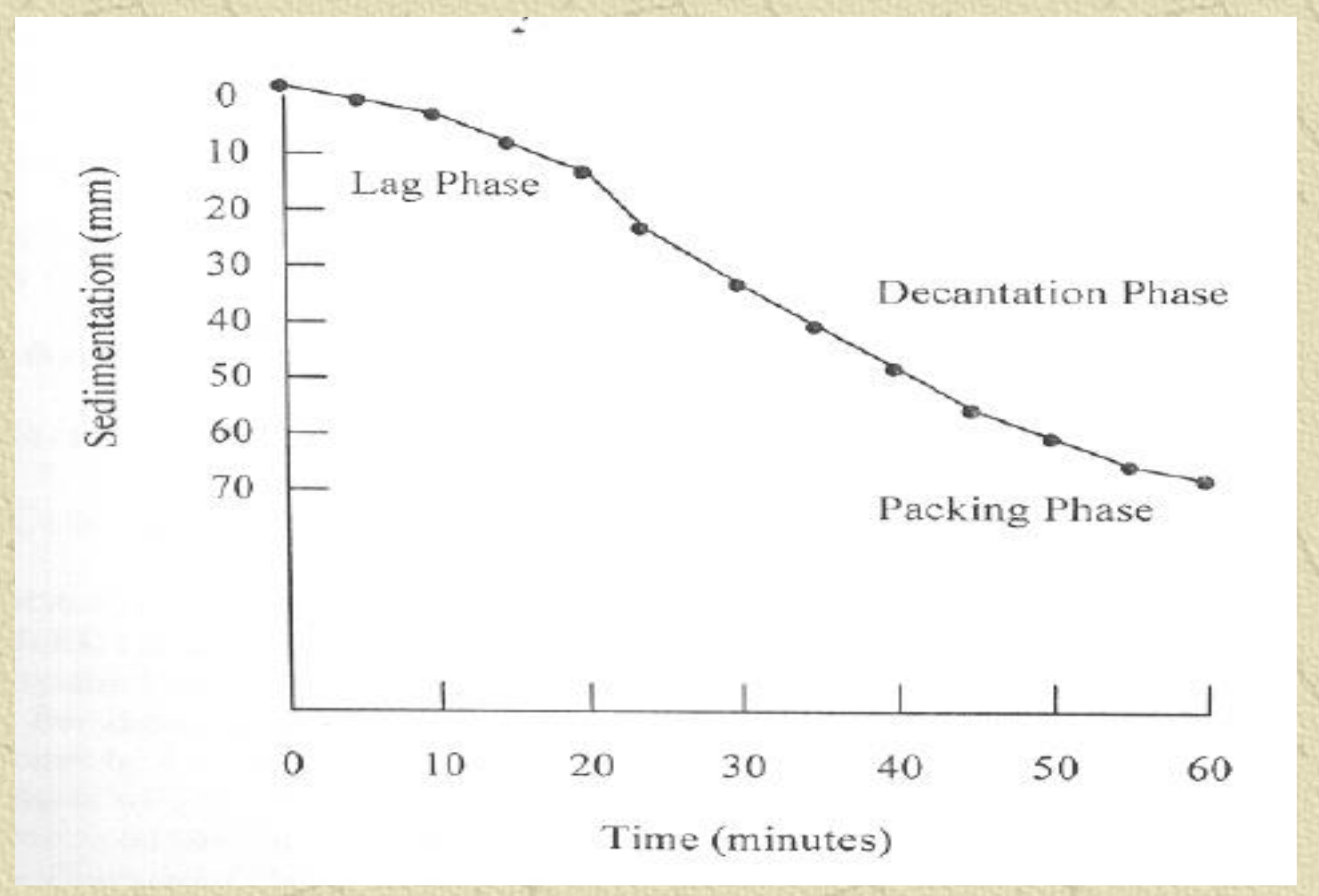
به نام هستی بخش یکتا

Definition

Erythrocyte Sedimentation Rate

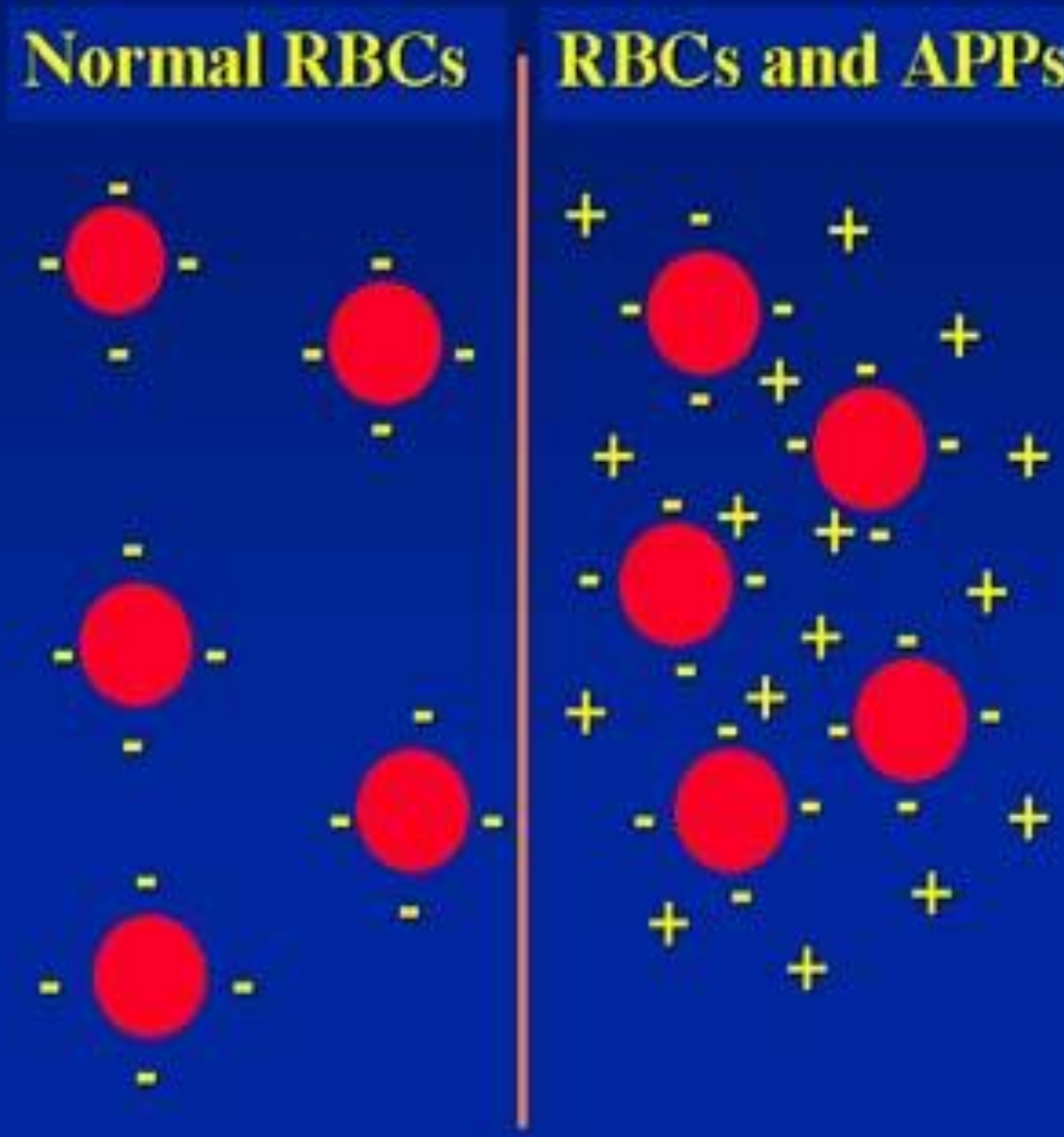
Principle


Sedimentation (mm)
0
10
20
30
40
50
60
70
Lag Phase
Decantation Phase
Packing Phase
0
10
20
30
40
50
60
Time (minutes)

Affected Factor

- **Plasma**
  - **Fibrinogen- Globulins-Albumin**
- **RBC**
  - **Macrocyte-Sickle-Aniso-spherocyte**

Erythrocyte Sedimentation Rate



Equipment

- **Pipette**
  - **Colorless**
  - **30cm**
  - **0-200mm**
  - **<2.55 mm**
  - **<5%**
  - **Clean & dry**
- **Pipette Rack**
  - **±2°**
  - **No leakage**

1. **Storage**
2. **Specimen preparation**
3. **Handling of pipette**
4. **Reading result**
5. **Reporting result**

Procedure - selected

1. Blood Collection

1. Vein less than 30 min
2. K2EDTA 1.4-2mg/ml
   K3EDTA 1.6-2.4
   Na2EDTA 1.4-2
3. Citrate 3.2%
   Normal salin 8.5 g/l

} 4 volume blood+1 volume

2. **Stability**

   4 hours at room temperature(18-25 °C)

   24 hours (4 °C)

ESR , 1 hour = x mm

3. **12**
4. **Pipette (no mouth)**
5. **60± 1 minute**

Reference value

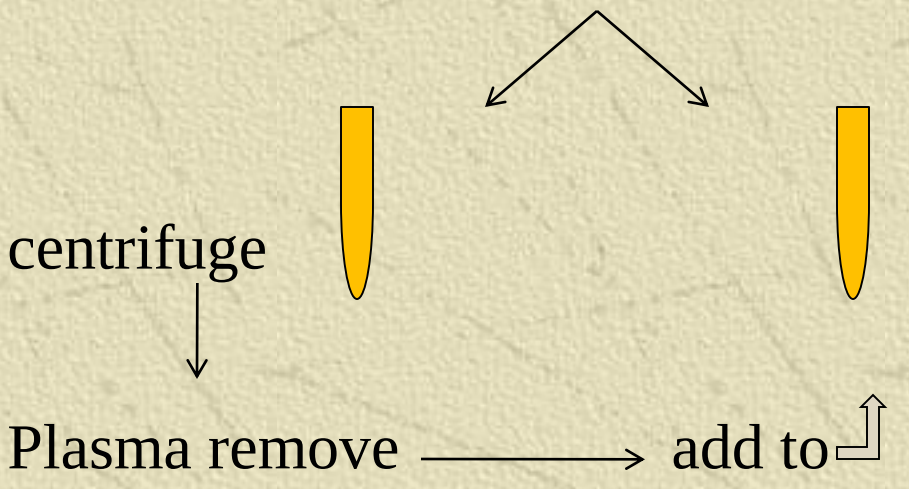
- **> 50 y**
  - **Men** **20**
  - **Women** **30**
- **< 50 y**
  - **Men** **15**
  - **Women** **20**
- **> 80 y**
  - **Men** **30**
  - **Women** **42**

Men=age/2

women=(age+10)/2

Reference method

- Better CV
- Adjust PCV<0.35
  - Sample is divided 2×3.5 ml



Volume of plasma

$$3.5 \times \left(\frac{PCV}{0.35}\right) - 3.5$$

ESR $_{ref}$ 1 hour = x mm

At last check PCV

Corrected ESR= (undiluted × 0.85) – 12

↓

Table

<95%

Reference Method*	Working Method Limits†	Reference Method*	Working Method Limits†	Reference Method*	Working Method Limits†
5	1-8	39	14-31	73	38-65
6	1-9	40	15-32	74	39-66
7	1-9	41	15-32	75	40-68
8	1-10	42	16-34	76	40-69
9	2-10	43	17-35	77	41-70
10	2-11	44	17-36	78	42-71
11	2-11	45	18-37	79	43-72
12	3-12	46	18-38	80	44-73
13	3-12	47	19-38	81	45-74
14	3-13	48	20-39	82	45-76
15	3-13	49	20-40	83	46-77
16	4-14	50	21-41	84	47-78
17	4-15	51	22-42	85	48-79
18	4-15	52	22-43	86	49-80
19	5-16	53	23-44	87	50-82
20	5-17	54	24-45	88	51-83
21	6-17	55	24-46	89	52-84
22	6-18	56	25-47	90	53-85
23	6-19	57	26-48	91	53-86
24	7-19	58	26-49	92	54-88
25	7-20	59	27-50	93	55-89
26	8-21	60	28-51	94	56-90
27	8-21	61	29-52	95	57-91
28	9-22	62	29-53	96	58-93
29	9-23	63	30-54	97	59-94
30	10-24	64	31-56	98	60-95
31	10-25	65	32-57	99	61-96
32	11-25	66	32-58	100	62-98
33	11-26	67	33-59	101	63-99
34	12-27	68	34-60	102	64-100
35	12-28	69	35-61	103	65-101
36	13-29	70	35-62	104	66-103
37	13-30	71	36-63	105	67-104
38	14-30	72	37-64		

Quality Assurance

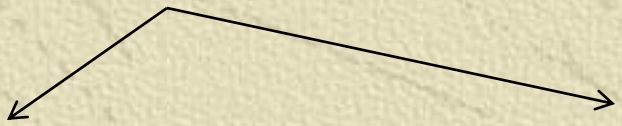
- **Equipment**
- **Procedure**

- **No control (except for automation)**

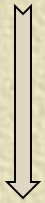
we can not calibrate but it is stable

control

- **Patient sample**



Reference method **routine**

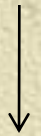


- **Compare them with table**

Reference = 33

Routine 11-26

- **Disposal**
- **Wash with tap water → acetone**



dry

Source of Error

- **Blood collection**
  - **Dilution step**
- **Storage**
- **Equipment**
  - **Diameter**
  - **Material**
  - **Clean less**
- **Procedure**
  - **Temperature**
  - **Direct sun light**
  - **Vertical**
  - **Vibration**
  - **Bubble**
  - **Time**
  - **Reading**

citrate

3.2% **/** **3.8%**

Osmolarity

HCT

Kits

Preparation

- 32 gr Na3C6H5O7.2H2o / 1L DW
- 121º 15min
- 4 months at 4 º
- 1/4 for ESR
- 1/9 for Coagulant assay

Correction

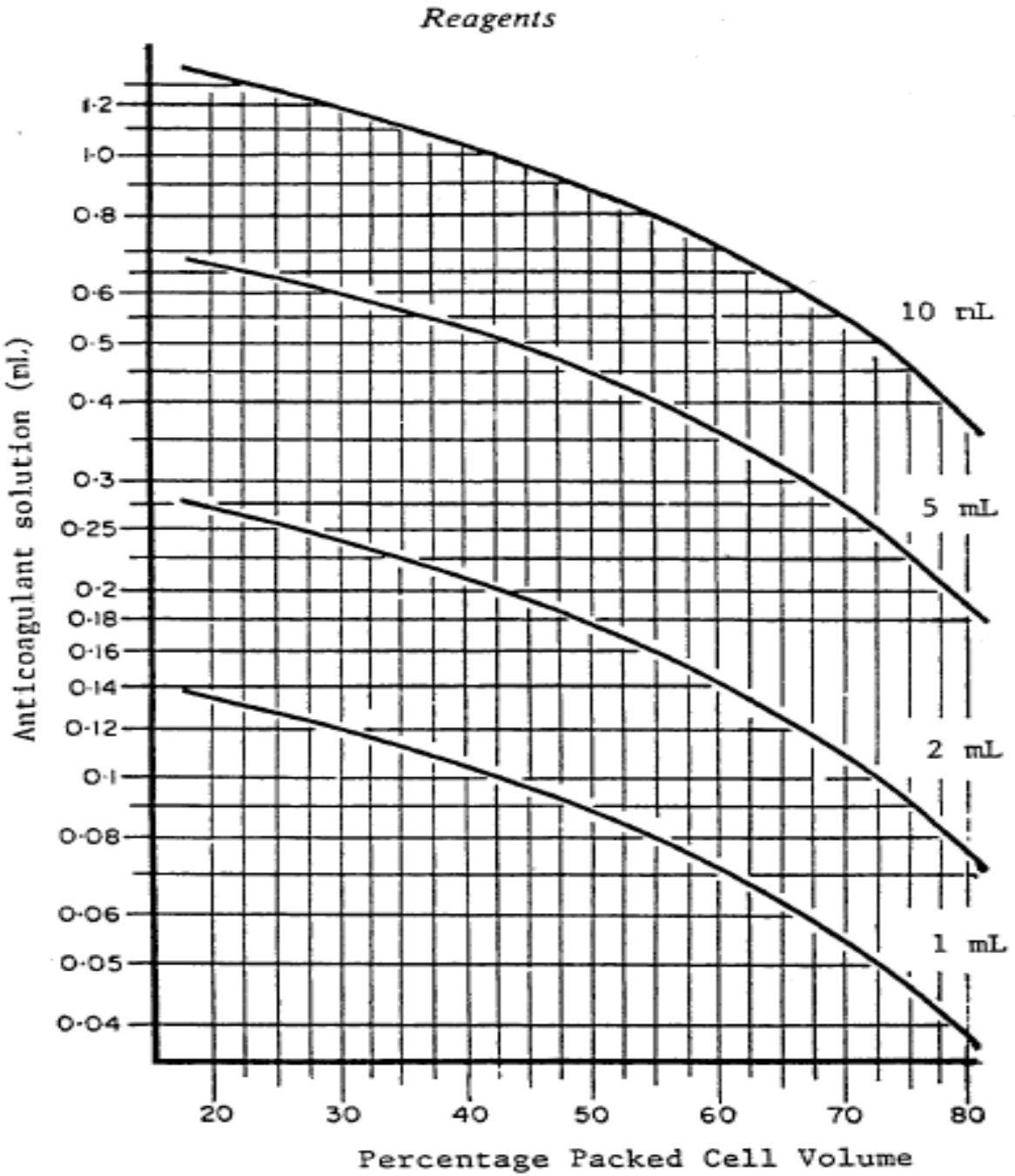
- **1- Formula**
- **(100-PCV)/(595-PCV)= cc citrate / 1 cc**

Example:HCT=55 ⇒

(100-55)/(595-55)=0.08 ⇒1-0.08=0.92

0.92 blood + **0.08** citrate

curve


Reagents
1·2
1·0
0·8
0·6
0·5
0·4
0·3
0·25
0·2
0·18
0·16
0·14
0·12
0·1
0·08
0·06
0·05
0·04
Anticoagulant solution (ml.)
10 mL
5 mL
2 mL
1 mL
20
30
40
50
60
70
80
Percentage Packed Cell Volume