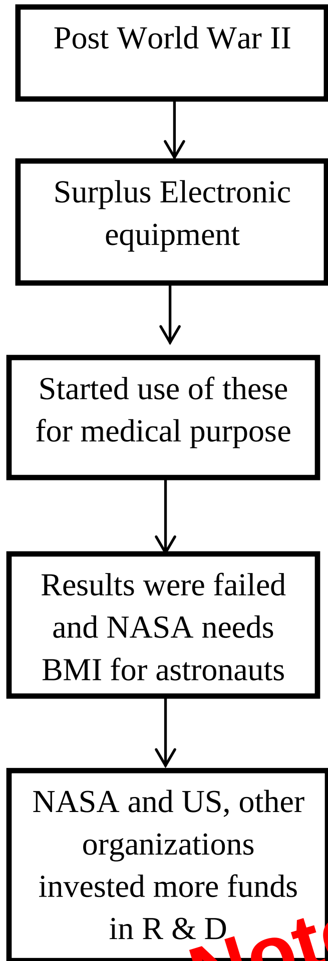

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Figure 2: Pictorial representation of age of Biomedical Instrumentation

Components of man-instrument system: It consists of following components.

1. Subject

2. Stimulus

3. Transducer

4. Signal condition circuit

5. Display device

6. Recording, data processing and transmission equipment

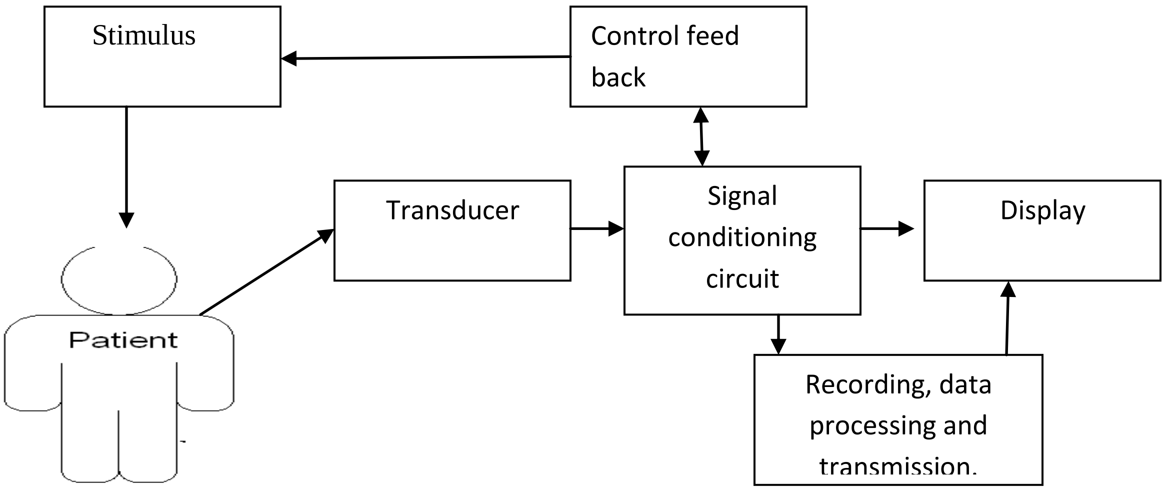

Figure 3: Block diagram of man Instrument system

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Subject: subject is the human being on whom the measurements are made. It constitutes a many biopotentials and living organisms. Some of the biopotentials are electrocardiogram, electromyogram, electroencephalogram and electroretinogram.

Stimulus: In many measurements, the response to some of external stimulus is required. The stimulus may ne visual (flash of light), auditory (tone), tactile or direct electrical stimulation of some of the nervous system.

Transducer: it is defined as capable of converting one of energy to another. It sense the biopotential converts to electrical signal. For example thermistor converts temperature to electrical signal, strain gauge produces electrical signal by sensing the pressure.

Signal conditioning circuit: biomedical signal comes from transducer transferred to signal conditioning circuit. It amplify the given signal some extent then process the signal by removing the noise and measure signal parameters. Finally transfer measured parameters to either display or memory for future purpose.

Display device: output of signal conditioning circuit must be converted into form that can be perceived by one of man's senses and that can be convey the information obtained by the measurements in a meaningful way. It can be visual, audible or tactile information.

Recording, data processing and transmission: It is often necessary to record the measured information for possible later use or to transmit it from one location to another. It used, where computer control is employed so that automatic storage or processing is required.

Control feedback device: it is necessary or desirable to have automatic control of stimulus, transducer or ant part of man-instrument system, a control system is incorporated. This system channels to open, producing a greater electric current across the cell membrane, and so on. The process proceeds explosively until all of the available ion channels are open, resulting in a large upswing in the membrane potential. The rapid influx of sodium ions causes the polarity of the plasma membrane to reverse, and the ion channels then rapidly inactivate. As the sodium channels close, sodium ions can no longer enter the neuron, and then they are actively transported back out of the plasma membrane. Potassium channels are then activated, and there is an outward current of potassium ions, returning the electrochemical gradient to the resting state. After an action potential has occurred, there is a transient negative shift, called the after hyperpolarization.

Propagation of action potential:

All cells in animal body tissues are electrically polarized – in other words, they maintain a voltage difference across the cell's plasma membrane, known as the membrane potential. This electrical polarization results from a complex interplay between protein structures embedded in the membrane called ion pumps and ion channels. In neurons, the types of ion channels in the membrane usually vary across different parts of the cell, giving the dendrites, axon, and cell body different electrical properties. As a result, some parts of the membrane of a neuron may be excitable (capable of generating action potentials), whereas others are not. Each excitable patch of membrane has two important levels of membrane potential: the resting potential, which is the value the membrane potential maintains as long as nothing perturbs the cell, and a higher value called the threshold potential. At the axon hillock of a typical neuron, the resting potential is around –70 millivolts (mV) and the threshold potential is around –55 mV. Synaptic inputs to a neuron cause the membrane to depolarize or hyperpolarize

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