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Department of Biomedical Engineering

Vision Tit 2 Vision Title 3

Course Name: 23BMT201 Human Anatomy & Physiology

I Year : II Semester

Unit I- Cell and Tissue Structure

Topic : Muscular Tissue and its function

Muscle Tissue

A muscle tissue is made of contractile cells

Muscle Tissue

- **Types-**

- 1.**Muscle tissue -Skeletal muscle**
  -Smooth muscle
  -Cardiac muscle

2.Single cell unite -myoepithelial cells
-myofibroblast cells

Muscle Tissue

Plasma membrane -Sarcolema

Cytoplasm -Sarcoplasm

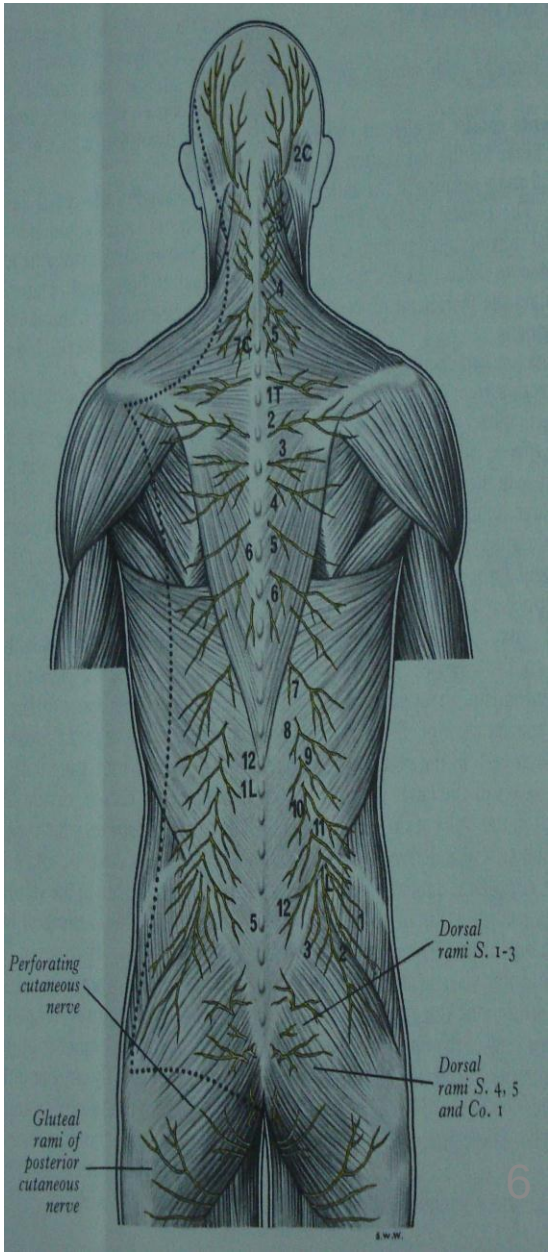
Endoplasmic reticulum-Sarcoplasmic reticulum

Mitochondria- -Sarcosome

Skeletal muscle….

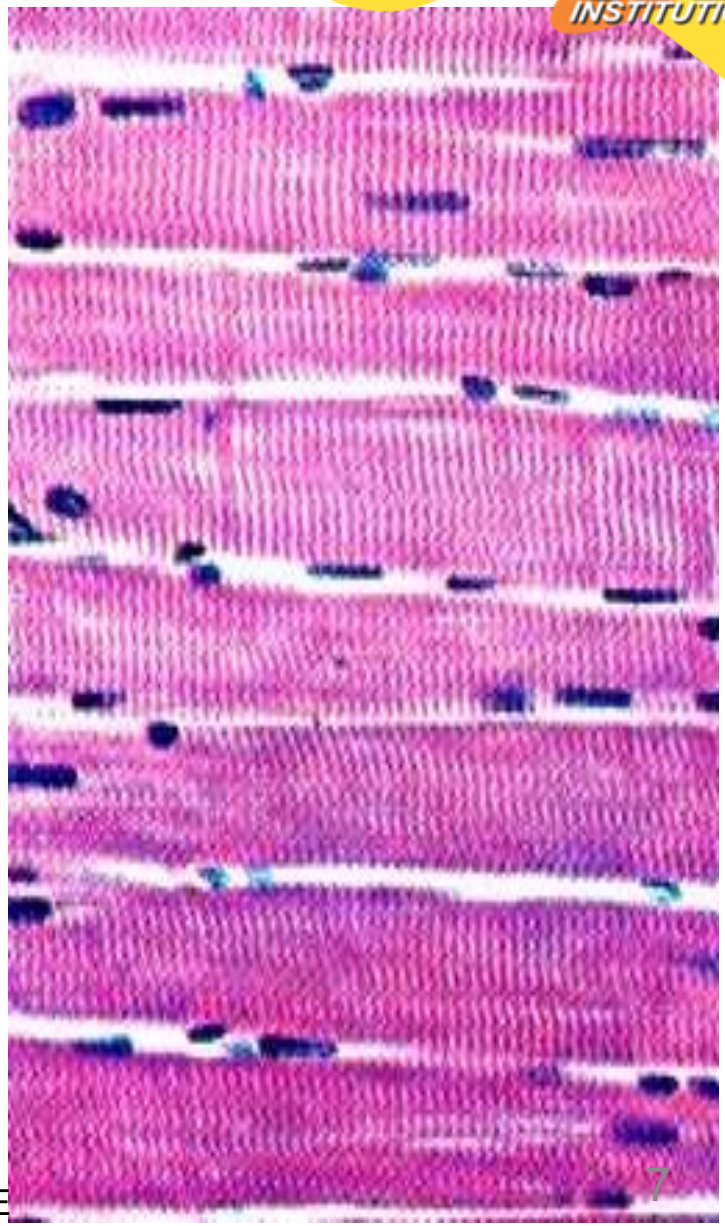
- Epi mysium
- Peri mysium
- Endo mysium

SKELETAL MUSCLE



Skeletal muscle

- features
- Skeletal muscle composed of muscle fibres
- Each muscle fibre is an elongated unbranched cell, voluntary
- Nuclei present at periphery
- Striations, Alternative dark and light bands



Skeletal muscle…..

E.M. Structure

- **Muscle fibre or Muscle cell**

A muscle fibre (muscle cell) contains bundle of myofibril

Myofibril

- **myofibrils are made of myofilaments**

Myofilament

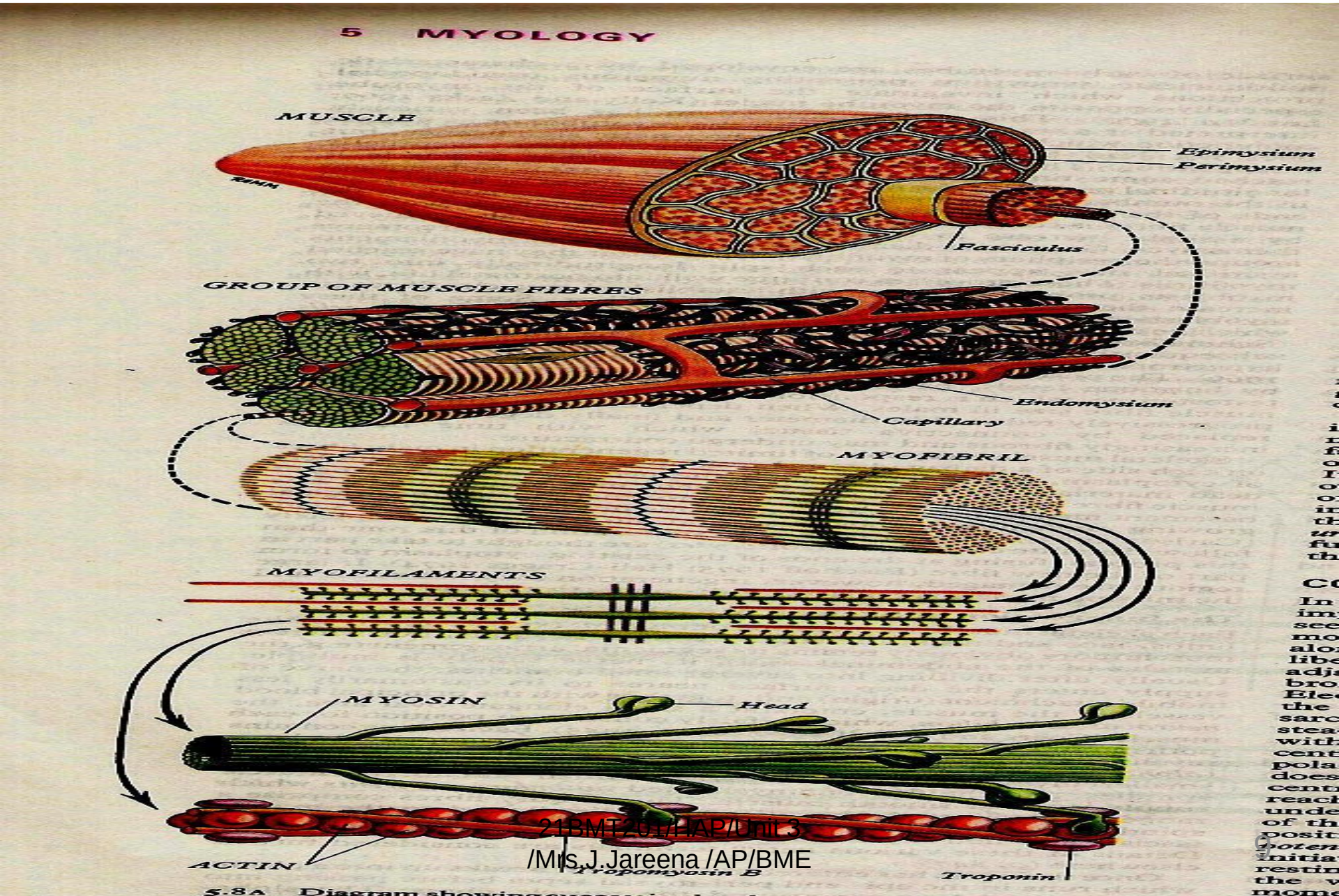
-Thick myofilaments- myosin protein

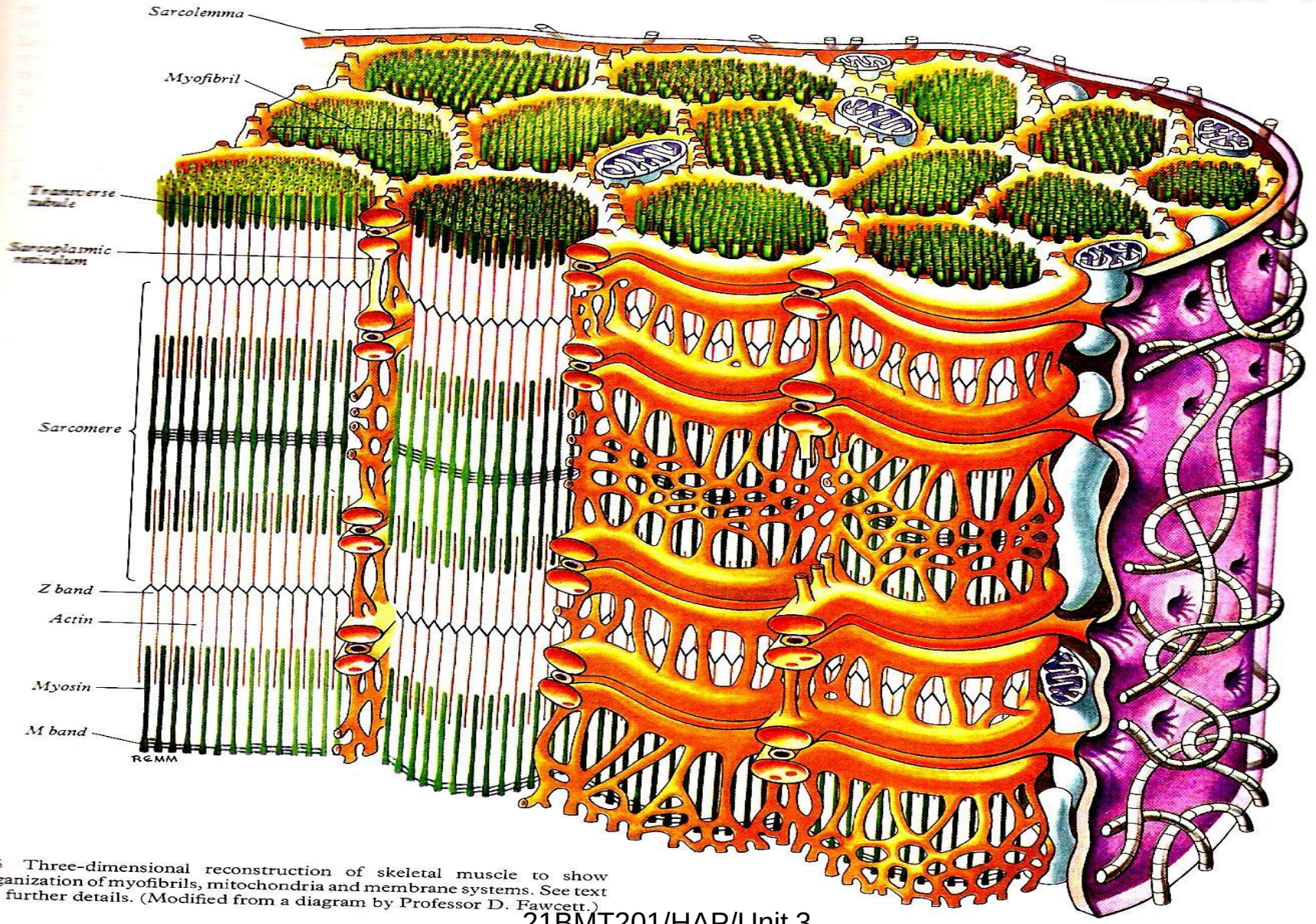
-Thin myofilaments- actin protein

Cross striations are the result of overlapping of myosin protein& actin protein

- Transvers tubule system - triad

Arrangement of myofibril





5.6 Three-dimensional reconstruction of skeletal muscle to show organization of myofibrils, mitochondria and membrane systems. See text for further details. (Modified from a diagram by Professor D. Fawcett.)

Arrangement of Myofilament

-Dark band-'A' band or anisotropic band

Light band-'I' band or isotropic band

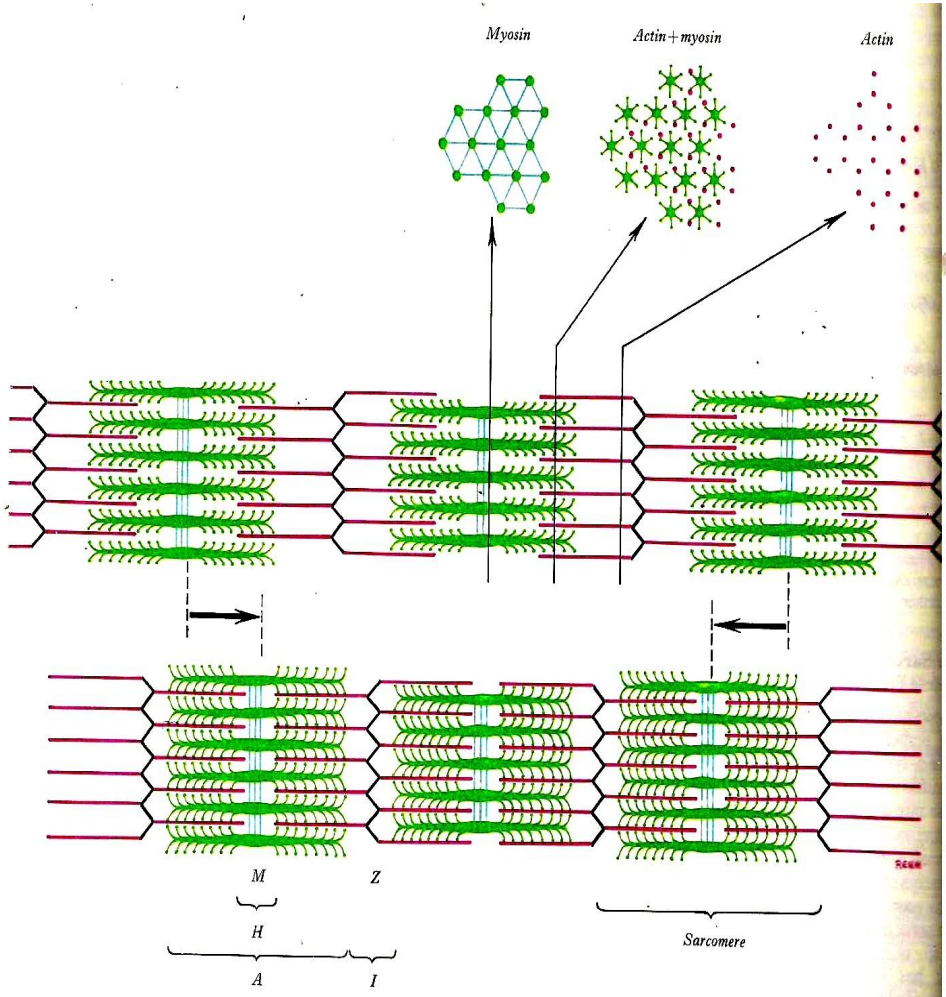
-H band-Hensen line-clear zone In A band

-M line-dark line in H band

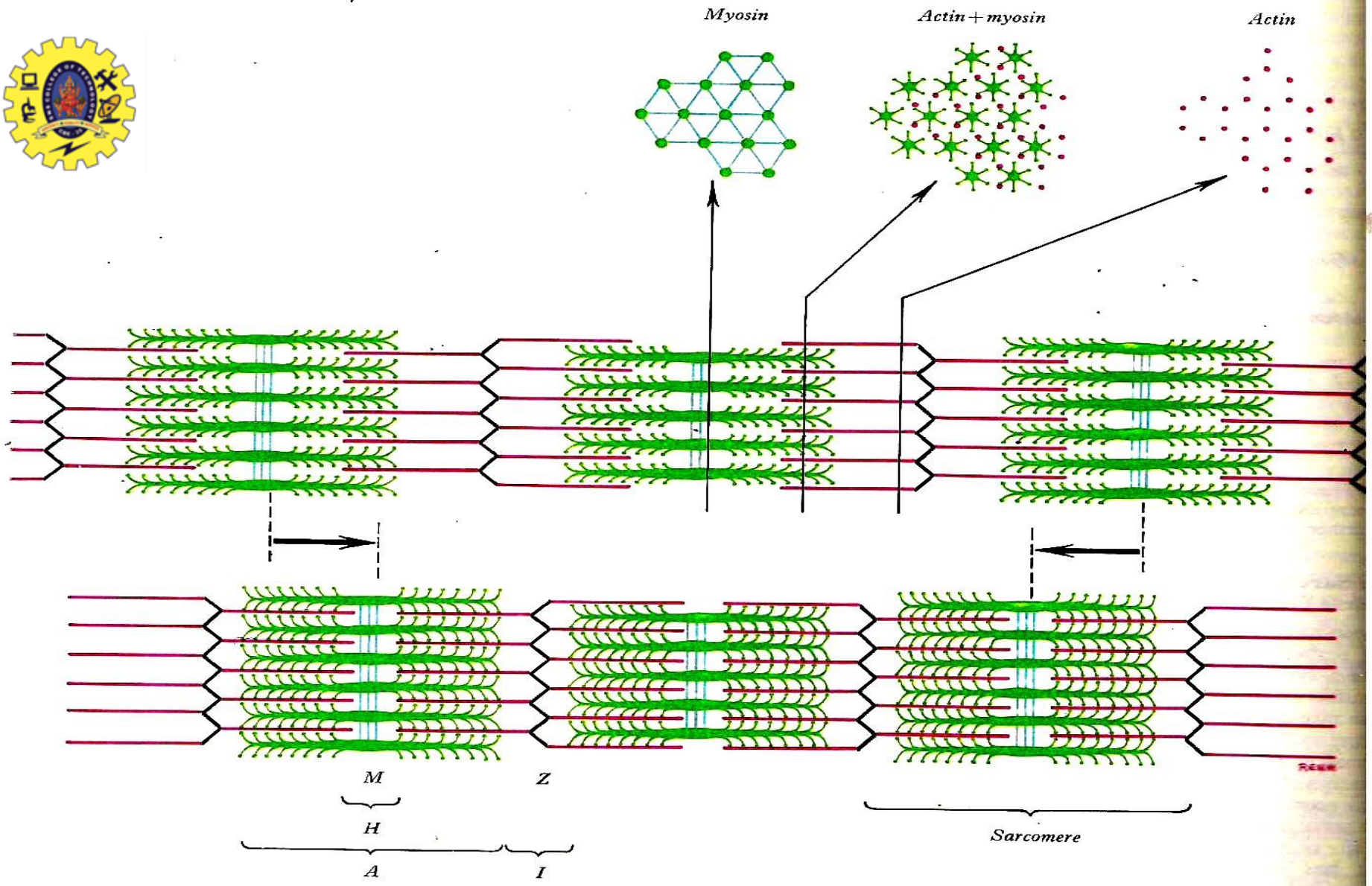
-

-Z disc- dark line in light band

-Sarcomere-part between two Z Disc



5·7 Diagram showing the organization of sarcomeres in skeletal and cardiac muscle and the changes occurring during shortening. Transverse sections are shown at various levels and indicate the packing of actin and myosin filaments. Compare with 5·4 and see text for a description.



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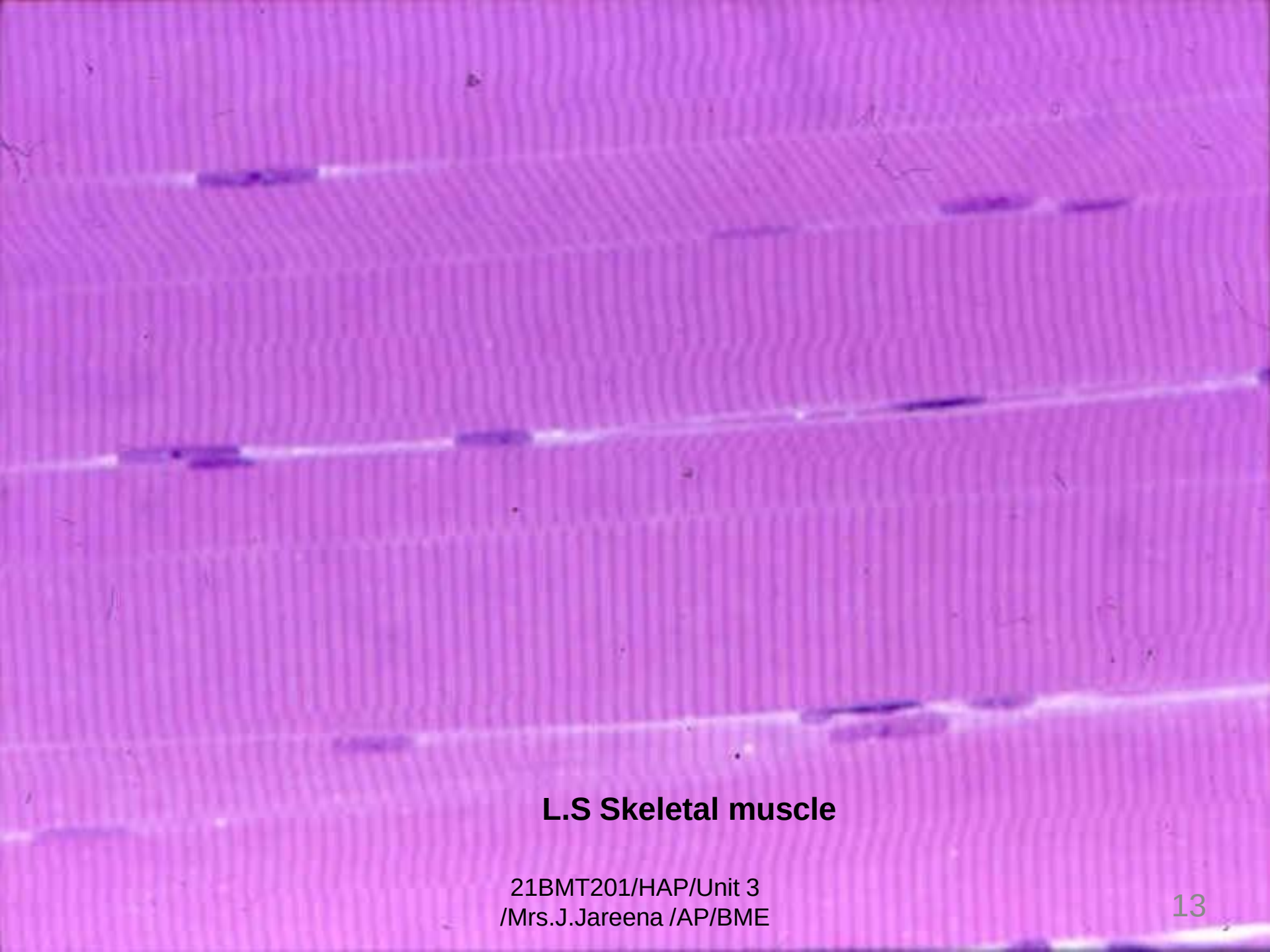
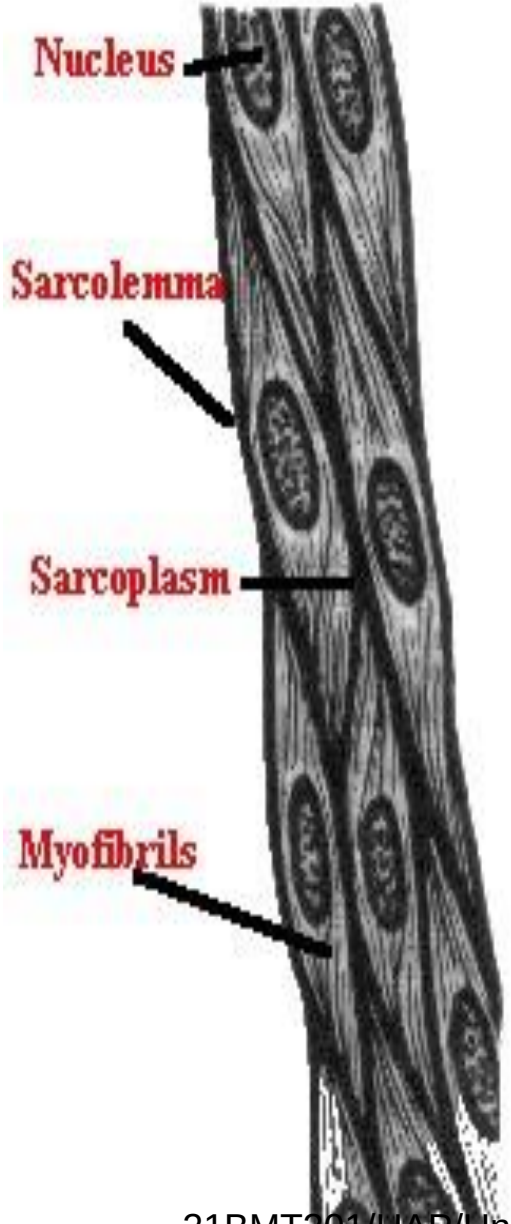


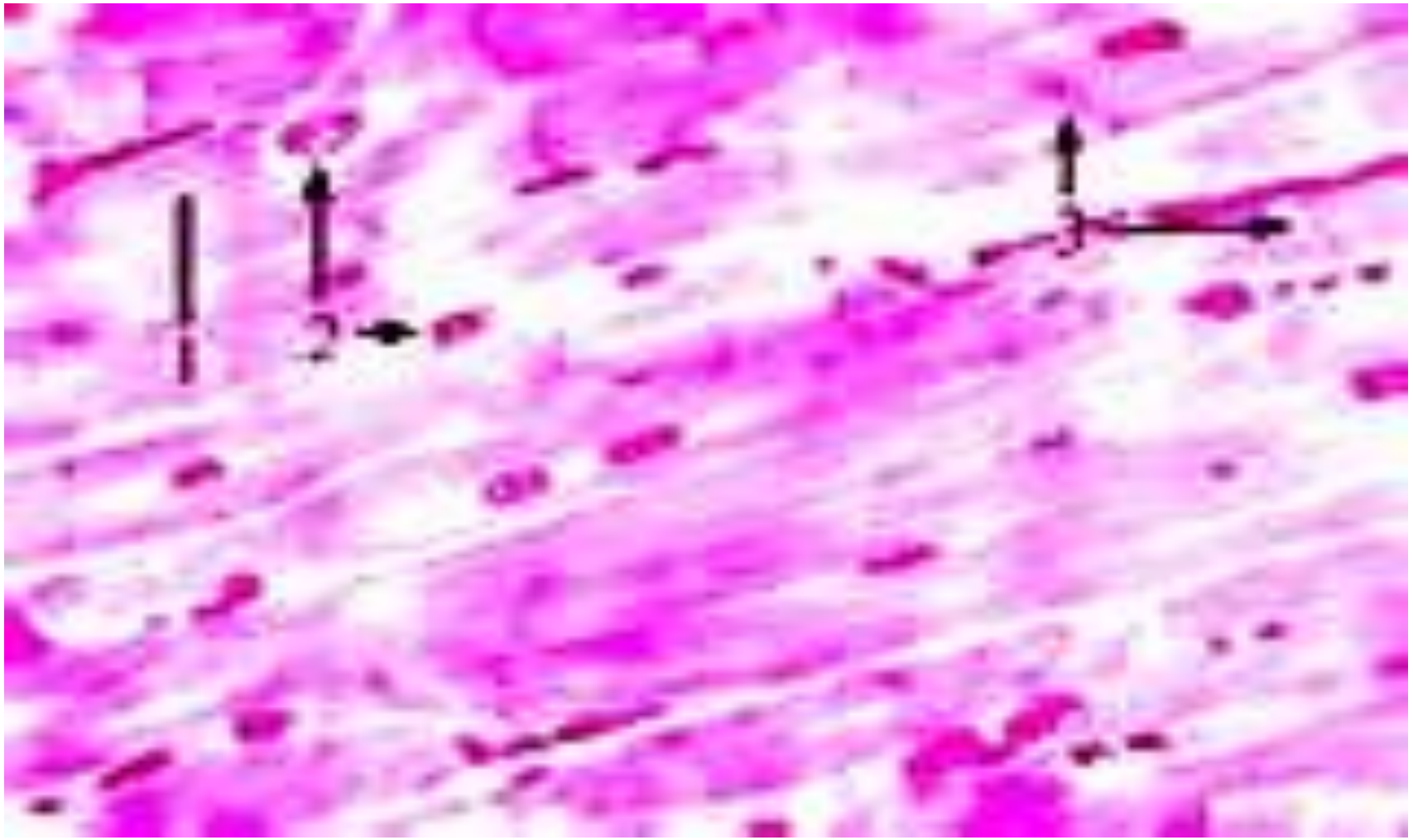
L.S Skeletal muscle

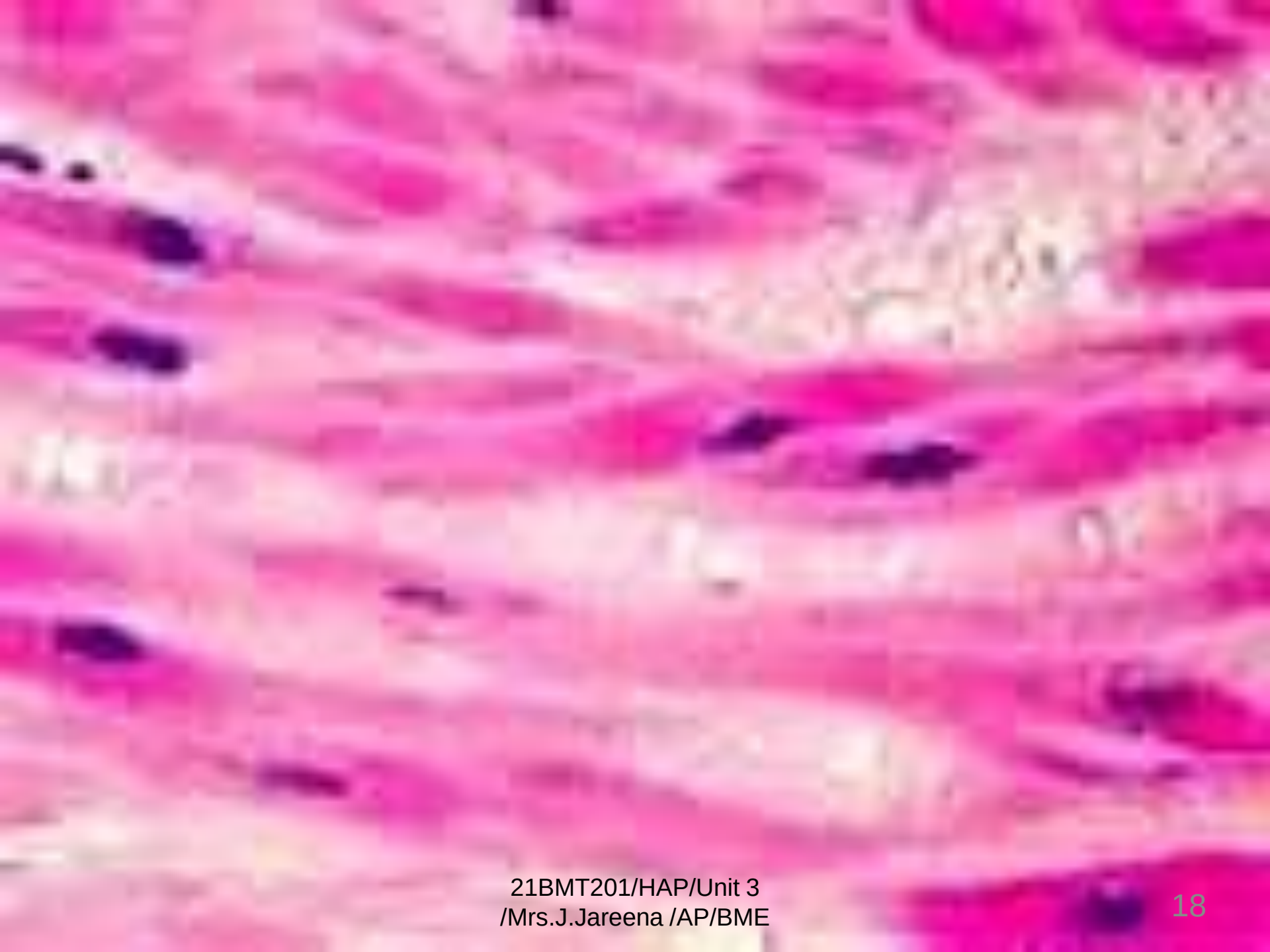
Smooth muscle

- Spindle shaped muscle cell
- Single central nucleus
- Involuntary, non striated
- no cross striations
- longitudinal striations may present
- Caveolae instate of T tubule
- Present in viscera usually
- Involuntary ,autonomic innervations
- Myofilaments obliquely disposed
- slow, wave like contractions


Nucleus
Sarcolemma
Sarcoplasm
Myofibrils

Smooth muscle





Cardiac muscle

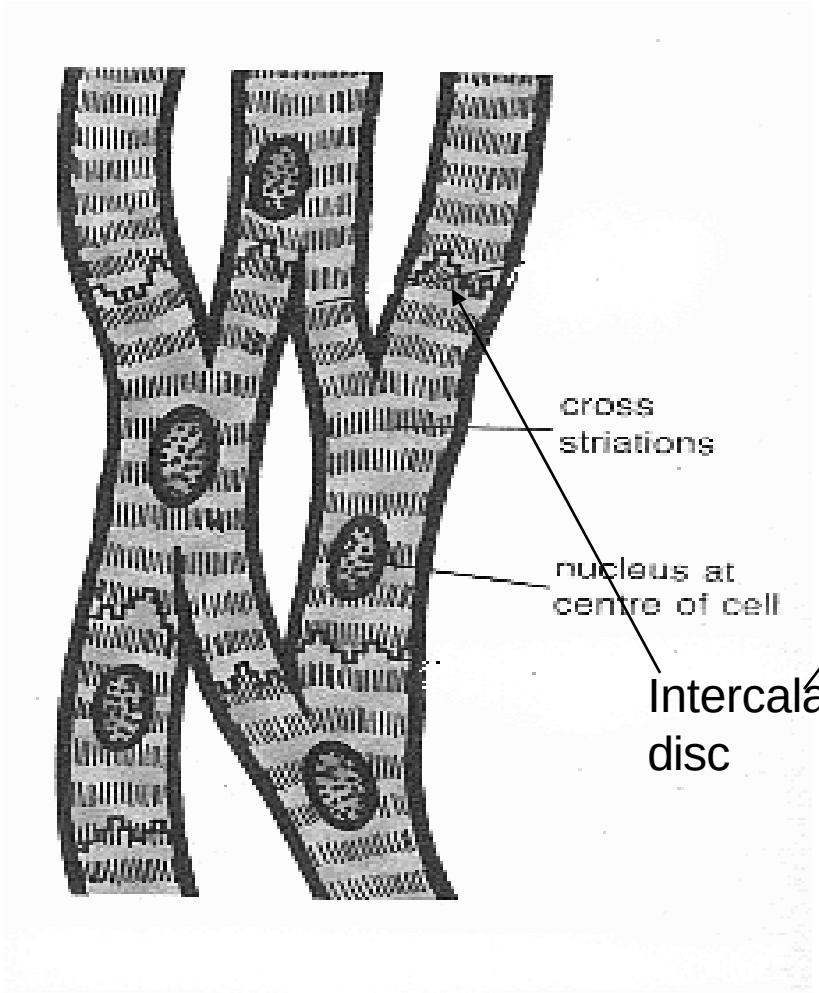
Similar as skeletal muscle

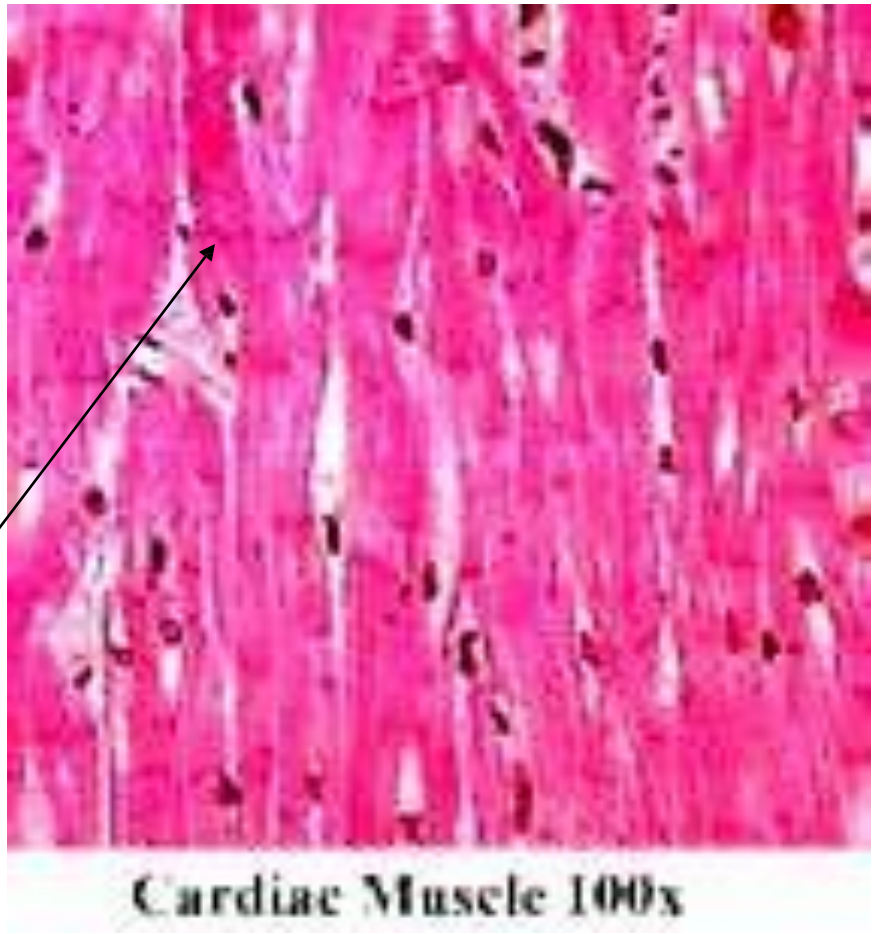
- -elongated muscle fibre with fibrils
- Cross striations present

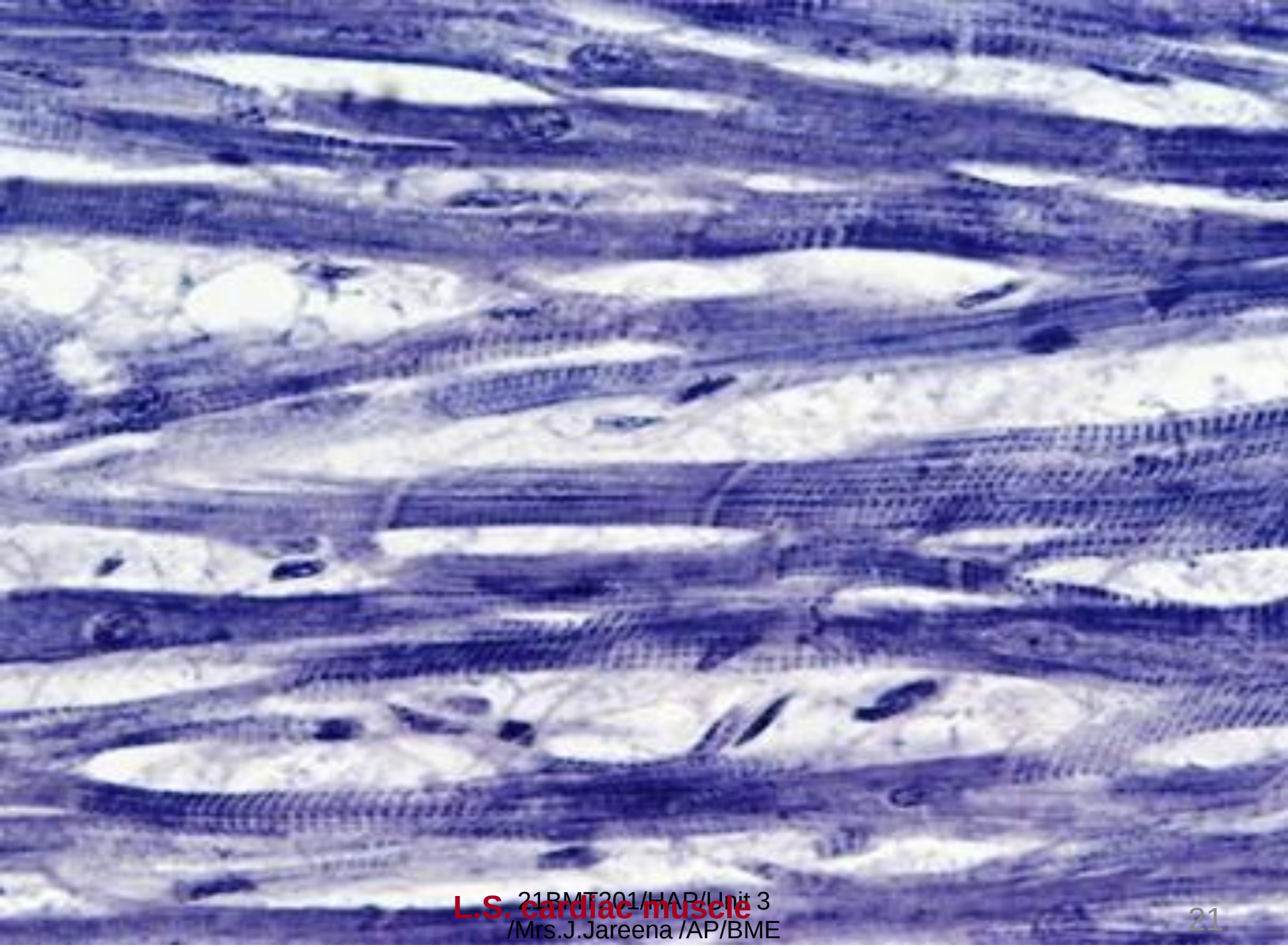
Dissimilar from skeletal muscle

- Muscle fibre are not as parallel but branched & anatomizing
- Nucleus placed centrally
- disc at the
- ocyte
- m
- n rhythmic

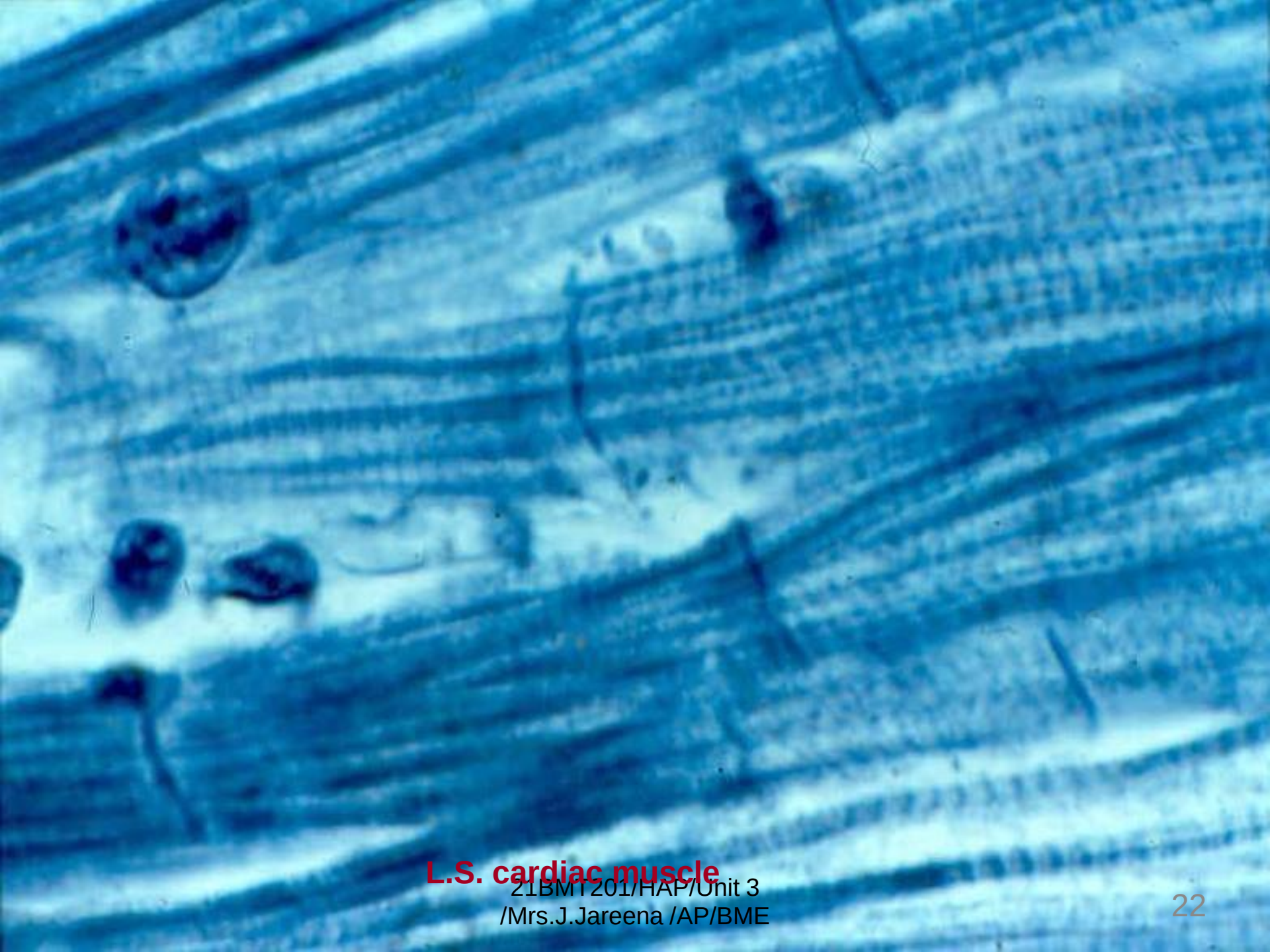
Cardiac muscle





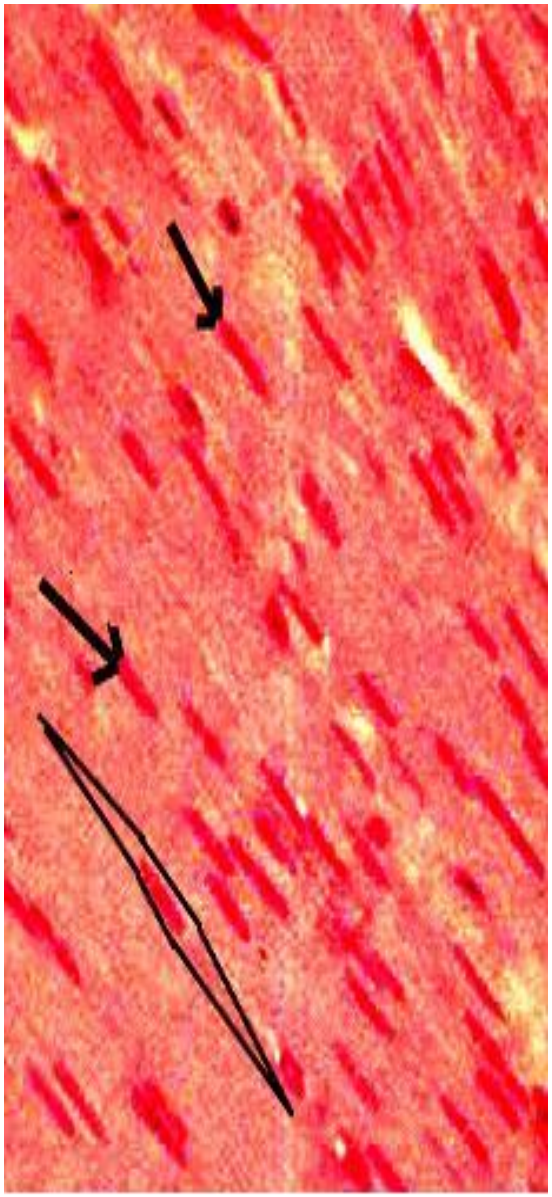


L.S. cardiac muscle

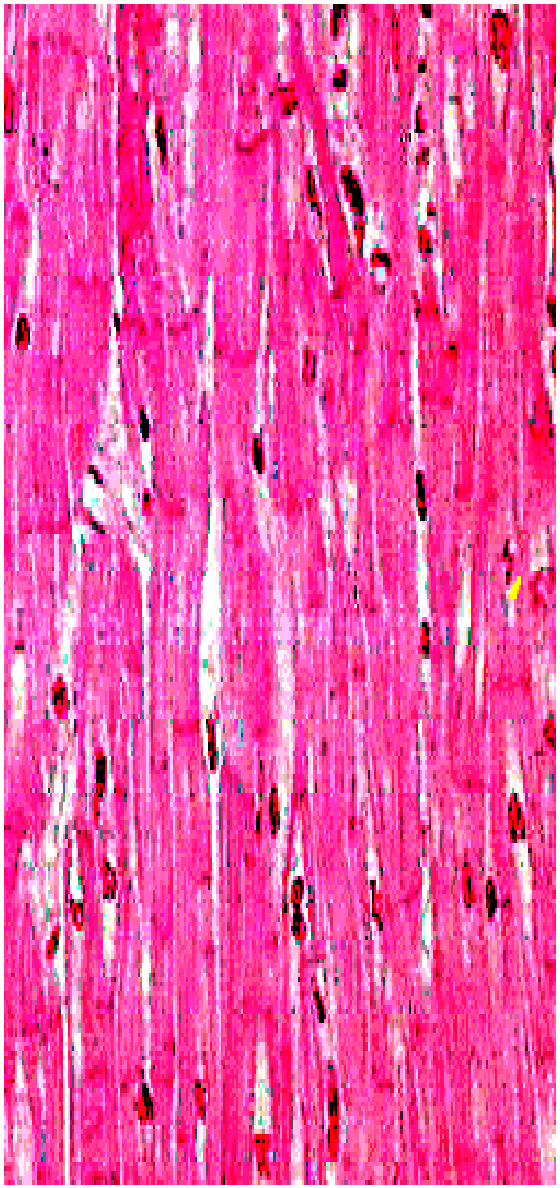


L.S. cardiac muscle

Skeletal Muscle 100x



Smooth Muscle 100x



Cardiac Muscle 100x

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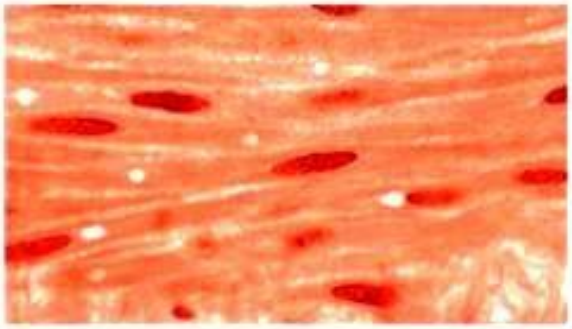

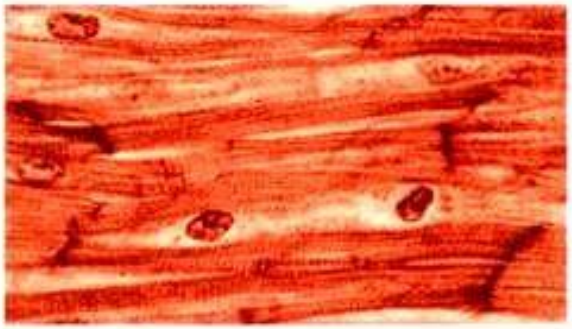

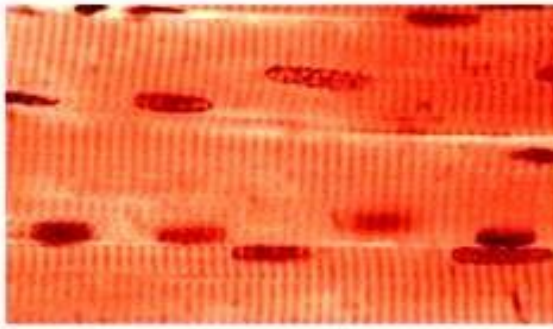

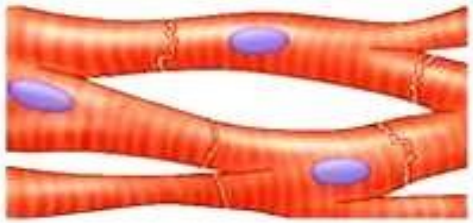

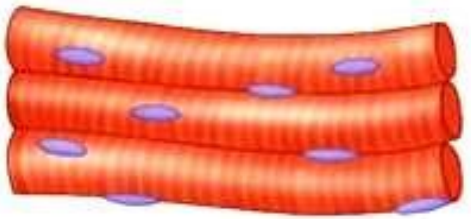

Smooth muscle
- has spindle-shaped, nonstriated, uninucleated fibers.
- occurs in walls of internal organs.
- is involuntary.

Cardiac muscle
- has striated, branched, generally uninucleated fibers.
- occurs in walls of heart.
- is involuntary.

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Skeletal muscle
- has striated, tubular, multinucleated fibers.
- is usually attached to skeleton.
- is voluntary.

Thank you