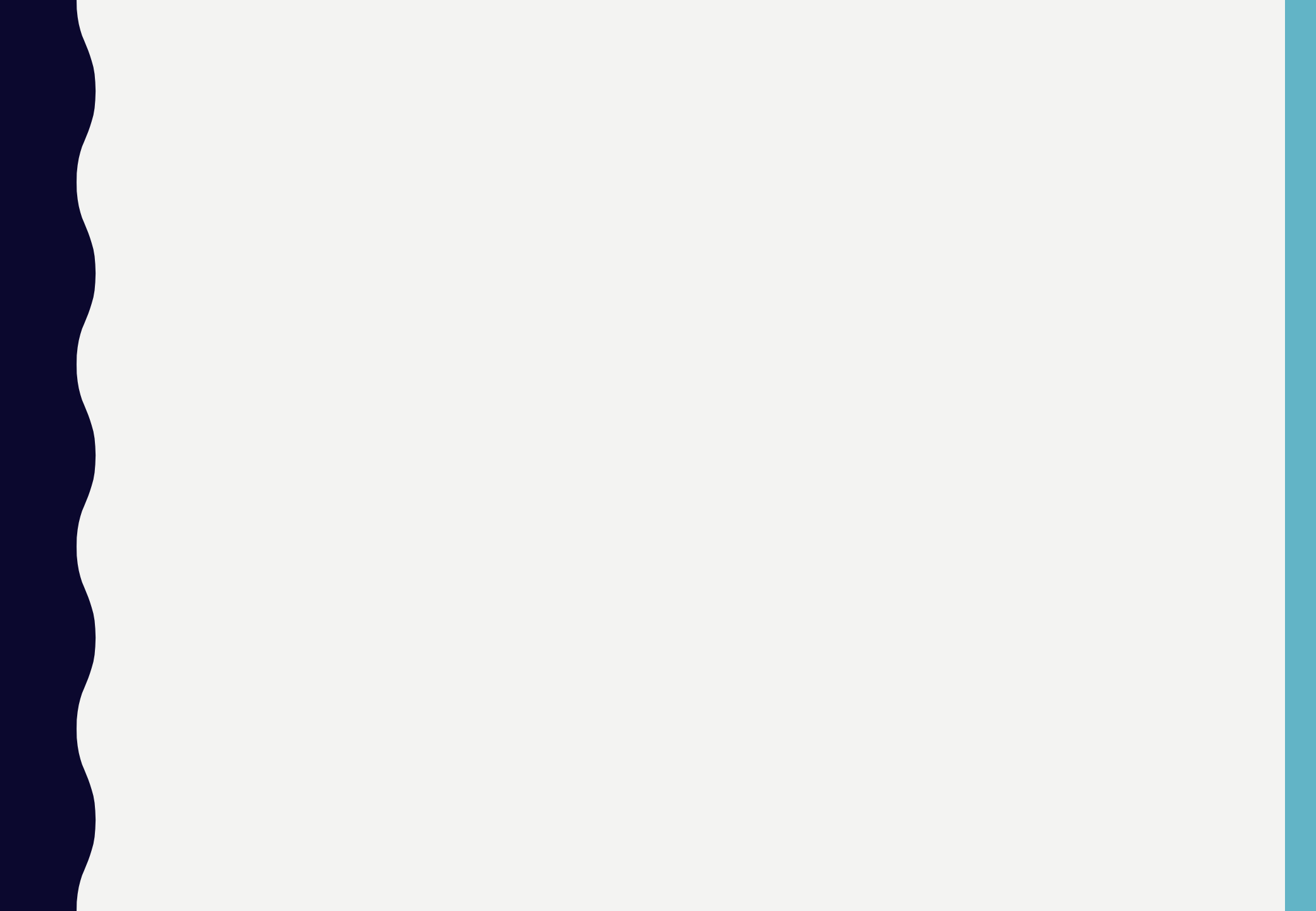


PHYSICAL ERGONOMICS

**DR. ANKUR GUPTA
IIT BHUBANESWAR**

LECTURE OUTLINE

- Introduction
- Musculoskeletal system
- Metabolism
- Cardiovascular System
- Respiratory System



CONVERTING GLUCOSE TO MUSCLE ENERGY

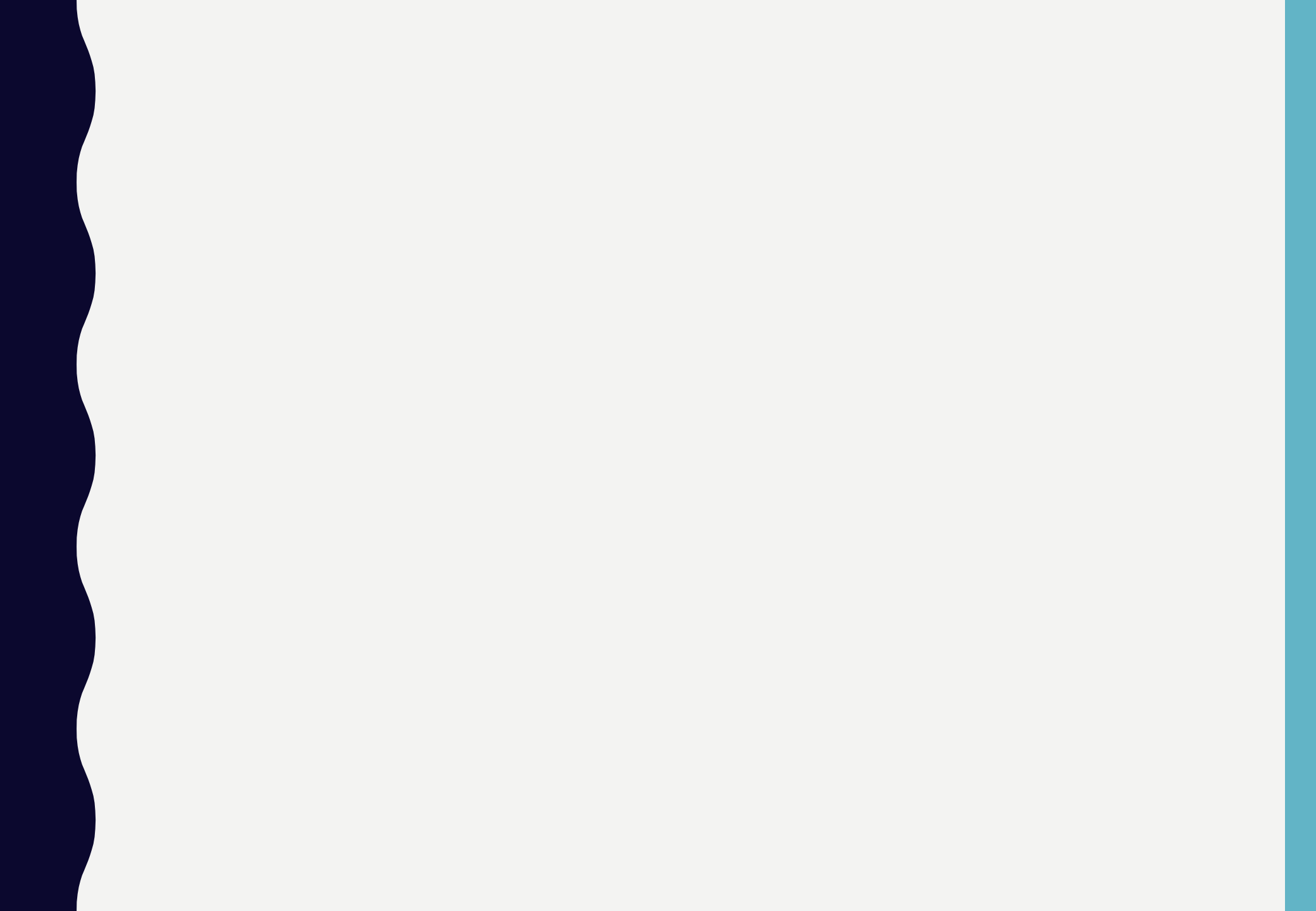
- Carbohydrates are organic compounds that have general chemical formula ($C_x H_x O_x$)
- Carbohydrates are primary source of muscle energy. These are transformed into simple sugars: glucose and glycogen.
- Glycogen is stored in muscles and changed into glucose as required.
- Protein are broken into amino acids.
- Lipids include fat and are converted into fatty acid (e.g. acetic acid and glycerol)

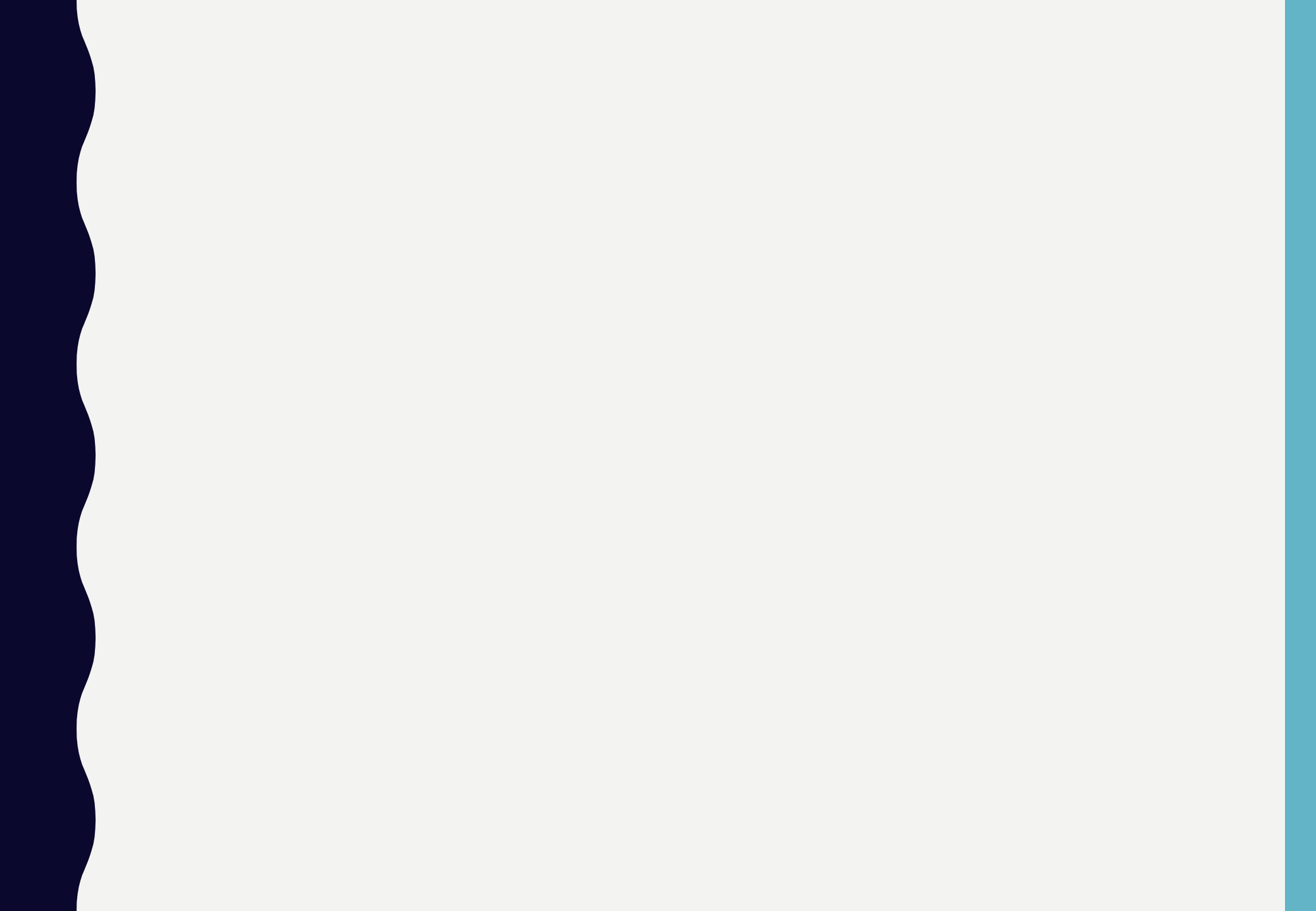
- In the metabolic process, Glucose reacts with oxygen to form carbon dioxide and water, releasing energy in the process



- Called aerobic glycolysis if sufficient oxygen is available
- Immediate energy requirement for muscle contraction are provided by two phosphate compound that are stored in the living muscle tissues: ATP and CP

ATP: Adenosine triphosphate
CP: Creatine phosphate





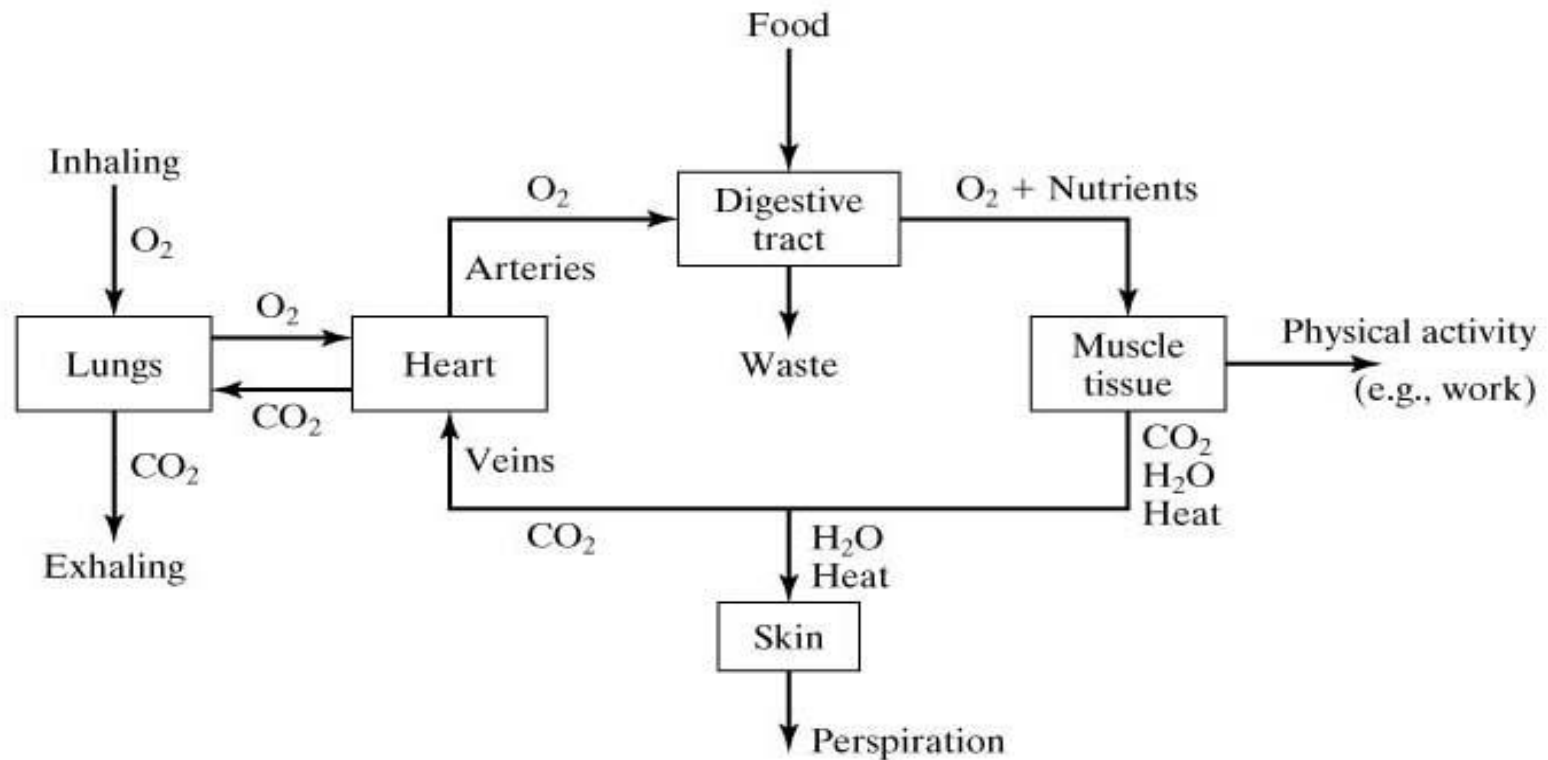
CARDIOVASCULAR SYSTEM

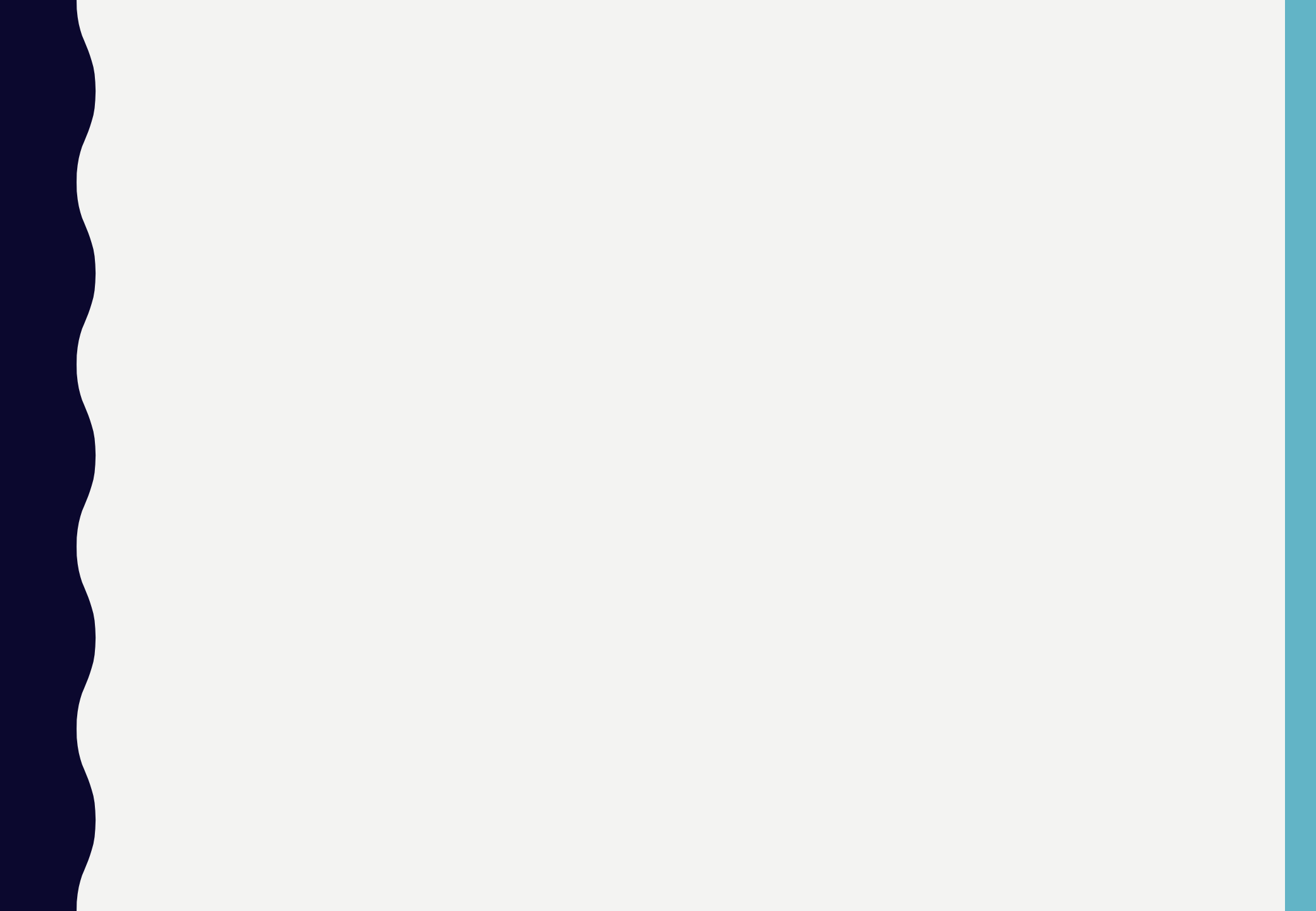
- Consists of :
- Heart : Pump that drives the circulation of blood throughout the body.
- Arteries - deliver oxygen, glucose, & other nutrients from lungs and digestive tract to muscle tissue and organs
- Veins - deliver carbon dioxide & waste products to lungs, kidneys, and liver
- Capillaries - small blood vessels between arteries and veins to exchange nutrients and waste between blood and tissue


RESPIRATORY SYSTEM

- Nasal cavity (nose) - inhales air (oxygen) and exhales carbon dioxide
- Air passageway connecting nasal cavity and lungs
- Lungs - consist of alveoli (air-containing cells) that provide for exchange of gases in the blood circulating through them
 - 200 to 600 million alveoli in adult human lungs
 - Surface area = 70 to 90 m² (750 to 970 ft²)

Respiratory and Cardiovascular Systems





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LECTURE CLOSING

DID YOU KNOW.....?????

- In one day, the average individual's heart exerts enough power to lift a 1-ton weight more than 40 feet off the ground.



IF YOU WERE.....?????

- If you were a coach which type of methods would you like to adapt to analyze performance and strategy of opposition to train your team accordingly so as to make them perform better.....???



A BRIEF HISTORY OF HUMAN PHYSIOLOGY

- Nineteenth century physiologists such as Michael Foster, Max Verworn, and Alfred Binet, based on Haeckel's ideas, elaborated what came to be called "general physiology", a unified science of life based on the cell actions, later renamed in the twentieth century as cell biology.
- In the 20th century, biologists became interested in how organisms other than human beings function, eventually spawning the fields of comparative physiology and ecophysiology. Major figures in these fields include Knut Schmidt-Nielsen and George Bartholomew. Most recently, evolutionary physiology has become a distinct subdiscipline.
- To be continued..... 😊

GRAFFITI



A decorative wavy line in light blue and white runs vertically along the left side of the slide.

THANK YOU



PLEASE READ PHYSIOLOGY FROM
RECOMMENDED REFERENCE BOOKS
FOR A BETTER UNDERSTANDING
OF NEXT LECTURE