



# *Introduction to Medical Measurements*

*Medical Measurements Lab 1*

*Fourth Stage*

*Supervised by*

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# Why studying biomedical instrumentation and measurement?

Studying biomedical instrumentation and measurement is essential for several reasons:

- ❖ **Improving Healthcare:** Biomedical instrumentation and measurement play a critical role in the diagnosis, monitoring, and treatment of various medical conditions
- ❖ **Advancements in Medical Technology:** These advancements can lead to more efficient, less invasive, and safer medical procedures and equipment
- ❖ **Quality Control:** Biomedical instrumentation ensures that medical devices and equipment meet the required quality standards, reducing the risk of errors and malfunctions that could harm patients
- ❖ **Biological Research:** It also supports research in biology and life sciences, allowing scientists to study and understand complex biological processes, which can lead to breakthroughs in areas like genetics, neuroscience, and pharmacology
- ❖ **Patient Monitoring:** Many medical conditions require continuous monitoring, such as heart rate, blood pressure, and oxygen levels.
- ❖ **Interdisciplinary Collaboration:** Biomedical instrumentation bridges the gap

# Basic of biomedical instrumentation and measurement

The science of structure of the body is known as **Anatomy** and that its function **Physiology**.

Anatomy is classified according to the following basis:

- **Gross anatomy** deals with the study of the structure of the organs as seen by the naked eye on dissection It describes the shape, size, component and appearance of the organ under study
- **Topographical Anatomy** deals with the position of the organs in relation to each other, as they are seen in section through the body in different planes
- **Microscopic anatomy** ( is the study of the minute structure of the organs by means of microscopy
- **Cytology** is a special field of histology in which the structure, function and development of the cell are studied

# Basic of biomedical instrumentation and measurement

## PHYSIOLOGY.

Physiology, related to the normal function of the organs of the body, Can be classified in different ways,

- **Cell physiology** is the study of the function of the cell
- **Pathophysiology** relates to the pathological (study or symptoms of disease) function of the organs

In addition, classification into various sub areas dealing with different organs can be made For example

- **Circulatory physiology** is the study of the blood circulation relating to functioning or the heart
- **Respiratory physiology** deals with the functioning of breathing organs

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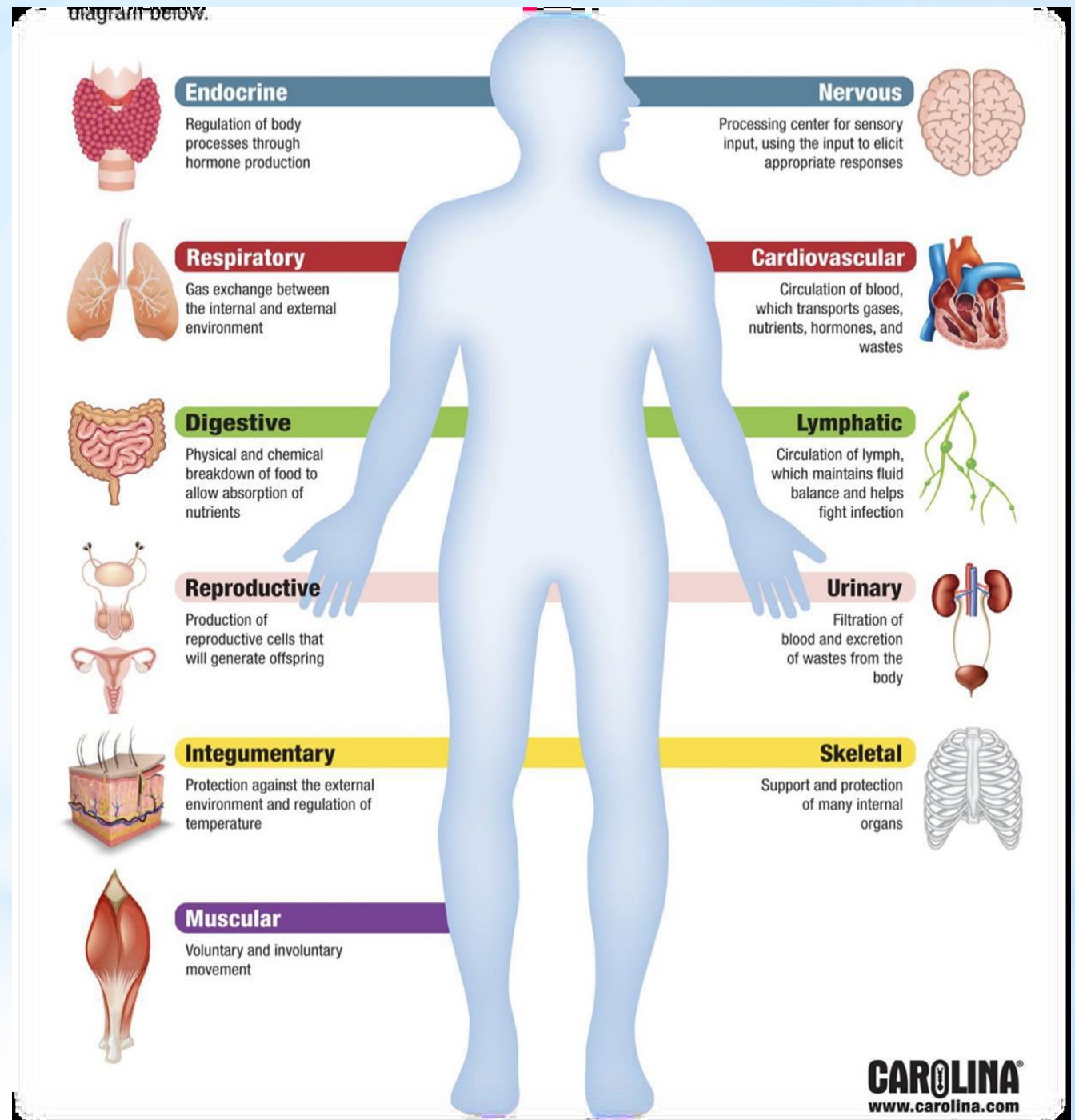
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# Physiology of Human body

Human body consists of many systems

- Respiratory system
- Endocrine system
- Circulatory system
- Cardiovascular system
- Nervous system
- Digestive system
- Reproduction system
- Muscular system
- Skelton system





# Types of Health Care Quality Measures



# Importance of Measurement Accuracy in Medical Readings

- The significance of achieving high accuracy in medical measurements to obtain correct and precise results.
- Factors influencing measurement accuracy, such as the quality of tools and techniques used and the training of the evaluator.



# Blood Pressure Measurement



- The importance of measuring blood pressure in assessing heart and blood vessel health.
- The tools used for blood pressure measurement, how to read and interpret the readings.

# Heart Rate Measurement



- The importance of measuring heart rate in evaluating heart function and detecting abnormal changes.
- Heart rate measurement devices, measurement methods, and interpretation of readings

# Temperature Measurement



- The importance of measuring body temperature in diagnosing fever and other heat-related conditions.
- Temperature measurement tools, their types, and proper usage

# Oxygen Saturation Measurement



- The importance of measuring blood oxygen saturation and evaluating respiratory function.
- Oxygen saturation monitoring devices, measuring saturation levels, and interpreting results

# Blood Glucose Measurement



- The importance of measuring blood glucose levels and monitoring glucose levels in diabetic patients.
- Blood glucose measurement tools, measurement methods, reading interpretation, and analysis.