DEPARTMENT OF HUMAN PHYSIOLOGY

प्रयोगशाला—शरीर क्रिया विज्ञान
Physiology Laboratory

DEPARTMENT OF HUMAN PHYSIOLOGY

Human Physiology is the science that deals with various functions of the human mechanisms under normal condition and their regulation under different physiological and pathphysiological conditions.

Students are taught the Physiology of different systems in the body. It includes hematology, cardio-vascular system, respiratory system, system, reproductive system, excretory physiology, gastroint Impacts of Yoga on Human Body are being taught to students.

The theoretical aspects are taught by the faculty during the lecture hours. The Practical aspects are taught in the Hematology, and Human Physiology labora and also learn to interpret the results of different procedures with special reference to clinical correlation.

This department is composed of Hematology, and Human Physiology laboratory. Hematology laboratory is equipped with monocular and binocular microscopes for every student. Latest gadgets are available for routine hematological investigations. Human physiology laboratory provides enough space including beds to carry out clinical and pre clinical expe equipped with basic instruments like weighing machine, height scale, caliper, stethoscope, sphygmomanometer, stopwatch, pulse oximetry etc to carry out routine clinical test.

laboratory is also equipped with Computerized Spirometer for Lung Function Test (LFT) Monitoring System etc.

Wireless Physiological Monitoring System

This instrument provides hardware and software support for Physiological Monitoring. Bionomadix is a product of BIOPAC Systems, Inc. Bionomadix is a system of wireless devices that can record and transmit physiological data from subjects in various environments and situations. It is designed for research applications that require greater degrees of subject freedom and complex experimental design. Bionomadix can measure many Physiological signals but Department of Human Physiology, MDNIY have the access of ECG, EMG, EDA, pulse, respiration and cardiac output. This device can interface with the MP160 data acquisition and analysis platform and AcqKnowledge software for a complete, wireless in-lab solution that supports advanced analysis for multiple applications.

Parameters may acquire:

➢ Electrocardiography followed by Heart rate Variability.

➢ Electromyography - Maximum Voluntary force of Muscle

➢ Electro dermal activity related to skin conductance.

➢ Pulse, respiration and cardiac output
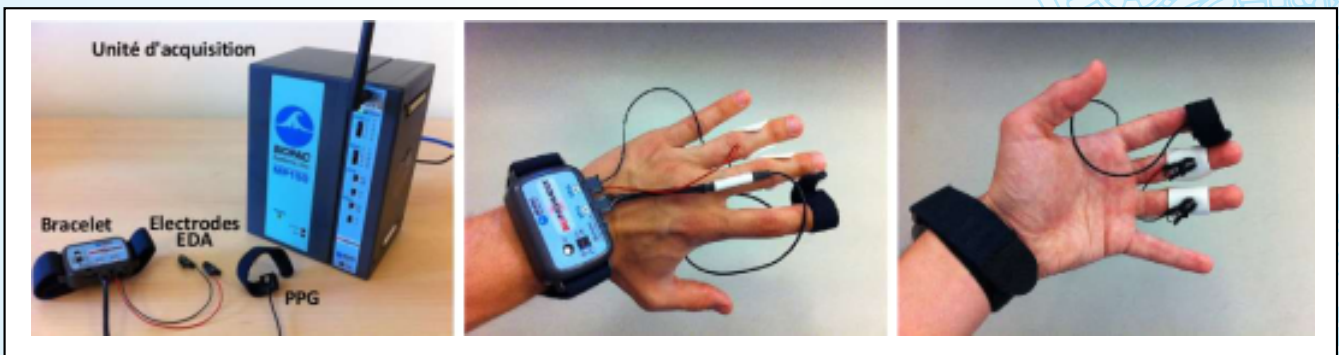
References: BIOPAC data acquisition and analysis solutions for measuring physiology have been validated in over 49,600 published scientific studies and papers worldwide, including more than 13,600 citations for Psychophysiology Applications.

The Link is: **https://www.biopac.com/psychophysiology-citation-list/**

Body Composition Analyzer

A body composition analyzer is a device that measures the percentage of fat, muscle, water, and bone in the human body. It can help you monitor your health and fitness goals by providing more accurate information than just weight and BMI. The brands which body composition analyzer Physiology laboratory of MDNIY has is Charder MA601 and BCA 1C. Charder is a manufacturer of medical scales and body composition analyzers for research and clinical applications. Bioelectrical Impedance Analysis is a technique used to estimate body composition. A weak electric current is passed through the body, and the speed at which the current flows through the body determines the amount of fat, water and muscle content. Advanced body composition analysers like the MA601 use BIA to provide a full breakdown of body composition. Traditional BIA body composition scales will use one frequency; the MA601 uses three. Low frequencies can have difficulty overcoming and passing through cell membranes, so are well suited for measuring extracellular water. High frequencies can pass through cell membrane walls, so they can provide intracellular readings.

Measures Basal Metabolic Rate (BMR), Total Body Water (TBW), Fat Free Mass (FFM), Fat Mass (FM), Body Fat %, Muscle Mass (MM), Protein Mass (PM), Extracellular Water (ECW), Intracellular Water (ICW), Skeletal Muscle (SM), Metabolic Age (AGEM), Visceral Fat Level, Body Balance Evaluation, Obesity Analysis, Body Type Analysis, Muscle Quality, Weight, and BMI.

References:

➢ Bioelectrical Impedance Analysis in a Mathematical Model for Estimating Fat-Free Mass in Multiple Segments in Elderly Taiwanese Males. International Journal of Gerontology (2012) 1-5.

➢ The novel application of artificial neural network on bioelectrical impedance analysis to assess the body composition in elderly. Nutrition Journal 2013, 21:2 1.

➢ New Application of Bioelectrical Impedance Analysis by the Back Propagation Artificial Neural Network Mathematically Predictive Model of Tissue Composition in the Lower Limbs of Elderly People. International Journal of Gerontology 6 (2012) 20-26.

Computerized Spirometer

Spirometer is used to RMS Helios Series of Spirometer are available in PC Based and Stand alone Versions capable of diagnosing, differentiating and measuring various pulmonary diseases. The Helios series Spirometry Machine comes with a highly advanced and user-friendly Software offering 34 Parameter readings, Pre-Post Bronchodialation Results, Percentage Improvement and Lung Age Calculations. The interpretation of the test results, trends and pediatric incentives are also available in the software. RMS is the leading manufacturer of PC Based Spirometer and Portable spirometer also known as spirometry machine, Pulmonary Function Testing Machine, pft machine. High resolution color graphic TFT. Built-in thermal printer. Indian predicted equations. Facility to download data to PC.

Measures Forced Vital Capacity (FVC), Slow Vital Capacity (SVC) and Maximum Ventilatory Volume (MVV). Evaluation of 51 vital parameters with interpretation.

References:

➢ Uz-Zaman S, Banerjee J, Singhamahapatra A, Dey PK, Roy A, Roy K, Roy Basu K. Assessment of lung function by spirometry and diffusion study and effect of glycemic control on pulmonary function in type 2 diabetes mellitus patients of the eastern India. J Clin Diagn Res. 2014 Nov;8(11):BC01-4. doi: 10.7860/JCDR/2014/9756.5076.

➢ Banerjee, J.; Sengupta, A.; Sinhababu, A. K.; Singhamahapatra, A.; Dey, P. K. Assessment of Acute Bronchodilator Response in Participants With or Without Airway Obstruction in a Tertiary Care Hospital of West Bengal. ijcep 2017, 4, 92-96.

➢ Madhur S, Kour H, A cross sectional study to find the association between junk food, obesity and peak expiratory flow rate in medical students of age group 18 to 25 years. Indian J Clin Anat Physiol 2019;6(3):269-274.

Multipara Monitor

Multipara Monitoring system is designed to help you enhance patient care and improve clinical performance. The multipara patient monitors are available in a wide range, starting from basic single vital sign parameter which makes them ultra portable to feature packed high-end multiparameter models which include all the major vital signs offering connectivity options to Central Monitoring Station.

Accurate real time monitoring of Electrocardiography (ECG), Peripheral Oxygen Saturation (SPO2), Non – Invasive blood Pressure (NIBP), Body Temperature, Respiration, Heart Rate, and End Tidal Carbon-di-oxide (EtCO2). Mainstream EtCO2 technology to obtain fast, simple, and accurate CO2 results. The choice of 12.1" LED color display provides superior flexibility for different clinical applications.

Instruments also available in the laboratory for practical of students and their uses are mentioned hereunder.

S.No.	Instrument/Device	Use	Photo
1.	Stadiometer	It is use to measure Height, Weight, Body Mass Index and fat%.	
2.	Wall mount Height Scale	It is used to measure total height.	
3.	Anthropometer	It is used to measure height of each parts of body. It is also used to measure girth.	
4.	Skin fold measuring caliper	It is used to measure Skin fold. Fat% may be calculated manually from skin fold.	
5.	Vernier caliper	It is used to measure size of small parts of body like size of fingers.	

S.No.	Instrument/Device	Use	Photo
6.	Measuring tape	It is used to measure diameter of different parts of body.	
7.	Weighing machine (Digital and Manual)	Weight measurement.	
8.	Compound Microscope	To magnify objects.	
9.	Hemoglobinometer	To measure hemoglobin.	
10.	Hamocytometer	To count Red Blood Cell, White blood cell.	
11.	Stethoscope	Clinical examination of the chest. Blood pressure measurement.	

S.No.	Instrument/Device	Use	Photo
12.	Sphygmomanometer	Blood pressure measurement.	
13.	Digital Blood pressure monitor	Blood pressure measurement. Heart rate measurement	
14.	Electrocardiography	ECG Record, Analysis of heart activity.	
15.	Hammer	To test reflex activity. Test of Nerve muscle Physiology	
16.	Thermometer	To record body temperature.	
17.	Stopwatch	To record time	

S.No.	Instrument/Device	Use	Photo
18.	Tunning forks	To test the ear for hearing.	
19.	Vitalograph (with water drum)	To record vital capacity. Lung Function measurement.	
20.	Peak flow meter	To record peak expiratory flow rate. Lung Function measurement.	
21.	Pulse Oximeter	To record peripheral oxygen saturation.	
22.	Steps for two step performance test	It is use during exercise to test performance. Cardio - respiratory performance measurement.	
23.	Hand Grip Dynamometer	It is use to measure strength of hand muscle.	
24.	Back and Leg strength Dynamometer	It is use to measure strength of back and leg muscle.	