

# Smooth Muscles



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# Smooth Muscle



## **Introduction**

- Smooth muscle is an involuntary non-striated muscle found in the walls of hollow organs such as the alimentary canal, blood vessels, genital tract , urinary bladder etc.
- These are often called visceral muscles
- It also occurs in the iris and ciliary body of the eye and dermis of the skin

# Smooth Muscle

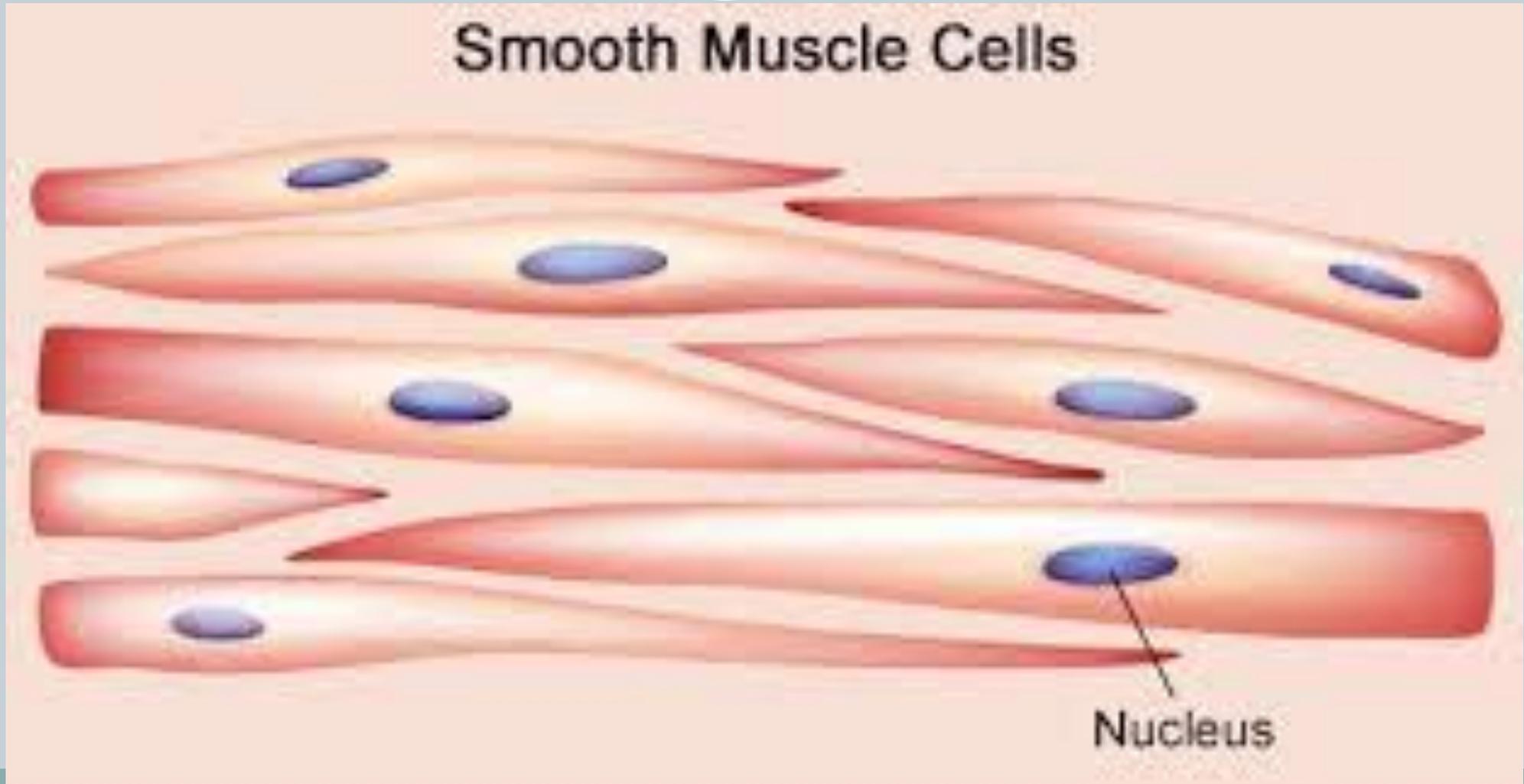


## **Structure of Smooth Muscle**

The smooth muscles consist of long , narrow spindle shaped fibers having tapering ends.

- The smooth muscle cell is 3 to 10 micrometer thick and 20-22 micrometer long
- The cytoplasm is consist mainly of myofilaments
- The cells are uninucleate, nucleus is single oval and centric
- The myofibril is composed of myosin and actin protein, but they do not form dark and light bands

# Smooth Muscle Cells



# Smooth Muscle



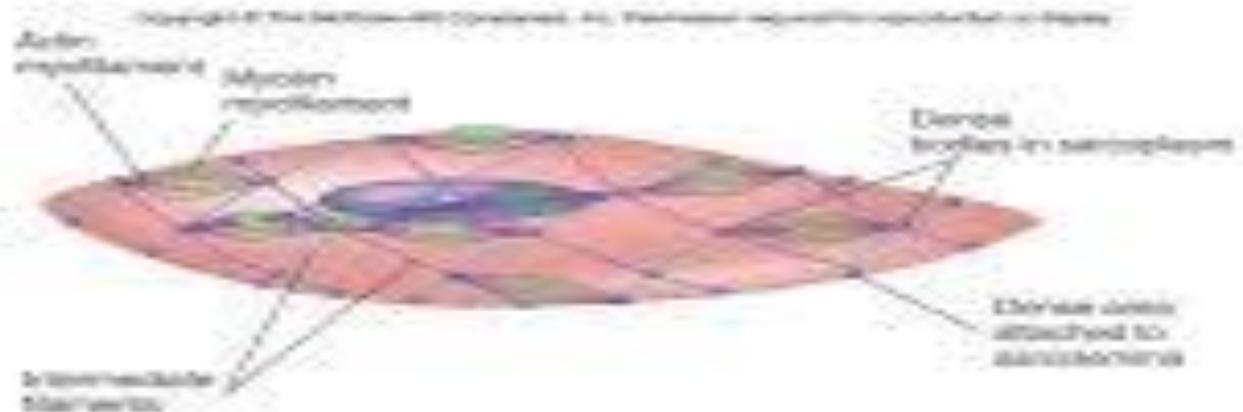
## **Structure of Smooth Muscle.. Contd...**

- The smooth muscle fibers are externally covered by plasma membrane
- The sarcoplasm surrounding the nucleus is clear while the remaining has myofibrils
- The smooth muscle fiber is usually shorter than the striated muscle fiber
- They have less sarcoplasmic reticulum and mitochondria than the striated muscle fiber
- These are not attached to skeletal structure , hence also called non skeletal muscles

# Structure of Smooth Muscle Cells



- Spindle-shaped with a single nucleus
- Have actin and myosin myofilaments
  - Actin myofilaments are connected to dense bodies and dense areas
- Not striated
- No T tubule system and most have less SR than skeletal muscle
- No troponin



# Smooth Muscle



## Types of Smooth Muscles

Smooth muscles are of two types

- **Single unit Smooth Muscles**

- The single unit smooth muscles have fibers that are closely joined together by abundant gap junctions .
- They contract simultaneously as a single unit.
- They have poor nerve supply
- They occur in the walls of hollow organs , such as digestive tract, uterus, urinary bladder etc.

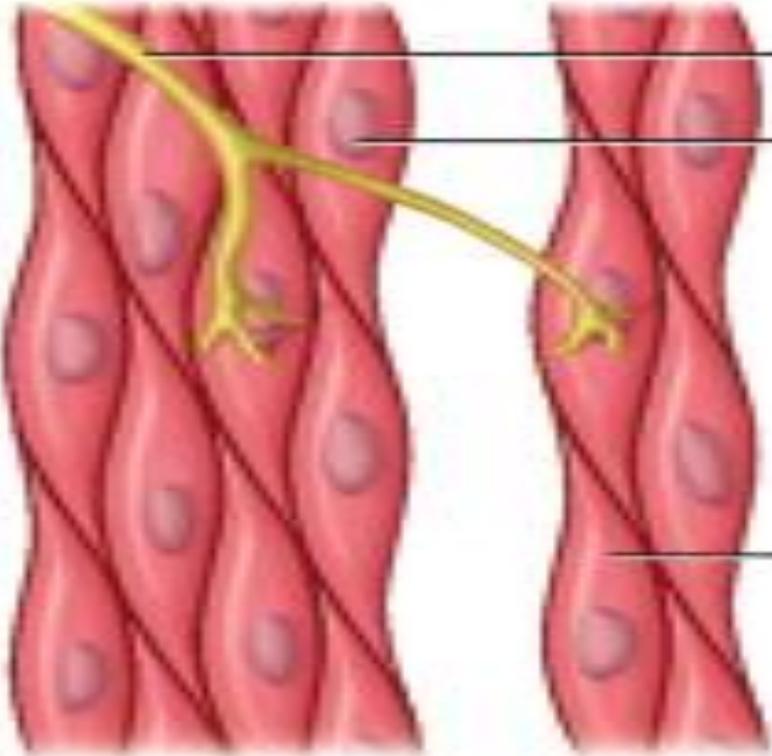
# Smooth Muscle



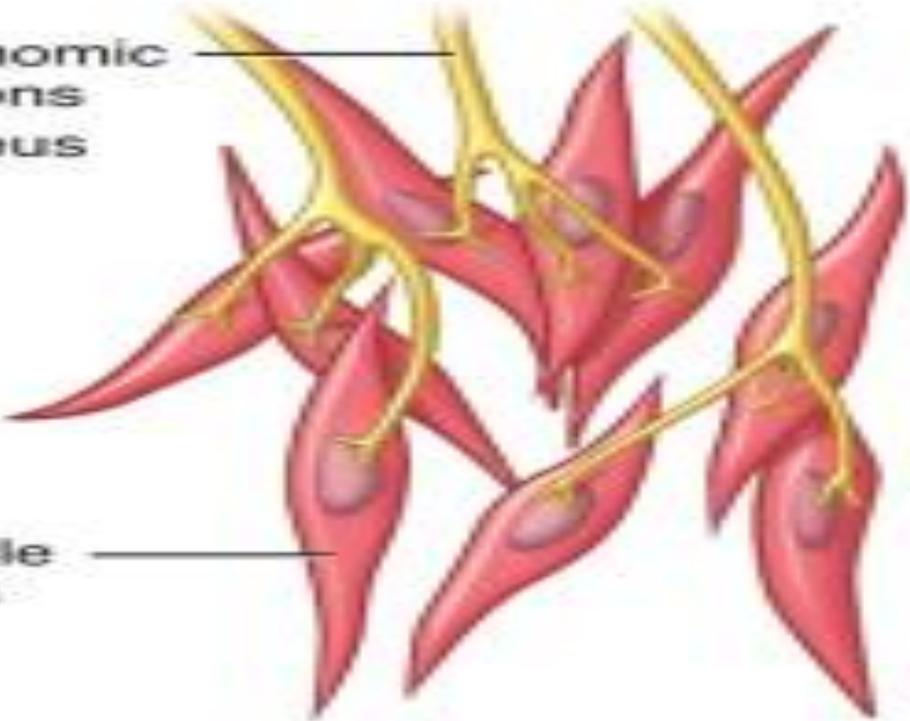
## Types of Smooth Muscles.. contd...

- Multi unit Smooth Muscles
  - The multi unit smooth muscles have fibers which are not so closely packed.
  - The individual fibers of such smooth muscles contract as separate units
  - They occur in the dermis of the skin, iris of the eye and walls of large blood vessels

# Type of smooth muscles



Autonomic neurons  
Nucleus



Muscle fibers

(a) Visceral (single-unit) smooth muscle tissue

(b) Multiunit smooth muscle tissue

# Smooth Muscle



## **Functions of Smooth Muscles**

The main function of smooth muscles is contraction, e.g.

- The smooth muscles in the uterus helps the woman to push out her baby
- In the bladder, smooth muscles help to push out urine
- Smooth muscles facilitate the flow of blood in the arteries
- Helps in movement of food through digestive tract

*Thank You*

