



CNS Module
Physiology Lectures
(Lecture 5)

Topic 2: Spinal cord & somatic sensations

Spinal Reflexes(Part 2)

Presented by:
Dr.Shaimaa Nasr Amin
Associate Professor of Medical Physiology

1

Muscle tone does not cause fatigue because:

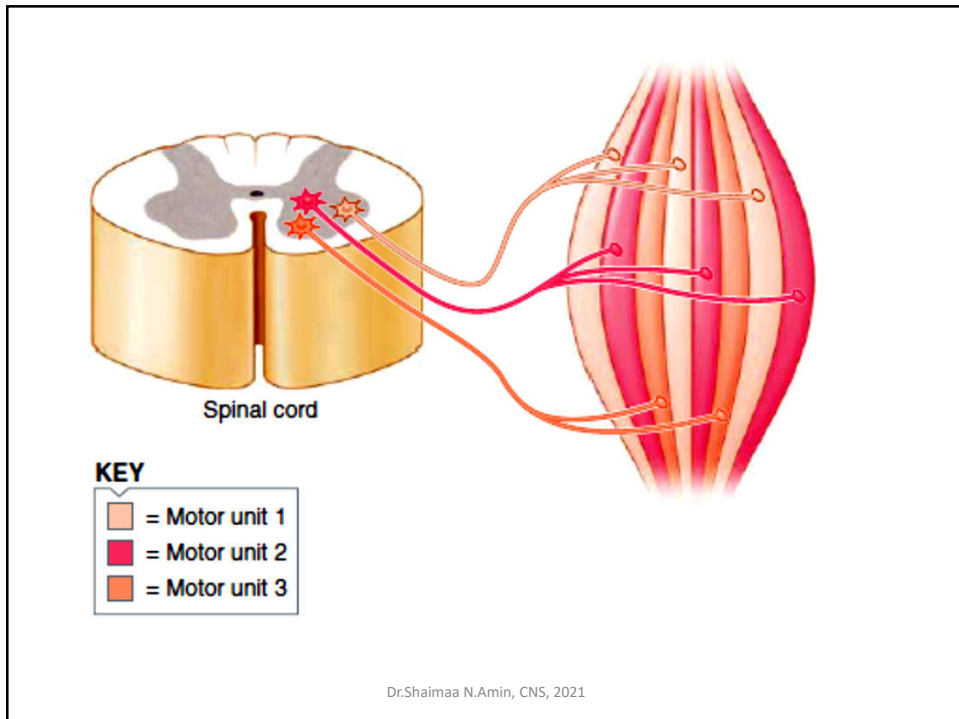
- 1- It is due to **alternate** contraction of different muscle fibres.
- 2- Contraction is **subtetanic**.
- 3- Muscle fibres involved in muscle tone are the **red muscle fibres**, which contract slowly and can sustain force in muscle for a long time.

Dr.Shaimaa N.Amin, CNS, 2021

2



3



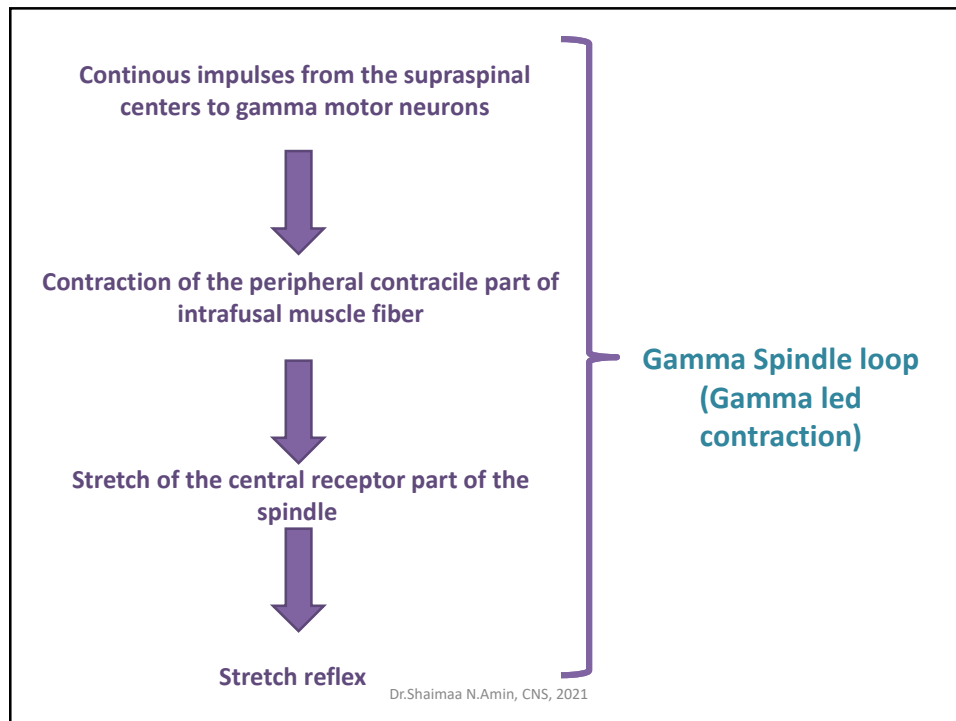
4

During rest the muscle spindle is continuously stretched



Dr.Shaimaa N.Amin, CNS, 2021

5



6



Dr.Shaimaa N.Amin, CNS, 2021

7

Functions of muscle tone

- 1- Maintain the body posture against the effect of gravity.
- 2- provides a background for voluntary movements.
- 3- helps in regulation of body temperature.
- 4- helps venous and lymph.

Dr.Shaimaa N.Amin, CNS, 2021

8

Muscle tone does not cause fatigue ?



Dr.Shaimaa N.Amin, CNS, 2021

9

Muscle tone does not cause fatigue because:

- 1- It is due to **alternate** contraction of different muscle fibres.
- 2- Contraction is **subtetanic**.
- 3- Muscle fibres involved in muscle tone are the **red muscle fibres**, which contract slowly and can sustain force in muscle for a long time.

Dr.Shaimaa N.Amin, CNS, 2021

10

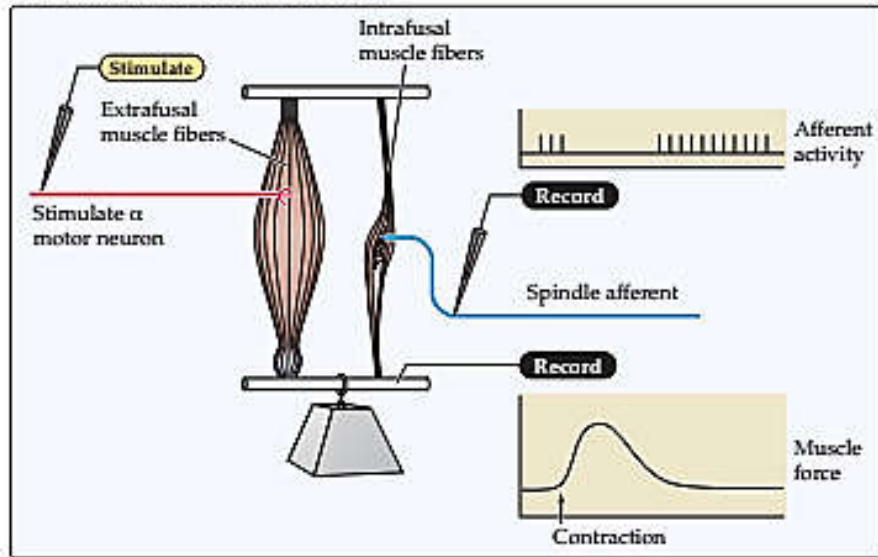
Testing Muscle Tone



Dr.Shaimaa N.Amin, CNS, 2021

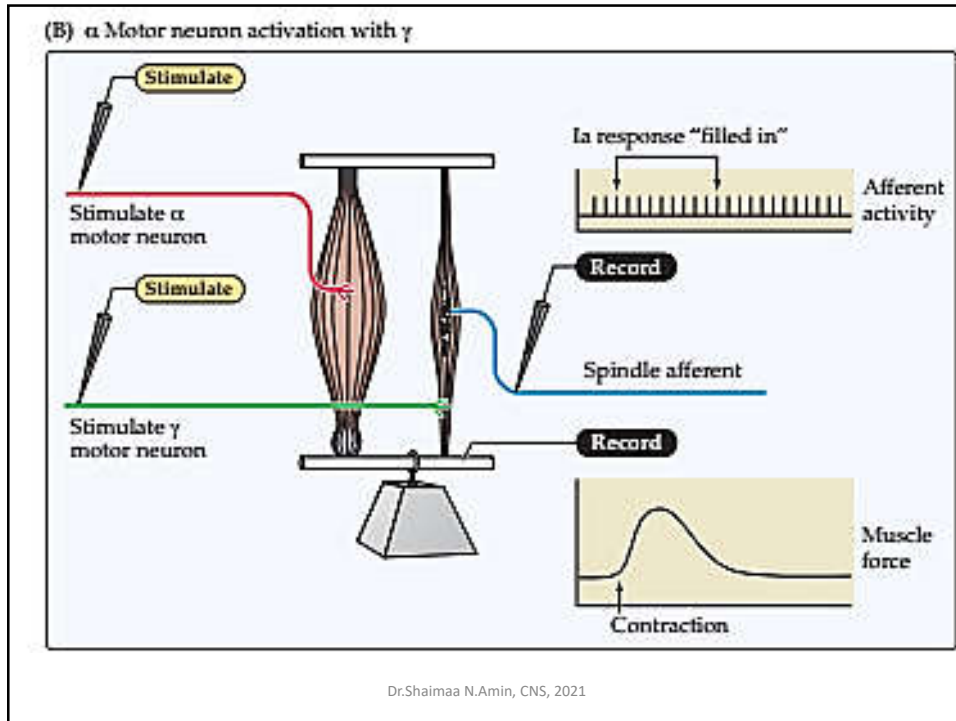
11

(A) α Motor neuron activation without γ

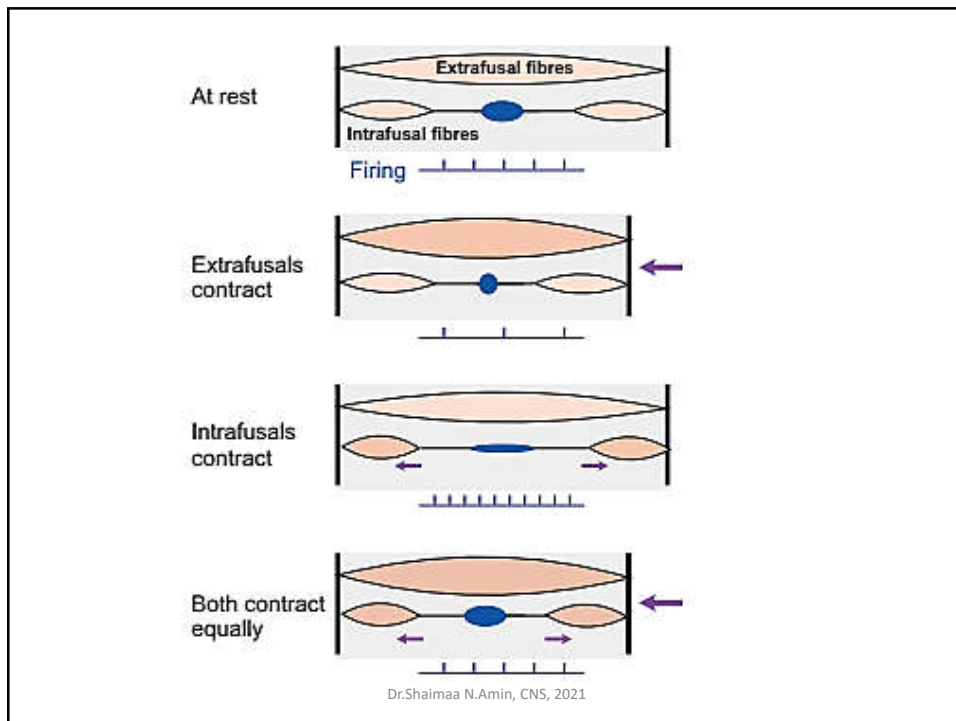


Dr.Shaimaa N.Amin, CNS, 2021

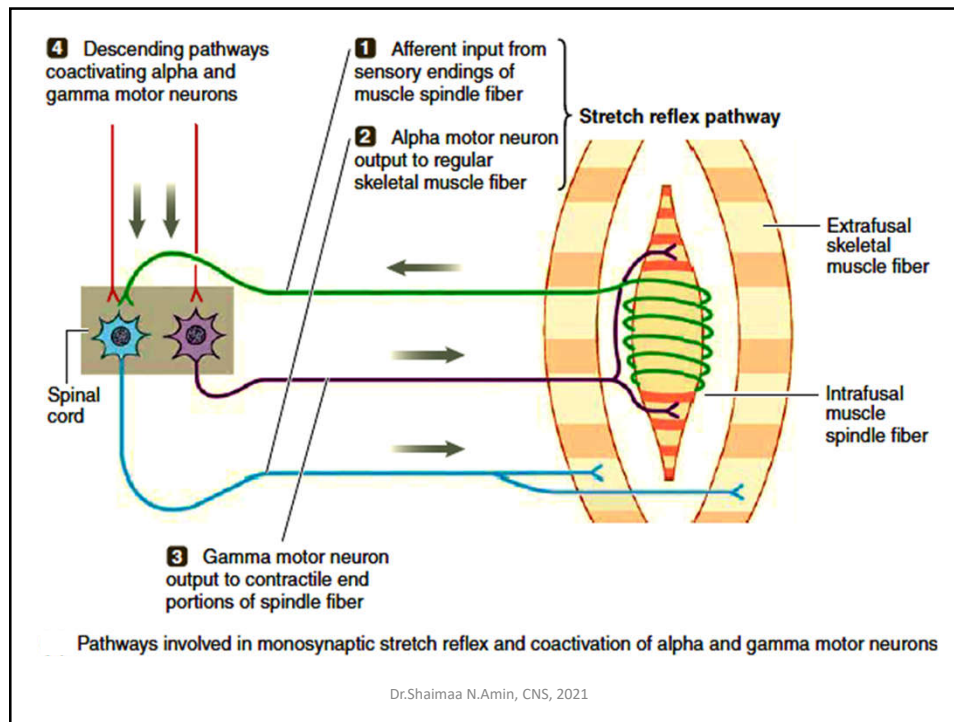
12



13



14

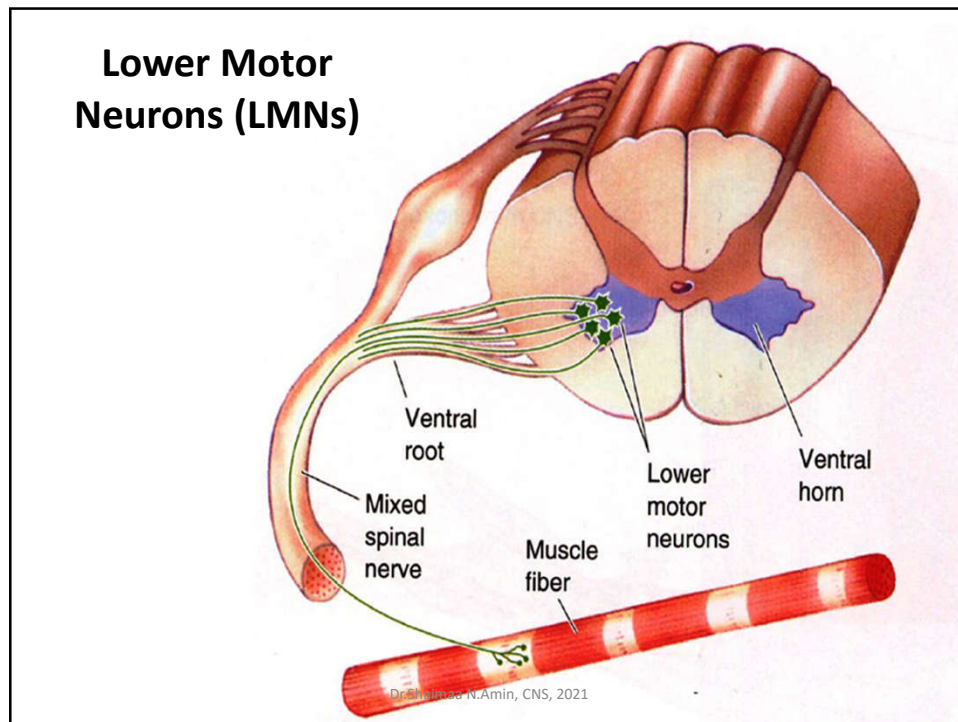


15

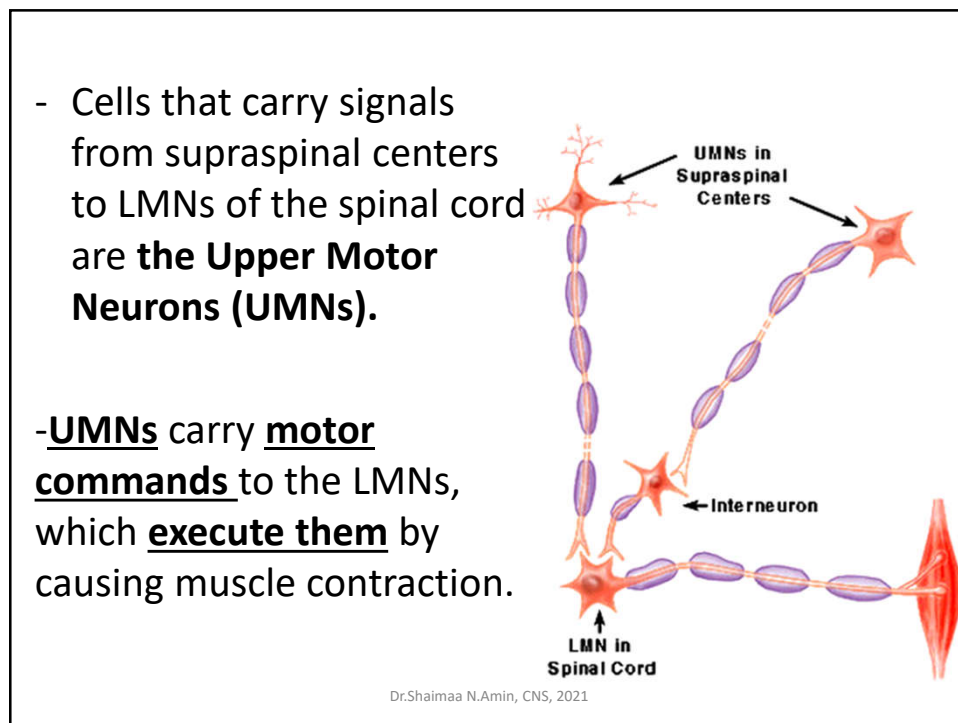
'load' means the force against which a muscle has to operate.

Dr.Shaimaa N.Amin, CNS, 2021

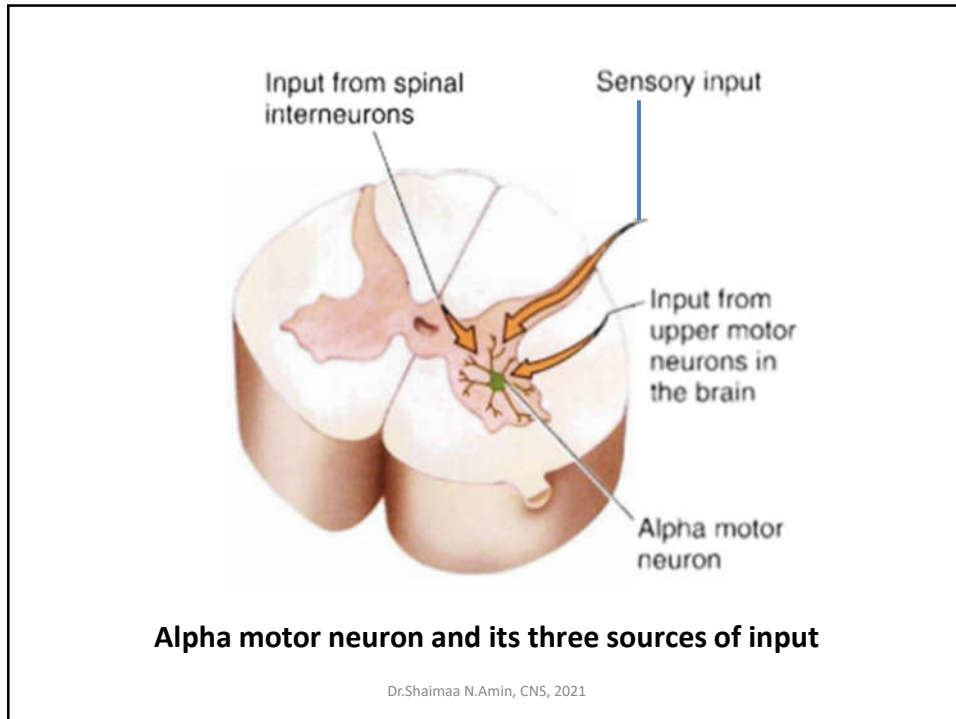
16



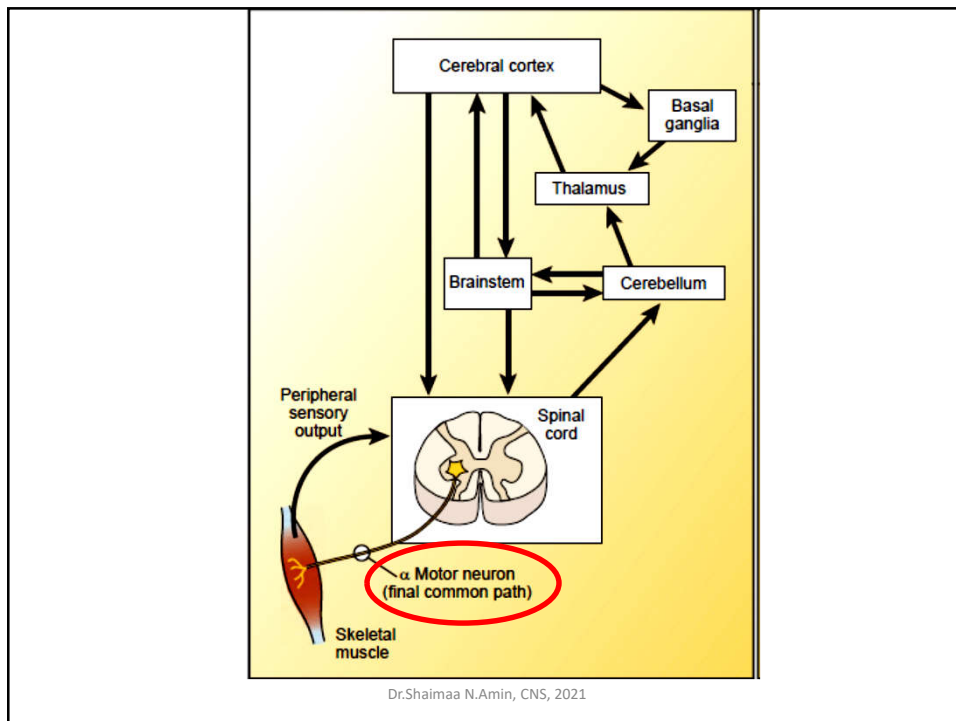
17



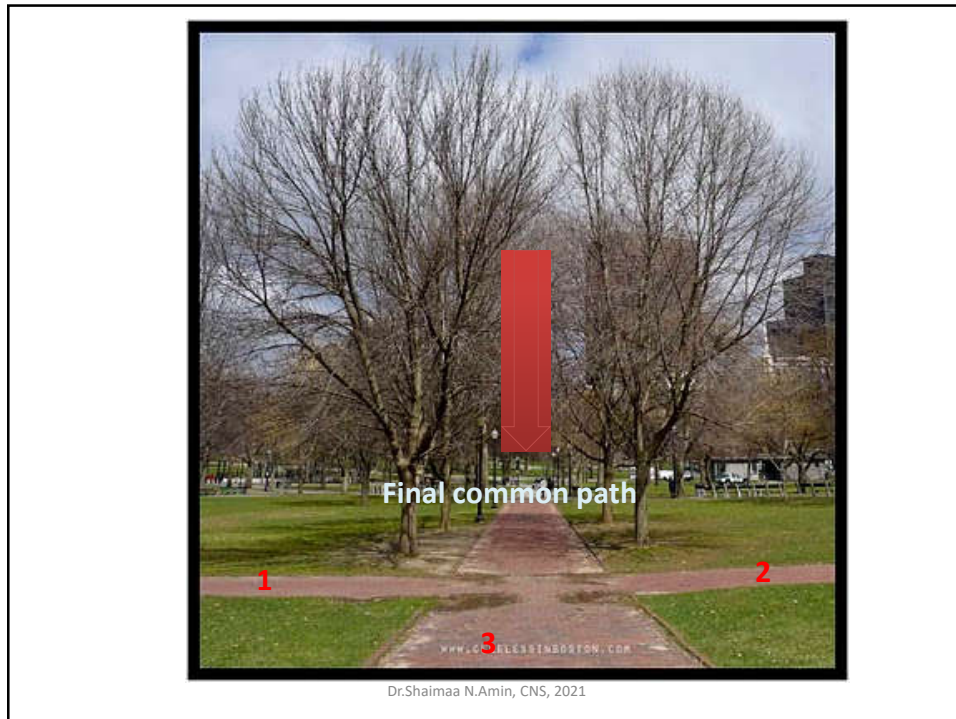
18



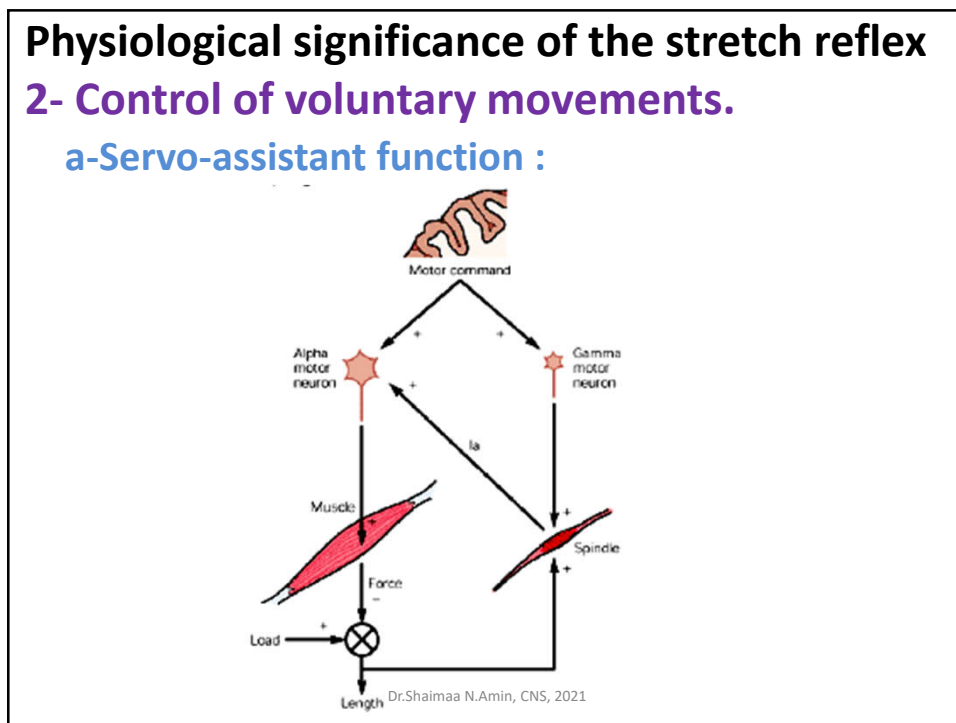
19



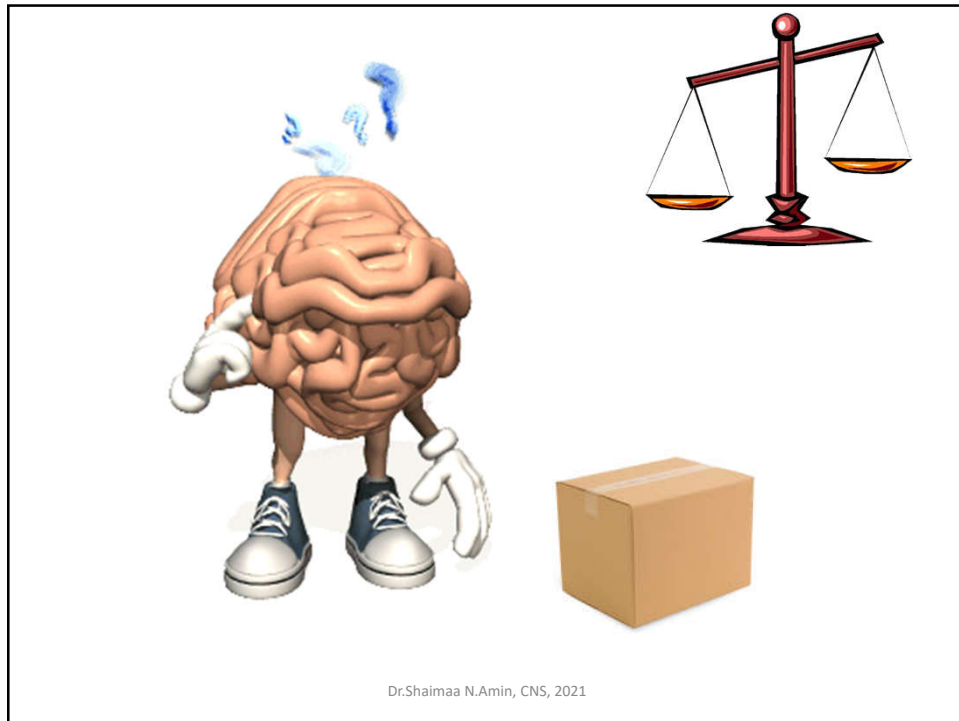
20



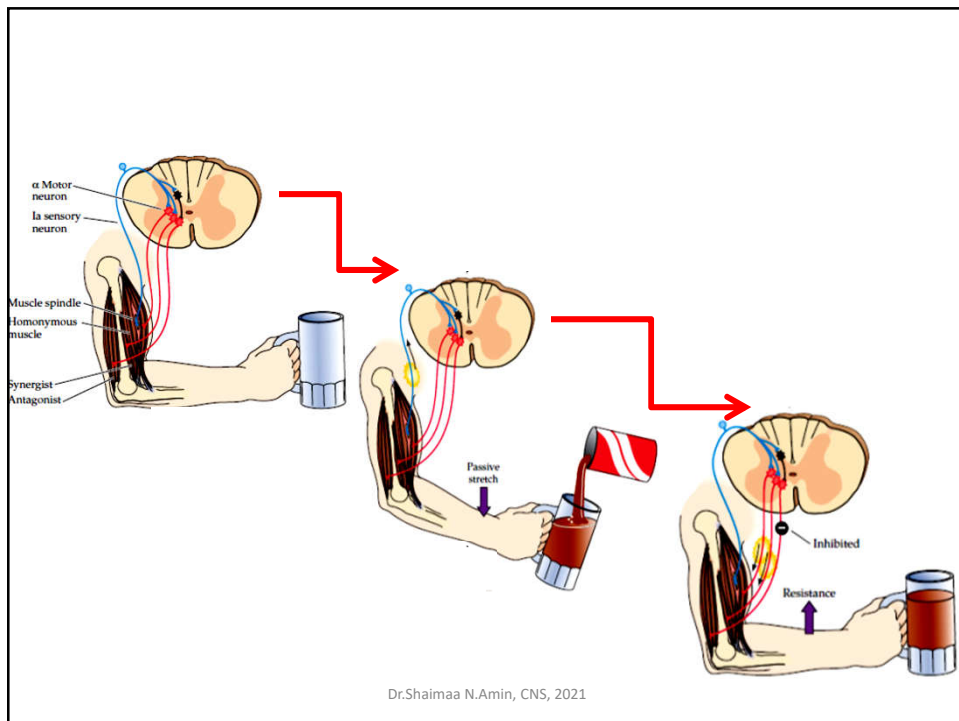
21



22



23



24



Supraspinal control of stretch reflex

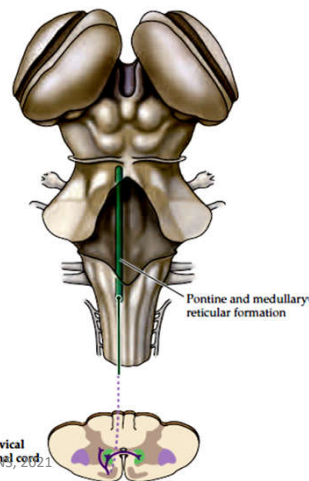
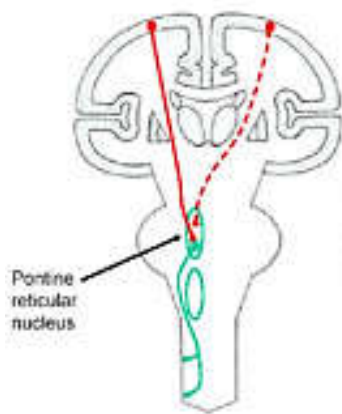
A-SUPRA SPINAL FACILITATORY AREAS

Dr.Shaimaa N.Amin, CNS, 2021

25

Supraspinal Facilitatory Areas

1-Facilitatory reticular formation

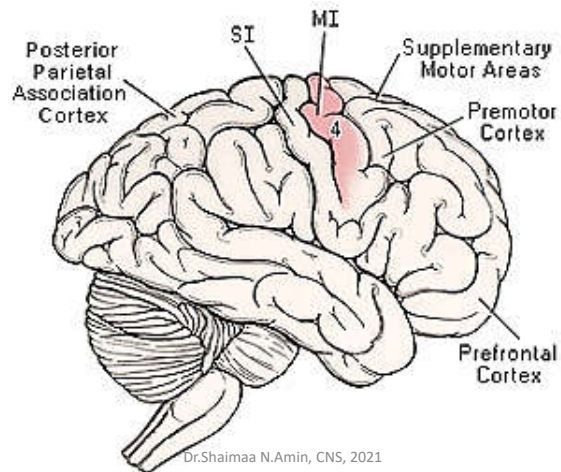


Dr.Shaimaa N.Amin, CNS, 2021

26

Supraspinal Facilitatory Areas

2-Primary motor area 4

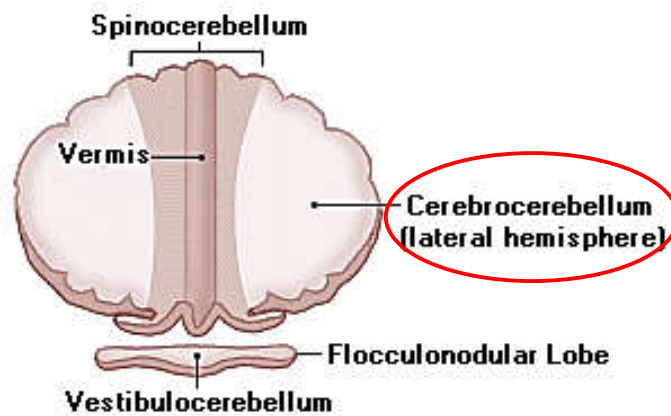


Dr.Shaimaa N.Amin, CNS, 2021

27

Supraspinal Facilitatory Areas

3-Neocerebellum

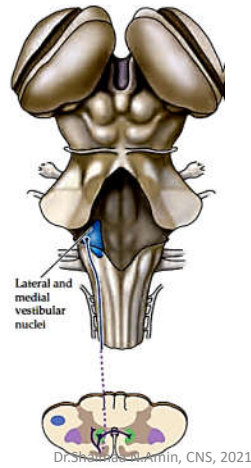


Dr.Shaimaa N.Amin, CNS, 2021

28

Supraspinal Facilitatory Areas

4-The lateral Vestibular nucleus



29



Supraspinal control of stretch reflex

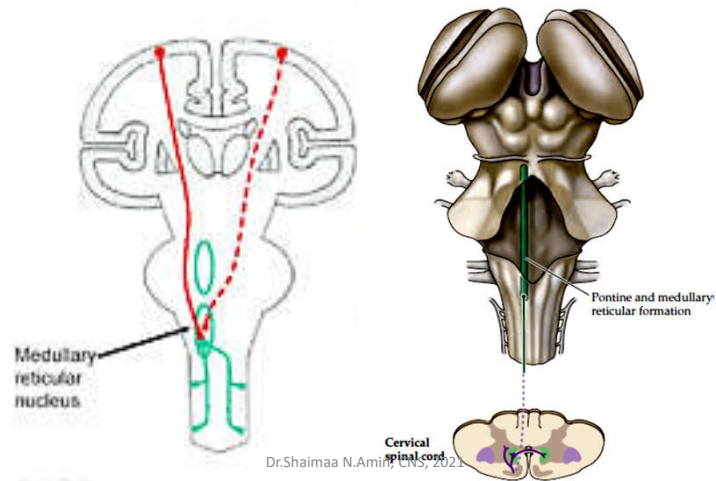
A-SUPRA SPINAL INHIBITORY AREAS

Dr.Shaimaa N.Amin, CNS, 2021

30

Supraspinal Inhibitory Area

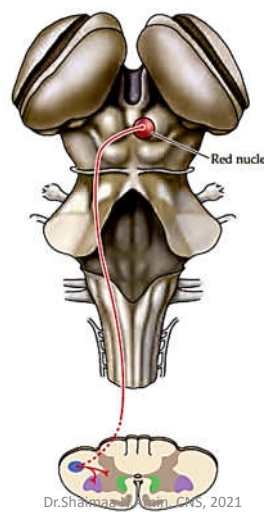
1-Inhibitory reticular formation



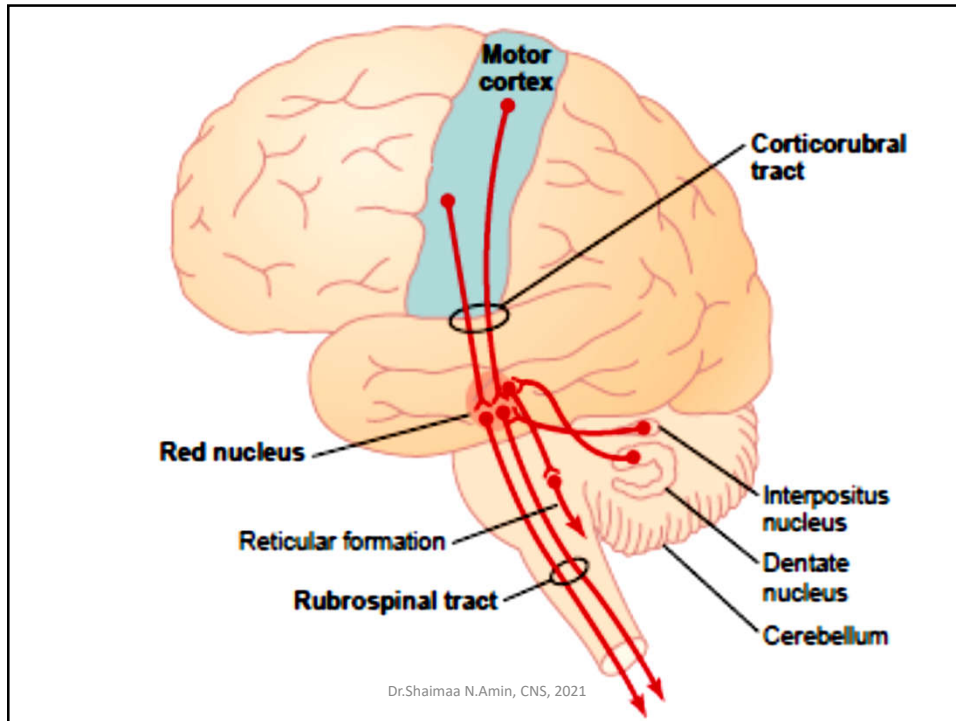
31

Supraspinal Inhibitory Area

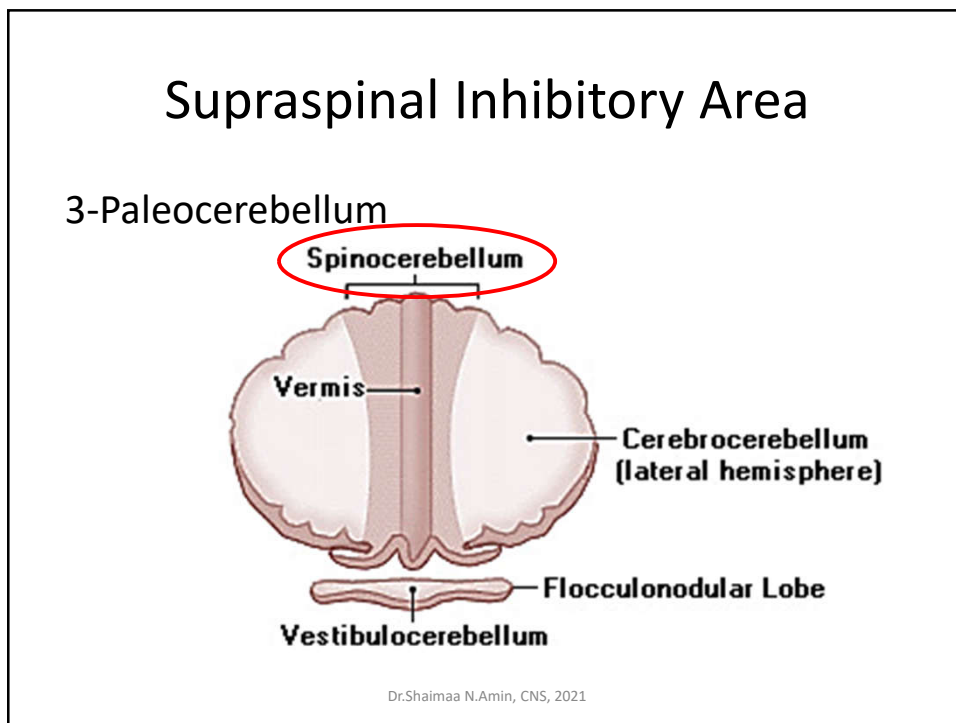
2-Red Nucleus



32



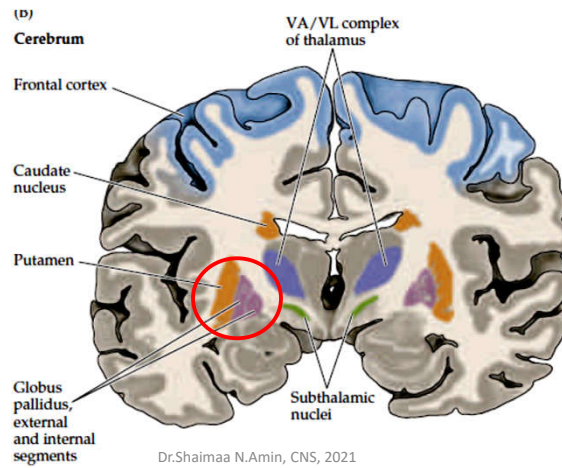
33



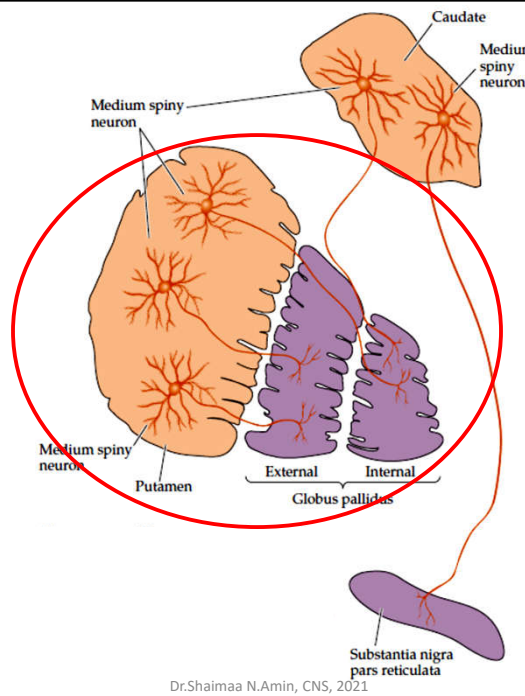
34

Supraspinal Inhibitory Area

4-Basal ganglia (lentiform nucleus)



35



36

Supraspinal Inhibitory Area

5-Cortical suppressor area (4S)

Dr.Shaimaa N.Amin, CNS, 2021

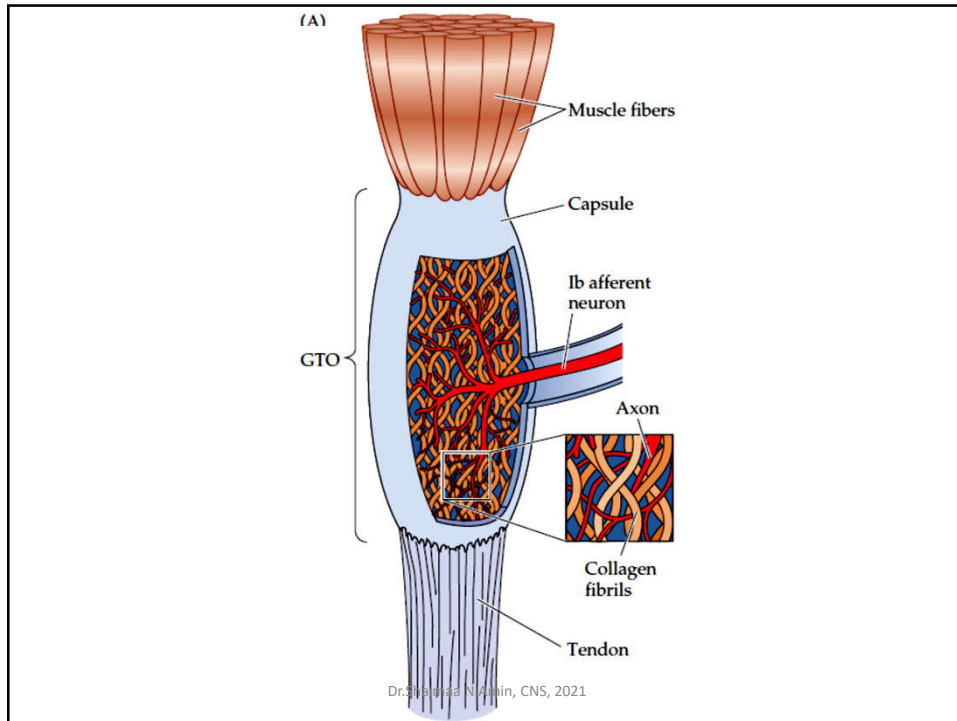
37



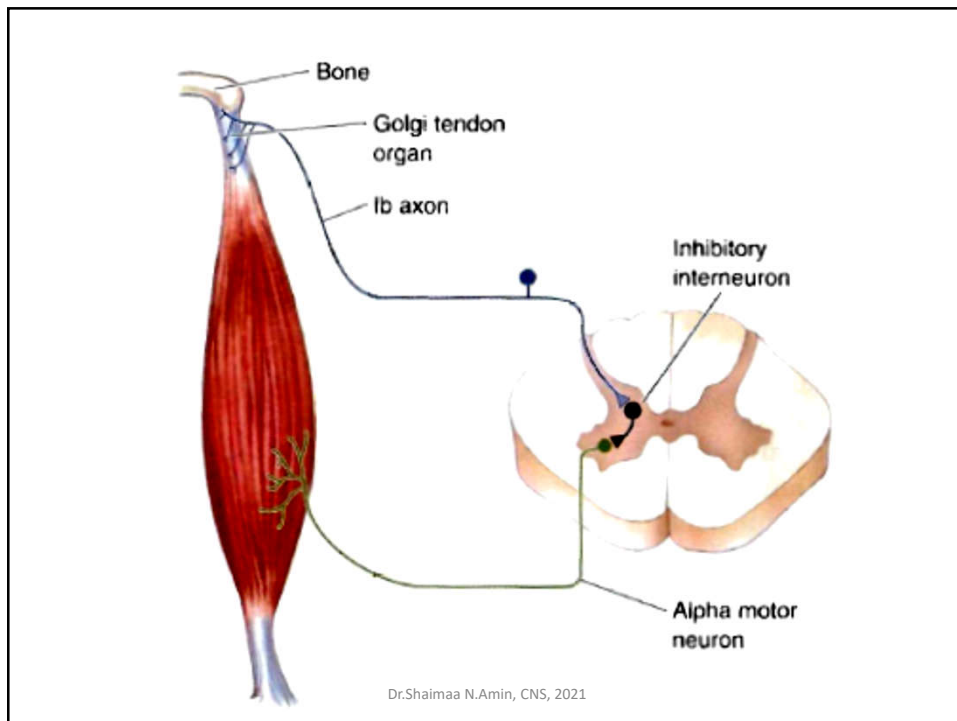
**Inverse stretch Reflex
(AUTOGENIC INHIBITION)**

Dr.Shaimaa N.Amin, CNS, 2021

38



39



40

Polysynaptic reflexes

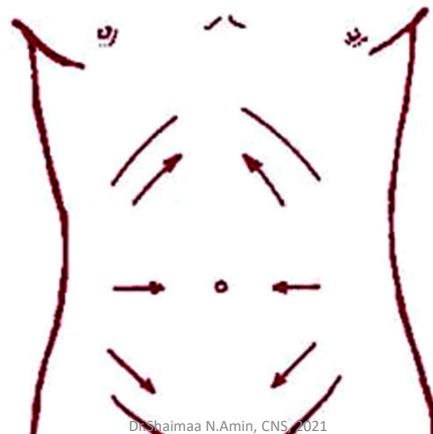
- Superficial abdominal reflexes
- Planter reflex
- Cremasteric reflex
- Withdrawal reflex
- Scratch reflex
- Positive supporting reaction
- Visceral reflexes

Dr.Shaimaa N.Amin, CNS, 2021

41

Polysynaptic reflexes

- Superficial abdominal reflexes

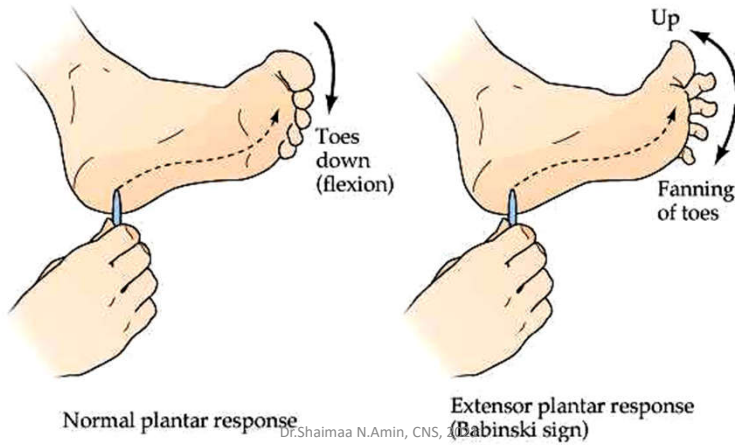


Dr.Shaimaa N.Amin, CNS, 2021

42

Polysynaptic reflexes

- Planter reflex



43

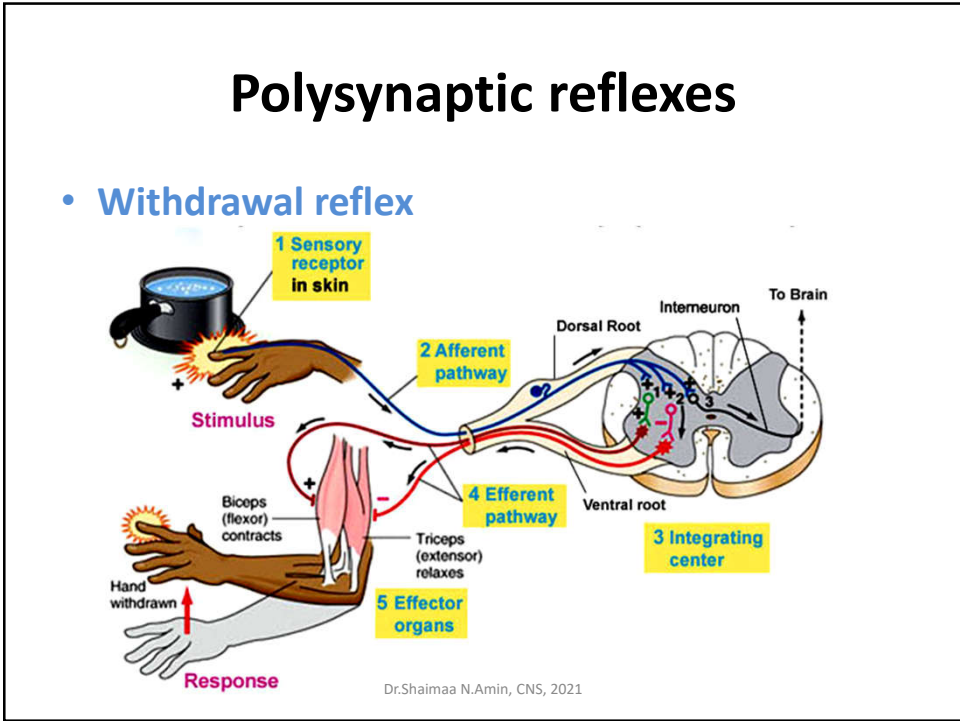
Polysynaptic reflexes

- Planter reflex

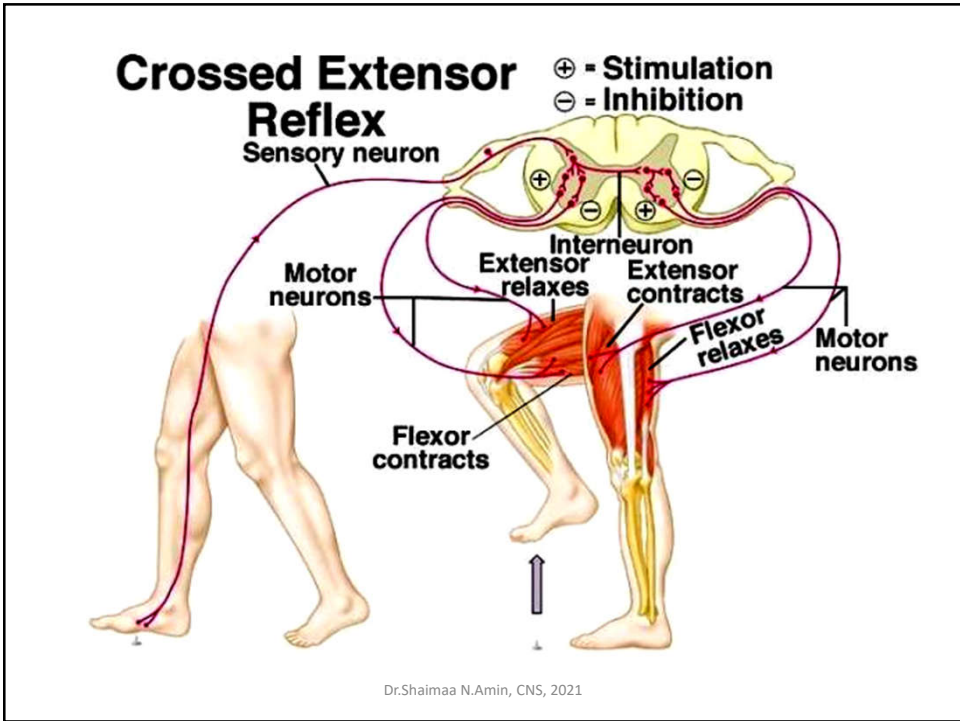


Dr. Shaimaa N. Amin, CNS, 2021

44



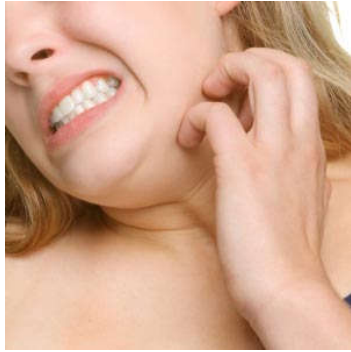
45



46

Polysynaptic reflexes

- Scratch reflex



Dr.Shaimaa N.Amin, CNS, 2021

47

Polysynaptic reflexes

- Positive supporting reaction

Dr.Shaimaa N.Amin, CNS, 2021

48

It is not as much about
who you used to be,
as it is about who
you choose to be.

SANHITA BARUAH

Dr.Shaimaa N.Amin, CNS, 2021