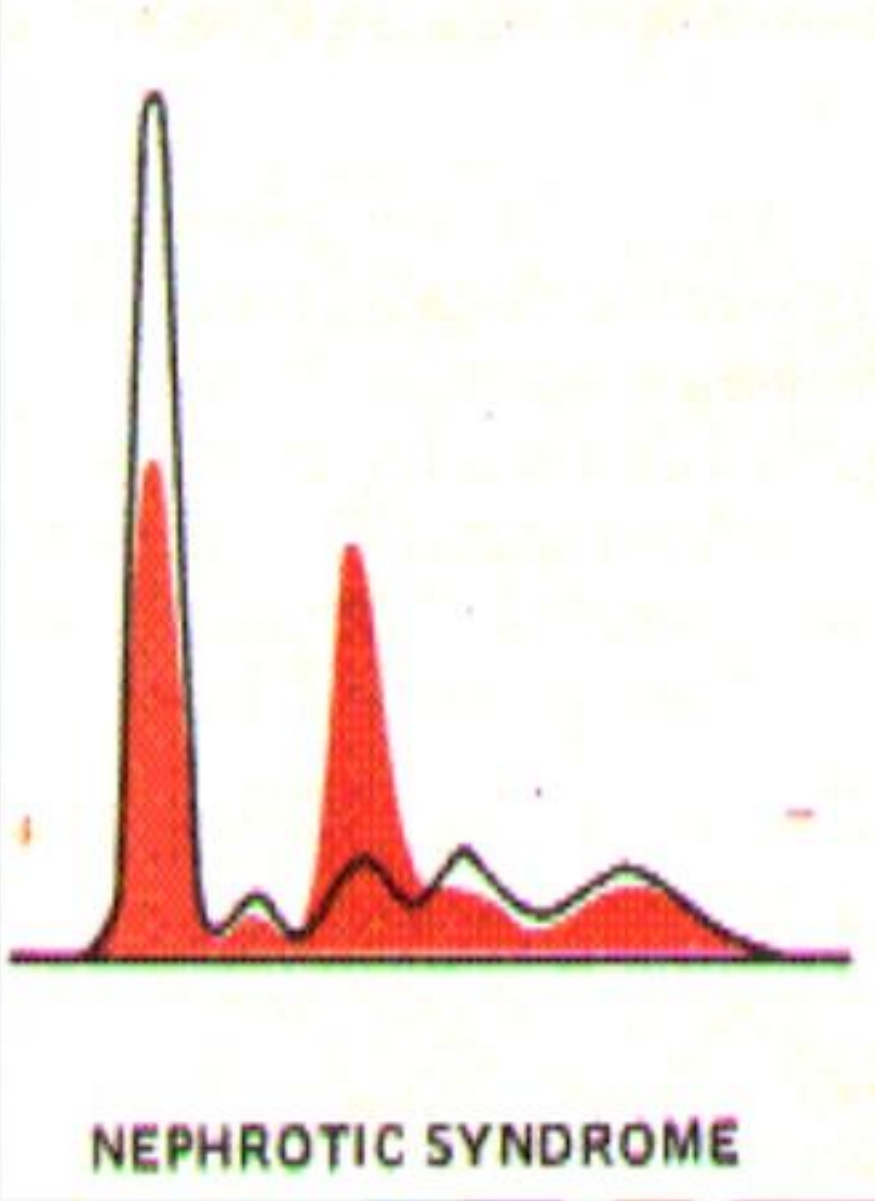


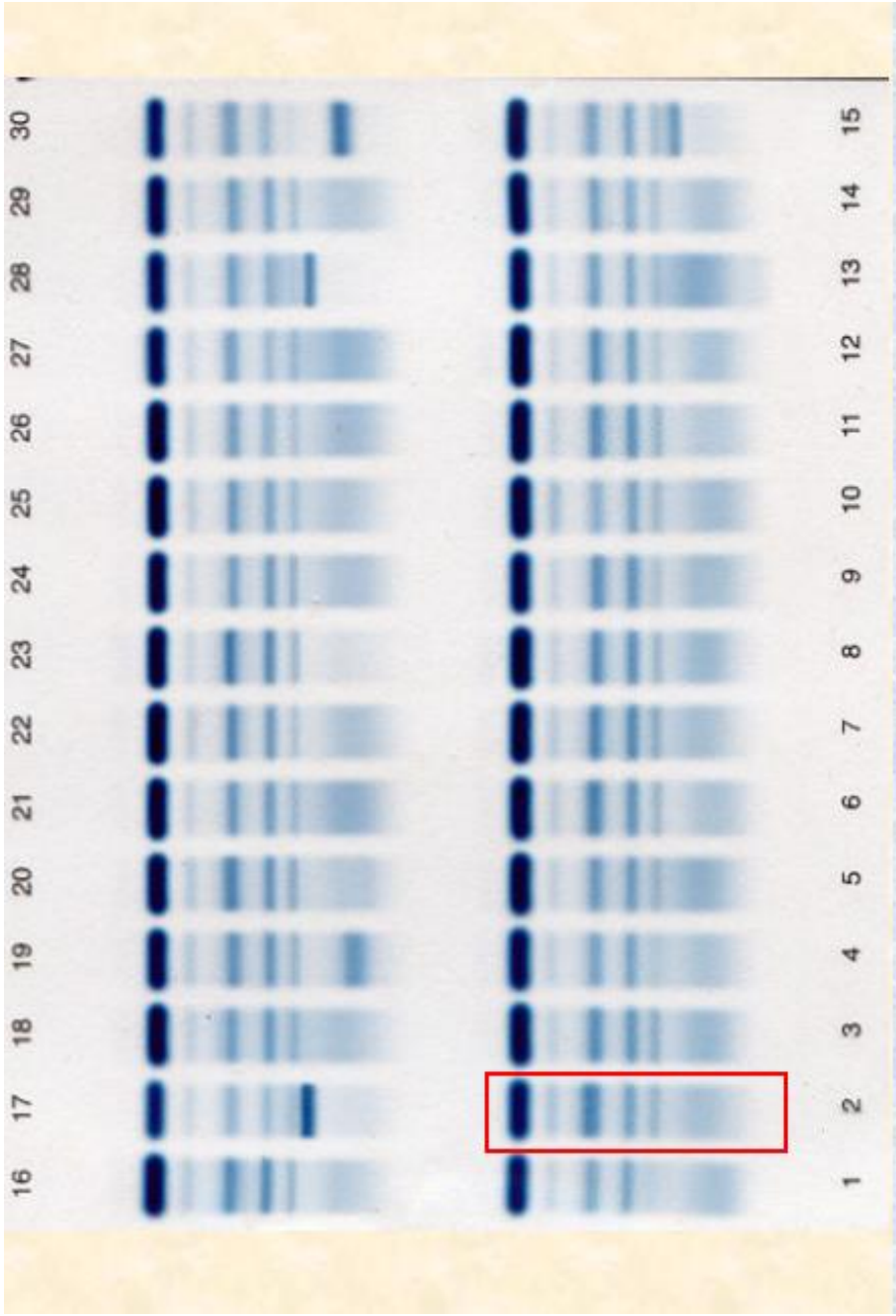
Reference ranges:

Total protein	6.0 – 8.0 g/dL
Albumin	3.5 – 5.0 g/dL
α1-globulins	0.1 – 0.4 g/dL
α2-globulins	0.4 – 1.3 g/dL
β-globulins	0.6 – 1.3 g/dL
γ-globulins	0.6 – 1.5 g/dL



Protein electrophoretic patterns of serum (Ser)and concentrated urine (Ur) in a patient with nephrotic syndrome.





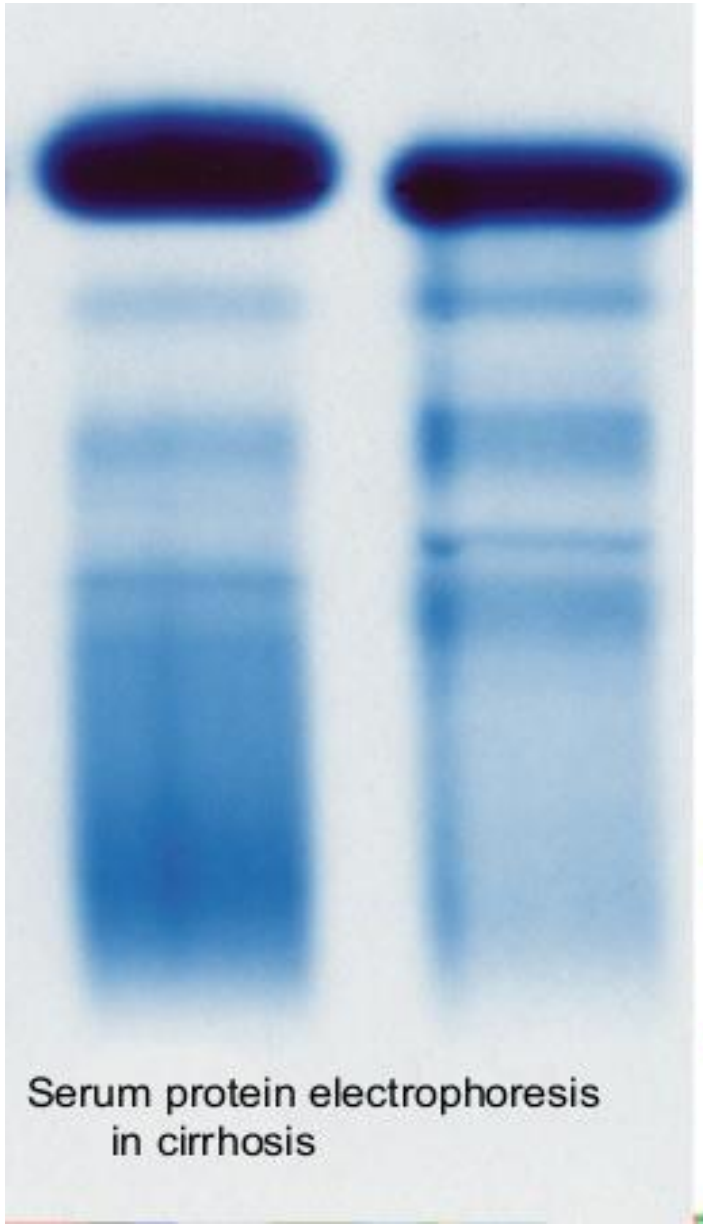
Selective protein loss

Long-term loss of albumin and IgG in kidney

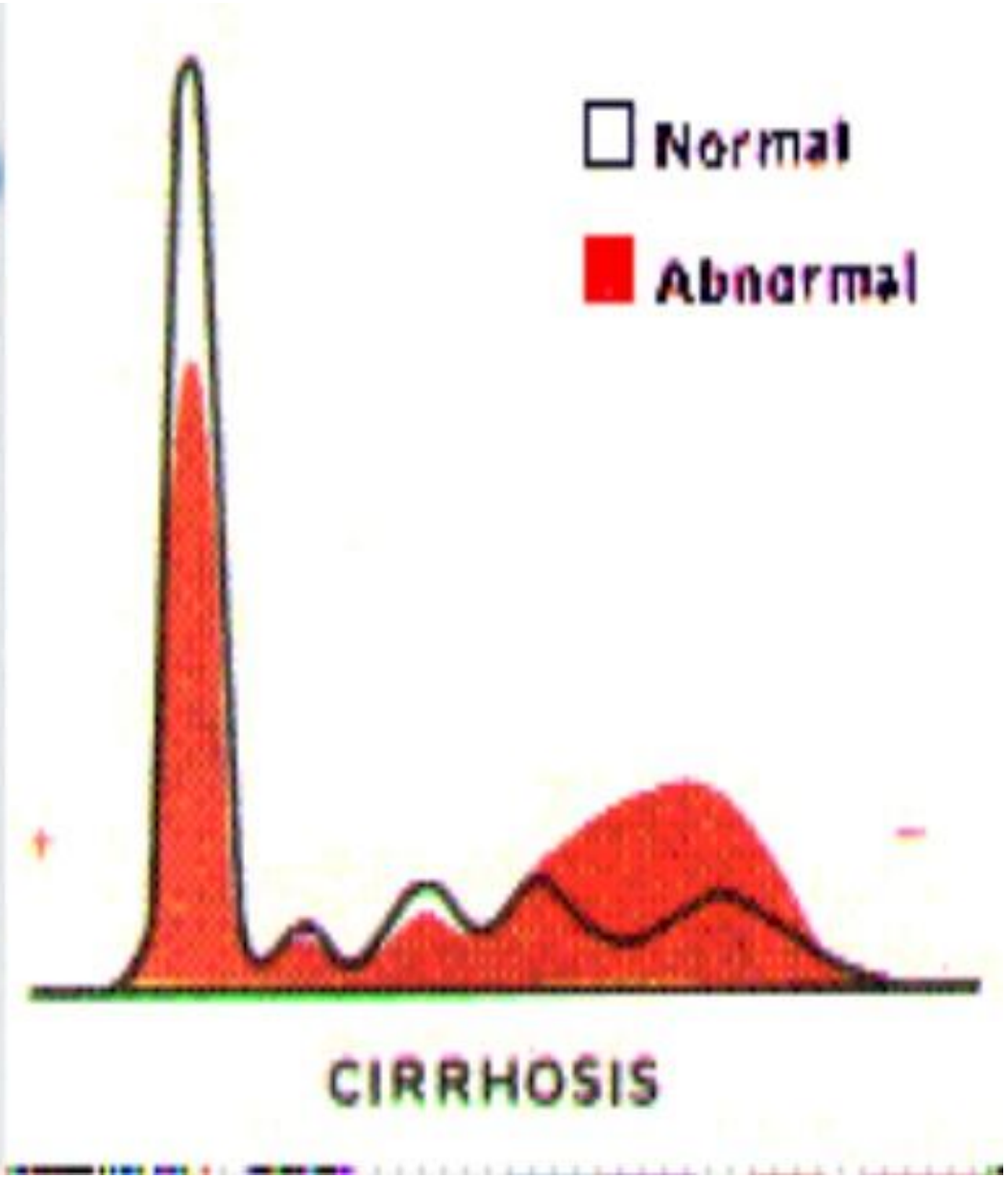
↓ albumin

↑↑ α_2 & ↑ β globulins

- nephrotic syndrome



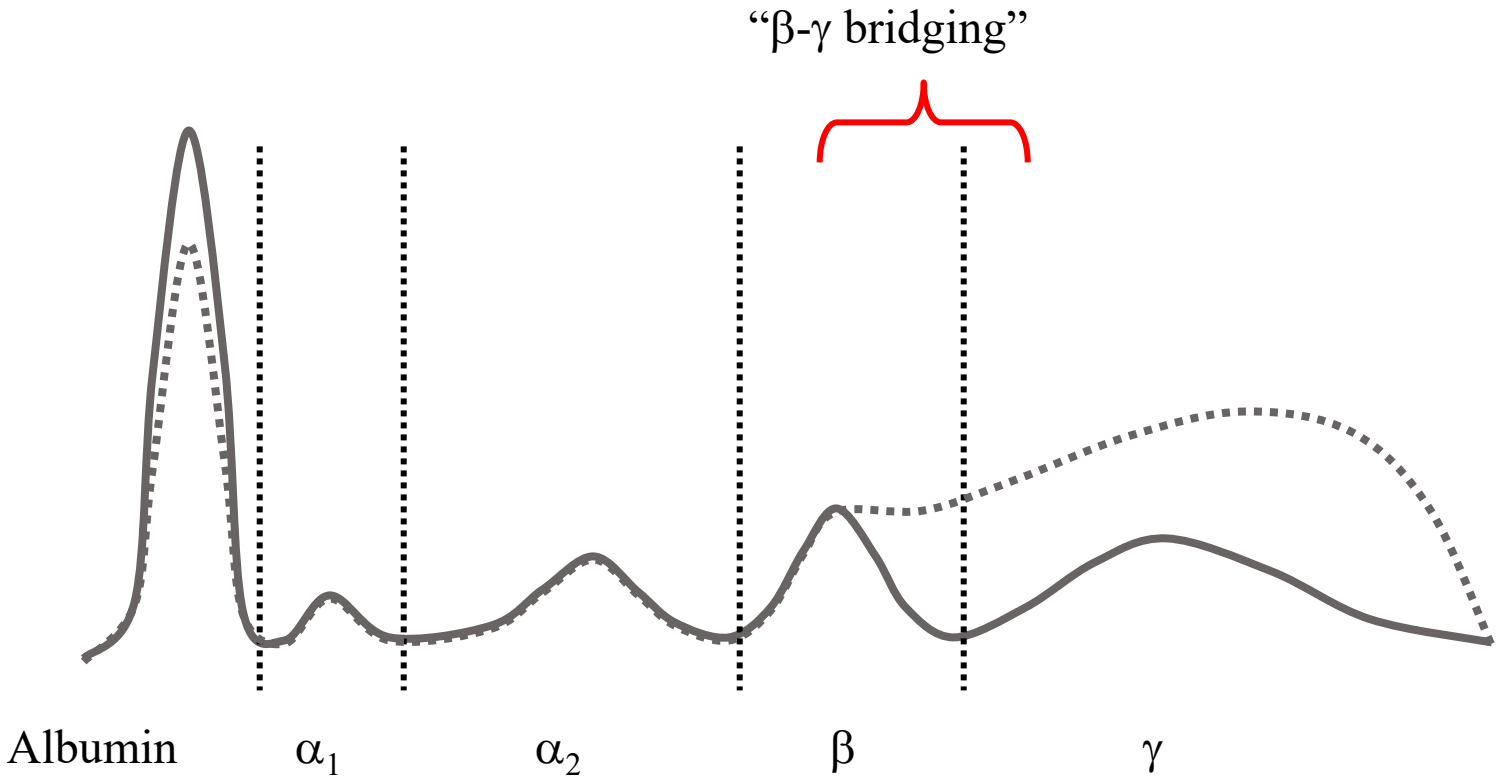
Serum protein electrophoresis
in cirrhosis

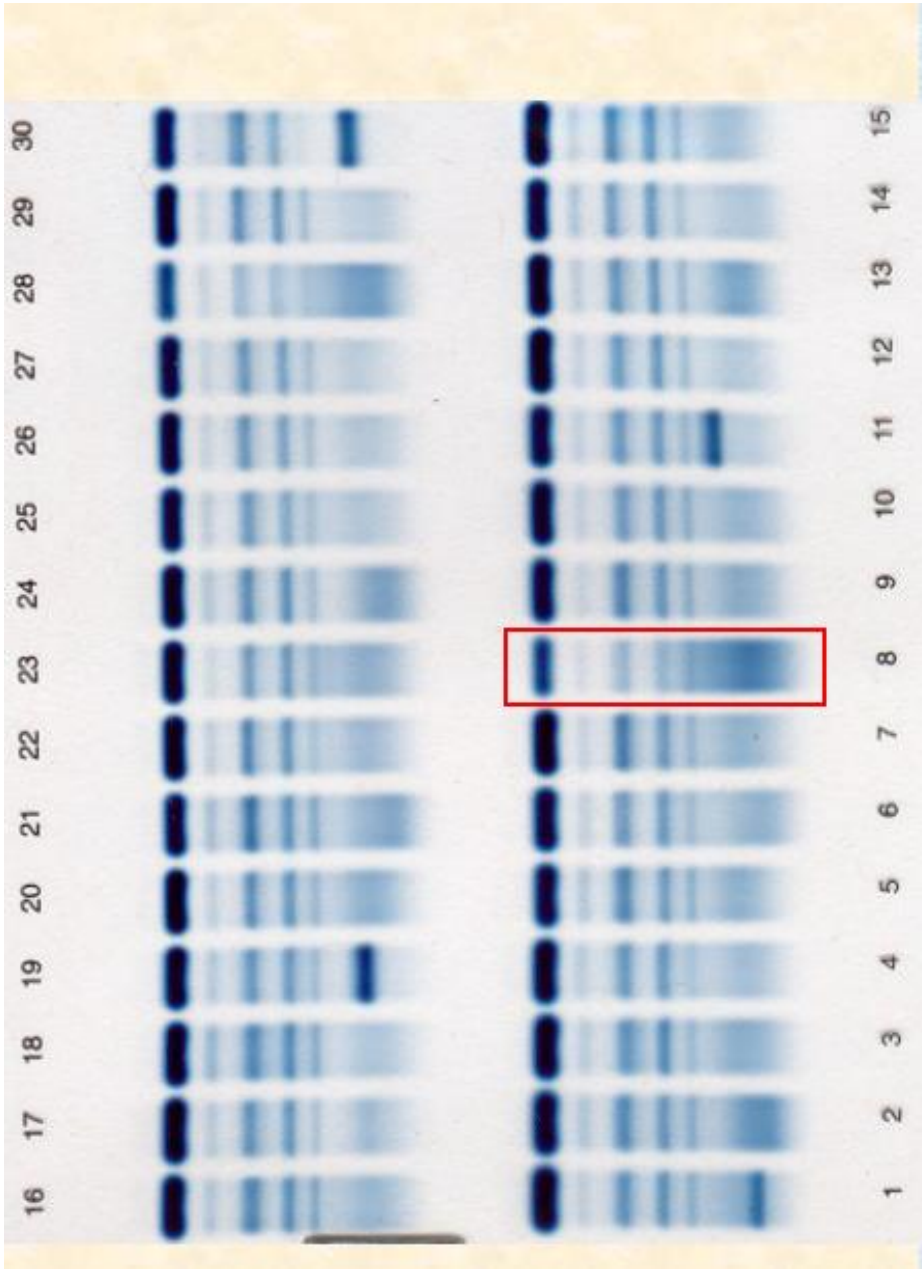


Hepatic cirrhosis

- Decreased albumin
- Increased γ globulins

Condition	Albumin	Globulins			
		α 1	α 2	β	γ
Cirrhosis	↓↓	N	N	↑	↑↑



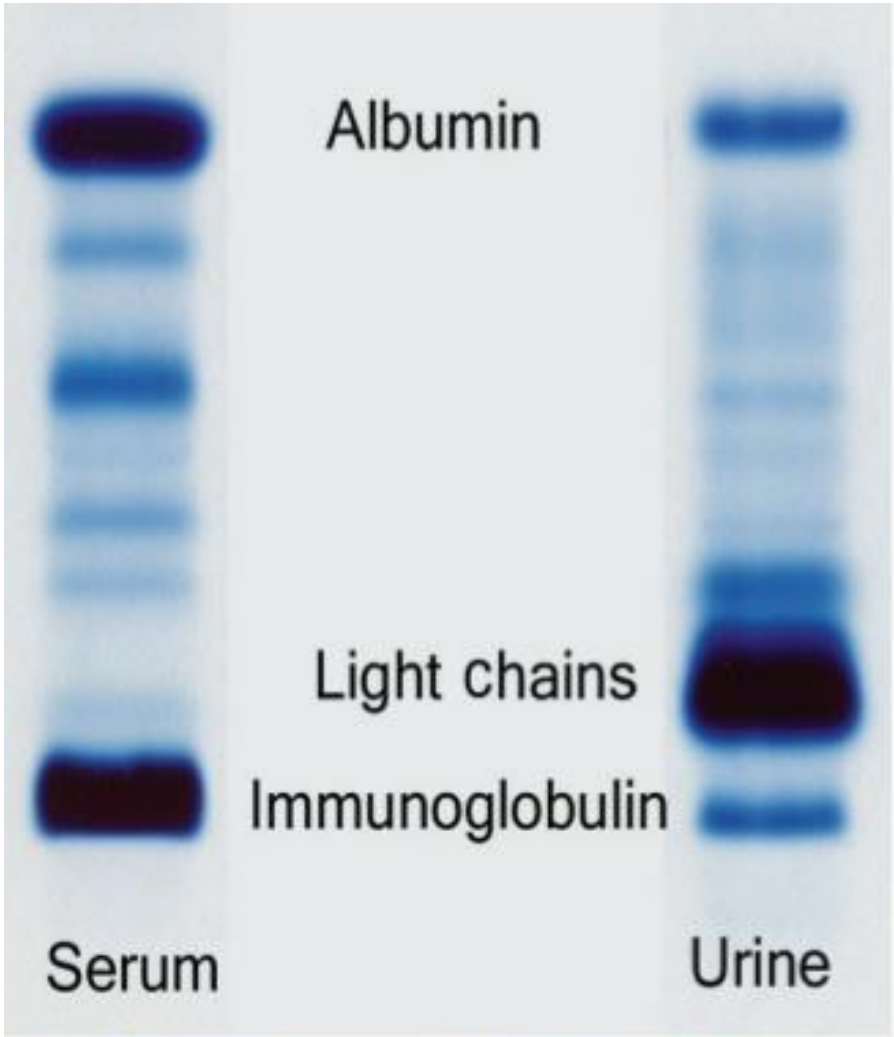


β-γ bridging

Polyclonal increase in IgA extending into beta region

This patient also shows decreased albumin

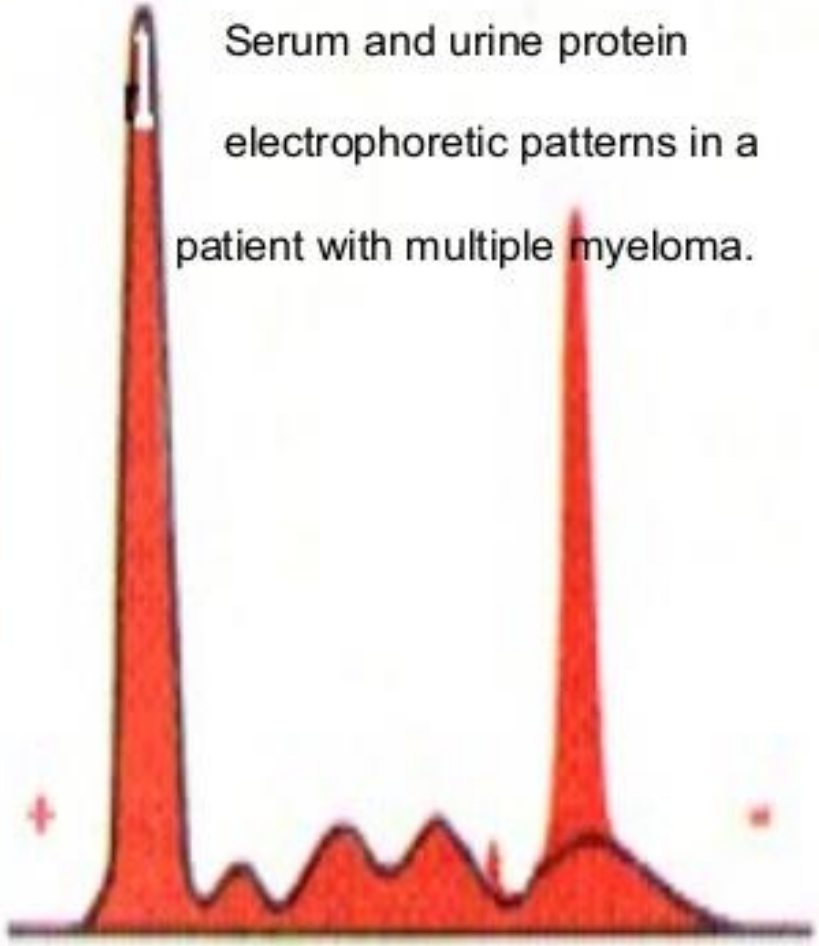
- cirrhotic liver disease
- malignancy
- inflammatory disease



A predominance of the larger complete immunoglobulin.

A large amount of the smaller-sized light chains with only a small amount of the whole

Serum and urine protein electrophoretic patterns in a patient with multiple myeloma.

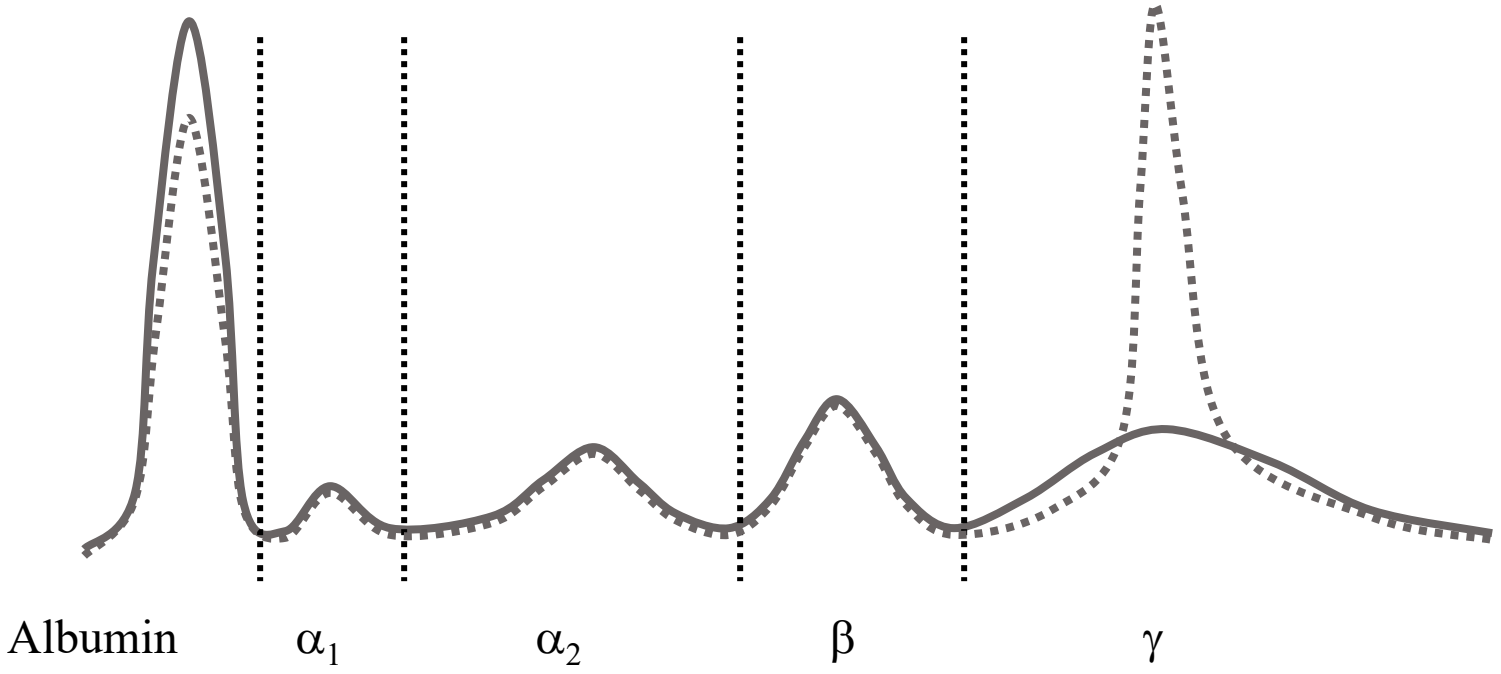


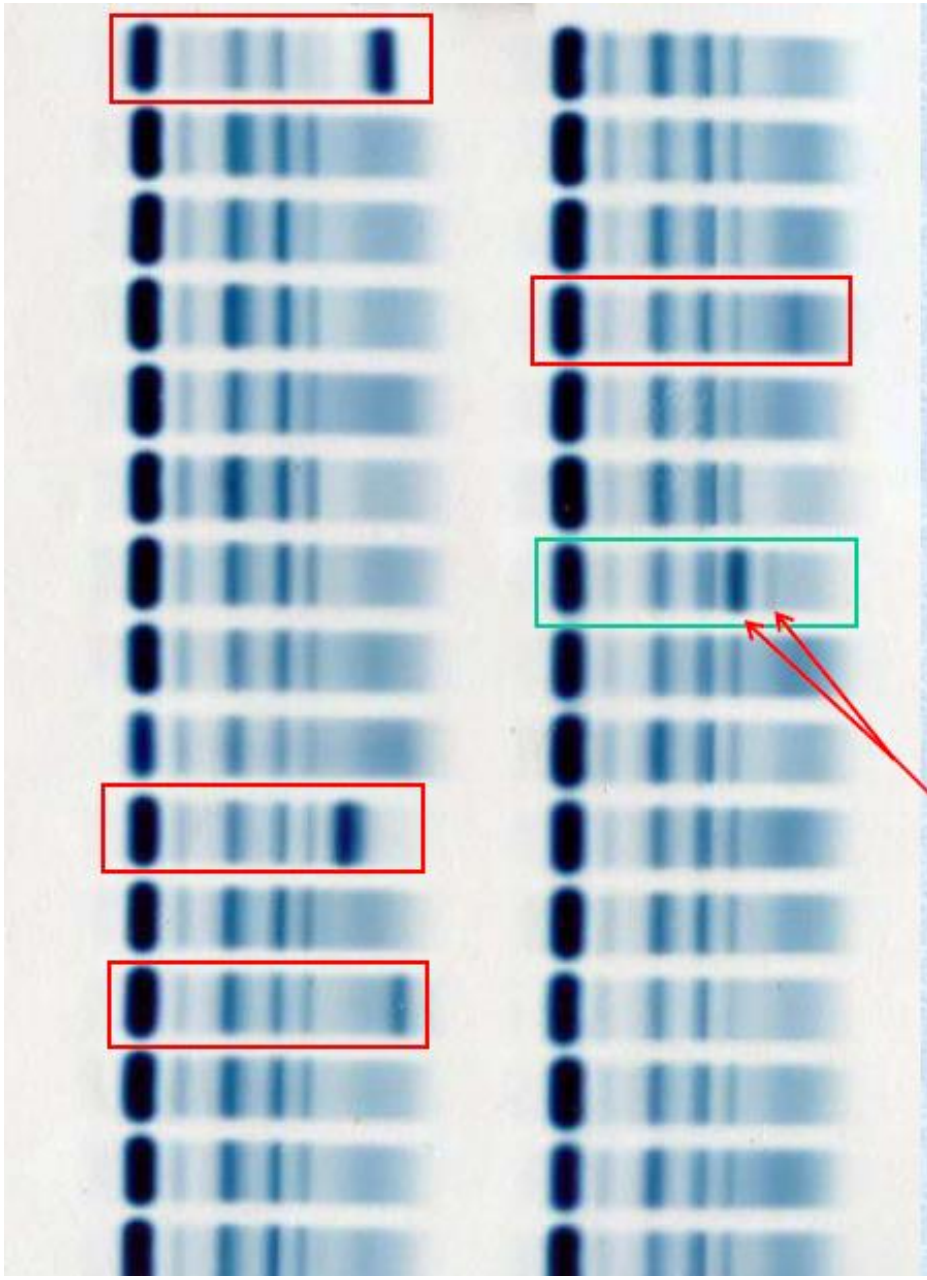
MONOCLONAL GAMMOPATHY

Monoclonal gammopathy

- Albumin decreased
- Sharp peak in γ region

Condition	Albumin	Globulins			
		α 1	α 2	β	γ
M. Myeloma	↓	N	N	N	↑↑





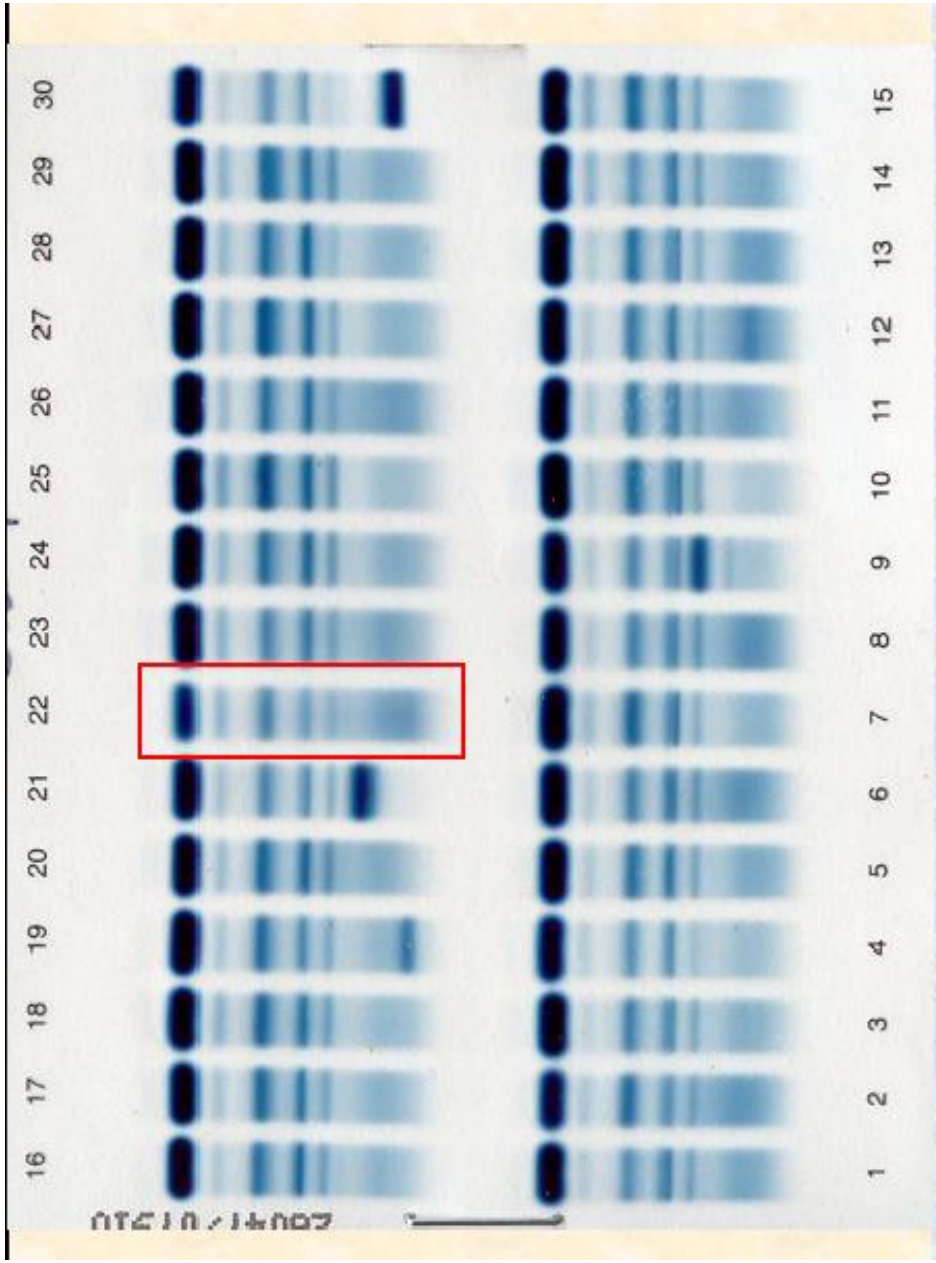
Monoclonal Gammopathy

Monoclonal proliferation of β-lymphocytes, producing an abnormal immunoglobulin paraprotein

Discrete band, typically within β - γ region

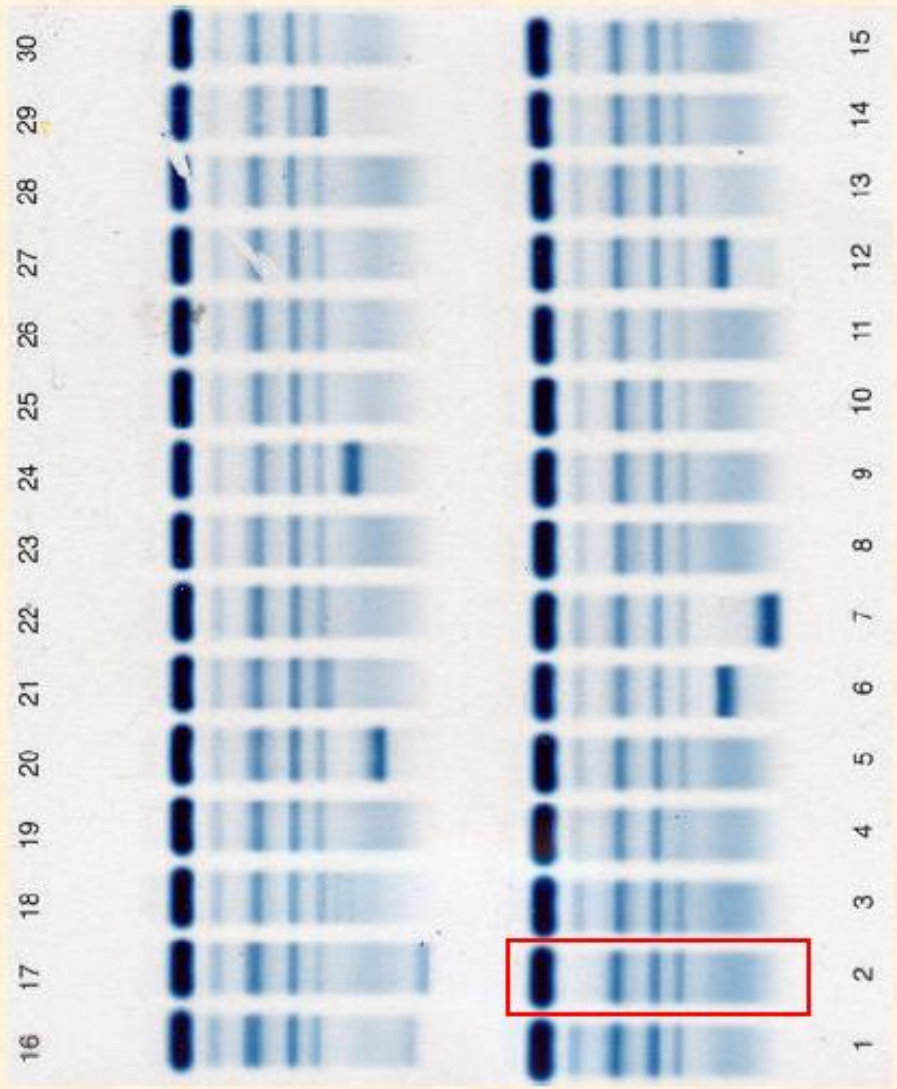
Monoclonal IgA and free light chains may migrate as far as α_2 region

example of a biclonal gammopathy



Hypoalbuminemia

- organ losses
  - renal
  - GI
- liver disease
- malnutrition



Markedly decreased alpha-1 globulins

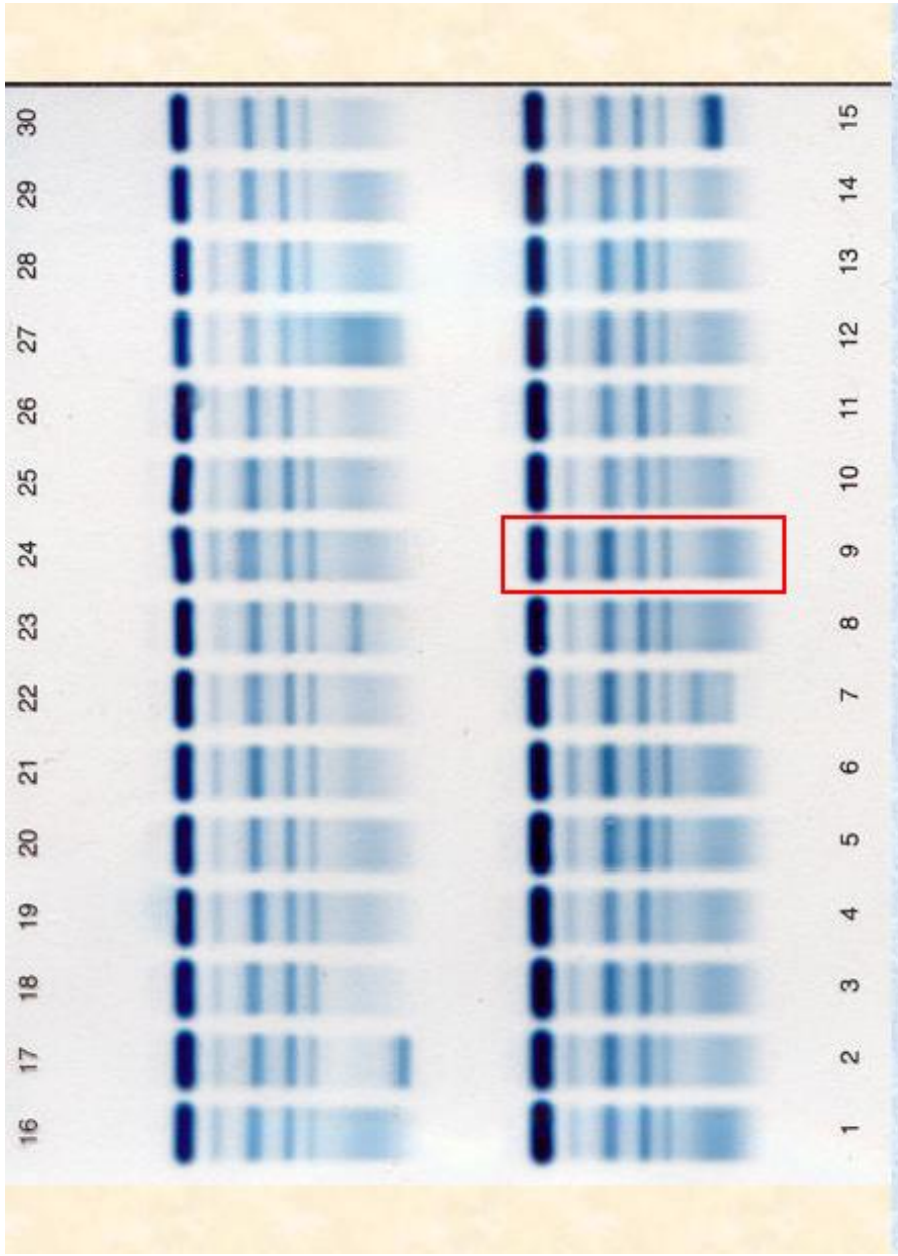
Isolated ↓ α1-AT

α1-antitrypsin deficiency

- LL ref range: 1-3 g/L
- suggest phenotyping if <0.6
- PiZZ genotype: 10% α1-AT

Combined with ↓ albumin

- liver disease
- malnutrition
- protein loss

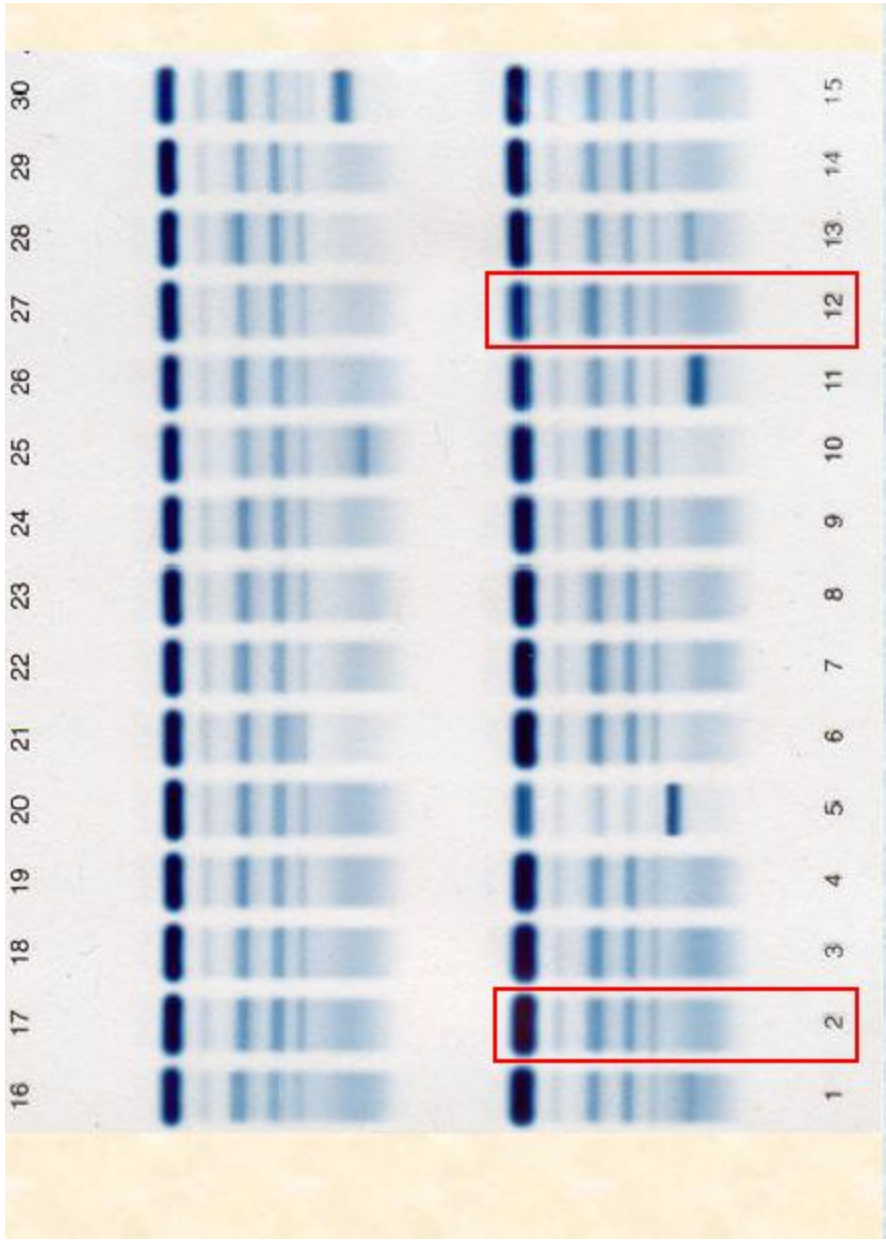


Increased alpha-2 globulins

- hemolysis
- ? monoclonal protein

Combined (eg with ↑ α1)

- acute phase response
- selective protein loss

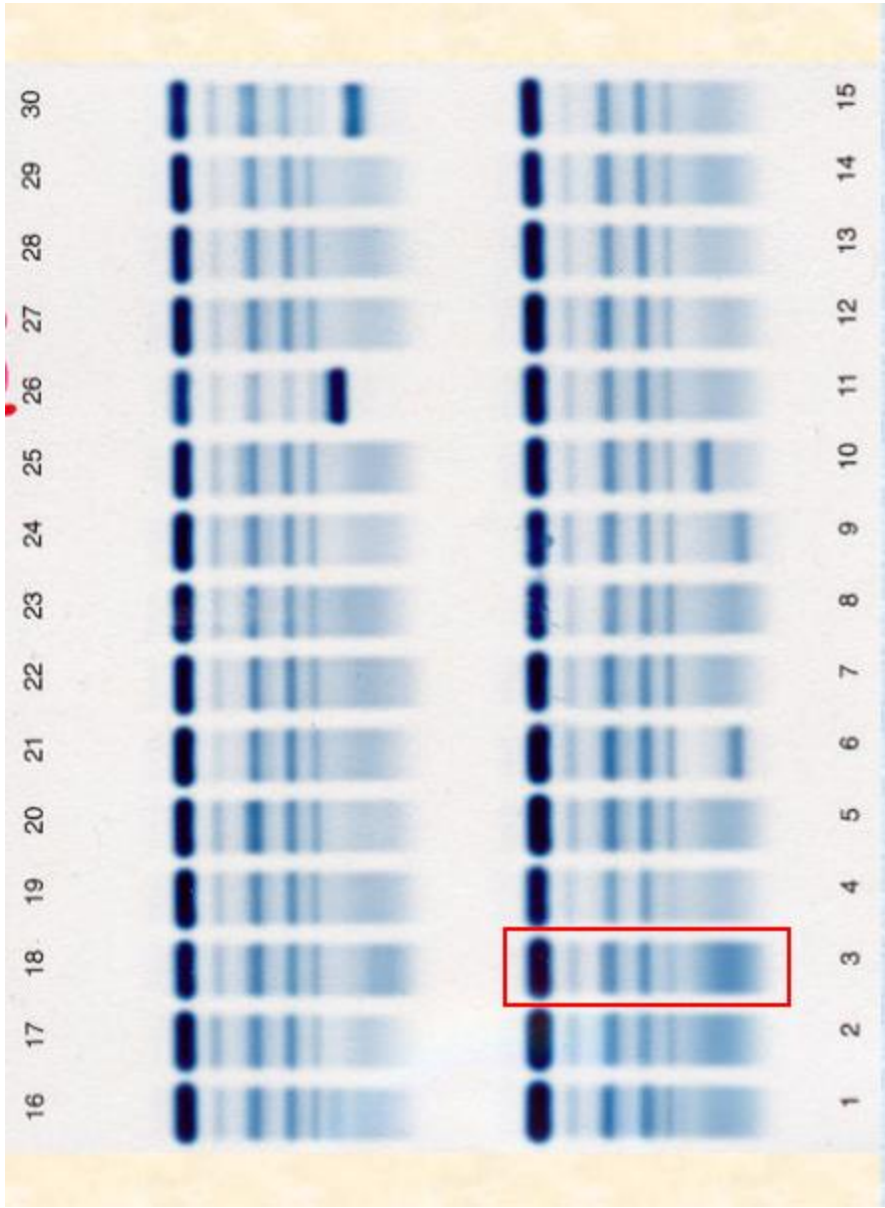


Acute inflammation

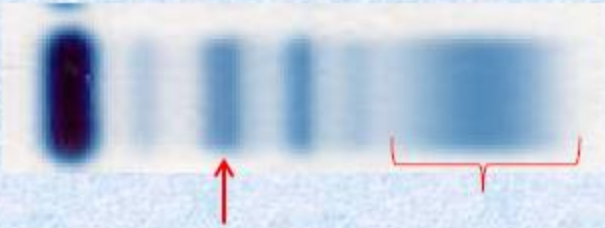
↑ α1- and ↑ α2-globulins

Often with decreased albumin, as shown in #12

- infection
- injury
- surgical trauma



Chronic inflammation



↑↑ γ-globulins

↑ α_2-globulins

± ↑ α_1-globulins

± ↓ albumin

- autoimmune disease
- chronic liver disease
- chronic infection
- malignancy

VELAMMAL MEDICAL COLLEGE
HOSPITAL AND RESEARCH INSTITUTE
MADURAI - 625009

Department of Biochemistry

Report on Certificate course on Serum Protein Electrophoresis

Topic: Serum Protein Electrophoresis

Date: 12.08.2021

Venue: Biochemistry Demonstration Room

Target audience: Faculties and M.B.B.S., students

Number of participants: 198

Event Report: The event started with the welcome address by Dr.K.Suganthy. Following that Dr. M.Jeyakumar started the lecture on serum protein electrophoresis. He explained the basics of electrophoresis and steps in performing serum protein electrophoresis and followed by this he showed a live demonstration of steps in serum protein electrophoresis and its interpretation.

Outcome: Participants should be able to do the serum protein electrophoresis by themselves and interpret the serum protein electrophoresis.

Prof. T. THIRUNAVUKKARASU, M.D.,D.A.,
Dean
Velammal Medical College Hospital
and Research Institute
"Velammal Village"
Madurai-Tuticorin Ring Road
Anuppanadi, Madurai-625 009, T.N.

VELAMMAL MEDICAL COLLEGE
HOSPITAL AND RESEARCH INSTITUTE
MADURAI - 625009

VELAMMAL MEDICAL COLLEGE
HOSPITAL AND RESEARCH INSTITUTE
MADURAI - 625009

VELAMMAL MEDICAL COLLEGE
HOSPITAL AND RESEARCH INSTITUTE
MADURAI - 625009

Resource persons with banner/ projection:

Velammal Medical College Hospital and Research Institute

Ref. No:VMCHRI/BIOCHEM/CC-11 Date:09/07/2021

CIRCULAR

To

All Doctors

Certificate Course on DNA extraction and PCR

Department of Biochemistry is organizing a certificate course onDNA extraction and PCRon 14/08/2021(Saturday) between at 9.00 AM to 11.00 AM.

All Faculties are invited.

VICE PRINCIPAL

Dr. P.K. MOHANTY
Vice Principal
Velammal Medical College Hospital
and Research Institute
Madurai-625 009

Copy submitted to:

The Hon. Chairman

Copy to:

The Dean

Medical Superintendent

Chief Administration Officer

HOD, Biochemistry

All Clinical and Non-Clinical HODs

Velammal Medical College Hospital & Research Institute
Anuppanadi, Madurai - 625009

Department of Biochemistry

Certificate course on

DNA extraction and PCR

Venue: Biochemistry Demonstration Room

Date: 14.08.2021

Time: 9.00 – 11.00 AM

For Faculties, M.B.B.S., Post graduates, DMLT, AHS and BSc MLT

PATRON

Chairman: Shri.M.V.Muthuramalingam

Advisors:

Dean: Dr.T.Thirunavukarasu

MS: Dr. S.R.Damodaran

DR.A.Hariharan
Course coordinator
Assistant Professor
Biochemistry

DR.P.K.Mohanty
Vice Principal
Prof. HOD Biochemistry

Click here for registration

Agenda

Time	Topics	Speaker
9.00 – 9.15 AM	Welcome address	DR.K.Suganthy
9.15 – 9.45 AM	Pre test Nucleic acid chemistry – Basics	DR.K.Suganthy
9.45 – 10.15 AM	DNA extraction and Quantification	DR.K.Suganthy & Resource persons
10.15 – 10.45 AM	Traditional PCR	DR.A.Hariharan
10.45 – 11.00 AM	Post test and feedback	DR.A.Hariharan
	Valediction	

Resource persons

Dr P.K. Mohanty
Vice Principal
Prof. HOD
Biochemistry

Dr K. Suganthy
Prof.
Biochemistry

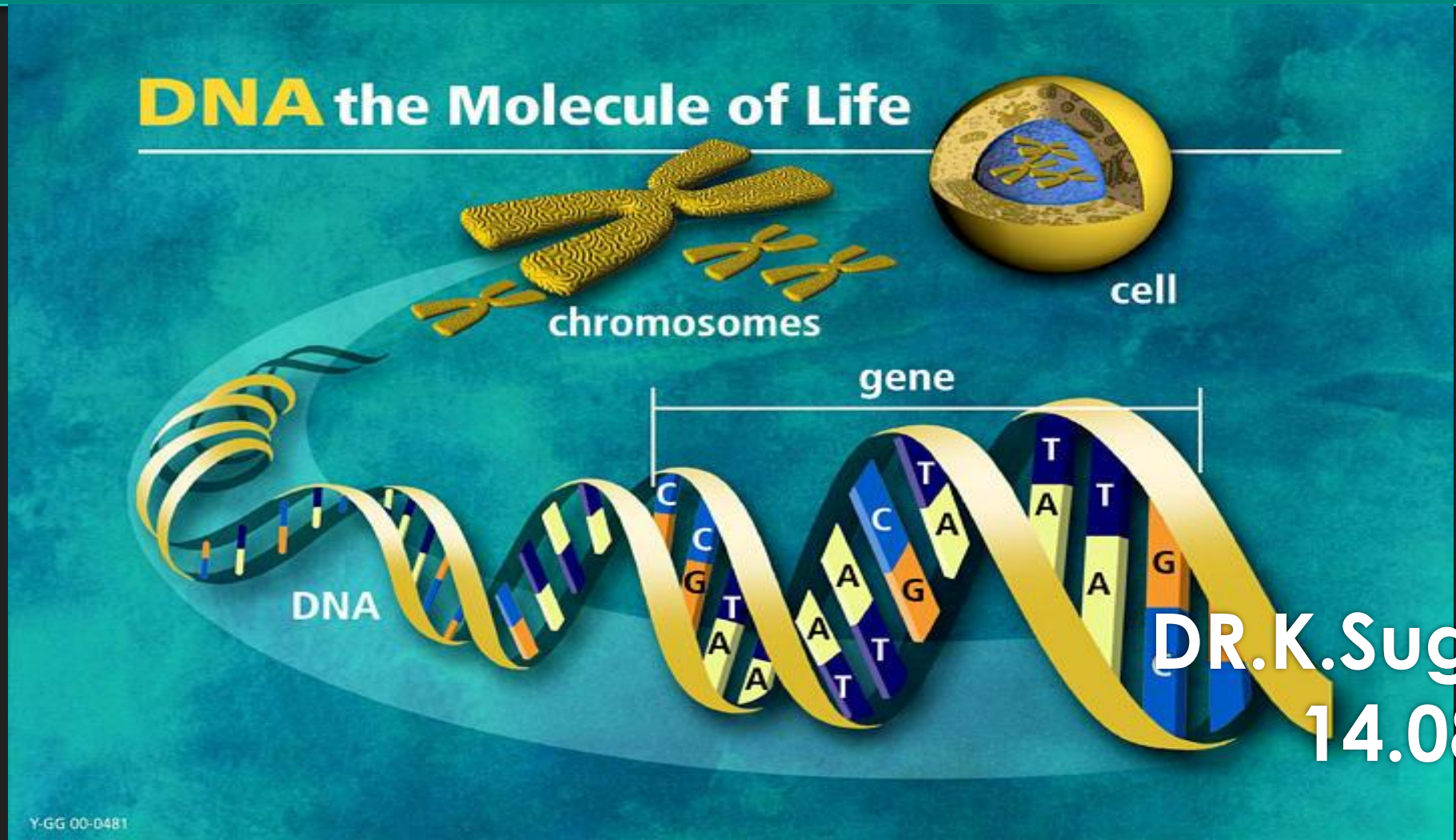
DR.M.Jeyakumar
Assoc. Professor
Biochemistry

Dr Mamatha T Shenoy
Assistant Professor
Biochemistry

Dr.A. Hariharan
Assistant Professor
Biochemistry

Dr.M. Viveka
Tutor
Biochemistry

Certificate course
Nucleic Acid Chemistry – Basics
DNA Extraction and Quantification



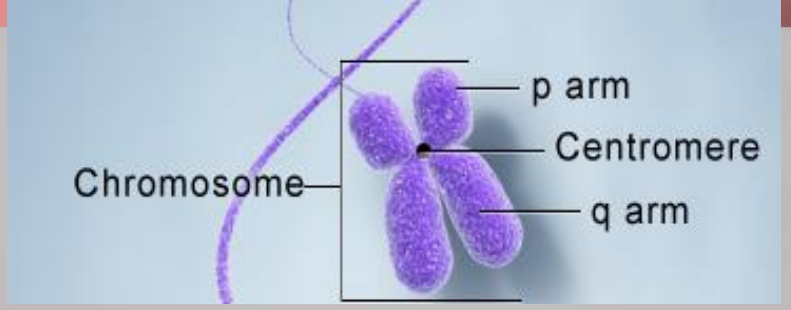
DR.K.Suganthy

14.08.2021

Objectives

- Basics – Nucleotides, Polynucleotides
- Structure of DNA – Watson & Crick
- DNA Extractionby Miller etal Method – Demonstration
- Quantification- Spectrophotometric method

DNA -Introduction



- **Chromosomes** are made of both DNA, it is the genetic code.(Genetic Resoitory)
- It determines our physical characteristics,Our DNA codes for 20 amino acids which building blocks of life
- Chemical energy to cells
- Components of enzyme cofactors
- Regulatory molecules – Second messengers

  cAMP, cGMP

Timeline

1800's	F Miescher - nucleic acids
1928	F. Griffith - Transforming principle
1944	Avery, McCleod & McCarty- Transforming principle is DNA
1949	Erwin Chargaff – base ratios
1952	Hershey-Chase 'blender' experiment
1952	R Franklin & M Wilkins–DNA diffraction pattern

http://www.dnai.org/lesson/go/2166/1994

The Watson-Crick Model: DNA is a double helix

WE wish to suggest a structure for the salt of deoxyribose nucleic acid (D.N.A.). This structure has novel features which are of considerable biological interest. *Watson and Crick, 1953, Nature, 171*

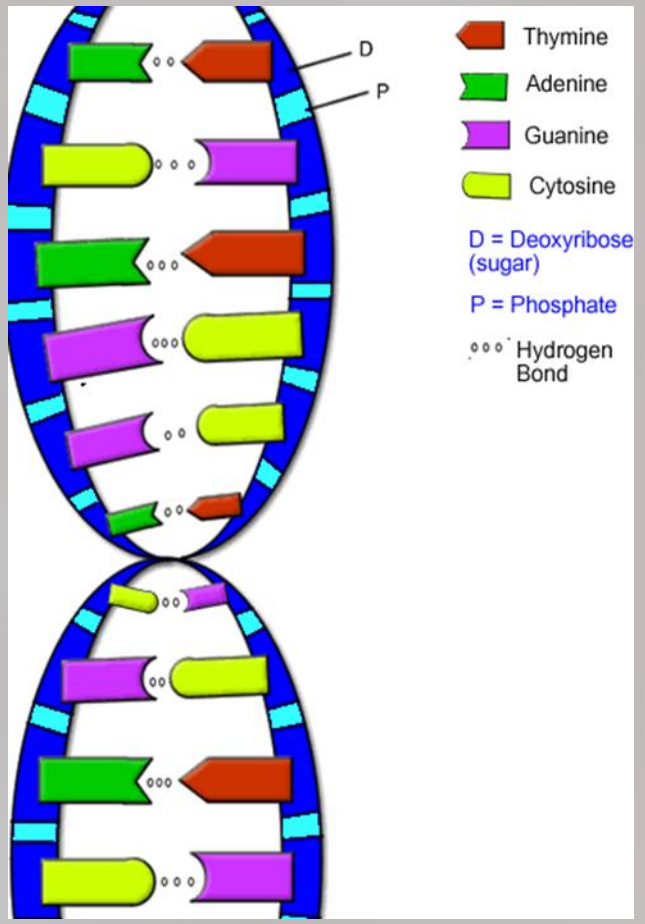
- In 1951 Watson learns about x-ray diffraction pattern projected by DNA
- Erwin Chargaff's experiments demonstrate that ratio of A and T are 1:1, and G and C are 1:1
- Chemical structure of nucleotides were known (deoxyribose sugar, phosphate, and nitrogenous base)
- Putting this together……

….in 1953 James Watson and Francis Crick propose their double helix model of DNA structure

STRUCTURE OF DNA

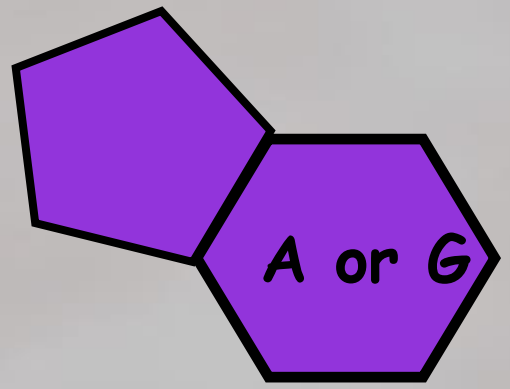
- Right handed Double helix stranded
- Each strand of DNA is a long, unbranched, linear polymer of nucleotides.
- → Polynucleotides

  → Phosphodiester bond

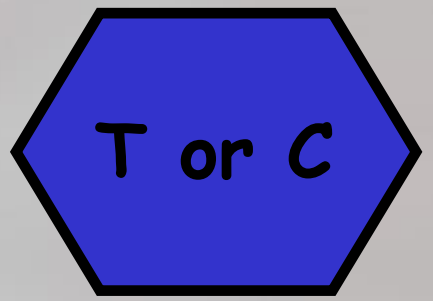


Nitrogenous Bases

- Double ring **PURINES**
  - Adenine (A)
  - Guanine (G)



- Single ring **PYRIMIDINES**
  - Thymine (T)
  - Cytosine (C)



nucleotide = phosphate ester monomer of pentose

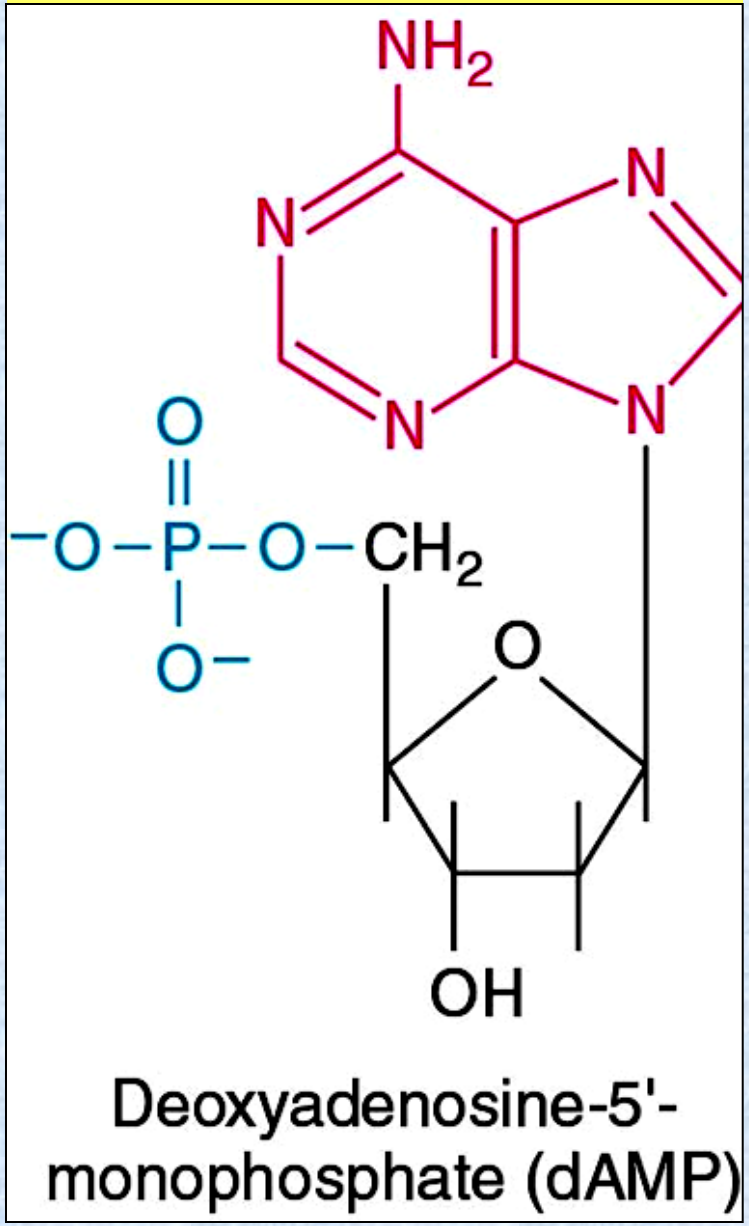
dinucleotide - Dimer

Oligonucleotide – short polymer (<10)

Polynucleotide – long polymer (>10)

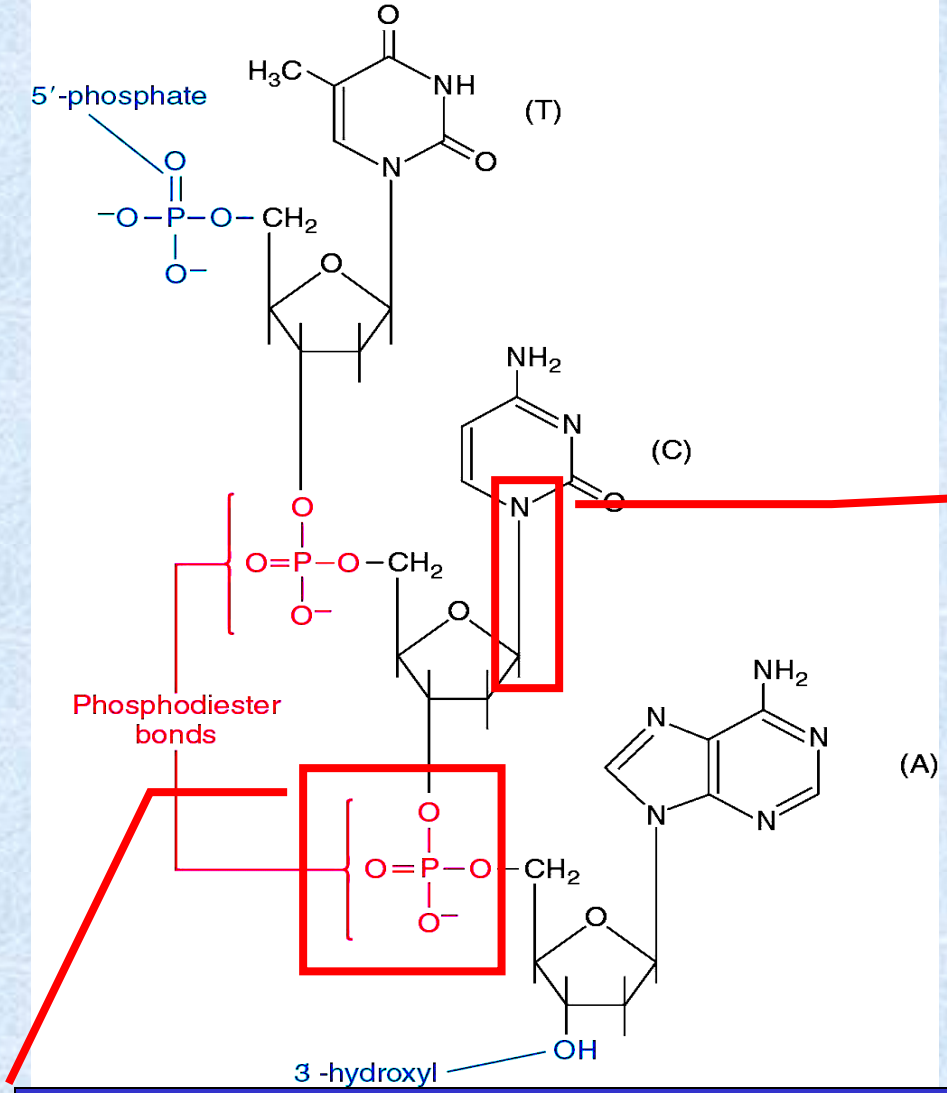
Nucleoside = monomer of sugar + base

Nucleotide monomer



Deoxyadenosine-5'-monophosphate (dAMP)

5' – 3' polynucleotide *linkages*



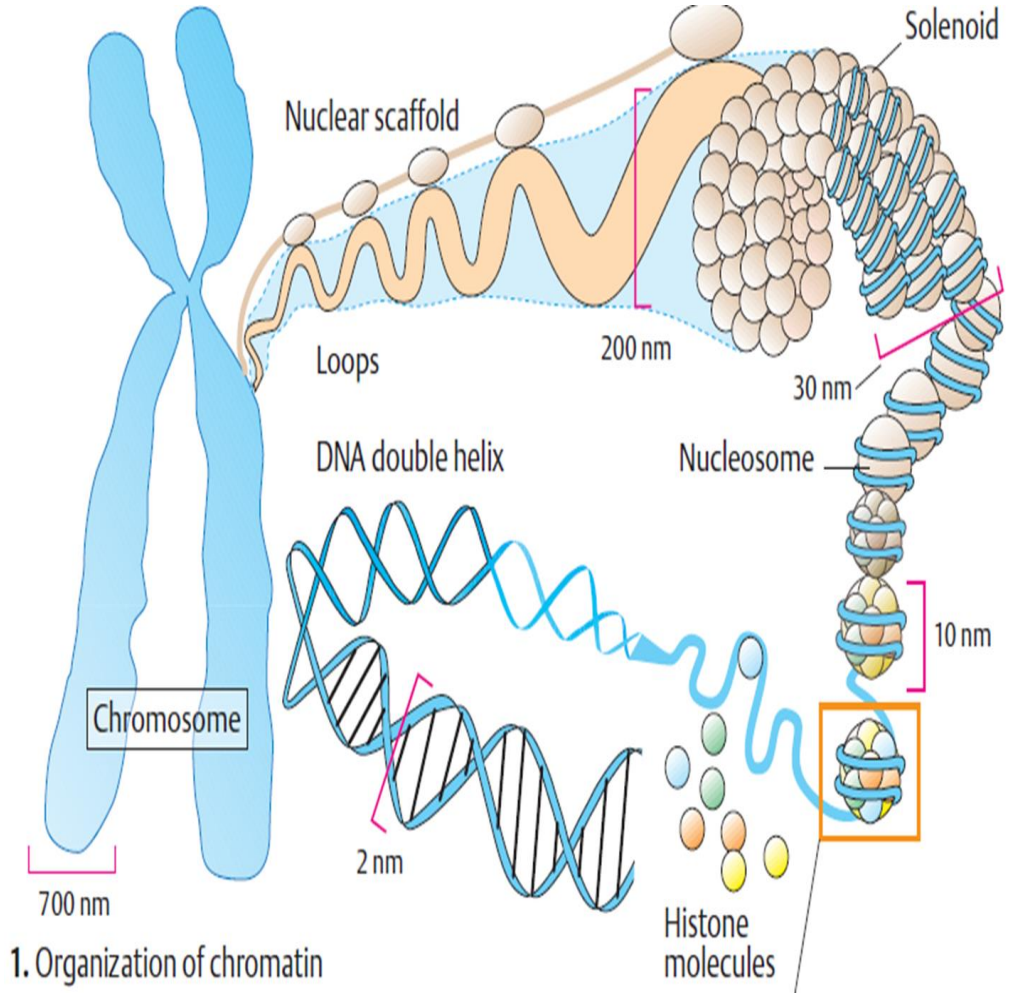
2) N-glycosidic bonds

Links nitrogenous base to C1' pentose in beta configuration

1) Phosphodiester bonds

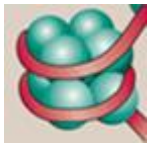
5' and 3' links to pentose sugar

Structural Organization of chromosome



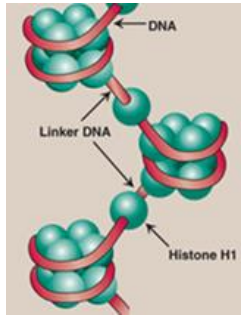
1. Organization of chromatin

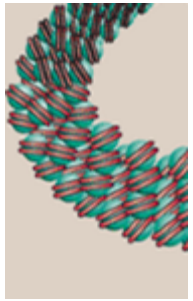
dsDNA



Nucleosome

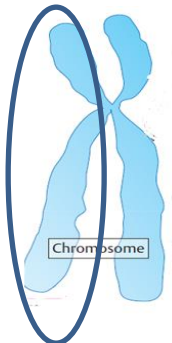
Polynucleosomes





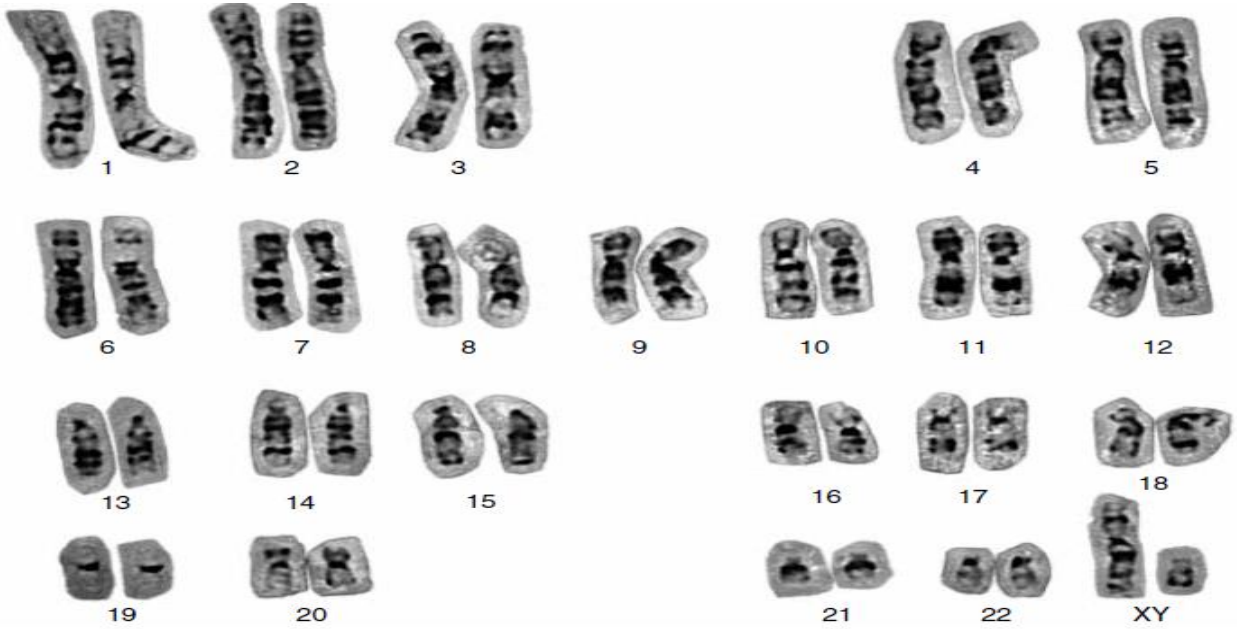
Chromatin

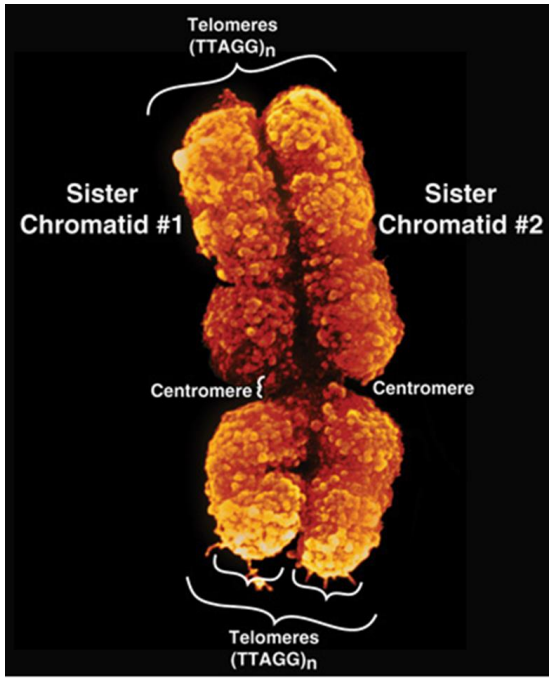
Sister Chromatid



Genome : The whole genetic material (i.e the total no of chromosomes) in a cell

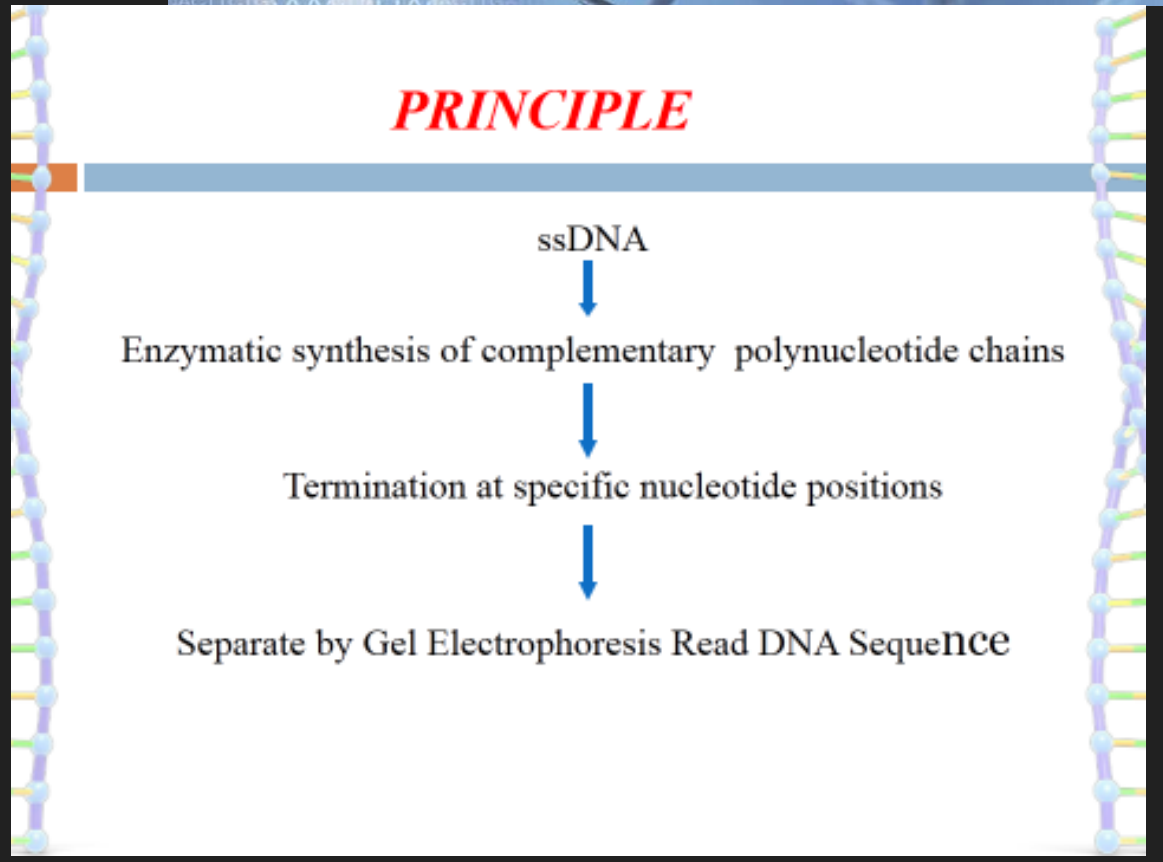
Human Genome contains: 23 pairs (46 nos) in which Somatic 22 pairs, plus XY in male, XX in female.



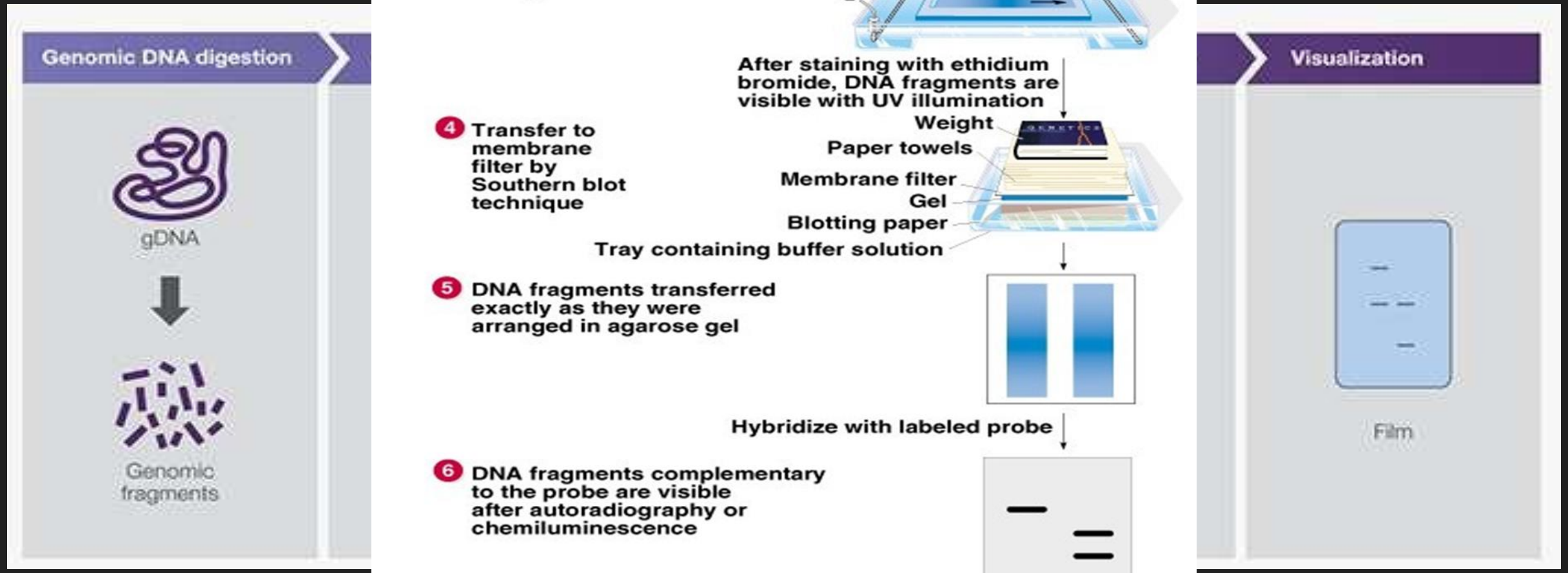


DNA Sequencing- Applications

- Determining the precise order of nucleotides within a DNA molecule.
- Used to determine the sequence of individual genes, larger genetic regions, full chromosomes or entire genomes.
- Forensics:
- To identify individuals because each individual has a different genetic sequence
- Medicine:
- To detect the genes which are linked to various genetic disorders such as muscular dystrophy.
- Agriculture:
- The mapping and sequencing of a genome of microorganisms has helped to make them useful for crops and food plants



RFLP - Restriction
The patterns gene es (and even strains) from



1. Cellular DNA

Cut with restriction enzyme

2. Restriction fragments of lengths determined by location of recognition sequences for restriction enzyme

Agarose gel

3. Gel electrophoresis of fragments

After staining with ethidium bromide, DNA fragments are visible with UV illumination

4. Transfer to membrane filter by Southern blot technique

Weight
Paper towels
Membrane filter
Gel
Blotting paper
Tray containing buffer solution

5. DNA fragments transferred exactly as they were arranged in agarose gel

Hybridize with labeled probe

6. DNA fragments complementary to the probe are visible after autoradiography or chemiluminescence

DNA Library

cDNA libraries

cDNA libraries are very useful for eukaryotic gene analysis

- **Condensed protein encoded gene libraries, have much less junk sequences.**
- **cDNAs have no introns → genes can be expressed in *E. coli* directly.**
- **Are very useful to identify new genes**
- **Tissue or cell type specific** (differential expression of genes)

Application of cDNA library:-

- Discovery of novel genes.
- Elucidation of gene function.
- In vitro study of gene function.
- To obtain pure sample of a gene.
- To get high yields of recombinant Cdna.
- Commercial production of proteins and other biological molecules.
- Study the alternative splicing.
- Carcinogen identification.

DNA Extraction and Quantification

MillerSA, Dykes DD,PoleskyHF.A simple salting out procedure for extracting DNA from human nucleated cells. NucleicAcidsRes.1988Feb11;16(3):1215.

http://www.whatisbiotechnology.org/science/extractio

Biological materials used for DNA profiling

- Blood
- Hair
- Saliva
- Semen
- Body tissue cells
- DNA samples have been obtained from vaginal cells transferred to the outside of a condom during sexual intercourse.

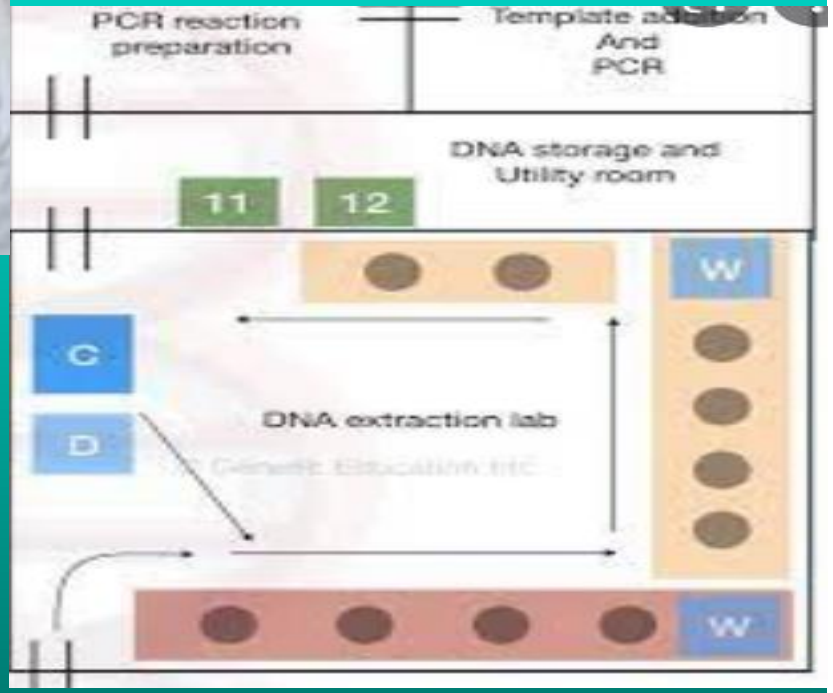
Millers Method – Whole Blood (3-5ml)

PRINCIPLE

- Removal and separation of DNA.

1. Cell Lysis
2. Precipitation
3. Wash
4. Resuspension

- Remove the non- Cellular component (Plasma)
- RBC Lysis Buffer – Salts to Rupture of RBC
- WBC Lysis Buffer- Salts to Rupture WBC (Nucleated Pellet)
- SDS/ Proteinase K- interfere restriction endonuclease
- Precipitation DNA -Subsquent extraction with chloroform, Ethanol mixture
- Stir at 4 degee Celsius



Reagents Requirement

10% Disodium EDTA salt. (For blood collection):

10gm in 100ml of MilliQ Water. Autoclave and store at room temperature.

Hypotonic buffer:

Ammonium chloride - 7.0 g

Ammonium bicarbonate - 0.072g

Dissolve in about 800 ml of MilliQ water and make up to 1 litre. Autoclave and store at room temp.

WBC lysis solution:

Na_2EDTA 10ml - 1.8g in 10ml of MilliQ water (0.5 M)

NaCl - 0.876g

Dissolve in 160ml of MilliQ water; adjust the pH to 8.0 using NaOH and make up to 200ml. Autoclave and store at room temp.

Proteinase K (10mg/ml):

Dissolve 100mg of Proteinase K in 10ml of MilliQ water. Aliquot 500ml in micro centrifuge tubes and store at –20 ^{o} C.

10 % Sodium dodecyl sulphate (SDS):

10g of SDS in 80ml of MilliQ water and make up the final volume to 100ml.

Saturated NaCl :

Normally 1gm of Nacl dissolves in 2.8ml of MilliQ water at 25^{o} C. Dissolve 1.1gm in 2.8ml of MilliQ water will give saturated NaCl.

Chloroform:Octanol (24:1):

Mix 24ml of Chloroform with 1ml of Octanol.

1 X Tris EDTA buffer (pH 7.4)

10 mMTris - 1.20 g }

Quantification

Formula for calculating concentration of DNA from OD values

OD value X Diluting factor X 50 = Concentration of DNA in µg/ml or ng/µl

(1 in 100 dilution done in above example; dilution factor is 100)

Formulas:

1.0 A260 unit double stranded DNA= 50µg/ml= 0.15µM(in nucleotides)

1.0 A260 unit single stranded DNA= 33µg/ml = 0.10µM(in nucleotides)

1.0 A260 unit single stranded RNA= 40µg/ml = 0.11µM(in nucleotides)

Conversions for ds DNA

(Data at hand in pmol) (Required data in µg)

No. of pmol X N X 660 X 10^{-6} = No. of micrograms

(Data at hand in µg) (Required data in pmol)

No. of micrograms X 1/N X 1/660 X 10^{-6} = No. of picomoles(pmoles)

Where N is number of base pairs and 660 is the average mol. Wt.

DNA Extraction and Quantification

MillerSA, Dykes DD,PoleskyHF.A simple salting out procedure for extracting DNA from human nucleated cells. NucleicAcidsRes.1988Feb11;16(3):1215.

http://www.whatisbiotechnology.org/science/extractio

VELAMMAL MEDICAL COLLEGE
HOSPITAL AND RESEARCH INSTITUTE
MADURAI - 625009

Department of Biochemistry

Report on Certificate course on DNA extraction and PCR

Topic: DNA extraction and PCR

Date:14.08.2021

Venue: Biochemistry Demonstration Room

Target audience: First year M.B.B.S., students

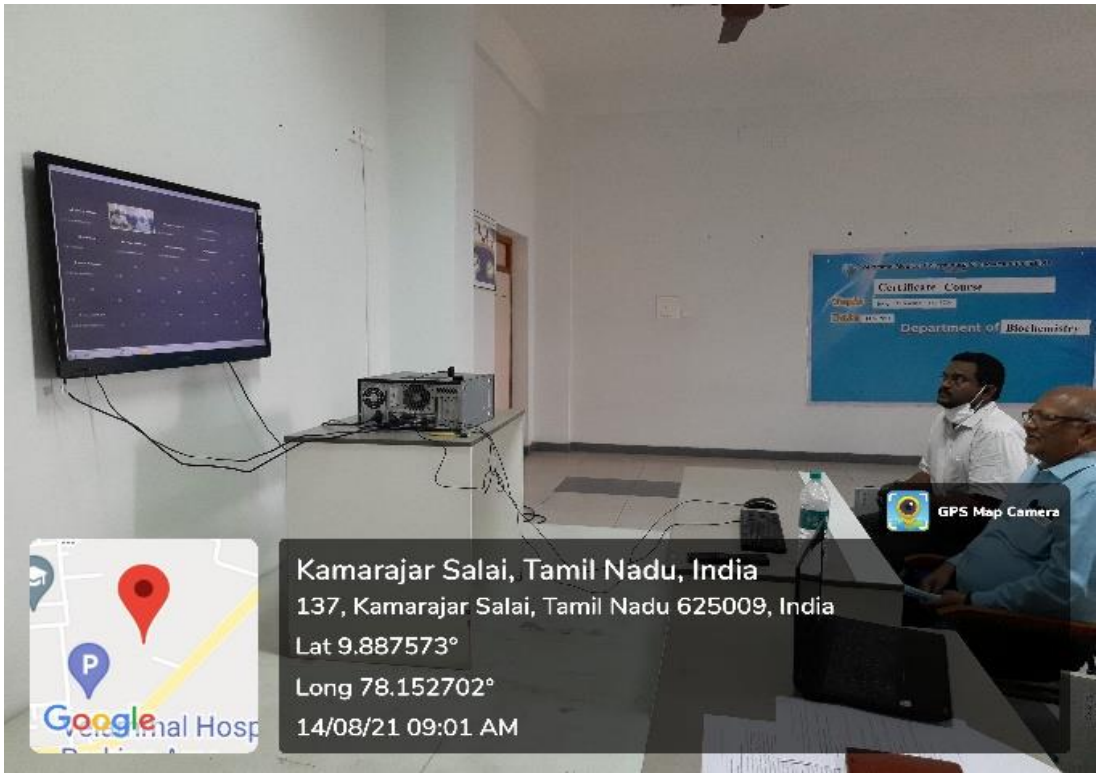
Number of participants: 196

Event Report: The event started with the welcome address by DR. P.K. Mohanty. Following that Dr.K.Suganthy started the lecture on Basic about nucleic acid chemistry and steps in DNA extraction and she demonstrated the DNA extraction. Then Dr.A.Hariharan explained the steps in PCR, primer designing and demonstrated the procedure in polymerised chain reaction.

Outcome: Participants should be able to do the DNA extraction and amplification of DNA by PCR.

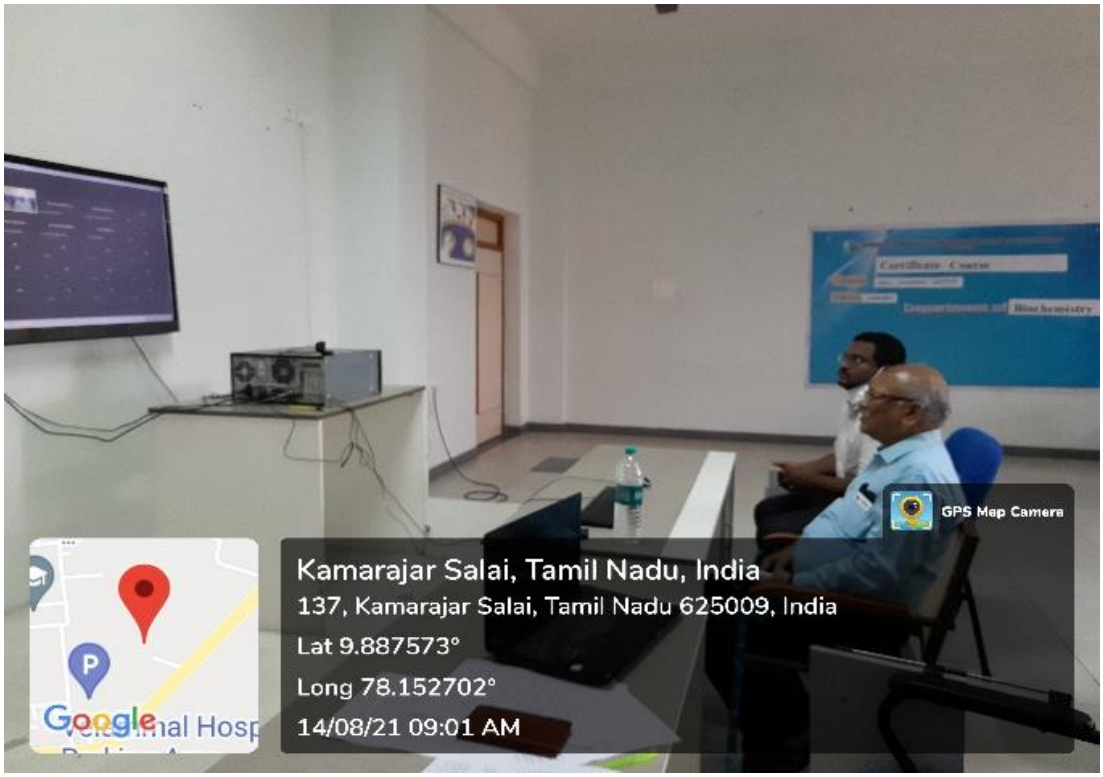
Prof. T. THIRUNAVUKKARASU, M.D.,D.A.,
Dean
Velammal Medical College Hospital
and Research Institute
"Velammal Village"
Madurai-Tuticorin Ring Road
Anuppanadi, Madurai-625 0[illegible]

VELAMMAL MEDICAL COLLEGE
HOSPITAL AND RESEARCH INSTITUTE
MADURAI - 625009



VELAMMAL MEDICAL COLLEGE
HOSPITAL AND RESEARCH INSTITUTE
MADURAI - 625009

Resource Persons with Banner/ Projection:



VELAMMAL MEDICAL COLLEGE HOSPITAL & RESEARCH INSTITUTE
DEPARTMENT OF ORTHOPAEDICCS

From

Dr. V. Raviraman
Department of Orthopaedics
Velammal Medical College Hospital and RI
Madurai

To:

The Dean
Velammal Medical College Hospital and RI
Madurai

Respected Sir:

We from the department of Orthopaedics are planning to conduct a Certificate Courses – " **postmenopausal osteoporosis – Among old age people** " on 20.08.2021 involving M.B.B.S Students. We kindly request you to give permission to conduct the same. Kindly do the needful.

Thanking You

Date: 16.08.2021

Yours sincerely,

Place: Madurai

Dr. V. Raviraman
Head of the Department

VELAMMAL MEDICAL COLLEGE HOSPITAL & RESEARCH INSTITUTE

DEPARTMENT OF ORTHOPAEDICS

CERTIFICATE COURSE

TOPIC: POSTMENOPAUSAL OSTEOPOROSIS – AMONG OLD AGE PEOPLE

DATE : 21.08.2021, **TIME : 11.00 AM TO 01.00 PM** **VENUE : ORTHO OPD DEMO HALL**

PARTICIPANT'S LIST

S.NO	FACULTY NAME
1	Dr. V. Raviraman
2	Dr. S. Shanmuganathan
3	Dr. Ganesan G Ram
4	Dr. K. N. Subramanian
5	Dr. M. Subbiah
6	Dr. R. Hari sudhan
7	Dr. Muthu kumar . S
8	Dr. S. Lokesh Kumar
9	Dr. E. Vijaya raja
10	Dr. M.J. Krishna kumar
11	Dr. S. Dheepan Kumar
12	Dr. V Janarthanan
S.NO	**PG'S**
1	Dr. Gokul Kumar
2	Dr. Jesmick ponniah
3	Dr. Swathikaa
	CRRI'S
1	Dr. Paulin S
2	Dr. Ponezhil M
3	Dr. Pooja Devi D
4	Dr. Prasanna Venkatesh N
5	Dr. Praveena M
6	Dr. Pravin D
7	Dr. Preetham S M
8	Dr. Prithivi Rajkumar S
9	Dr. Priyanga M
10	Dr. Raam Sundar M
11	Dr. Raja Mithra R K
12	Dr. Rajamanickam M

Prof. T. THIRUNAVUKKARASU, M.D.,D.A.,
Dean
Velammal Medical College Hospital
and Research Institute
"Velammal Village"
Madurai-Tuticorin Ring Road
Anuppanadi, Madurai-625 009, T.N.

	PREFINAL YEAR STUDENTS
1	Abitha Barveen M
2	Aditya Rahul R
3	Advaitha A
4	Ajay Sreevatsav S
5	Akshara V K
6	Akshatha Udayakumar
7	Akshayaa Sree B
8	Amritha Varshini Ragavan
9	Anjali Rebecca Abraham
10	Anugraha Sreeram
11	Anusha M D
12	Apoorva Karthickeyan
13	Aravind Raghav
14	Archana V S
15	Aswin K
16	Barath Kumar G
17	Bhagya Lakshmi S
18	Darisi Sarayu
19	Darshana R
20	Dhanushya R
21	Dharshana S
22	Dharshini S
23	Dhivya V
24	Divya Bharthi V S
25	Fasiha Balkees P

Prof. T. THIRUNAVUKKARASU, M.D.,D.A.,
Dean
Velammal Medical College Hospital
and Research Institute
"Velammal Village"
Madural-Tuticorin Ring Road
Anuppanadi, Madural-625 009, T.N.

Department of Orthopaedics

VELAMMAL HOSPITAL
the healing touch

Certificate Course

Title:

Post Menopausal Osteoporosis

AGENDA

TIME	TOPIC	SPEAKER
8.30 am to 09.00 am	Introduction	Dr. Muthu kumar
9.00 am to 11.00 am	Assessment	Dr. V. Raviraman
11.00 am to 01.00 pm	Diagnosis	Dr. Lokesh kumar
01.00 pm to 01.30 pm	Lunch	
01.30 pm to 02.30 pm	Management	Dr.V. Janarthanan
02.30 pm to 03.30 pm	Complications	Dr. Dheepan kumar
03.30 pm to 04.30 am	Assessment	Dr. R. Hari sudhan

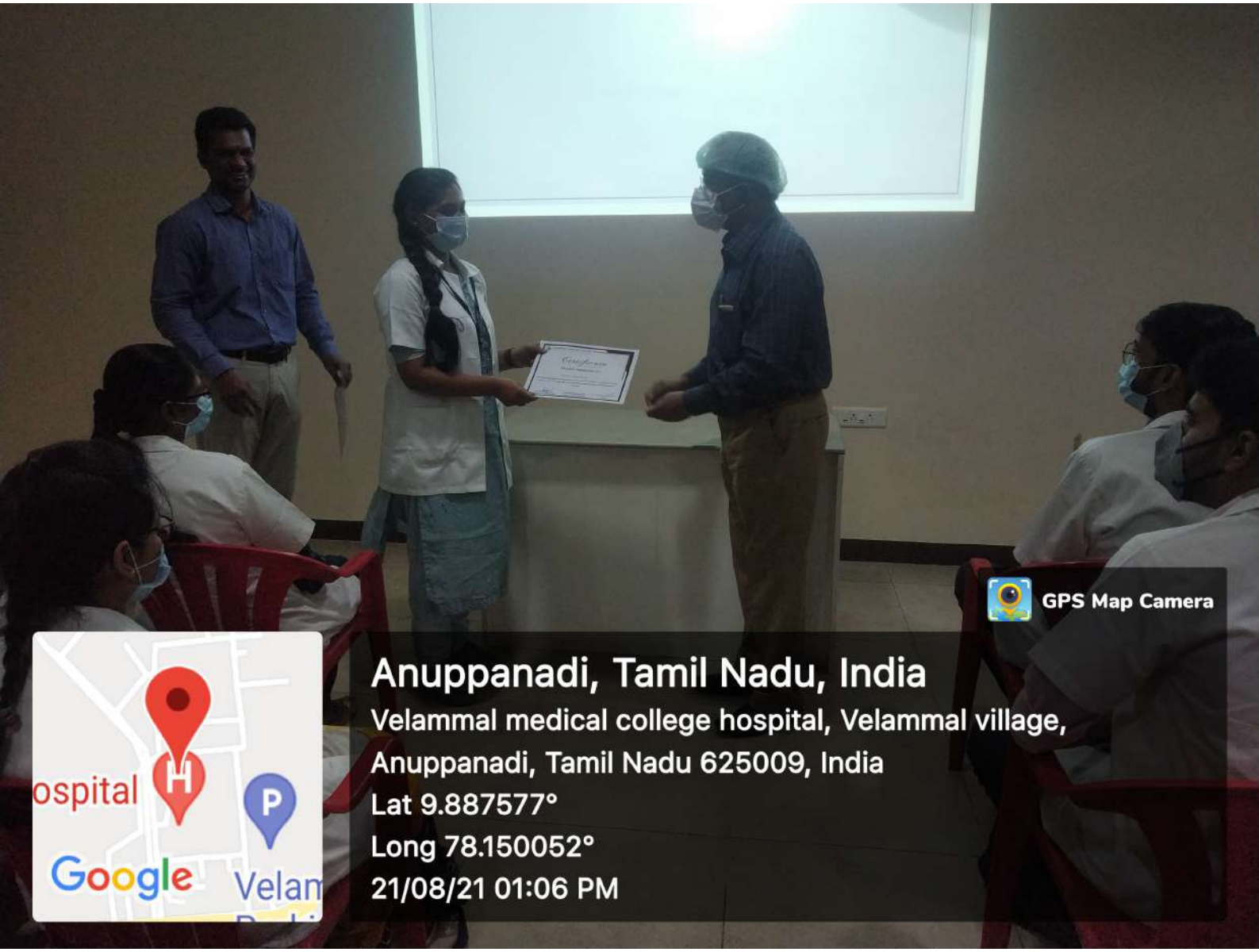
Date: 21.08.2021

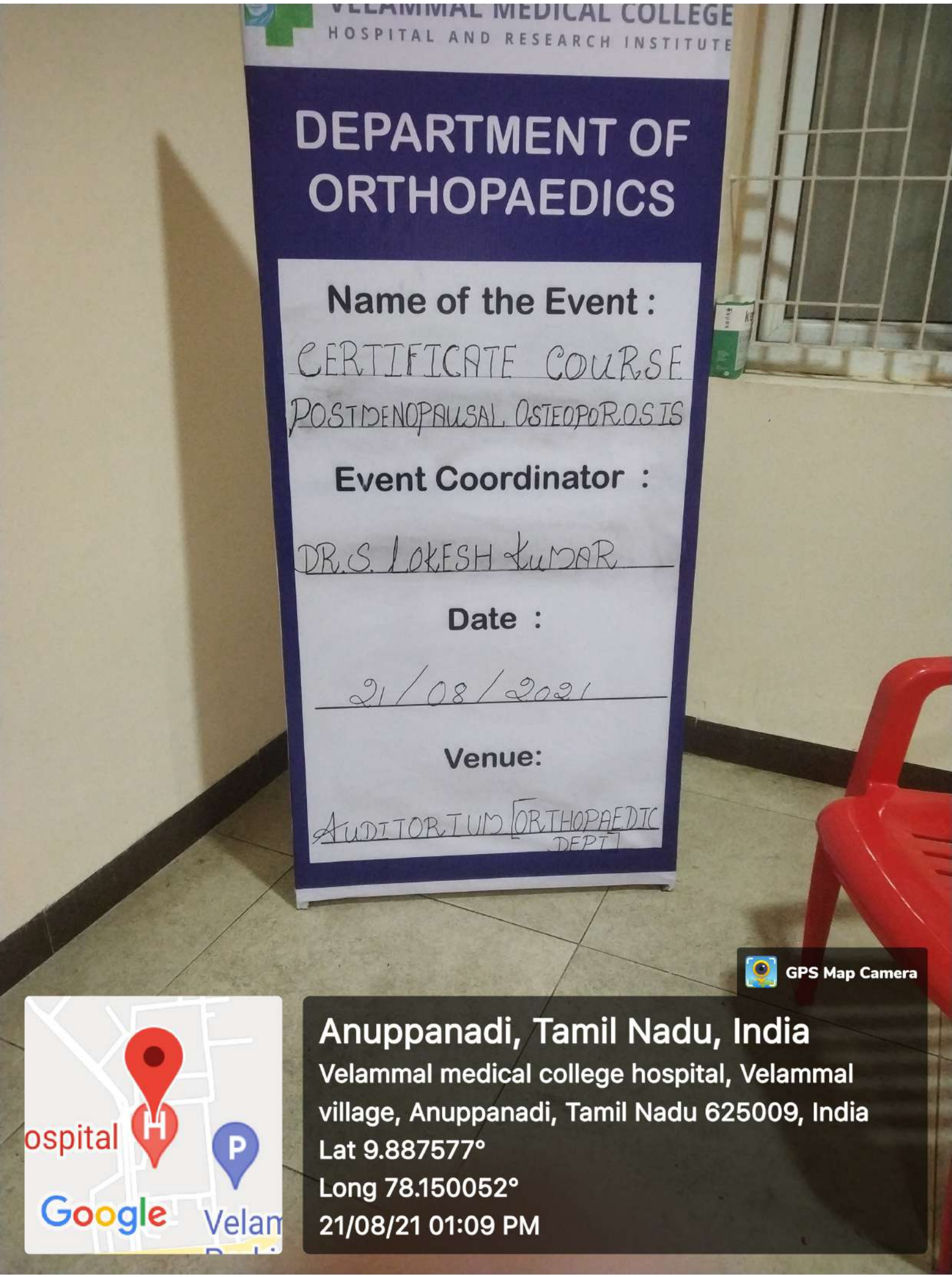
Day: Saturday

Venue: Lecture Hall

Duration: 8 hours

Teaching method power point presentation, interactive discussion


GPS Map Camera
Anuppanadi, Tamil Nadu, India
Velammal medical college hospital, Velammal village,
Anuppanadi, Tamil Nadu 625009, India
Lat 9.887577°
Long 78.150052°
21/08/21 01:06 PM
ospital
Google
Velan


VELAMMAL MEDICAL COLLEGE
HOSPITAL AND RESEARCH INSTITUTE
DEPARTMENT OF ORTHOPAEDICS
Name of the Event :
CERTIFICATE COURSE
POSTMENOPAUSAL OSTEOPOROSIS
Event Coordinator :
DR.S. LOKESH KUMAR
Date :
21/08/2021
Venue:
AUDITORIUM [ORTHOPAEDIC DEPT]
GPS Map Camera
Anuppanadi, Tamil Nadu, India
Velammal medical college hospital, Velammal village, Anuppanadi, Tamil Nadu 625009, India
Lat 9.887577°
Long 78.150052°
21/08/21 01:09 PM
ospital
Google
Velam


POSTMENOPAUSAL
OSTEOPOROSIS – AMONG
OLD AGE PEOPLE
CERTIFICATE COURSE
DEPARTMENT OF ORTHOPAEDICS
Date : 21 - 08 -2021
DEPARTMENT OF
GPS Map Camera
Anuppanadi, Tamil Nadu, India
Velammal medical college hospital, Velammal village,
Anuppanadi, Tamil Nadu 625009, India
Lat 9.887577°
Long 78.150052°
21/08/21 11:11 AM
Velamm
Google
38

VELAMMAL MEDICAL COLLEGE HOSPITAL & RESEARCH INSTITUTE
DEPARTMENT OF ORTHOPAEDICS
CERTIFICATE COURSE
TOPIC: POSTMENOPAUSAL OSTEOPOROSIS – AMONG OLD AGE PEOPLE
DATE : 21.08.2021, TIME : 11.00 AM TO 01.00 PM VENUE : ORTHO OPD DEMO HALL
PARTICIPANT'S LIST

S.NO	FACULTY NAME	Sign
1	Dr. V. Raviraman	
2	Dr. S. Shanmuganathan	
3	Dr. Ganesan G Ram	
4	Dr. K. N. Subramanian	
5	Dr. M. Subbiah	
6	Dr. R. Hari sudhan	
7	Dr. Muthu kumar . S	
8	Dr. S. Lokesh Kumar	
9	Dr. E. Vijaya raja	
10	Dr. M.J. Krishna kumar	
11	Dr. S. Dheepan Kumar	
12	Dr. V Janarthanan	
S.NO	**PG'S**	
1	Dr. Gokul Kumar	
2	Dr. Jesmick ponniah	
3	Dr. Swathikaa	
	CRRI'S	
1	Dr. Paulin S	
2	Dr. Ponezhil M	
3	Dr. Pooja Devi D	
4	Dr. Prasanna Venkatesh N	
5	Dr. Praveena M	
6	Dr. Pravin D	
7	Dr. Preetham S M	
8	Dr. Prithivi Rajkumar S	

9	Dr. Priyanga M	
10	Dr. Raam Sundar M	
11	Dr. Raja Mithra R K	
12	Dr. Rajamanickam M	
	PREFINAL YEAR STUDENTS	
1	Abitha Barveen M	
2	Aditya Rahul R	
3	Advaitha A	
4	Ajay Sreevatsav S	
5	Akshara V K	
6	Akshatha Udayakumar	
7	Akshayaa Sree B	
8	Amritha Varshini Ragavan	
9	Anjali Rebecca Abraham	
10	Anugraha Sreeram	
11	Anusha M D	
12	Apoorva Karthickeyan	
13	Aravind Raghav	
14	Archana V S	
15	Aswin K	
16	Barath Kumar G	
17	Bhagya Lakshmi S	
18	Darisi Sarayu	
19	Darshana R	
20	Dhanushya R	
21	Dharshana S	
22	Dharshini S	
23	Dhivya V	
24	Divya Bharthi V S	
25	Fasiha Balkees P	

Dr. RAVI RAMAN
Orthopedic Dept

POST MENOPAUSAL OSTEOPOROSIS

Dr. Lokesh Kumar
Dept of Orthopaedics

Osteoporosis

Osteoporosis is a systemic skeletal disease characterized –

1. low bone density

2. a micro- architecture deterioration of bone tissue

3. that enhances bone fragility

4. increases the risk of fracture

Classification

- RIGGS AND MELTON-
- Primary osteoporosis
  - type 1 post menopausal
  - type 2 senile
- Secondary osteoporosis

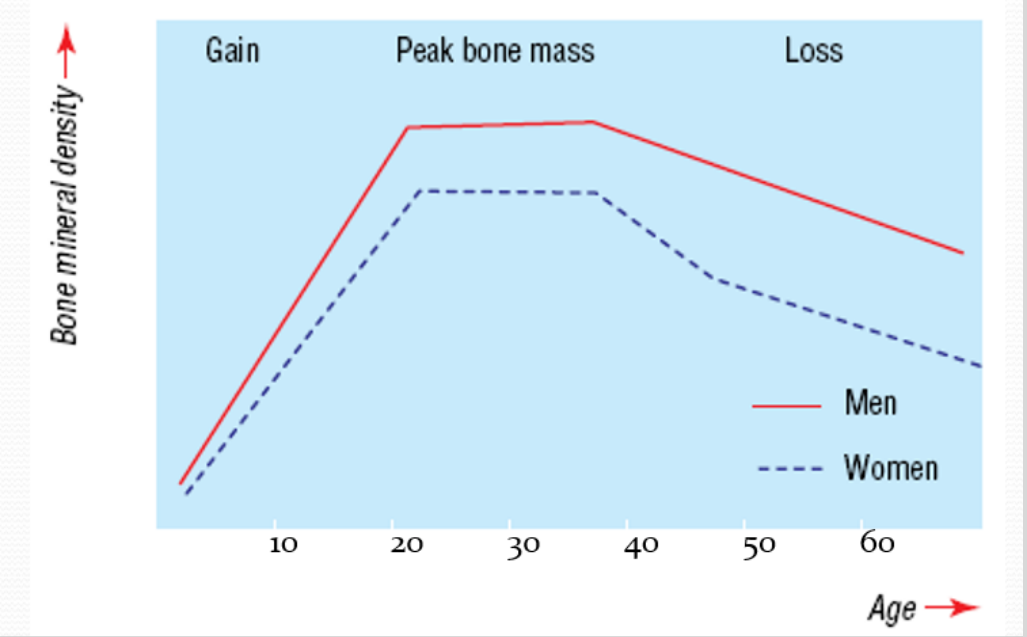
Epidemiology

- 1 in 3 women over 50 years suffer from osteoporosis.
- 1 in 5 men over 50 years suffer from osteoporosis.
- 15% - 30% men and 30%- 50% women suffer fractures related to osteoporosis in their life time.
- Peak incidence : western 70-80, India 60-70 years
- 3 x more common than men

1. Low peak bone mass (PBM)
2. hormonal changes at menopause
3. live longer than men

Peak bone mass

- Peak bone mass is the maximum mass of bone achieved by an individual at skeletal maturity, typically between ages 25 and 35
- After peak bone mass is attained, both men and women lose bone mass over the remainder of their lifetimes

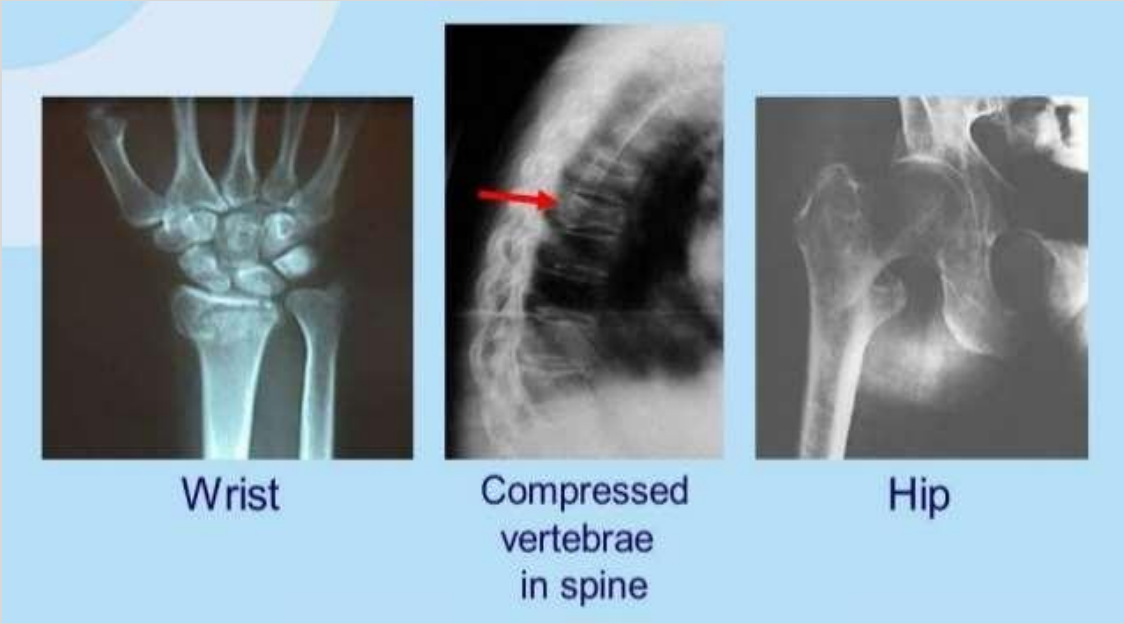


Post menopausal osteoporosis

- Exaggerated form of physiological bone depletion
- Withdrawal of estrogen, a normal restraint on osteoclastic activity
- The spine, hips, ribs, and wrists are common areas of bone fractures from osteoporosis.

Clinical features

- Asymptomatic, unless fractures occur – aka silent disease
- Fractures due to low energy trauma
- Significant height loss
- Thoracic kyphosis

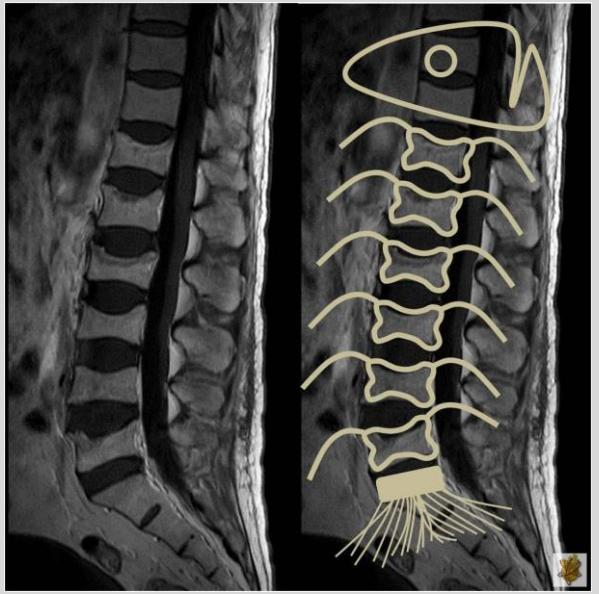


WHO Working group classification of osteoporosis for postmenopausal women

Normal	Bone mineral density (BMD) ≥ –1.0 SD of young adult reference range (T-score ≥ –1.0)
Osteopenia	BMD between -1.0 SD and - 2.5 SD below the young adult mean (–1.0 > T-score > – 2.5)
Osteoporosis	BMD ≤ - 2.5 SD of the young adult mean (T-score ≤ – 2.5)
Severe / Established Osteoporosis	BMD ≤ - 2.5 SD of the young adult mean with the presence of 1 or more fragility fractures

Diagnosis

- Imaging : plain radiograph
- Trabecular resorption and cortical resorption
- Approximately 30 to 80 per cent of bone tissue must be lost before a recognizable abnormality can be detected on spinal radiographs
- Codfish appearance



INDICATIONS FOR VERTEBRAL IMAGING

1. ALL WOMEN AGE 70 AND OLDER AND ALL MEN AGE 80 AND OLDER IF BMD T SCORE AT THE SPINE, TOTAL HIP OR FEMORAL NECK IS <-1.0
2. WOMEN AGE 65 TO 69 YEARS AND MEN AGE 70 TO 79 IF BMD T SCORE AT THE SPINE, TOTAL HIP OR FEMORAL NECK <-1.5
3. POSTMENOPAUSAL WOMEN AND MEN AGE 50 AND OLDER WITH SPECIFIC RISK FACTORS LIKE

A.LOW TRAUMA FRACTURE DURING ADULTHOOD{AGE 50}

B.HISTORICAL HEIGHT LOSS OF 1.5 INCHES OR MORE{4cm}

C.PROSPECTIVE HEIGHT LOSS OF 0.8INCHES OR MORE{2cms}

D.RECENT OR ONGOING LONG TERM GLUCOCORTICOID TREATMENT

Bone mineral density

- Indications:
  - In women age 65 and older and men age 70 and older
  - In postmenopausal women and men above age 50–69, based on risk factor profile
  - In postmenopausal women and men age 50 and older who have had an adult age fracture, to diagnose and determine degree of osteoporosis

TABLE 19-3 Methods for Bone Mineral Measurement

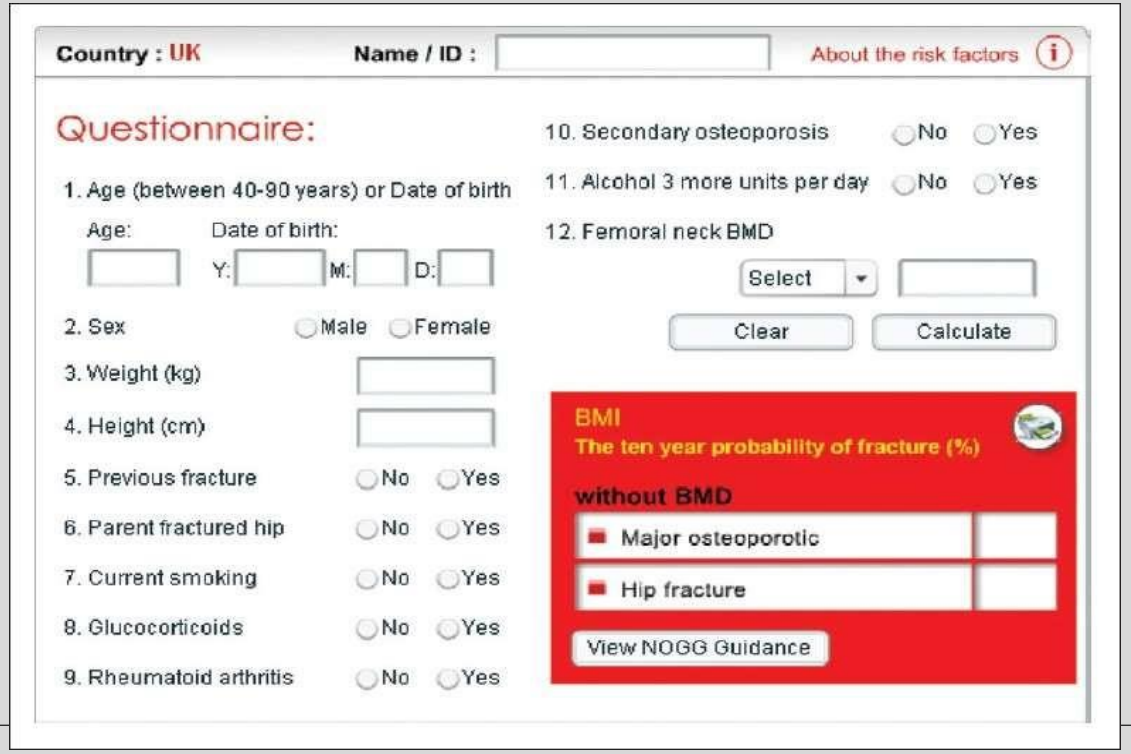
Ionizing Radiation		Nonionizing Radiation
Gamma Radiation	*X-Ray*	
Single photon absorptiometry (SPA)	Radiogrammetry	
Dual photon absorptiometry (DPA)	Single x-ray absorptiometry (SXA)	Ultrasound
Neutron activationanalysis (NAA)	Dual x-ray absorptiometry (DXA)	Magnetic resonance tomography (MRT)
Compton scatteringtechnique	Quantitative computed tomography (QCT)	

DEXA scan

- Commercially introduced in 1987.
- Principle – 2 x ray of 70Kv and 140kv are fired on site of measurement with lag time of 4ms.
- Detector detects accentuation of 2 beams.
- Data is fed into computer powered with complex algorithm and calculates BMD.
- SITES-
- Central dexa- lumbar spine, hip, whole body.
- Peripheral dexa- forearm , calcaneum.

WHO FRAX SCORING SYSTEM

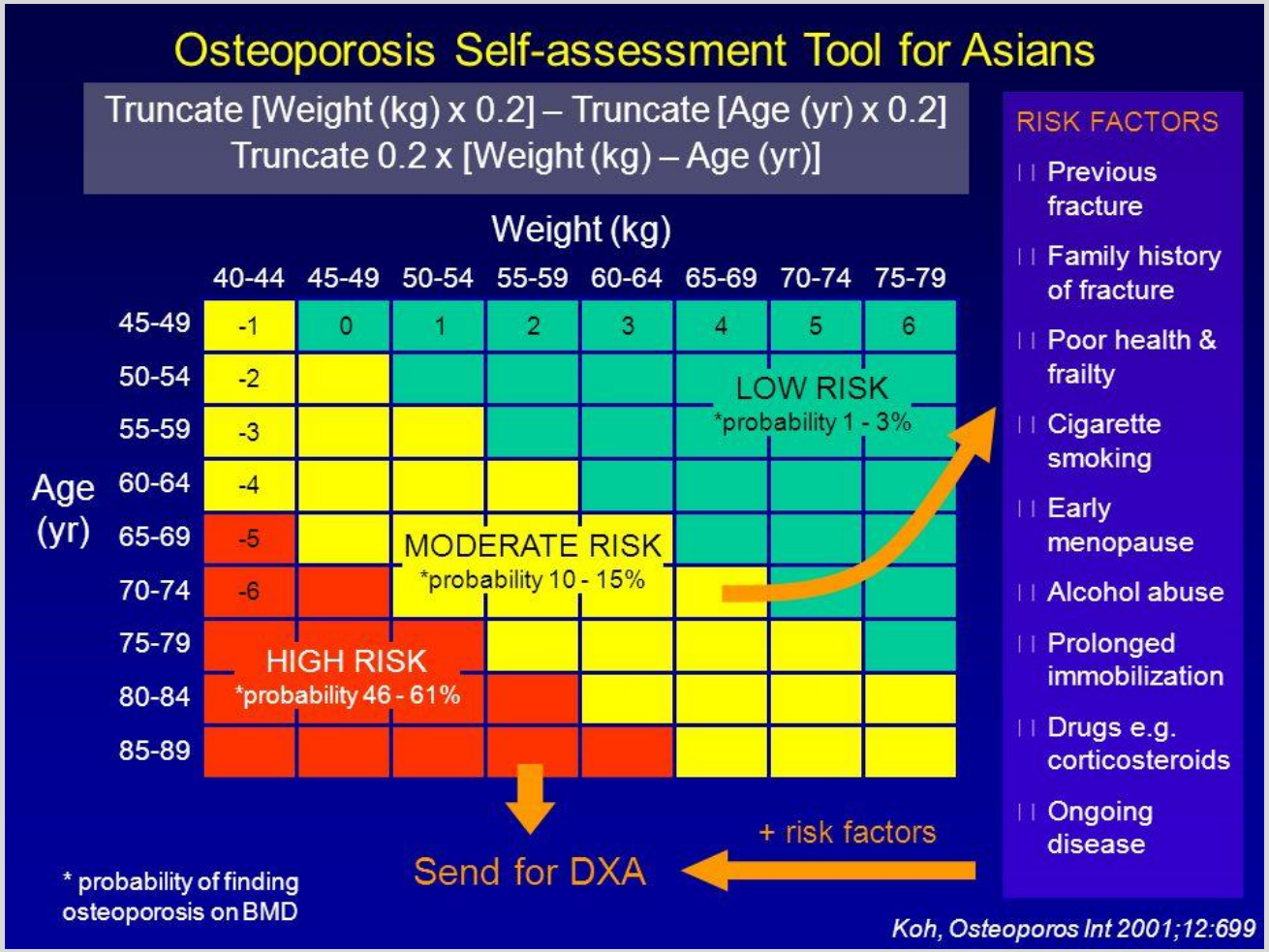
- A web based algorithm designed to calculate the 10 year probability of major osteoporosis related fracture based on clinical risk factors and BMD.
- Results evaluated are given in % of risk of patient developing fracture in next 10 years.



FRAX

- Following assessment of fracture risk using FRAX, the patient can be classified according to the NOGG intervention thresholds: -
- Low risk – reassure, give lifestyle advice and reassess in ≤5 years depending on the clinical context.
- Intermediate risk - measure BMD and recalculate the fracture risk to determine whether the individual's risk lies above or below the intervention threshold.
- High risk - can be considered for treatment without the need for BMD, although BMD measurement may sometimes be appropriate, particularly in younger postmenopausal women -

OSTA screening



Management

1.NON PHARMACOLOGICAL – PREVENTION OF OSTEOPOROSIS AND OSTEOPOROTIC FARCTURE.

A.NUTRITION

B.LIFE STYLE MODIFICATIONS

C.PREVENTION OF FALL

D.HIP PROTECTORS

2. BASIC THERAUPETIC MEASURES

A. VIT D AND CALCIUM SUPPLEMENTATION

B. ESTEROGEN AND HRT

3.ANTI RESORPTIVE AGENTS

A.CALCITONIN

B. BISPHOSHPHANTES

C.SERM

D.DONESUMAB

4. DRUGS STIMULATE BONE FORMATION

A.SODIUM FLOURIDE

B.EXOGENOUS PTH

C.VIT D ANALOGUES

5. DRUGS WITH DUAL ACTION

A.STRONTIUM RANELATE

Bisphosphonates

- First line drug
- Reduce osteoclastic bone resorption and bone turn over rate
- Oral preparations – GI side effects
- IV preparations – atypical femoral fractures, osteonecrosis of jaw

Vitamin D

- 800 to 1000 international units (IU) of vitamin D per day for adults age 50 and older.

- **Treatment of vitamin D deficiency-**

- Adults should be treated with 50,000 IU once a week or the equivalent daily dose (7000 IU vitamin D_2 or vitamin D_3) for8–12 weeks to achieve a 25(OH)D blood level *of approximately* 30 ng/ml.

- This regimen should be followed by maintenance therapy of 1500–2000 IU/day.

Denosumab

- Antibody to RANK-L
- Prevents osteoclastogenesis
- Subcutaneous injection – every six months
- Side effects – atypical femoral fractures, osteonecrosis of jaw

Parathyroid hormone

- Preotact and Teriparatide
- Prevent fractures
- Prevent corticosteroid induced osteoporosis

SERM

- Raloxifene
- Reduce risk of vertebral fractures
- Side effects – hot flushes, venous thromboembolism

Strontium ranelate

- Increase bone formation, reduce bone resorption
- Granules – dissolved in water and consumed
- Side effects – IHD, VTE, Peripheral arterial diseases, CVA

Recent advances

- Cathepsin K – cysteine proteinase with high collagenase activity
- Cathepsin k inhibitors – Odanacatib (P3 trial)
- Synthetic PTHrp – Abaloparatide (P3 trial)

Surgical management

- Femoral neck fractures and other long bone fractures
- Vertebral fractures –

1. For mild and moderate painful conditions – physiotherapy, controlled mobilisation, postural training
2. Severe painful conditions – vertebral augmentation procedures – vertebroplasty, kyphoplasty

VELAMMAL MEDICAL COLLEGE
HOSPITAL AND RESEARCH INSTITUTE
MADURAI - 625009

Department of Orthopaedics

Report

Topic : Certificate course on Postmenopausal Osteoporosis – Among Old Age People

Date : 21.08.2021

Venue : Ortho OPD Demo Hall, VMCH & RI

Target Audience : CRRIs

Number of participants: 45

A certificate course on **Postmenopausal Osteoporosis – Among Old Age People** was organised by Department of Orthopaedics to CRRIs & Prefinal year students on 21.08.2021. 45 CRRIs & Pre final year students participated in the course. The program began by 08.30 am with a pretest followed by Introduction, Assessment, Diagnosis, Management & Complications. The program concluded with a vote of thanks. Pretest and posttest were conducted to sensitize the students with topic content and grade their knowledge gain of the course.

Outcome:

Students learnt about the concepts of Postmenopausal Osteoporosis – Among Old Age People. The Gained Idea About Postmenopausal Osteoporosis – Among Old Age People.

Prof. T. THIRUNAVUKKARASU, M.D.,D.A.,
Dean
Velammal Medical College Hospital
and Research Institute
"Velammal Village"
Madurai-Tuticorin Ring Road
Anuppanadi, Madurai-625 009, T.N.

VELAMMAL MEDICAL COLLEGE HOSPITAL & RESEARCH INSTITUTE
DEPARTMENT OF ORTHOPAEDICS

Forwarded to IT

From

Dr. V. Raviraman
Department of Orthopaedics
Velammal Medical College Hospital and RI
Madurai

To:

The Dean
Velammal Medical College Hospital and RI
Madurai

Respected Sir:

We from the department of Orthopedics are planning to conduct a Certificate Courses – **"Management of Polytrauma patient"** on 19.10.2021 involving Ortho posting M.B.B.S Students & CRRIs. We kindly request you to give permission to conduct the same. Kindly do the needful.

Thanking You

Yours sincerely,

Date: 15.10.2021

Place: Madurai

Dr. V. Raviraman
Head of the Department

Department of Orthopaedics

VELAMMAL HOSPITAL
the healing touch

Certificate Course

Title:

Management of Poly Trauma Patient

AGENDA

TIME	TOPIC	SPEAKER
8.30 am to 09.00 am	Introduction	Dr. S. Shanmuganathan
9.00 am to 11.00 am	Assessment	Dr. M. Subbiah
11.00 am to 01.00 pm	Critical decision	Dr. E. Vijaya raja
01.00 pm to 01.30 pm	Lunch	
01.30 pm to 02.30 pm	Primary / Secondary survey	Dr. M.J. Krishan kumar
02.30 pm to 03.30 pm	Conservative / Surgical intervention	Dr. Muthu kumar. S
03.30 pm to 04.30 am	Complications	Dr. V. Janarthanan

Date: 19.10.2021

Day: Tuesday

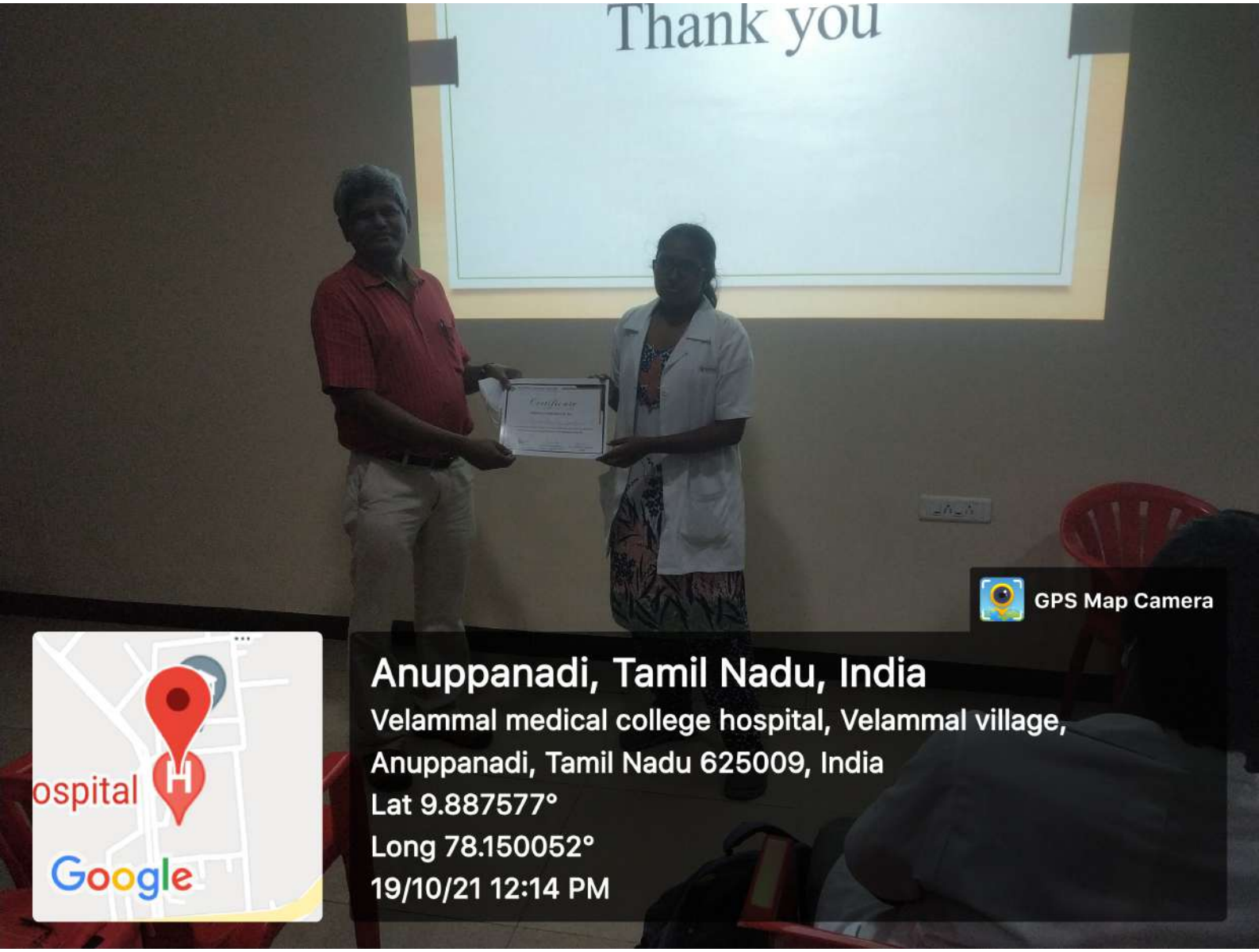
Venue: Lecture Hall

Duration: 8 hours

Teaching method power point presentation, interactive discussion


CERTIFICATE
COURSE
DEPARTMENT
OF ORTHOPAEDICS
MANAGEMENT OF
POLYTRAYUMA
PATIENT
DEPARTMENT OF
ORTHOPAEDICS
GPS Map Camera
ospital
Google
Anuppanadi, Tamil Nadu, India
Velammal medical college hospital, Velammal village,
Anuppanadi, Tamil Nadu 625009, India
Lat 9.887577°
Long 78.150052°
19/10/21 10:12 AM


GPS Map Camera
Anuppanadi, Tamil Nadu, India
Velammal medical college hospital, Velammal village,
Anuppanadi, Tamil Nadu 625009, India
Lat 9.887577°
Long 78.150052°
19/10/21 10:13 AM
ospital
Google


Thank you
GPS Map Camera
ospital
Google
Anuppanadi, Tamil Nadu, India
Velammal medical college hospital, Velammal village,
Anuppanadi, Tamil Nadu 625009, India
Lat 9.887577°
Long 78.150052°
19/10/21 12:14 PM

VELAMMAL HOSPITAL
the healing touch

CERTIFICATE COURSE

DEPARTMENT OF ORTHOPAEDICS

MANAGEMENT OF POLYTRAYUMA PATIENT

MBBS,PG's, CRRI's & Faculties

19 OCTOBER 2021

Timing :10am-12 Noon
Venue : Ortho OPD Demo hall

Management of the Polytrauma

Department of orthopaedics

Velammal medical college hospital and research institute

DEFINITION

Polytrauma is a syndrome of multiple injuries exceeding a defined severity (ISS ≥ 17) with sequential systemic reactions that may lead to dysfunction or failure of remote organs and vital systems, which have not themselves been directly injured.

POLYTRAUMA

- World wide No.1 killer amongst the younger age group (18-44 yrs).

- Third most common cause of death in all age group.

- Great economic & social loss to country.

- Less than 2% of budgets for health services spend on trauma patients.

TRAUMA- Neglected Disease of Modern Society

POLYTRAUMA / MULTIPLE FRACTURES

- Polytrauma is not synonym of multiple fractures.
- ***Multiple fractures*** are purely orthopaedic problem as there is involvement of skeletal system alone.

While in ***Polytrauma*** there is involvement of more than one system,Like associated head/spinal injury, chest injury, abdominal or pelvic injury.

- **Polytrauma is a multi-system injury and needs management by a team of surgeons and physicians. Orthopaedic surgeon is one of the team member of trauma unit**.

First Peak of Death :

…. within minutes

- Severe head injury
- Brain stem
- High cord injury
- Heart
- Aorta
- Massive blood loss

Second Peak of Death :

- Intra cranial Bleed
- Chest injury
- Abdominal Bleeding
- Pelvic Bleeding
- Multiple limb injury

The "Golden hour"

Third Peak of Death :

… several days or weeks

- Sepsis
- Organ failure

Influenced by Early Management

Scoring Systems

- Glasgow Coma Scale
- Abbreviated Injury Scale
- Injury Severity Score
- New Injury Severity Score

Scoring systems

Physiologic	Anatomic	Combined
Revised Trauma Score	Abbreviated Injury Score	TRISS
APACHE	Injury Severity Score	ASCOT
SOFA	New Injury Severity Score	ICISS
SIRS	Anatomic Profile	
Emergency Trauma Score	PATI	
	ICISS	
	TMPM-ICD9	

Scoring systems

Injury Severity Score; ISS

Region	Injury Description	AIS	Square Top Three
Head & Neck	Cerebral Contusion	3	9
Face	No Injury	0	
Chest	Flail Chest	4	16
Abdomen	Minor Contusion of Liver Complex Rupture Spleen	2 5	 25
Extremity	Fractured femur	3	
External	No Injury	0	
		Injury Severity Score:	50

AIS Score	Injury
1	Minor
2	Moderate
3	Serious
4	Severe
5	Critical
6	Survivable

ISS	
1-8	Minor
9-15	Moderate
16-24	Serious
25-49	Severe
50-74	Critical
75	Maximum

Glasgow Coma Scale

- Summation of **best** motor, verbal , eye response
- Observer dependant
- Predictive of mortality (admission > field)
- Affected by pharmacological agents, level of resuscitation

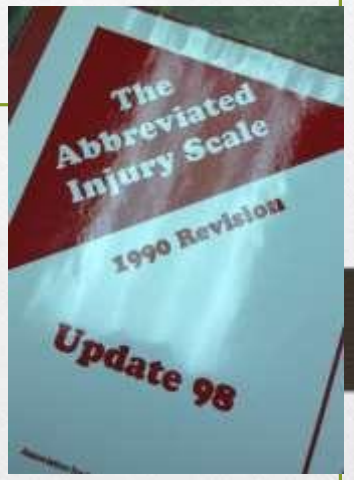
- Eye Opening
  - Spontaneous 4
  - To voice 3
  - To pain 2
  - None 1
- Verbal Response
  - Oriented 5
  - Confused 4
  - Inappropriate words 3
  - Incomprehensible sounds 2
  - None 1
- Motor Response
  - Obeys commands 6
  - Localized pain 5
  - Withdraw to pain 4
  - Flexion to pain 3
  - Extension to pain 2
  - None 1

Abbreviated Injury Scale (AIS)

- 9 anatomic areas:
  - Head
  - Face
  - Neck
  - Thorax
  - Abdomen
  - Spine
  - Upper Extremity
  - Lower Extremity
  - External

Abbreviated Injury Scale (AIS)

- Each area scored from 0 to 6
- Values are consensus driven
- Values found in “dictionary”



1 None
2 Minor
3 Moderate
4 Serious
5 Severe
6 Critical
7 Not survivable

Abbreviated Injury Scale

- Examples:
  - Femur fracture → serious, AIS=3
  - Pulmonary contusion → serious, AIS=3
  - Flail chest→ severe, AIS=4

Injury Severity Score (ISS)

- Calculated from AIS
- Highest AIS value from each individual anatomic area (6)
  - Head/ neck
  - Face
  - Chest
  - Abdomen
  - Extremities including pelvis
  - External
- Three highest AIS values (from different anatomic areas)
  - → squared
  - → summed

$$AIS^2 + AIS^2 + AIS^2$$

Injury Severity Score (ISS)

- Highest Score: 75 (not survivable)
  - AIS of 5 in three anatomic areas
  - AIS of 6 in any anatomic area

Injury Severity Score (ISS)

- Defines polytrauma
  - ISS $\geq$ 18
- Correlates with:
  - Morbidity
  - Mortality
  - Length of hospital stay

Injury Severity Score (ISS)

- A problem with ISS… injuries within the same anatomic system are only counted once

New Injury Severity Score (NISS)

- Three highest AIS values **regardless** of anatomic region are utilized
- May be a better predictor of morbidity and mortality

Pathophysiology

- Major trauma induces an intense immuno-inflammatory response.
- The magnitude of this response depends on the initial trauma load, the pain stimuli, the systemic and local release of pro-inflammatory cytokines, age, sex as well as the genetic make-up of the patient.

Physiologic Response to Trauma

- Systemic Inflammatory Response (SIRS)
- Compensatory Anti-inflammatory Response (CARS)

Immunological response

Proinflammatory phase

- IL-1, IL-6, TNF-alpha
- Hypothalamus → pyrexia
- Hepatic acute phase protein

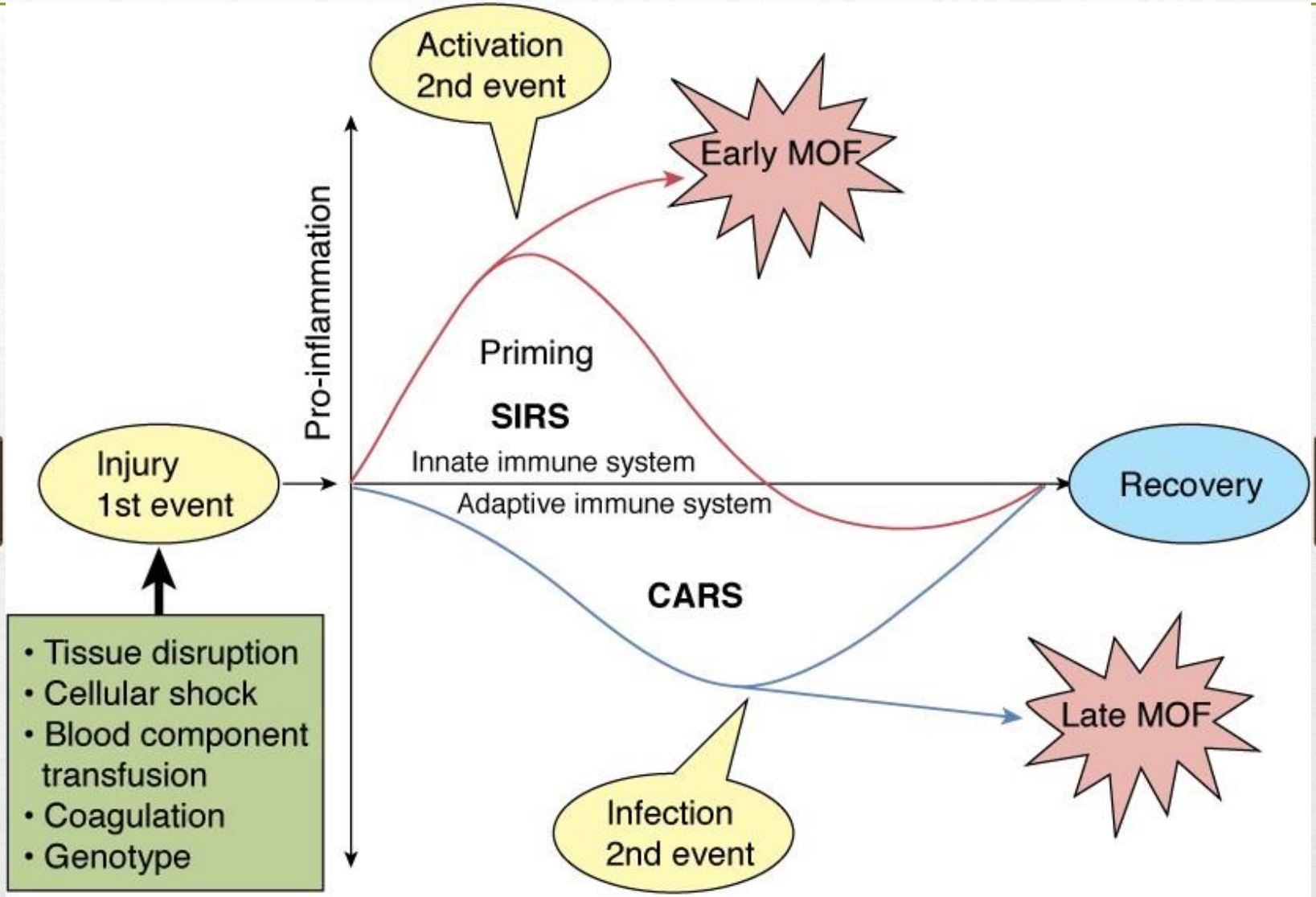
SIRS

MODS

Counter regulatory phase

- IL-1 receptor antagonist (IL-1Ra) and TNFsoluble receptors (TNF-sR-55 and 75)
- Prevent excessive proinflammatory activities
- Restore homeostasis

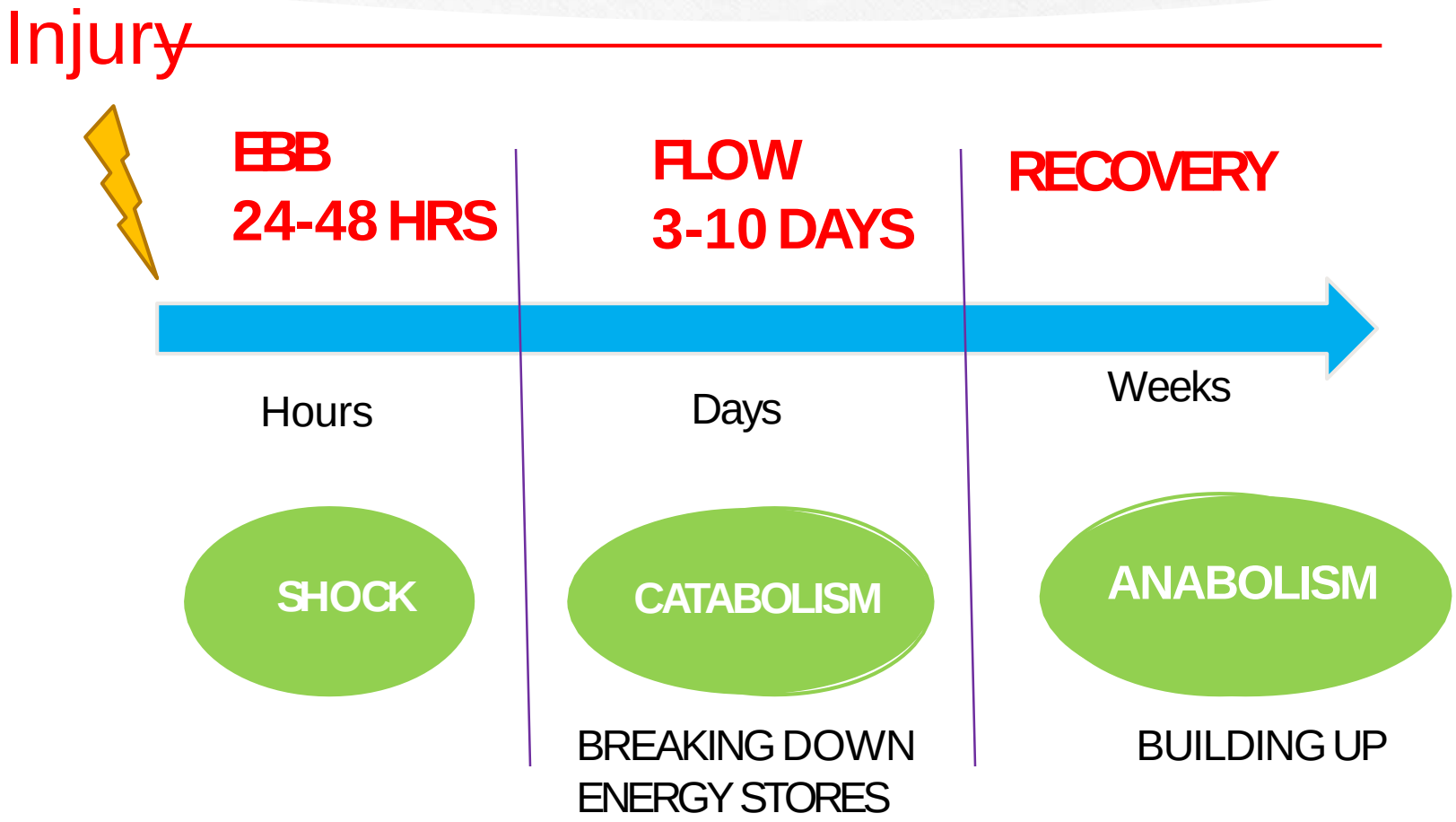
COMP. ANTI-INFLAMMATORY RESPONSE SYNDROME { CARS}

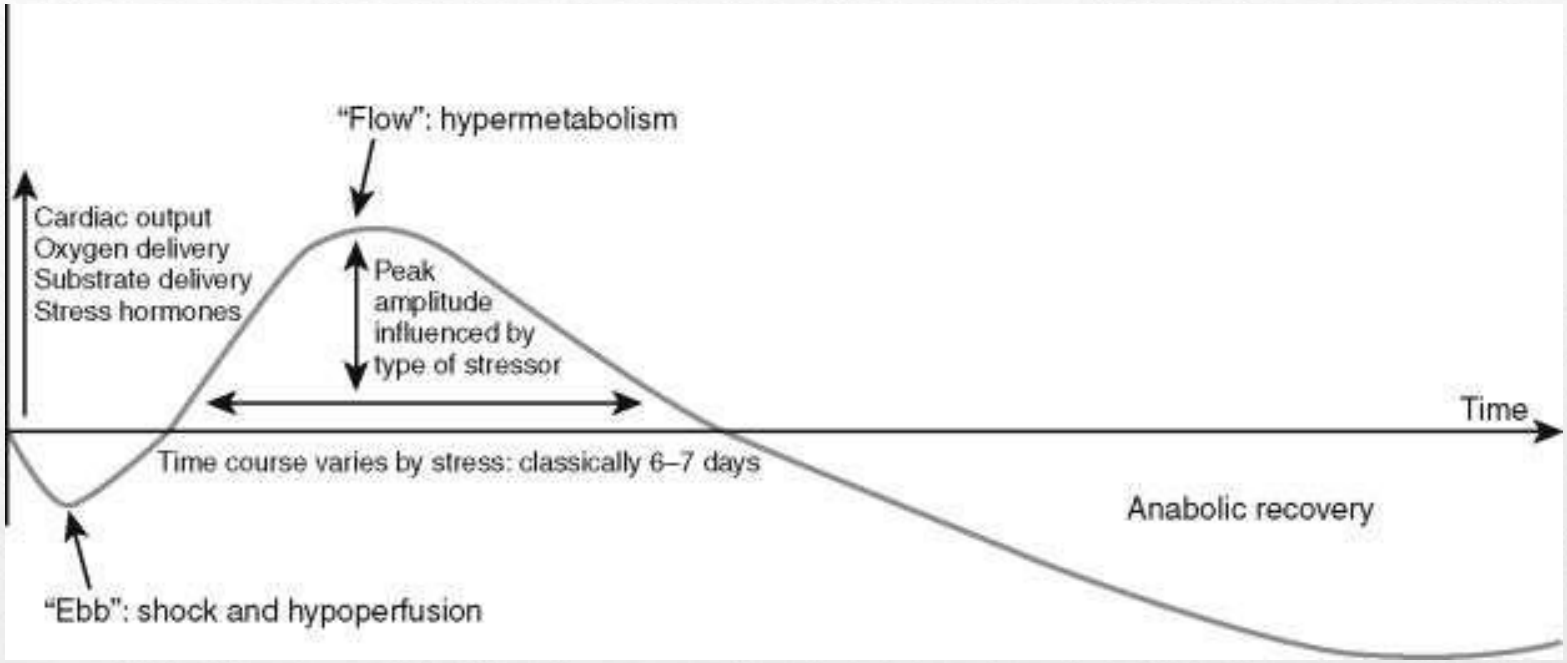


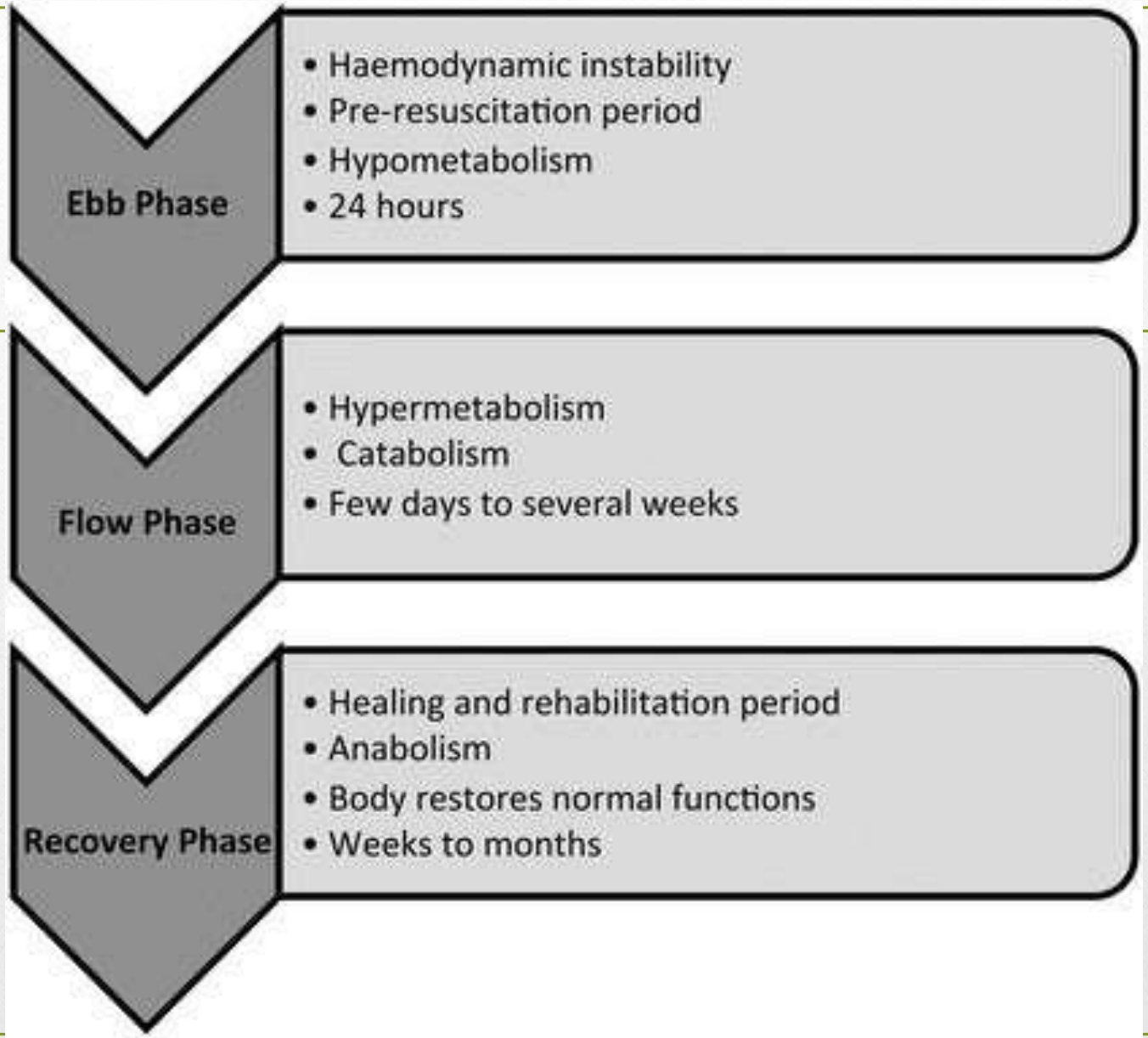
Source: Mattox KL, Moore EE, Feliciano DV: *Trauma, 7th Edition:*
www.accesspharmacy.com

Phases – Physiological response

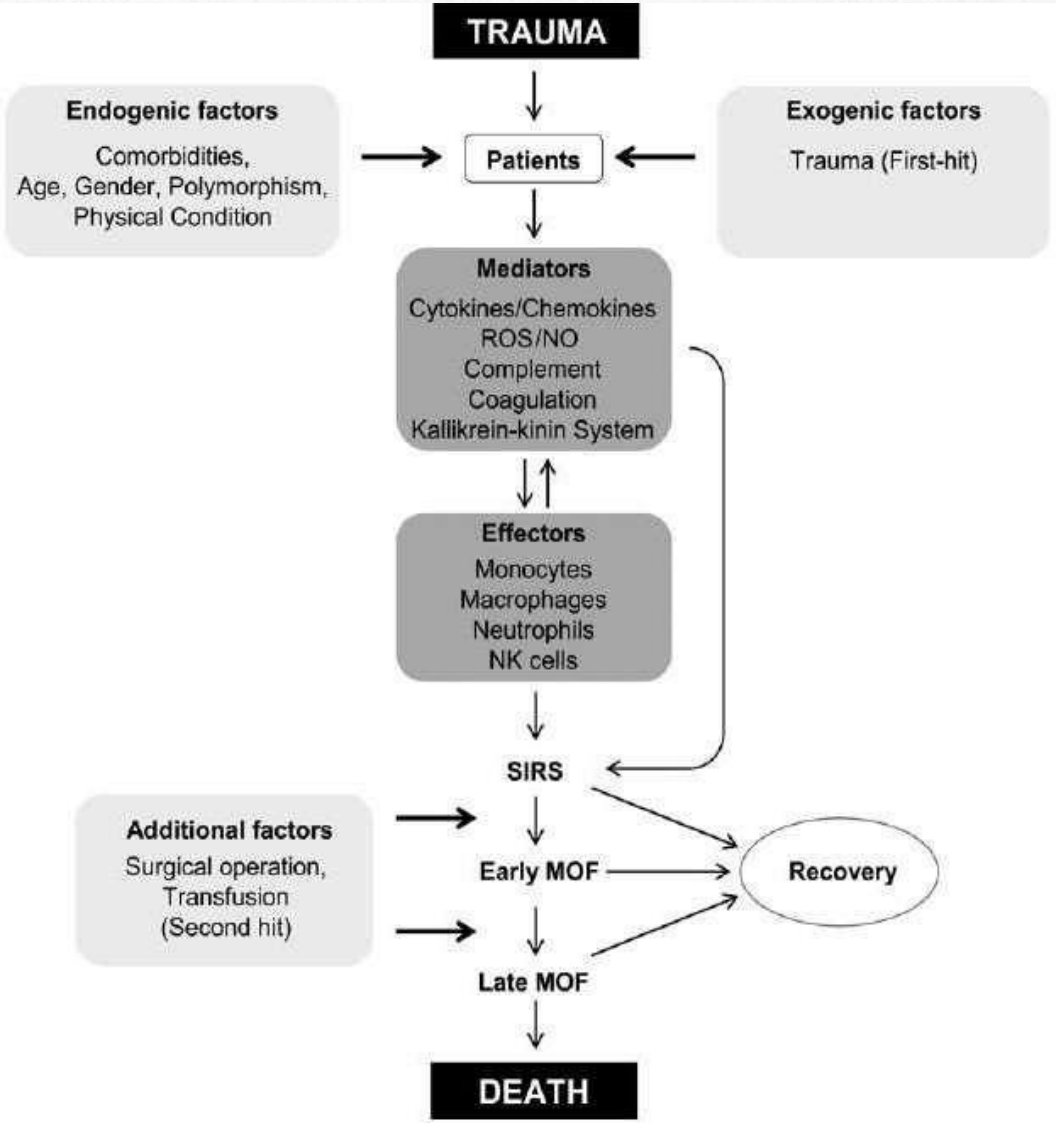
[David Cuthbertson – 1930]



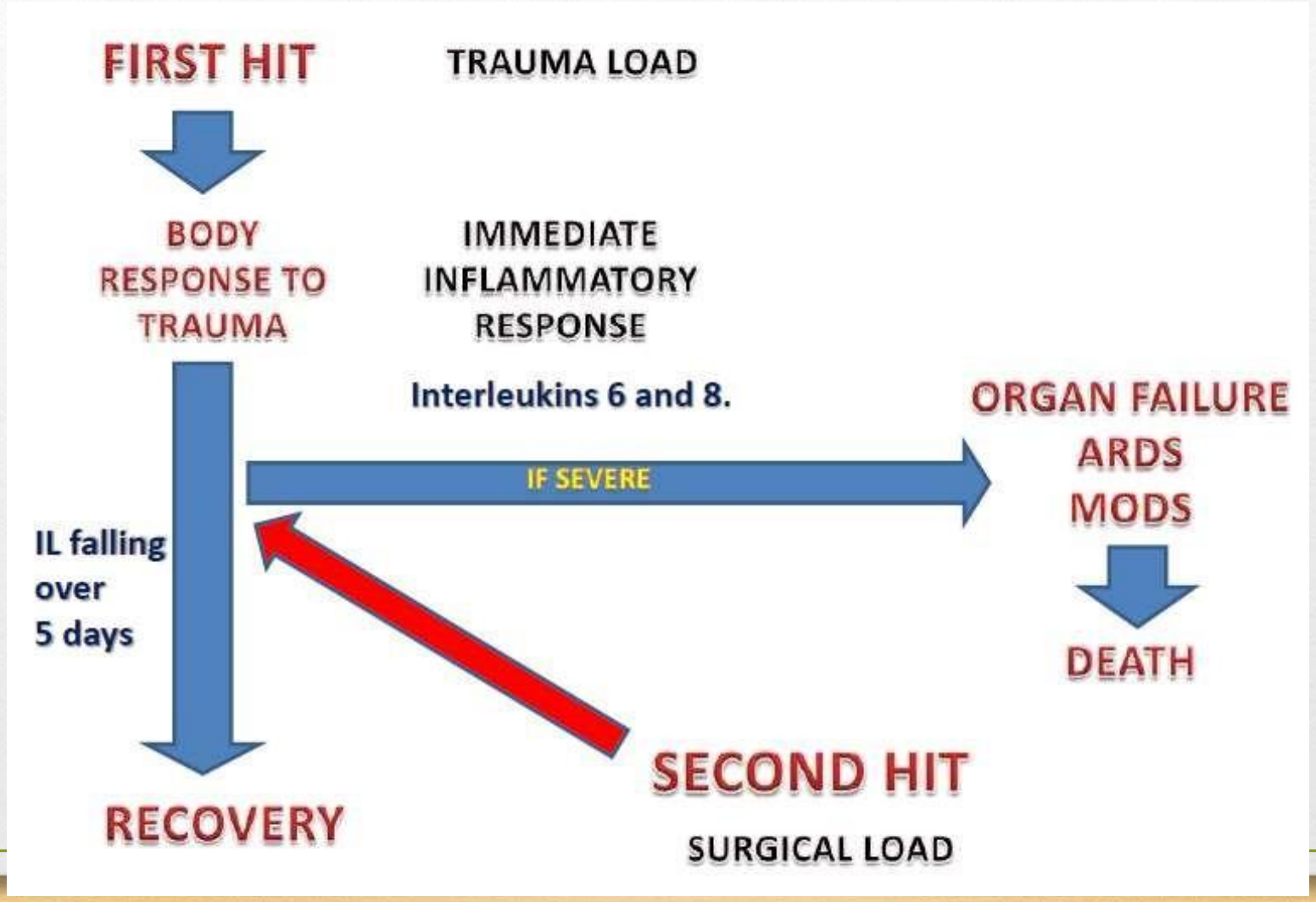

"Flow": hypermetabolism
Cardiac output
Oxygen delivery
Substrate delivery
Stress hormones
Peak amplitude influenced by type of stressor
Time
Time course varies by stress: classically 6–7 days
Anabolic recovery
"Ebb": shock and hypoperfusion


Ebb Phase
• Haemodynamic instability
• Pre-resuscitation period
• Hypometabolism
• 24 hours
Flow Phase
• Hypermetabolism
• Catabolism
• Few days to several weeks
Recovery Phase
• Healing and rehabilitation period
• Anabolism
• Body restores normal functions
• Weeks to months

Pathophysiology



Pathophysiology



“First Hit” →
Systemic Inflammatory Response

“First Hit”

We as surgeons have **no** control…

“Second Hit”

We as surgeons **have** control…

Clinical Manifestations of the Systemic Inflammatory Response

- Fever
- Tachycardia
- Hyperventilation
- Leukocytosis

Quantifying the Systemic Inflammatory Response

- SIRS Score
- Four variables, each scored 0 or 1
  - HR > 90
  - WBC <4,000 or >12,000
  - RR > 20 (or PaCO2<33mmHg)
  - Temperature <36 or >38 (100.4 degrees Fahrenheit)
- Total Score= sum of four variables (0 to 4)
- Score > 2 indicative of *Systemic Inflammatory Response Syndrome*

Systemic Inflammatory Response Syndrome (SIRS)

- Predictive of:
  - ARDS
  - DIC
  - ARF
  - Shock

INFLAMATORY MEDIATORS

Mediator	Source(s)	Actions
Cell-Derived		
Histamine	Mast cells, basophils, platelets	Vasodilation, increased vascular permeability, endothelial activation
Serotonin	Platelets	Vasoconstriction
Prostaglandins	Mast cells, leukocytes	Vasodilation, pain, fever
Leukotrienes	Mast cells, leukocytes	Increased vascular permeability, chemotaxis, leukocyte adhesion and activation
Platelet-activating factor	Leukocytes, mast cells	Vasodilation, increased vascular permeability, leukocyte adhesion, chemotaxis, degranulation, oxidative burst
Reactive oxygen species	Leukocytes	Killing of microbes, tissue damage
Nitric oxide	Endothelium, macrophages	Vascular smooth muscle relaxation; killing of microbes
Cytokines (TNF, IL-1, IL-6)	Macrophages, endothelial cells, mast cells	*Local*: endothelial activation (expression of adhesion molecules). *Systemic*: fever, metabolic abnormalities, hypotension (shock)
Chemokines	Leukocytes, activated macrophages	Chemotaxis, leukocyte activation

MANAGEMENT

- Trauma management should be multidisciplinary team
- Each one in the team plays his role where he is perfect in

MANAGEMENT

ATLS

'TREAT LETHAL INJURY FIRST, THEN REASSESS AND TREAT AGAIN'

The steps in management are:

- **Primary survey**
- **Resuscitation**
- **Secondary survey**
- **Definitive care**

MANAGEMENT

Prehospital care

- Resuscitation
- Preliminary stabilization
- Safe and fast transfer

MANAGEMENT

1. Acute “reanimation” period (1 to 3 hours)
2. Primary “stabilization” period (1 to 48 hours)
3. Secondary “regeneration” period (2 to 10 days)
4. Tertiary “reconstruction and rehabilitation” period (weeks)

ASSESMENT POLYTRAUM A PATIENT

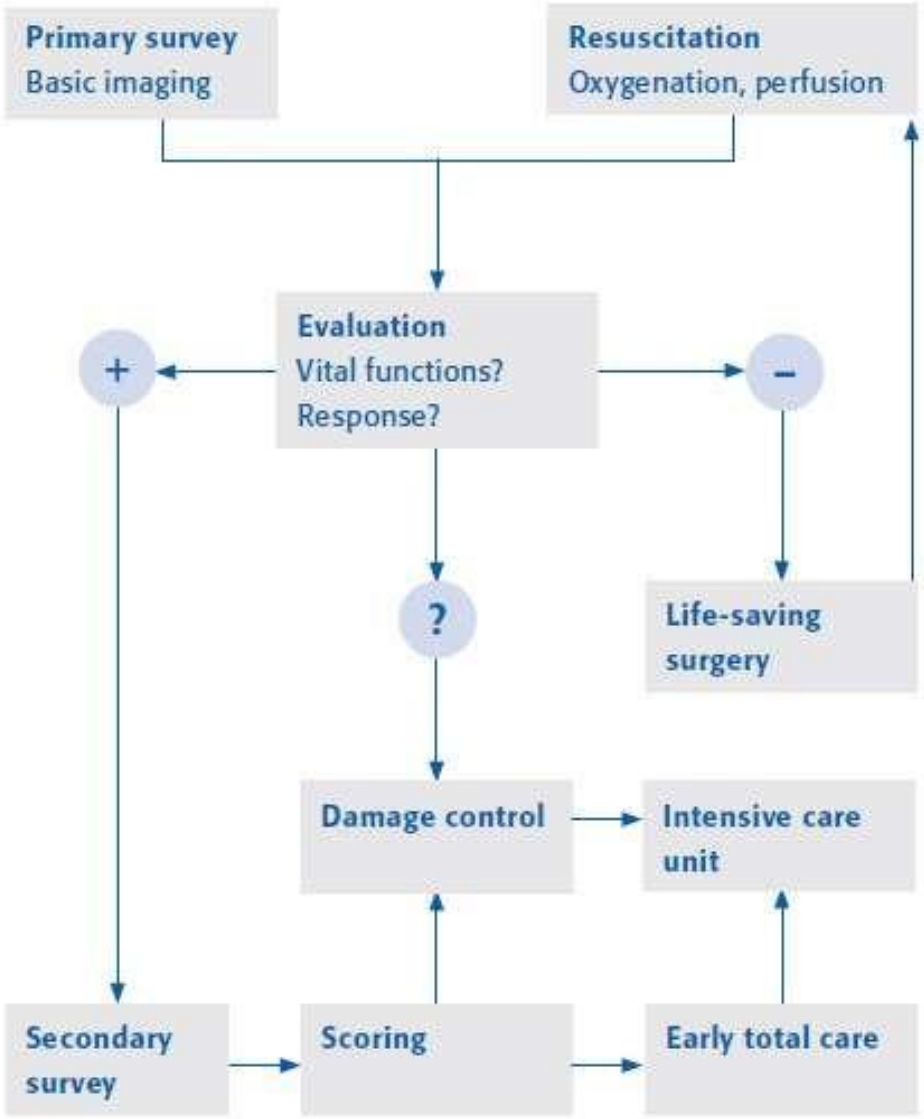


Fig 4.1-2 Algorithm for initial assessment, life support, and day-1 surgery.

Evaluation of the polytrauma patient

- ATLS
- Primary Survey
  - Airway
  - Breathing
  - Circulation
  - Disability
  - Exposure/Environmental Control
- Secondary Survey
- Tertiary Survey

Evaluation of the polytrauma patient

- Primary Survey
  - Airway
    - Establishment of an airway with regard for associated cervical spine injury
    - Clinical evaluation for obstruction
      - Facial fractures, mandible fractures, laryngeal or tracheal injury, aspiration, foreign body

Evaluation of the polytrauma patient

- Primary Survey
  - Breathing
    - Clinical and radiographic (CXR) evaluation
    - ABG
    - Common causes of hypoxemia:
      - Flail chest with contusion, tension pneumothorax, open pneumothorax

Evaluation of the polytrauma patient

- Primary Survey
  - Circulation
    - Clinical and radiographic (CXR, pelvic X-Ray evaluation)
    - Application of circumferential sheet or binder where indicated
    - Application of direct pressure to areas of obvious hemorrhage
    - Initiation of resuscitation

Evaluation of the polytrauma patient

- Primary Survey
  - Disability
    - Neuro evaluation

Evaluation of the polytrauma patient

- Primary Survey
  - Exposure/Environmental Control
    - Clinical evaluation to identify occult injuries
    - Rewarming of patients

Evaluation of the polytrauma patient

- Must differentiate hemorrhagic shock from shock secondary to other etiologies:
  - Neurogenic
  - Cardiogenic

		Pre-load	Pump Fn	After-load	Perfusion
		PCWP JVP	CO	SVR	O2 Sat
Hypovolemic	- Intravascular vol loss - hemorrhagic - fluid loss	↓	↓	↑	↓
Cardiogenic	- Arrhythmia - AMI, valve failure - cardiomyopathy - pericarditis/PE	↑	↓	↑	↓
Distributive	Vasodilatory-↓↓ SVR -septic shock/SIRS/TSS - Anaphylaxis - neurogenic shock - Drug/toxin - Addisonian crisis	↓/-	↑	↓	-/↑
Obstructive	- Tension PTX - Tamponade - PE	↑	↓	-/↑	-/↓

Evaluation of the polytrauma patient

- Initiation of Resuscitation
- Anticipated needs based on degree (*"Class"*) of hemorrhage at presentation
  - Crystalloid
    - 1-2 L crystalloid
  - Assess response
    - Rapid, transient, or minimal/none

Class of Hemorrhage

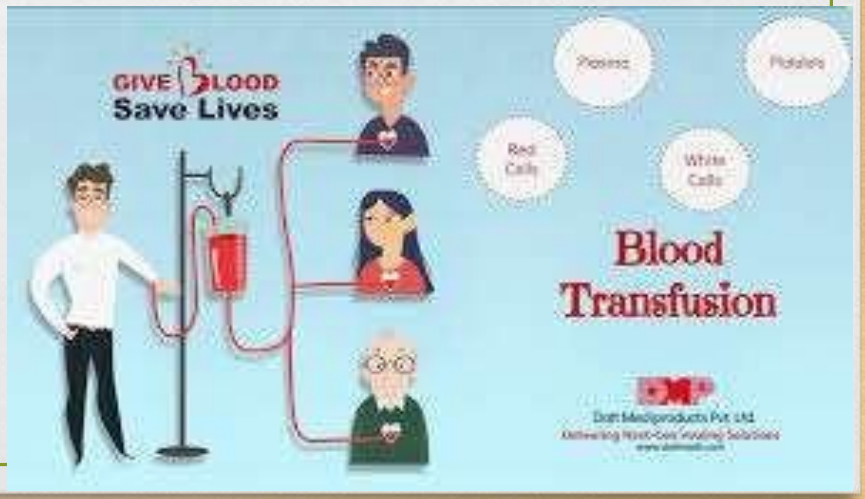
- Class I:
  - up to 15% (750cc) blood volume loss
- Class II:
  - 15-30% (750-1500cc) blood volume loss
- Class III:
  - 30-40% (1500-2000cc) blood volume loss
- Class IV:
  - >40% (>2000cc) blood volume loss

Class of Hemorrhage

	Class 1	Class 2	Class 3	Class 4
Blood loss (mL)	Up to 750	750-1500	1500-2000	>2000
Blood loss (% of volume)	Up to 15%	15-30%	30-40%	>40%
Heart rate	<100	100-120	120-140	>140
Blood pressure	Normal	Normal	Decreased	Decreased
Pulse pressure (mmHg)	Normal	Decreased	Decreased	Decreased
Respiratory rate	14-20	20-30	30-40	>35
Urine output (mL/hr)	>30	20-30	5-15	Negligible
Mental status	Slightly anxious	Mildly anxious	Confused	Lethargic

Blood Transfusion

- Transient or nonresponders to crystalloid (Class III/IV hemorrhage) will require transfusion
- Cross-matched, Type-specific, or Type O blood given based upon timing of need



Massive Transfusion

- Greater emphasis on more balanced product administration
- *Damage control resuscitation*
  - 1:1:1 ratio of pRBC:plasma:platelets

Patient risk stratification

- **Stable**
- **Borderline**
- **Unstable**
- **In extremis**

Patient risk stratification

TABLE 9-5 Classification Systems for Clinical Patient Assessment

	Parameter	Stable (Grade I)	Borderline (Grade II)	Unstable (Grade III)	In Extremis (Grade IV)
Shock	Blood pressure (mm Hg)	100 or more	80–100	60–90	<50–60
	Blood units (2 h)	0–2	2–8	5–15	>15
	Lactate levels	Normal range	Around 2.5	>2.5	Severe acidosis
	Base deficit (mmol/L)	Normal range	No data	No data	>6–8
	ATLS classification	I	II–III	III–IV	IV
Coagulation	Platelet count (µg/mL)	>110	90–110	<70–90	<70
	Factor II and V (%)	90–100	70–80	50–70	<50
	Fibrinogen (g/dL)	1	Around 1	<1	DIC
	D-dimer	Normal range	Abnormal	Abnormal	DIC
Temperature		<33°C	33–35°C	30–32°C	30°C or less
Soft Tissue Injuries	Lung function; PaO_2/FiO_2	350–400	300–350	200–300	<200
	Chest trauma scores; AIS	AIS 1 or 2	AIS 2 or more	AIS 2 or more	AIS 3 or more
	Chest trauma score; TTS	0	I–II	II–III	IV
	Abdominal trauma (Moore)	< or = II	< or = III	III	III or > III
	Pelvic trauma (AO class.)	A type (AO)	B or C	C	C (crush, rollover abd.)
	Extremities	AIS I–II	AIS II–III	AIS III–IV	Crush, rollover extrem.

Pape HC, Giannnoudis PV. Management of the Multiply Injured Patient. In Court-Brown C, Heckman JD, McQueen MM, et al (Eds.), *Rockwood and Green's Fractures in Adults*, 8th Edition. 2015.

Evaluation of the polytrauma patient

- Further Imaging
  - FAST
  - CT

Evaluation of the polytrauma patient

- FAST (focused assessment with sonography for trauma)
  - Intraabdominal free fluid
  - Pericardial effusion
  - Solid organ injury (limited sensitivity)

Nural MS, Yardan T, Guven H, et al. Diagnostic value of ultrasound in the evaluation of blunt abdominal trauma. *Diagn Interv Radiol.* 2005;11:41-44.

Evaluation of the polytrauma patient

- Secondary Survey
  - Complete physical exam with updating of patient's history
  - Incorporates information from ongoing studies (FAST, CT, extremity XRays, etc.)
  - Usually within first 12-24 hours after injury

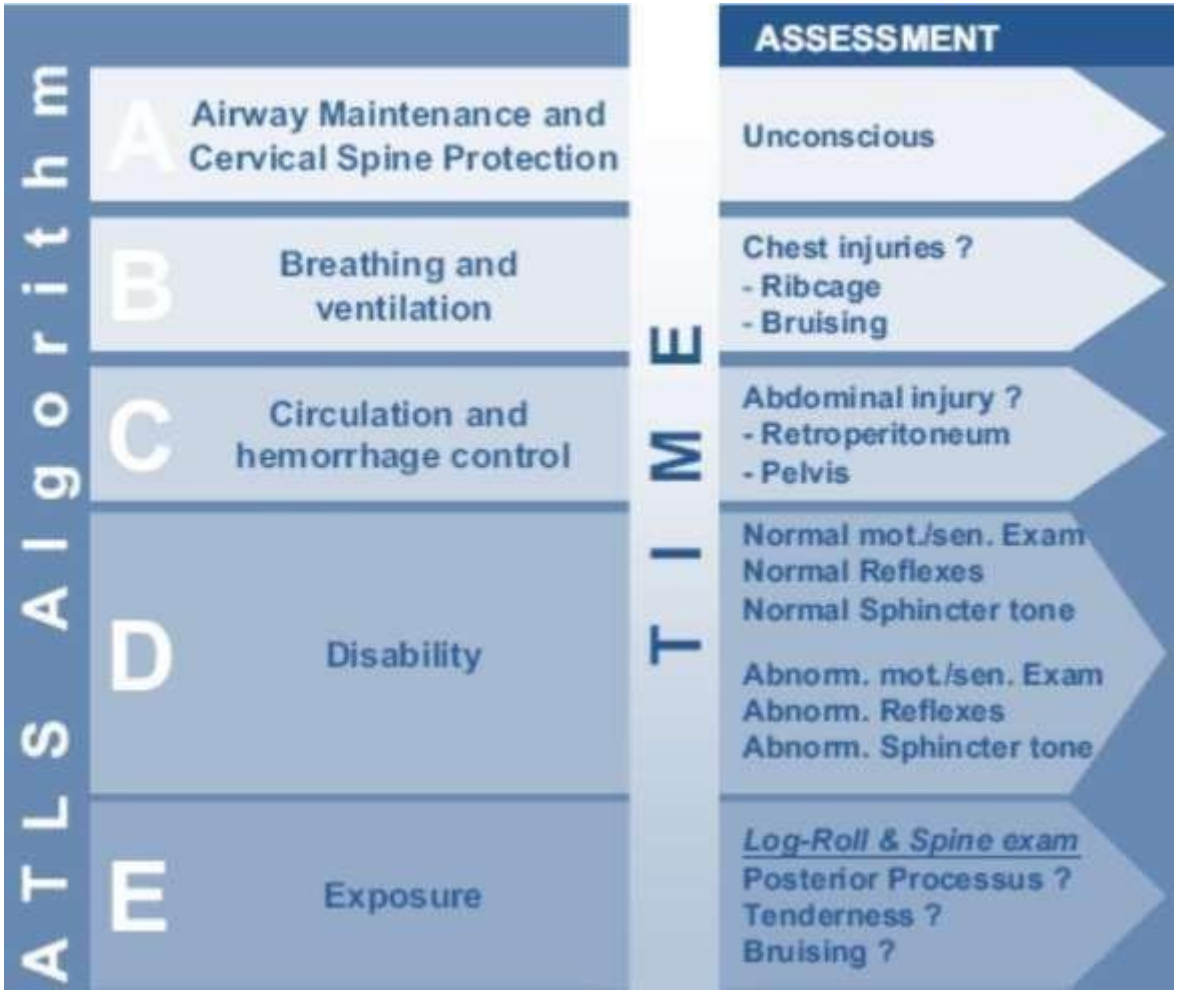
Evaluation of the polytrauma patient

- Tertiary Survey
  - Repeat physical exam with review of any additional labs and radiographs
  - 12% of injuries in polytrauma patients are missed in first 24 hours
  - Standardized tertiary survey has shown to decrease missed injuries by 36%

Chan RN, Ainscow D, Sikorski JM. Diagnostic failures in the multiple injured. *JTrauma.* 1980;20:684-687.
Biffl WL, Harrington DT, Cioffi WG. Implementation of a tertiary survey decreases missed injuries. *JTrauma.* 2003;54:38-43.

MANAGEMENT

Primary survey



Life > Limb
in the initial treatment of polytrauma patient

- However, care of the orthopaedic injuries does impact mortality
- Orthopaedic urgencies and emergencies must be treated within overall context of polytraumatized patient's condition

What are we trying to avoid in care of polytrauma patient?

- MOF
- ARDS

Multiorgan Failure (MOF)

- Multiorgan Dysfunction Syndrome
- Affects multiple organ systems
- Many theories re: etiology
- High incidence of mortality
- May be related to **imbalance between proinflammatory and antiinflammatory mediators**

Acute Respiratory Distress Syndrome

- ARDS
- Acute onset
- Bilateral infiltrates on CXR
- PaO2/FiO2 < **200**
- High incidence of mortality
- May be related to **imbalance between proinflammatory and antiinflammatory mediators**

MANAGEMENT

Resuscitation

- ABCDE
- Fluids
- History (AMPLE)
- Radiography

(Chest,Pelvis,Spine, Abdominal U/S)

MANAGEMENT

SECONDARY SURVEY

- Does not begin until the primary survey (ABCDEs) is completed.
- Head to Toe evaluation & reassessment of all vital signs.
- A complete neurological exam is performed including a GCS score.
- Special procedure is order.

MANAGEMENT

End point of resuscitation

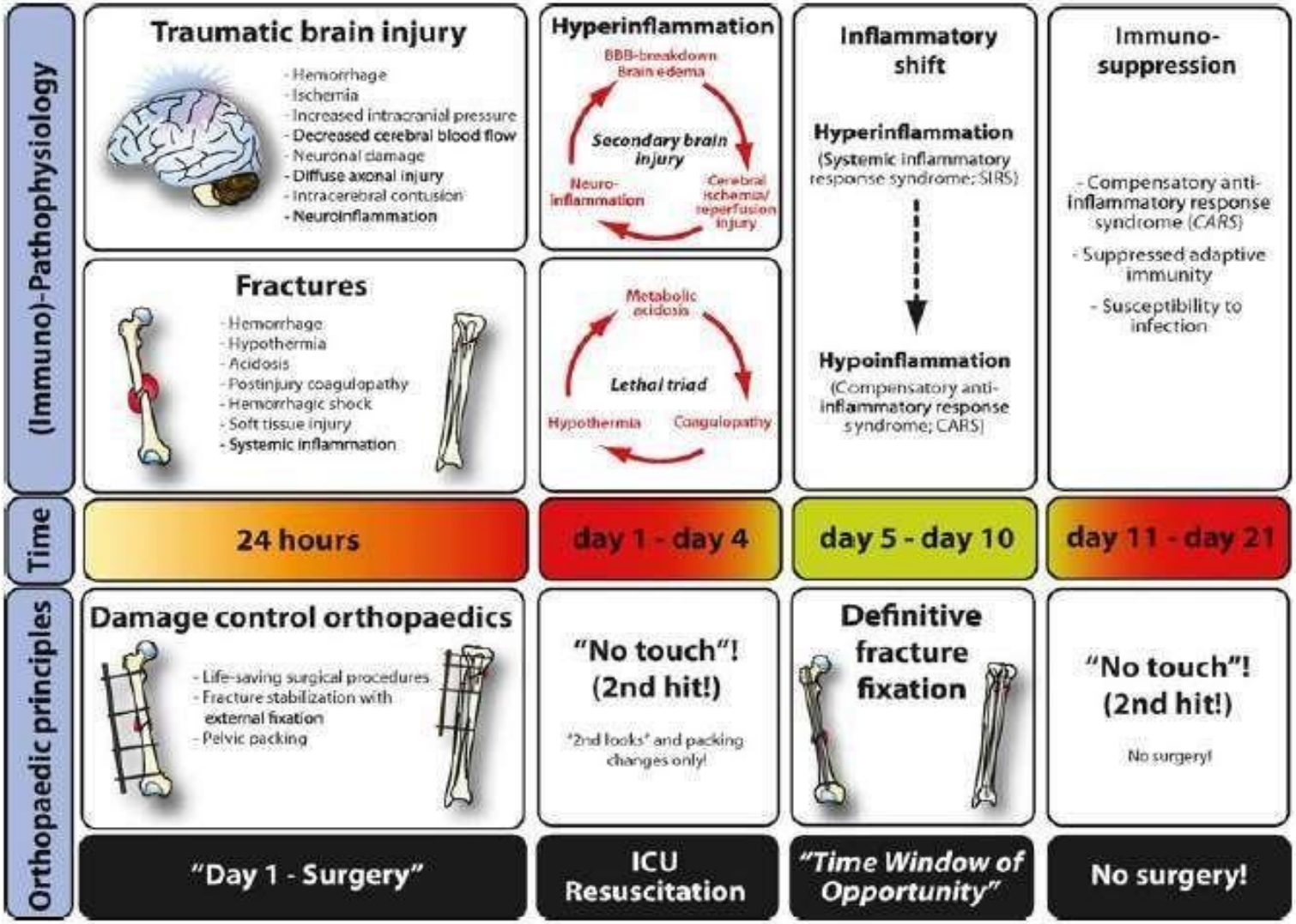
- Stable hemodynamics
- Stable oxygen saturation
- Lactate level below 2 mmol / L
- No cogaulation disturbance
- Normal temp
- Urinary output > 1ml /kg/hr
- No requirement of inotropic support

MANAGEMENT

- Definitive care

Physiological status		Surgical intervention	Timing
Response to resuscitation	None	Life-saving surgery	Day 1
	Partial	Damage control	Day 1
	Normal	Early total care	Day 1
Hyperinflammation		"Second look" only!	Day 2–3
"Window of opportunity"		Definitive surgery	Day 5–10
Immunosuppression		No surgery	Day 12–21
Recovery		Secondary reconstructive surgery	Week 3 +

MANAGEMENT


(Immuno)-Pathophysiology
Traumatic brain injury
- Hemorrhage
- Ischemia
- Increased intracranial pressure
- Decreased cerebral blood flow
- Neuronal damage
- Diffuse axonal injury
- Intracerebral contusion
- Neuroinflammation
Hyperinflammation
BBB-breakdown
Brain edema
Secondary brain injury
Neuro-inflammation
Cerebral ischemia/ reperfusion injury
Inflammatory shift
Hyperinflammation
(Systemic inflammatory response syndrome; SIRS)
Hypoinflammation
(Compensatory anti-inflammatory response syndrome; CARS)
Immuno-suppression
- Compensatory anti-inflammatory response syndrome (CARS)
- Suppressed adaptive immunity
- Susceptibility to infection
Fractures
- Hemorrhage
- Hypothermia
- Acidosis
- Postinjury coagulopathy
- Hemorrhagic shock
- Soft tissue injury
- Systemic inflammation
Metabolic acidosis
Lethal triad
Hypothermia
Coagulopathy
Time
24 hours
day 1 - day 4
day 5 - day 10
day 11 - day 21
Orthopaedic principles
Damage control orthopaedics
- Life-saving surgical procedures
- Fracture stabilization with external fixation
- Pelvic packing
"No touch"! (2nd hit!)
"2nd looks" and packing changes only!
Definitive fracture fixation
"No touch"! (2nd hit!)
No surgery!
"Day 1 - Surgery"
ICU Resuscitation
"Time Window of Opportunity"
No surgery!

Orthopaedic management

(1) facilitating overall patient care,

(2) ~~controlling bleeding,~~

(3) decreasing additional soft-tissue injury,

(4)avoiding further activation of the systemic inflammatory response,

(5) removal of devitalized tissue,

(6) prevention of ischemia/reperfusion injury,

(7) pain relief

When do we fix the fracture in the polytrauma patient?

ETC vs DCO

VS

The 24-72 hour period after the initial injury appears to be the most at-risk time

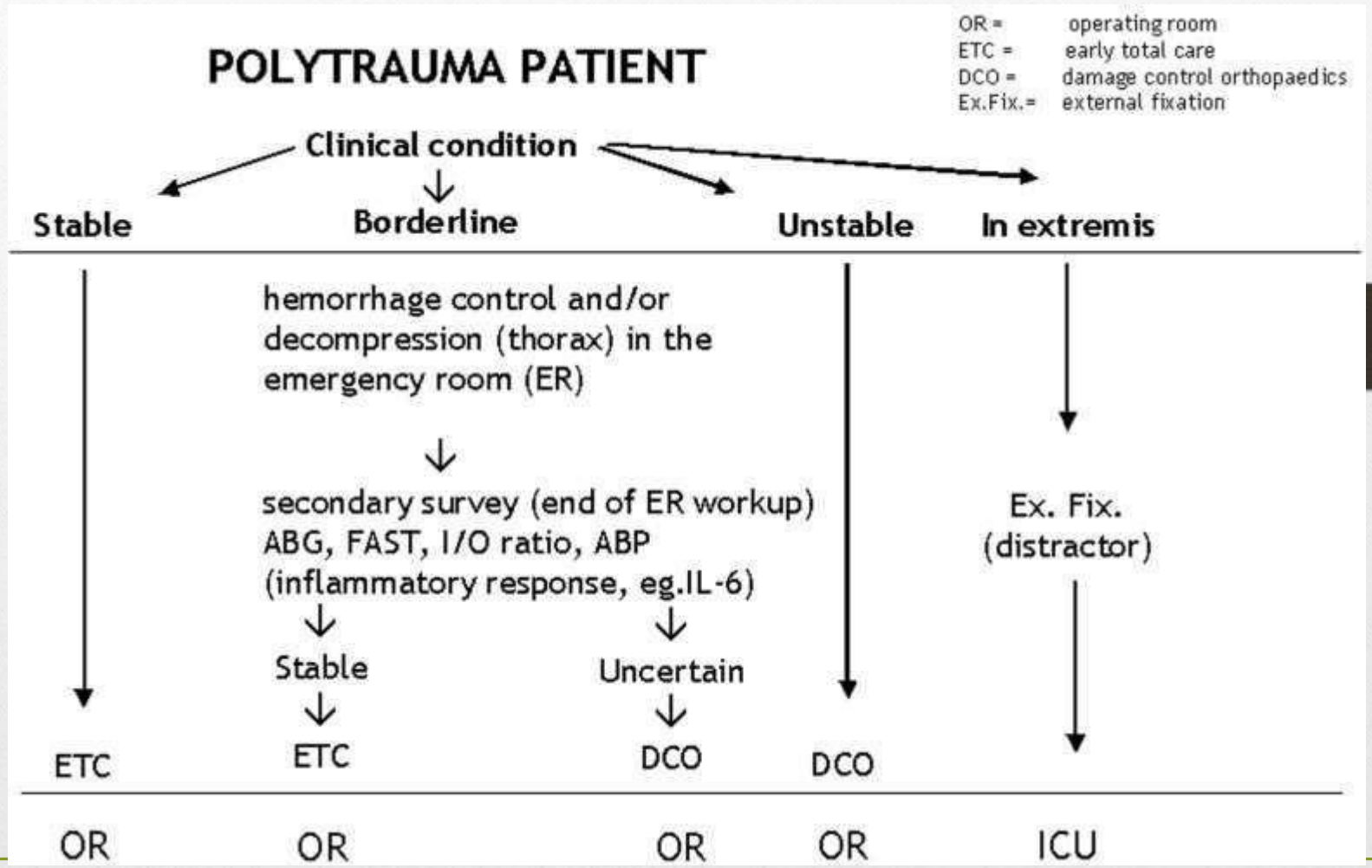
DAMAGE CONTROL ORTHOPAEDICS

Decrease the chance of a second hit

EARLY TOTAL CARE

Stabilize fractures and bleeding prior to the 24-72 hour high-risk period.

Orthopaedic management



Orthopaedic management

Indications for Early Total Care

- Stable hemodynamics
- No need for vasoactive/inotropic stimulation
- No hypoxemia, no hypercapnia
- Lactate <2 mmol/L
- Normal coagulation
- Normothermia
- Urinary output >1 mL/kg/h

Orthopaedic management

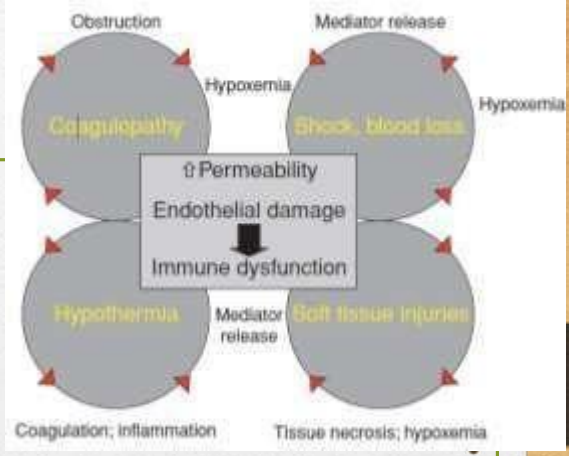
Indications for "Damage Control" Surgery

1. Physiologic criteria

- Blunt trauma: hypothermia, coagulopathy, shock/blood loss, soft tissue injury = Four vicious cycles
- Penetrating trauma: hypothermia, coagulopathy, acidosis = "Lethal Triad"

2. Complex pattern of severe injuries—expecting major blood

loss and a prolonged reconstructive procedure in a physiologically unstable patient



DAMAGE CONTROL ORTHOPAEDICS

Definition of Damage Control Orthopaedics

- Approach to treating polytrauma patients with the goal of minimizing the impact of the “second hit”

Definition of Damage Control Orthopaedics

- Initial priorities→
  - Hemorrhage control
  - Soft tissue management
  - Provisional fracture stabilization
- Definitive treatment delayed until physiology improved

Damage Control 0rthopedics

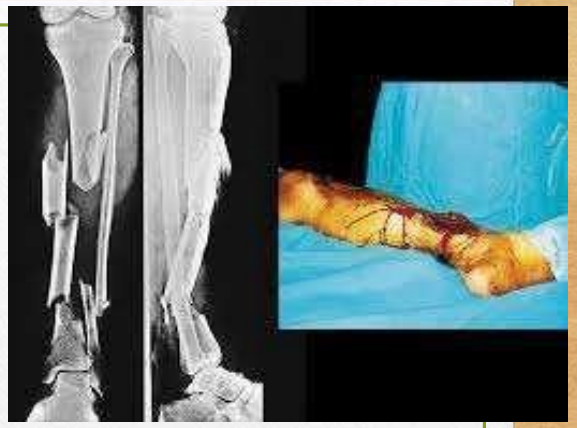
Definition

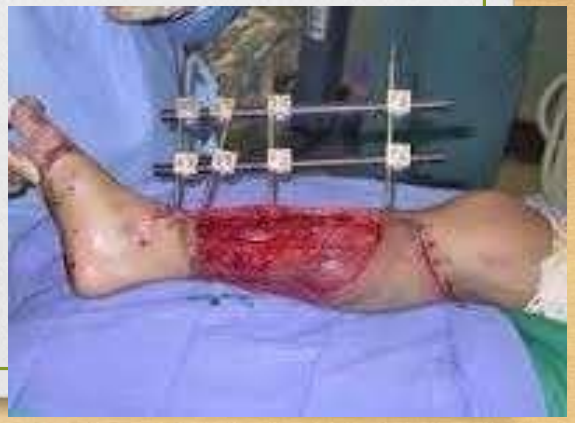
An approach that

1- Contains & Stabilizes Orthopaedic Injuries so that the Patient's Overall Physiology can improve

2- Avoid worsening of the patient's condition by a major Orthopaedic Procedure

3- Delay Definitive Fracture Repair in borderline or unstable patient till condition is optimized





Damage control orthopedics (DCO)

Early rapid fracture stabilization by external fixation
Avoiding prolonged operative times
Preventing the onset of the
lethal triad (Coagulopathy, Acidosis & Hypothermia)

Definitive open reduction & internal fixation is delayed until the inflammatory response and tissue edema have decreased and the patient is in a stable clinical condition

Applied in polytrauma patients with pelvic and long bones fractures to avoid the "second hit" of an extensive definitive procedure and minimize initial morbidity – mortality

DCO – A CURRENT CONCEPT

STOP ONGOING DAMAGE

RELEASE COMPARTMENTS
REDUCE DISLOCATIONS
DEBRIDE OPEN WOUNDS
STABILIZE LONG BONES/ PELVIS

STABILIZE LONG BONES

INITIAL EARLY EXTERNAL FIXATION

STABILIZE PHYSIOLOGY

DEFINITIVE STABILIZATION

STAGED INTRAMEDULLARY FIXATION
MINIMAL INVASIVE PLATE OSTEOSYNTHESIS

CONTROL HAEMORRHAGE
FLUID RESUSCITATION
CXR – ICD IF NECESSARY
LATERAL CERVICAL SPINE X RAY
X RAY PELVIS AP
FAST/ DPL

RE EVALUATE
MONITOR
BP, URINE OUTPUT
ABG
REPEAT FAST
IL-6

Do not kill your Borderline patient by (ETC)

Help him to live by (DCO)

Give him the chance to fight another day

References

- Advanced Trauma Life Support Student Course Manual. 9th Edition. American College of Surgeons
- Nural MS, Yardan T, Guven H, et al. Diagnostic value of ultrasound in the evaluation of blunt abdominal trauma. *Diagn Interv Radiol.* 2005;11:41-44.
- Chan RN, Ainscow D, Sikorski JM. Diagnostic failures in the multiple injured. *JTrauma.* 1980;20:684-687.
- Biffl WL, Harrington DT, Cioffi WG. Implementation of a tertiary survey decreases missed injuries. *JTrauma.* 2003;54:38-43.
- Kobbe P, Micansky F, Lichte P et al. Increased morbidity and mortality after bilateral femoral shaft fractures: myth or reality in the era of damage control? *Injury.* 2013;44:221-225.
- Cannada LK, Taghizadeh S, Murali J, et al. Retrograde intramedullary nailing in treatment of bilateral femur fractures. *JOrthop Trauma.* 2008;22:530-534.
- Lane MK, Nahm NJ, Vallier HA. Morbidity and mortality of bilateral femur fractures. *Orthopedics.* 2015;38:588-592.
- Manson T, O'Toole RV, Whitney A, et al. Young-Burgess classification of pelvic ring fractures: does it predict mortality, transfusion requirements, and non-orthopaedic injuries? *J Orthop Trauma.* 2010;24:603-609
- Weinlein, J. Fractures and Dislocations in Adults: Hip. In S. Canale & James H. Beaty (Eds.), *Campbell's Operative Orthopaedics*, 12th Edition. 2013.
- Lack WD, Karunakar MA, Angerame MR, et al. Type III open tibia fractures: immediate antibiotic prophylaxis minimizes infection. *JOrthop Trauma.* 2015;29:1-6.
- Bosse MJ, Kellam JF. Damage Control Orthopaedic Surgery: A Strategy for the Orthopaedic Care of the Critically Injured Patient. In Browner BD, Jupiter JB, Levine AM et al. (Eds.), *Skeletal Trauma,* 4th Edition. 2009.
- Pape HC, Giannnoudis PV. Management of the Multiply Injured Patient. In Court-Brown C, Heckman JD, McQueen MM, et al (Eds.), *Rockwood and Green's Fractures in Adults*, 8th Edition. 2015.
- Bone LB, Johnson KD, Weigelt J, et al. Early versus delayed stabilization of femoral fractures. A prospective randomized study. *JBone Joint Surg Am.* 1989;71:336-340.
- Pape HC, Aufm'Kolk M, Paffrath T, et al. *JTrauma.* 1993;34:540-547.
- Pape HC, Hildebrand F, Pertschy S, et al. Changes in the management of femoral shaft fractures in polytrauma patients: from early total care to damage control orthopedic surgery. *J Trauma*;200253:452-462.
- Sears BW, Stover MD, Callaci J. *JAm Acad Orthop Surg.* 2009; 17:255-265.

References (cont.)

- Morshed S, Miclau T, Bembom O, et al. *JBone Joint Surg Am*. 2009;91:3-13.
- Pape HC, Rixen D, Husebye EE, et al. *Ann Surg*. 2007;246:491-499.
- Weinlein JC, Deaderick S, Murphy, R. Morbid obesity increases risk for systemic complications in patients with femur fractures. *JOrthop Trauma*. 2015;29:91-95.
- Canadian Orthopaedic Trauma Society. Reamed versus unreamed intramedullary nailing of the femur: comparison of the rate of ARDS in multiple injured patients. *JTrauma*. 2006;20:384-387.
- Crowl AC, Young JS, Kahler DM, et al. Occult hypoperfusion is associated with increased morbidity in patients undergoing early femur fracture fixation. *J Trauma*. 2000;48:260-267.
- Morshed A, Corrales LA, Lin K, et al. Femoral nailing during serum bicarbonate-defined hypo-perfusion predicts pulmonary organ dysfunction in multi-system trauma patients. *Injury*. 2011;42:643-649.
- Vallier HA, Wang X, Moore TA et al. Timing of orthopaedic surgery in multiple trauma patients: development of a protocol for early appropriate care. *JOrthop Trauma*. 2013; 27:543- 551.
- Nahm NJ, Moore TA, Vallier HA. Use of two grading systems in determining risks associated with timing of fracture fixation. *JTrauma Acute Care Surg*. 2014; 77:268-279 Vallier
- HA, Moore TA, et al. Complications are reduced with a protocol to standardize timing of fixation based on response to resuscitation. *JOrthop Surg Res*. 2015;10:155.
- O'Toole RV, O'Brien M, Scalea T, et al. Resuscitation before stabilization of femoral fractures limits acute respiratory distress syndrome in patients with multiple traumatic injuries despite low use of damage control orthopedics. *JTrauma*. 2009;67:1013-1021.
- Scannell BP, Waldrop NE, Sasser HC, et al. Skeletal traction versus external fixation in the initial temporization of femoral shaft fractures in severely injured patients. *JTrauma*. 2010;68:633-640.
- Pape HC, van Griensven M, Rice J, et al. Major secondary surgery in blunt trauma patients and perioperative cytokine liberation: determination of the clinical relevance of biochemical markers. *JTrauma*. 2001;50:989-1000.
- Harwood JH, Giannoudis PV, van Griensven M, et al. Alterations in the systemic inflammatory response after early total care and damage control procedures for femoral shaft fracture in severely injured patients. *JTrauma*. 2005;58:446-454.

VELAMMAL MEDICAL COLLEGE
HOSPITAL AND RESEARCH INSTITUTE
MADURAI - 625009

Department of Orthopaedics

Report

Topic : Certificate course on Management Of Poly Trauma Patient

Date : 19.10.2021

Venue : Ortho OPD Demo Hall, VMCH & RI

Target Audience : Pre-Final year students

Number of participants: 25

A certificate course on Management of Poly Trauma Patient was organised by the Department of Orthopaedics to Pre-Final year students on 19.10.2021. 25 Pre-Final year students participated in the course. The program began by 08.30 am with pretest followed by Introduction, Assessment, Critical decision, Primary , Secondar survey, Conservative / surgical intervention & Complications. The program concluded with a vote of thanks. Pretest and posttest were conducted to sensitize the students with topic content and grade their knowledge gain of the course.

Outcome:

Students learnt about the concepts of Management of Poly Trauma Patient. The Gained Idea About Management of Poly Trauma Patient.

Prof. T. THIRUNAVUKKARASU, M.D.,D.A.,
Dean
Velammal Medical College Hospital
and Research Institute
"Velammal Village"
Madurai-Tuticorin Ring Road
Anuppanadi, Madurai-625 009, T.N.

VELAMMAL MEDICAL COLLEGE
HOSPITAL & RESEARCH INSTITUTE

DEPARTMENT OF RADIODIAGNOSIS

CHEST IMAGING IN COVID PATIENTS

CERTIFICATE COURSE

DEAN APPROVAL LETTER

07.10.2021
Madurai

From

Dr. M. Mariappan
Professor & Head Of the Department
Department of Radiodiagnosis
VMCH & RI

To

The Dean
VMCH & RI

Respected Sir

Sub: Permission to conduct Certificate Course

We are planning to conduct **Certificate Course – Chest imaging in COVID patients** on 08.10.2021 from 10.00 am to 12.00 pm for Radiology post graduates and 2nd & 3rd year Bsc Radiology & Imaging Technology students. We kindly request you to grant permission to conduct this programme.

Thanking you.

Yours Sincerely

Dr. M. Mariappan
Professor & HOD
Department of Radiodiagnosis

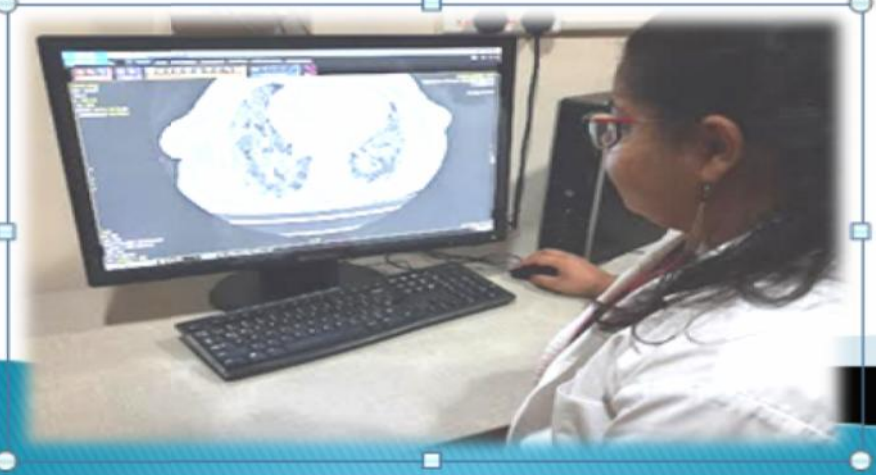
BROCHURE

VELAMMAL MEDICAL COLLEGE HOSPITAL & RESEARCH INSTIUTE

CHEST IMAGING IN COVID PATIENTS

CERTIFICATE COURSE

Department of Radiodiagnosis



Date: 08.10.2021
Time: 10 am - 12 pm

Radiology Post Graduates
Bsc Radiology & Imaging Technology Students

ENROLEMENT LIST & ATTENDANCE

CERTIFICATE COURSE – CHEST IMAGING IN COVID PATIENTS

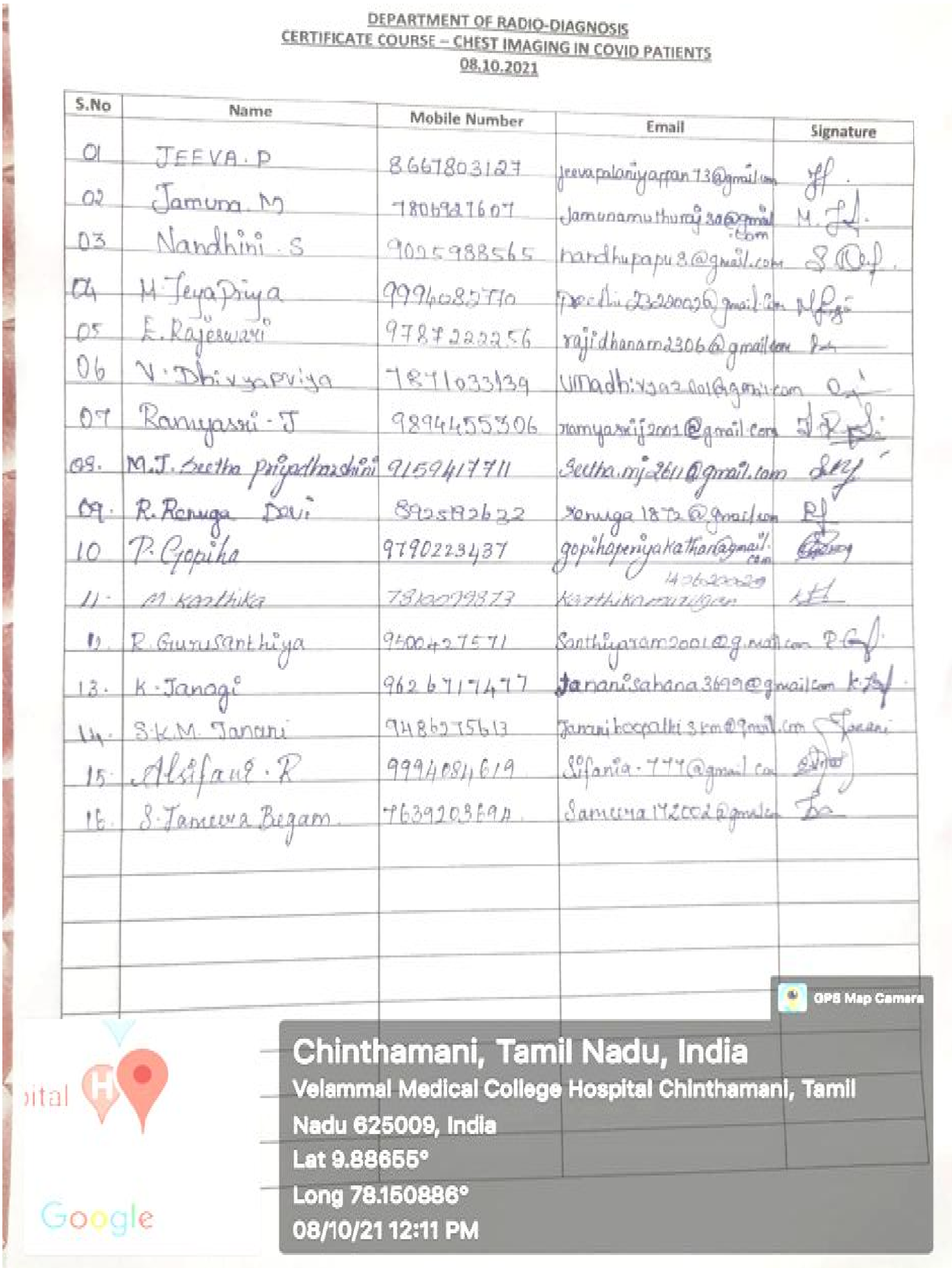
DEPARTMENT OF RADIODIAGNOSIS

08.10.2021 - 10.00 AM TO 12.00 PM

S.No	Name	Roll No	Course	Registered	Attended	Certificate Issued
1	Dr. KAUTHAM		Radiology PG	Yes	Yes	Yes
2	Dr. SARAH		Radiology PG	Yes	Yes	Yes
3	Dr. KIRUTHIKA		Radiology PG	Yes	Yes	Yes
4	PRADEEPA M		Bsc Radiology & Imaging Technology	Yes	Yes	Yes
5	DIVYA BHARATHI M		Bsc Radiology & Imaging Technology	Yes	Yes	Yes
6	SUBEGA MERLIN M		Bsc Radiology & Imaging Technology	Yes	Yes	Yes
7	YUVASRI R		Bsc Radiology & Imaging Technology	Yes	Yes	Yes
8	SURYA A		Bsc Radiology & Imaging Technology	Yes	Yes	Yes
9	NISHA		Bsc Radiology & Imaging Technology	Yes	Yes	Yes
10	BHUVANESWARI S		Bsc Radiology & Imaging Technology	Yes	Yes	Yes
11	AISHWARYA M		Bsc Radiology & Imaging Technology	Yes	Yes	Yes
12	SHALINI P		Bsc Radiology & Imaging Technology	Yes	Yes	Yes
13	SIVASANKARI P		Bsc Radiology & Imaging Technology	Yes	Yes	Yes
14	KARTHICA REESHA D		Bsc Radiology & Imaging Technology	Yes	Yes	Yes
15	ALSIFANI R		Bsc Radiology & Imaging Technology	Yes	Yes	Yes
16	DHIVYA PRIYA V		Bsc Radiology & Imaging Technology	Yes	Yes	Yes
17	GOPIHA		Bsc Radiology & Imaging Technology	Yes	Yes	Yes
18	GURUSANTHIYA R		Bsc Radiology & Imaging Technology	Yes	Yes	Yes
19	JAMEERA BEGAM S		Bsc Radiology & Imaging Technology	Yes	Yes	Yes
20	JAMUNA M		Bsc Radiology & Imaging Technology	Yes	Yes	Yes
21	JANAKI K		Bsc Radiology & Imaging Technology	Yes	Yes	Yes
22	JANANI SKM		Bsc Radiology & Imaging Technology	Yes	Yes	Yes
23	JEEVA P		Bsc Radiology & Imaging Technology	Yes	Yes	Yes
24	JEYA PRIYA M		Bsc Radiology & Imaging Technology	Yes	Yes	Yes

25	KARTHIKA M		Bsc Radiology & Imaging Technology	Yes	Yes	Yes
26	NANDHINI S		Bsc Radiology & Imaging Technology	Yes	Yes	Yes
27	RAJESWARI E		Bsc Radiology & Imaging Technology	Yes	Yes	Yes
28	RAMYA SRI J		Bsc Radiology & Imaging Technology	Yes	Yes	Yes
29	RENUGA DEVI R		Bsc Radiology & Imaging Technology	Yes	Yes	Yes
30	SEETHA PRIYADHARSHINI MJ		Bsc Radiology & Imaging Technology	Yes	Yes	Yes

ATTENDANCE



DEPARTMENT OF RADIO-DIAGNOSIS
CERTIFICATE COURSE – CHEST IMAGING IN COVID PATIENTS
08.10.2021

S.No	Name	Mobile Number	Email	Signature
01	JEEVA. P	8667803127	jeevapalaniyappan73@gmail.com	
02	Jamuna. M	7806927607	Jamunamuthuraj30@gmail.com	
03	Nandhini. S	9025988565	nandhupapu8@gmail.com	
04	M. JeyaPriya	9994085770	[illegible]@gmail.com	
05	E. Rajeswari	9787222256	rajidhanam2306@gmail.com	
06	V. Dhivyapriya	7871033139	vmadhivya2001@gmail.com	
07	Ramyasri. J	9894455306	ramyasrij2001@gmail.com	
08.	M.J. Seetha priyadharshini	9159417711	Seetha.mj2611@gmail.com	
09.	R. Renuga Devi	8925892622	renuga1872@gmail.com	
10	P. Gopika	9790223437	gopikaperiyakathan@gmail.com	
11.	M. karthika	7810099873	karthikamurugan14062002@[illegible]	
12.	R. GuruSanthiya	9500427571	Santhiyaram2001@gmail.com	
13.	K. Janagi	9626717477	Jananisahana3699@gmail.com	
14.	S.K.M. Janani	9486975613	Jananikoppalki3km@gmail.com	
15.	Alsifana. R	9994084619	Sifania.777@gmail.com	
16.	S. Sameera Begam.	7639203694	Sameera142002@gmail.com	

DEPARTMENT OF RADIO-DIAGNOSIS

CERTIFICATE COURSE – CHEST IMAGING IN COVID PATIENTS

08.10.2021

S.No	Name	Mobile Number	Email	Signature
01	M. AISHWARYA	9095990999	dazzling762@gmail.com	[signature]
02	S. Bhuvaneswari	9679559819	wariss bhuvanes 4@gmail.com	Bhuvaneswari
03	M. Divya Bharathi	7868000135	divyabharathi 1112 2002@gmail.com	M. Divya
04	D. KARTHICA REESHA	7010757528	Karthica reesha dharmaling-am@gmail.com	D. Reesh
05	P. NISHA	7708076685	nishapj2000@gmail.com	P. Nisha
06	M. Pradeepa	7604859893	pradeepamurugesan 5530@gmail.com	M. Pdeepa
07	P. Shalini	9361634125	shalinios pgs@gmail.com	shalini. P
08	P. siva sankari	7708527421	parthasarathy sandhya 2001@gmail.com	P. siva sankari
09	M. Subiya Martin	9790537978	subiyamartin@gmail.com	M. Martin
10	A. Surya	9500926020	asuryaalex1234@gmail.com	[signature]
11	R. Yuvasri	7339426512	yuvaravisri@gmail.com	R. Yuvasri

GPS Map Camera

Chinthamani, Tamil Nadu, India
Velammal Medical College Hospital Chinthamani, Tamil Nadu 625009, India
Lat 9.88655°
Long 78.150886°
08/10/21 12:10 PM

POWER POINT PRESENTATION

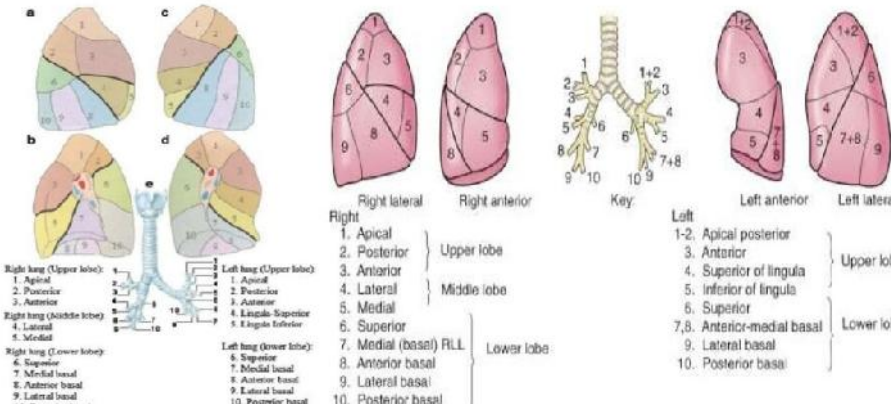
ROLE OF IMAGING IN COVID-19

Dr NITIN WADHWANI MD ,DNB, FRCR
HOD& PROFESSOR OF RADIODIAGNOSIS
D. Y. PATIL COLLEGE, HOSPITAL AND RESEARCH INSTITUTE,
KADAMWADI, KOLHAPUR

Introduction :

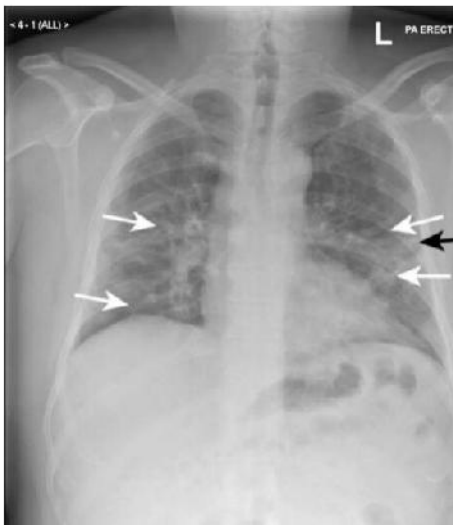
- Covid-19 is likely to remain an important differential diagnosis for the foreseeable future in anyone presenting to hospital with a flu-like illness, lymphopenia on full blood count, and/or a change in normal sense of smell (anosmia) or taste.
- Most people with COVID-19 , do not develop pneumonia , and thus have a normal chest radiograph.
- There is no DIAGNOSTIC feature of COVID-19 on imaging , this has to be correlated clinically to help interpret the imaging.

BRONCHOPULMONARY SEGMENTS

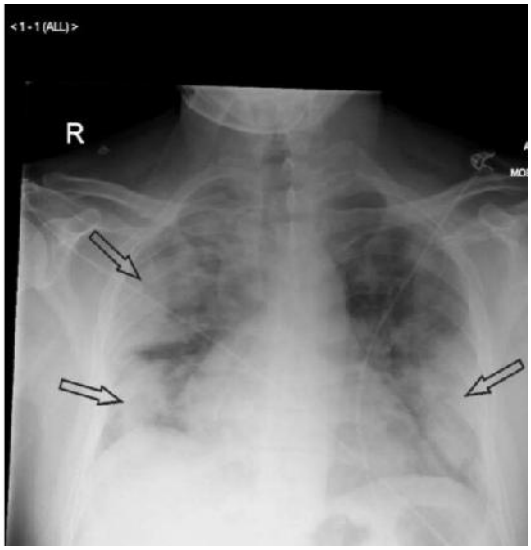


CHEST X-RAY

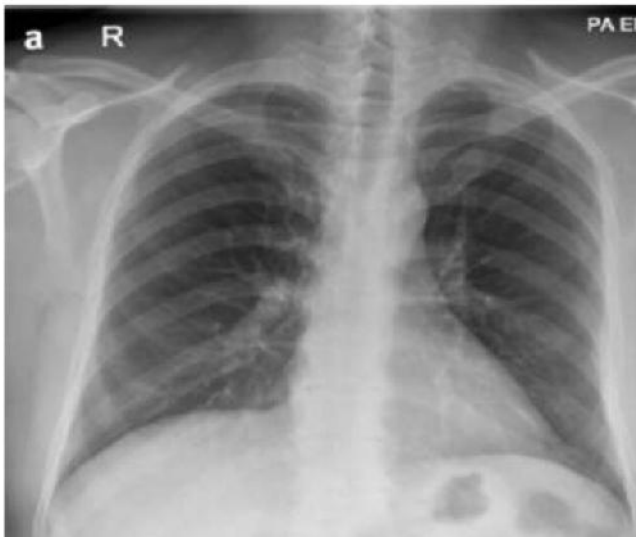
- It is NOT sensitive in early cases and changes , if seen are suttle
- Any changes suggestive for COVID-19 , should be confirmed through CT imaging
- More useful to follow up evaluation and more so if serial chest radiographs are available.



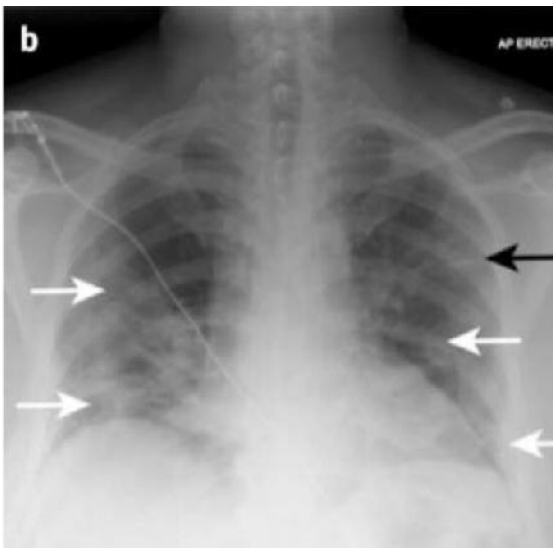
- Changes include ground glass (68.5%), coarse horizontal linear opacities, and consolidation.These are more likely to be peripheral and in the lower zones, but the whole lung can be involved.
- Bilateral involvement is more common (72.9%) , but it can be unilateral.
- nodules, pneumothorax, or pleural effusion (1-3%) might be incidental, caused by covid-19 or by comorbidities



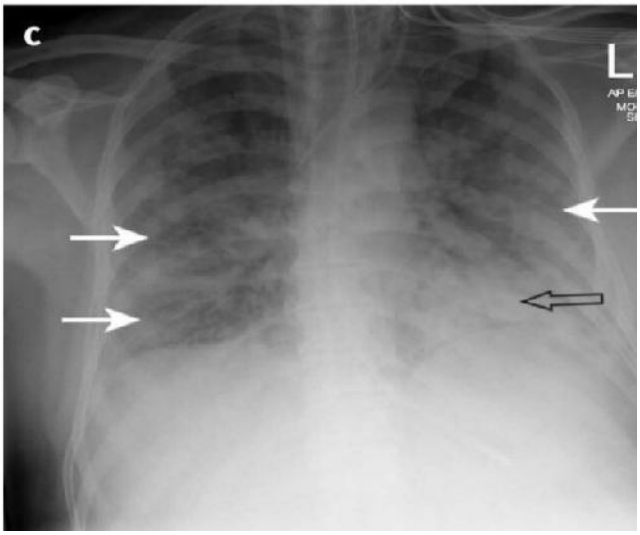
➢**Old CXR**

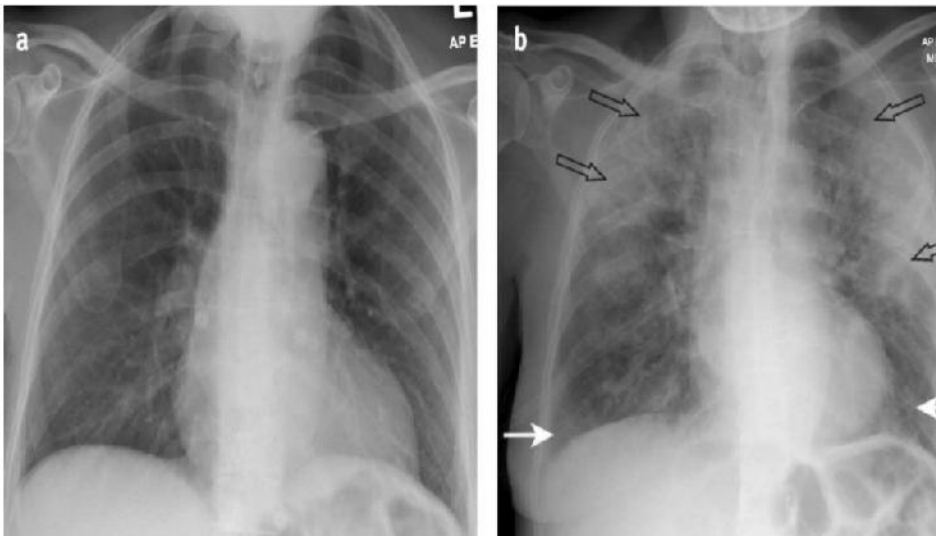


CXR- DAY 0



- DAY 10





D/D for CXR changes

- Other atypical pneumonias and the early stages of community acquired pneumonias
- Pulmonary aspiration
- Pulmonary oedema
- Lung cancer
- Inflammatory lung disease, such as pulmonary eosinophilia
- Vasculities, eg Wegener's (granulomatosis with polyangiitis)
- Haemorrhage

IMAGING FEATURES ON CT

- B/L peripheral dependent , Basal GGO's are suggestive of CoV-19 ,especially early in the disease
- Consolidations are seen later in the disease , rarely without GGO's
- Crazy paving & reverse halo(atoll) sign
- rounded appearance of opacities in some cases

The features NOT seen with early cases:

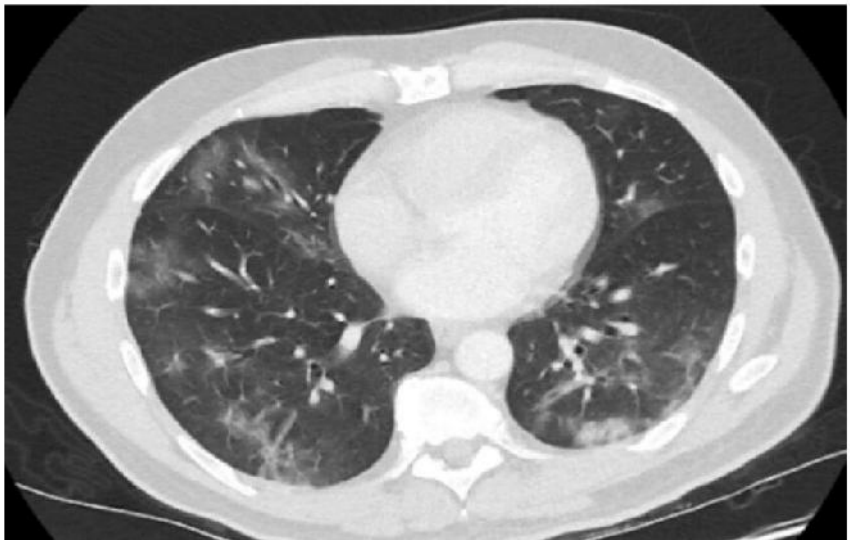
- Pleural effusion
- Lymphadenopathy
- Cavitation
- Discrete nodules
- Lobar consolidation
- Tree in bud opacities

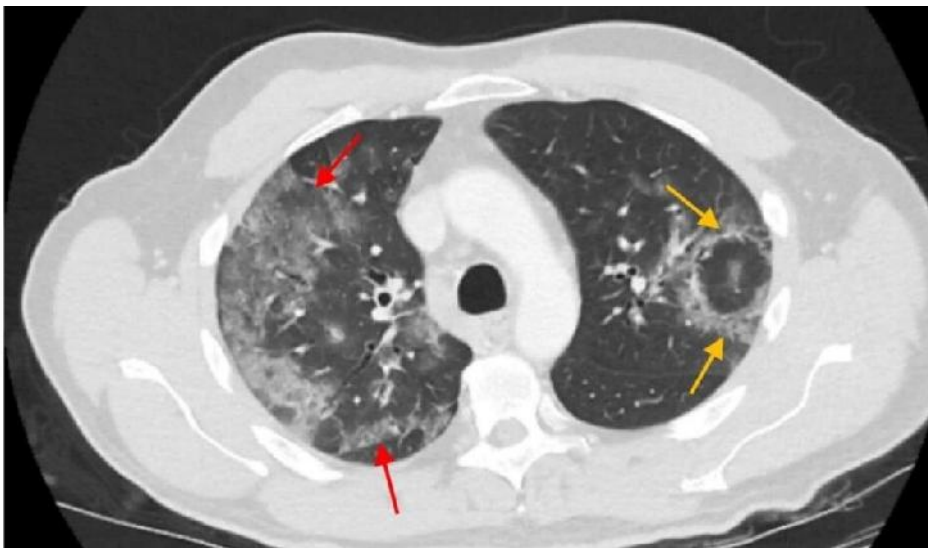
Obligatory features

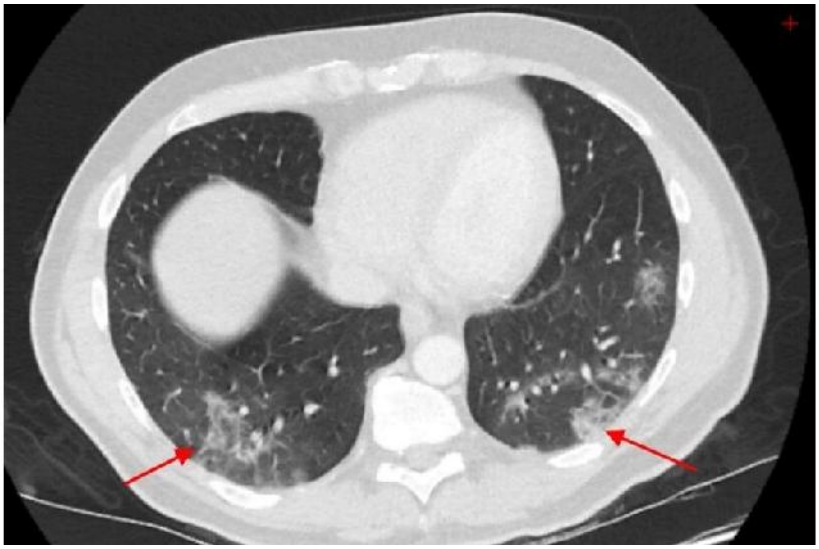
- Ground-glass opacities, with or without consolidations, in lung regions close to visceral pleural surfaces, including the fissures (subpleural sparing is allowed)
- Multi focal , bilateral involvement

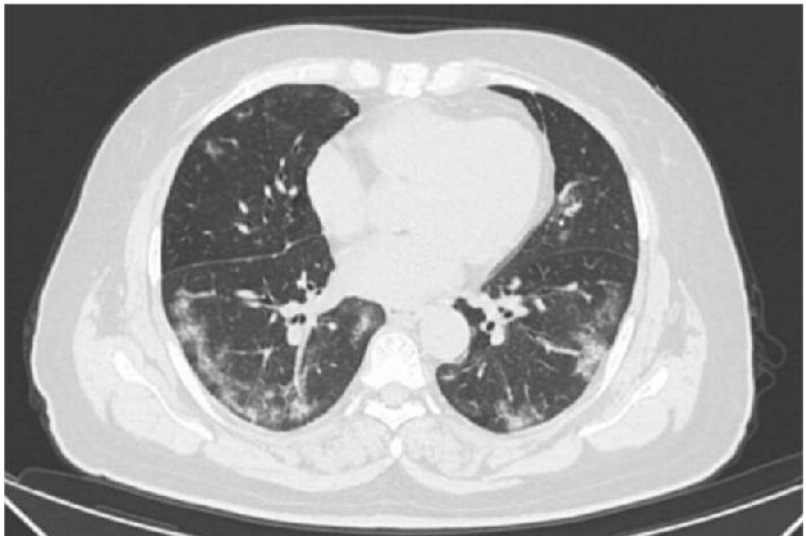
Confirmatory patterns:

- Ground-glass regions
  - Unsharp demarcation, (half) rounded shape.
  - Sharp demarcation, outlining the shape of multiple adjacent secondary.
  - Pulmonary lobules.
- Crazy paving.
- Patterns compatible with organizing pneumonia.
- Thickened vessels within parenchymal abnormalities found in all confirmatory patterns.









Temporal distribution of CT findings in patients with COVID pneumonia:

Timeline	Duration	Predominant finding
Early	0-2 days	Normal CT chest
Intermediate	3-5 days	Ground-glass opacities Consolidations Peripheral distribution of disease
Late	>6 days	Linear opacities

CDC'S , American College of Radiology , Society of thoracic Radiology , American society of emergency radiology , RANZR , British Society of thoracic Imaging , DO NOT recommend CT as a diagnostic modality for CoV-19

Recommendations for Imaging for COVID-19 (SARS-CoV-2 pneumonia) by the Fleishner Society

Main Recommendations

Imaging Recommended

- For patients with moderate to severe features of COVID-19 regardless of COVID-19 test results.
- For patients with COVID-19 and evidence of worsening respiratory status.
- In a resource-constrained environment where access to CT is limited, CXR may be preferred for patients with COVID-19 unless features of respiratory worsening

Imaging NOT routinely recommended

- As a screening test in asymptomatic individuals.
- Patients with mild features of COVID-19 unless they are at risk for disease progression.

Additional Recommendations

- Daily chest radiographs are NOT indicated in stable intubated patients with COVID-19
- CT is indicated in patients with functional impairment and/or hypoxemia after recovery from COVID-19.
- COVID-19 testing is indicated in patients incidentally found to have findings suggestive of COVID-19 on a CT scan

CORADS:

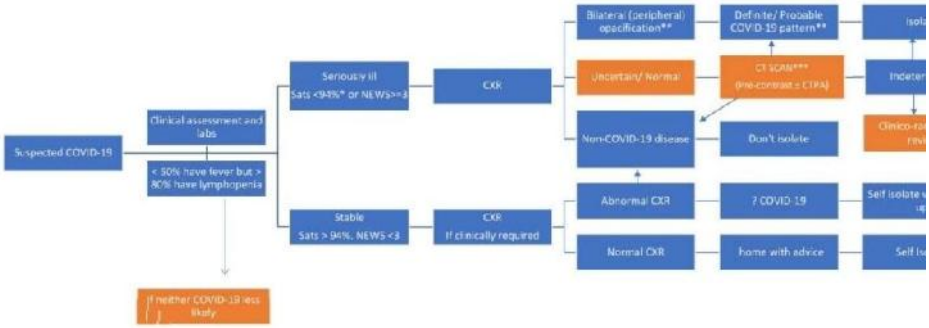
- The Dutch Radiological Society has developed this system for uniform and reproducable data systems for evaluation and studying the CoV-19

Category	Level Of suspicion for pulmonary involvement of COVID-19	Summary
CO-RADS 0	Not interpretable	Scan technically insufficient for assigning a score
CO-RADS 1	Very low	Normal or non-infectious
CO-RADS 2	Low	Typical for other infection but not COVID-19
CO-RADS 3	Equivocal / Unsure	Features compatible with COVID-19, but also other diseases
CO-RADS 4	High	Suspicious for COVID-19
CO-RADS 5	Very High	Typical for COVID-19
CO-RADS 6	Proven	RT-PCR positive for SARS-CoV-2

CT SEVERITY SCORE:

The CT-SS was defined by summing up individual scores from 20 lung regions; scores of 0, 1, and 2 were respectively assigned for each region if parenchymal opacification involved 0%, less than 50%, or equal to or more than 50% of each region (theoretic range of CT-SS from 0 to 40).

Radiology decision tool for suspected COVID-19

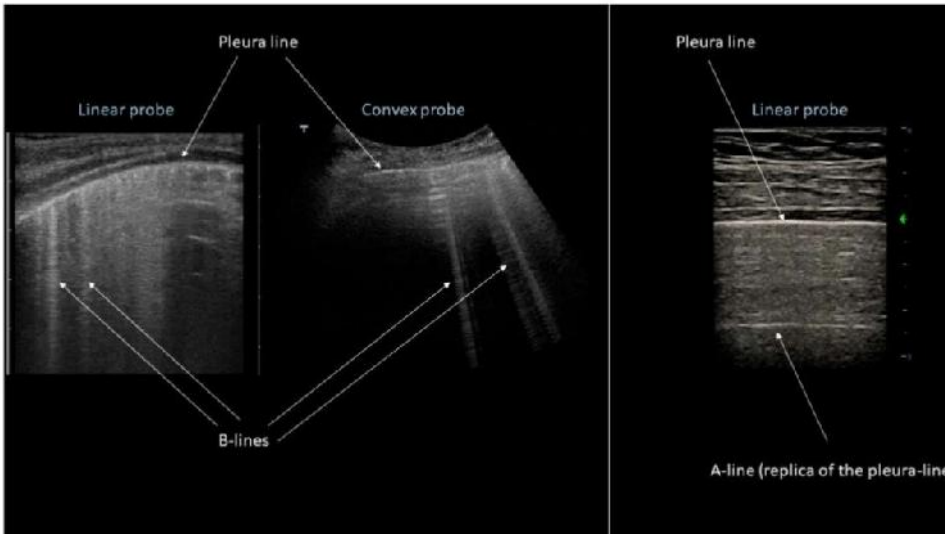


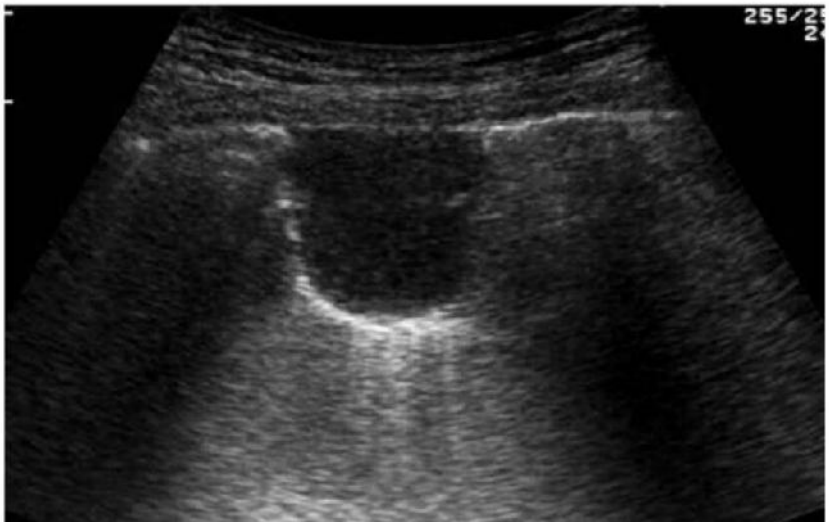
*94% unless known COPD in which case <90%
** Unsuspected/ unexpected cases may be incidentally discovered on CXR/ CT at this stage; should be reviewed in the context of clinical suspicion as to likelihood of COVID-19.
***Classic and indeterminate CTs should be scored either 'mild' or 'moderate/severe'

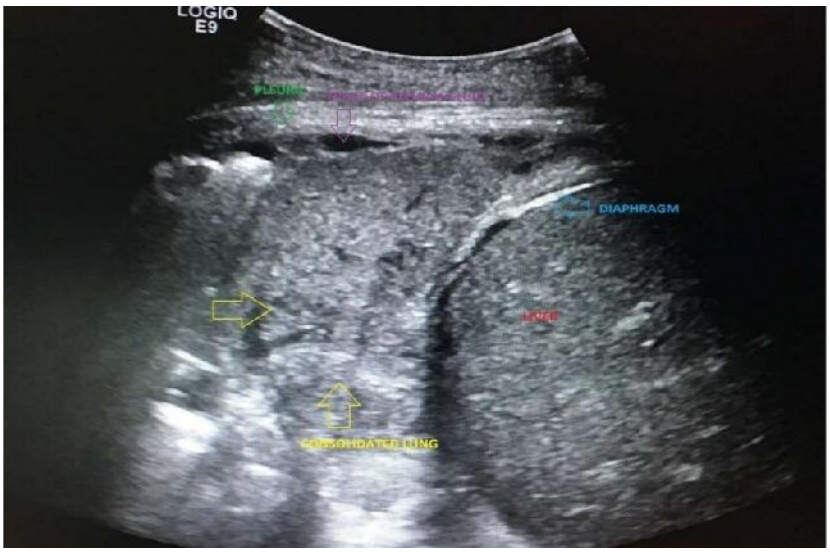
Ultrasound changes in CoV-19

- B Lines
- Sub pleural consolidations
- Consolidations with air bronchograms
- Thickened / irregular pleural lines
- Localized pleural effusions adjacent to consolidations

- >/= 3 B Lines per lung field is considered "POSITIVE zone"
- Pulmonary edema , contusions , ARDS , Pulm. Fibrosis , Radiation may all show B-Lines , hence it is not specific
- a peculiar aspect of Blines in CoV19 is shining band-form artifact spreading down from a large portion of a regular pleural line, often appearing and disappearing with an on–off effect in the context of a normal A-lines lung pattern visible on the background


Pleura line
Linear probe
Convex probe
B-lines
Pleura line
Linear probe
A-line (replica of the pleura-lin




LOGIQ
E9
PLEURA
DIAPHRAGM
LIVER
CONSOLIDATED LUNG

PHOTOS


GPS Map Camera
Chinthamani, Tamil Nadu, India
Velammal Medical College Hospital Chinthamani, Tamil Nadu 625009, India
Lat 9.88655°
Long 78.150886°
08/10/21 10:56 AM
Google


GPS Map Camera
Chinthamani, Tamil Nadu, India
Velammal Medical College Hospital Chinthamani, Tamil Nadu 625009, India
Lat 9.88655°
Long 78.150886°
08/10/21 10:56 AM
Google


GPS Map Camera
Chinthamani, Tamil Nadu, India
Velammal Medical College Hospital Chinthamani, Tamil Nadu 625009, India
Lat 9.88655°
Long 78.150886°
08/10/21 10:57 AM
Google


GPS Map Camera
Chinthamani, Tamil Nadu, India
Velammal Medical College Hospital Chinthamani, Tamil Nadu 625009, India
Lat 9.88655°
Long 78.150886°
08/10/21 10:57 AM
Google


GPS Map Camera
Chinthamani, Tamil Nadu, India
Velammal Medical College Hospital Chinthamani, Tamil Nadu 625009, India
Lat 9.88655°
Long 78.150886°
08/10/21 10:57 AM
Google


GPS Map Camera
Chinthamani, Tamil Nadu, India
Velammal Medical College Hospital Chinthamani, Tamil Nadu 625009, India
Lat 9.88655°
Long 78.150886°
08/10/21 10:58 AM
Google

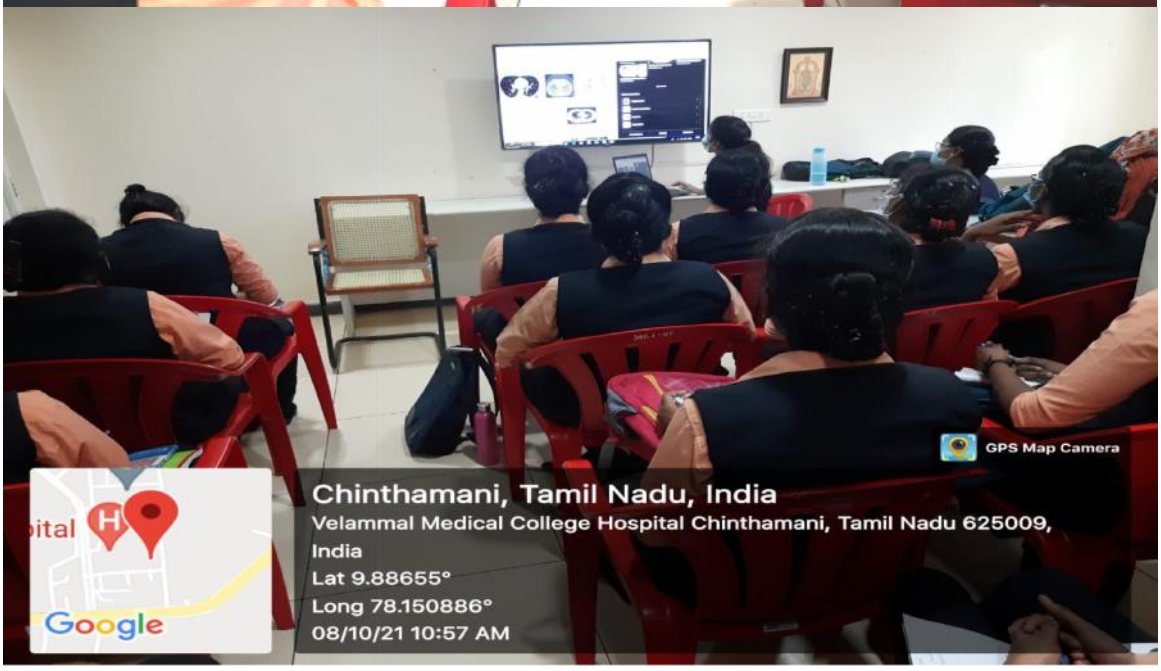

GPS Map Camera
Chinthamani, Tamil Nadu, India
Velammal Medical College Hospital Chinthamani, Tamil Nadu 625009, India
Lat 9.88655°
Long 78.150886°
08/10/21 10:58 AM
Google


GPS Map Camera
Chinthamani, Tamil Nadu, India
Velammal Medical College Hospital Chinthamani, Tamil Nadu 625009, India
Lat 9.88655°
Long 78.150886°
08/10/21 10:58 AM
Google

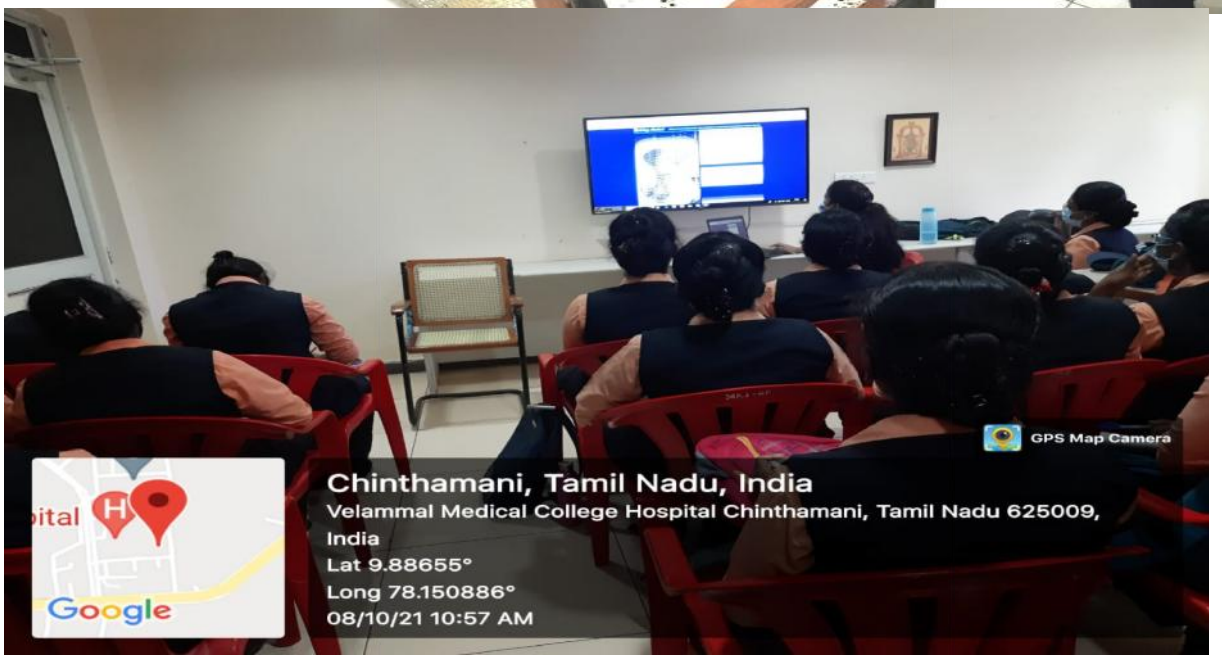

GPS Map Camera
Chinthamani, Tamil Nadu, India
Velammal Medical College Hospital Chinthamani, Tamil Nadu 625009, India
Lat 9.88655°
Long 78.150886°
08/10/21 10:58 AM
Google


GPS Map Camera
Chinthamani, Tamil Nadu, India
Velammal Medical College Hospital Chinthamani, Tamil Nadu 625009, India
Lat 9.88655°
Long 78.150886°
08/10/21 10:58 AM
Google


GPS Map Camera
Chinthamani, Tamil Nadu, India
Velammal Medical College Hospital Chinthamani, Tamil Nadu 625009, India
Lat 9.88655°
Long 78.150886°
08/10/21 10:58 AM
Google


GPS Map Camera
Chinthamani, Tamil Nadu, India
Velammal Medical College Hospital Chinthamani, Tamil Nadu 625009, India
Lat 9.88655°
Long 78.150886°
08/10/21 10:57 AM
Google


GPS Map Camera
Chinthamani, Tamil Nadu, India
Velammal Medical College Hospital Chinthamani, Tamil Nadu 625009, India
Lat 9.88655°
Long 78.150886°
08/10/21 10:56 AM
Google


GPS Map Camera
Chinthamani, Tamil Nadu, India
Velammal Medical College Hospital Chinthamani, Tamil Nadu 625009, India
Lat 9.88655°
Long 78.150886°
08/10/21 10:57 AM
Google

Velammal Medical College Hospital & Research Institute
Anuppanadi, Madurai-625009

CERTIFICATE COURSE ON "ADR REPORTING"

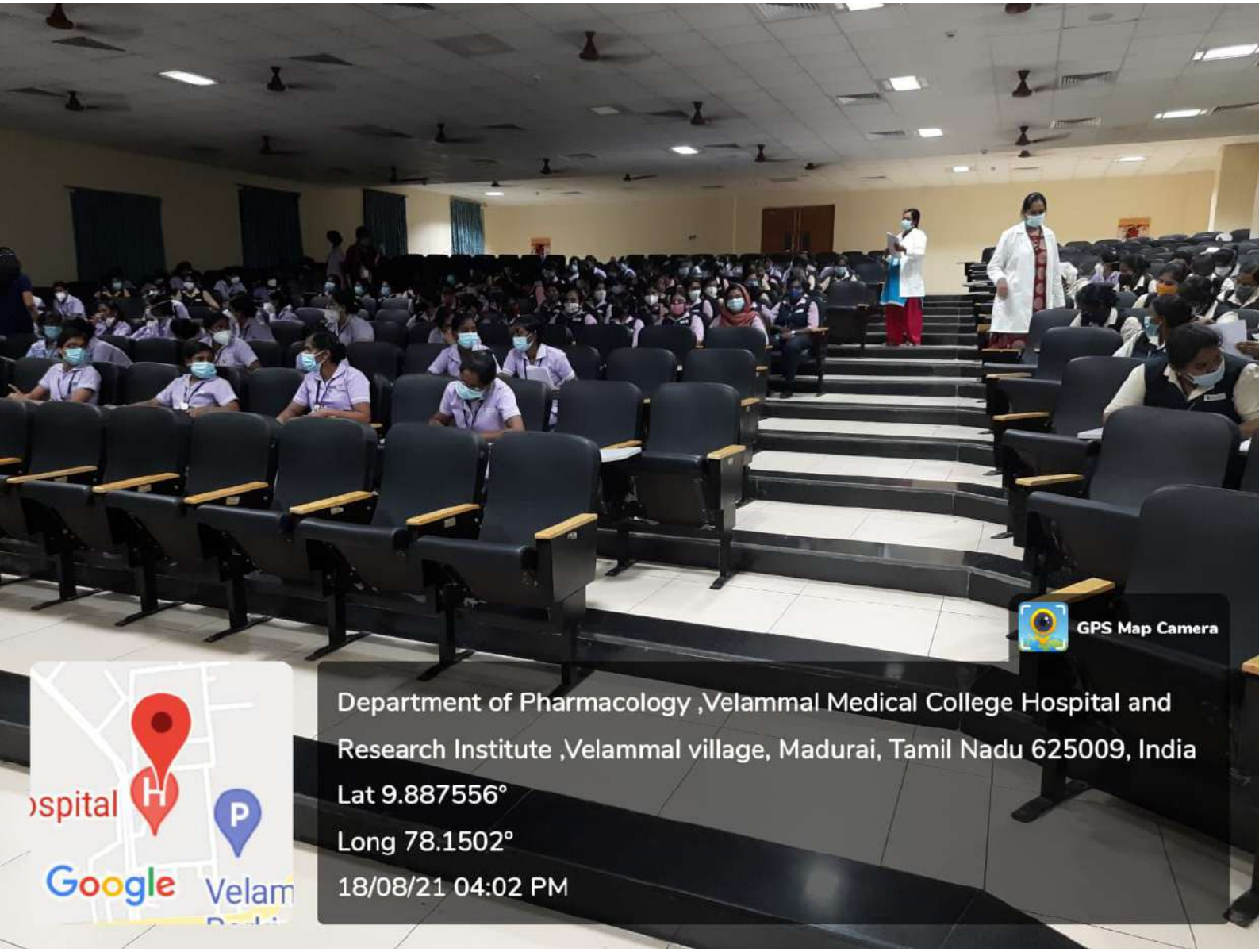
For AHS (Allied Health Sciences) students and Nursing staff

Organised by
Department of Pharmacology
VMCHRI, Madurai
Date: 18.08.2021; Time: 2 to 4 pm
Venue: Hospital auditorium

Agenda of the Programme (18.08.21)

2 to 2.15 pm	Registration & Attendance	
2.15 pm to 3 pm	Description of ADR monitoring	Dr. Raj Kishore Mahato Professor & Head, Department of Pharmacology VMCHRI, Madurai
3 pm to 3.30 pm	Hands on training to fill ADR forms	Dr. John Flamitha, PvPI Associate, VMCHRI
3.30 pm- 4.00 pm	Interaction & Discussion with students	


GPS Map Camera
Velamn
Google
Department of Pharmacology ,Velammal Medical College Hospital and Research Institute ,Velammal village, Madurai, Tamil Nadu 625009, India
Lat 9.887556°
Long 78.1502°
18/08/21 02:20 PM


GPS Map Camera
Department of Pharmacology ,Velammal Medical College Hospital and Research Institute ,Velammal village, Madurai, Tamil Nadu 625009, India
Lat 9.887556°
Long 78.1502°
18/08/21 04:02 PM
Google


GPS Map Camera
Department of Pharmacology ,Velammal Medical College Hospital and Research Institute ,Velammal village, Madurai, Tamil Nadu 625009, India
Lat 9.887556°
Long 78.1502°
18/08/21 04:05 PM
Google


VELAMMAL
GPS Map Camera
Velamn
Google
Department of Pharmacology ,Velammal Medical College Hospital and Research Institute ,Velammal village, Madurai, Tamil Nadu 625009, India
Lat 9.887556°
Long 78.1502°
18/08/21 03:06 PM

VELAMMAL MEDICAL COLLEGE
HOSPITAL AND RESEARCH INSTITUTE
MADURAI - 625009

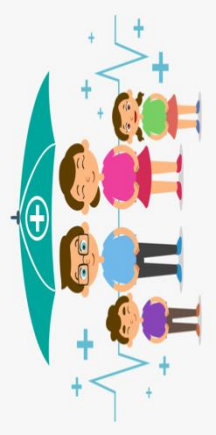
Department of Forensic Medicine

Presents

Certificate Course on

Insurance and its Medico Legal Implications

Date : 19/11/2021



Velammal medical college hospital & research institute velammal village Anuppanadi Madurai Tamilnadu 625009, India

2021-11-19(Fri) 02:17(PM)

Velammal medical college hospital & research institute velammal village Anuppanadi Madurai Tamilnadu 625009, India

2021-11-19(Fri) 02:20(PM)


VELAMMAL MEDICAL COLLEGE
HOSPITAL & RESEARCH INSTITUTE
Department of Forensic Medicine
Presents
Certificate Course on
Insurance and its Medico Legal Implications
Date : 19/11/2021