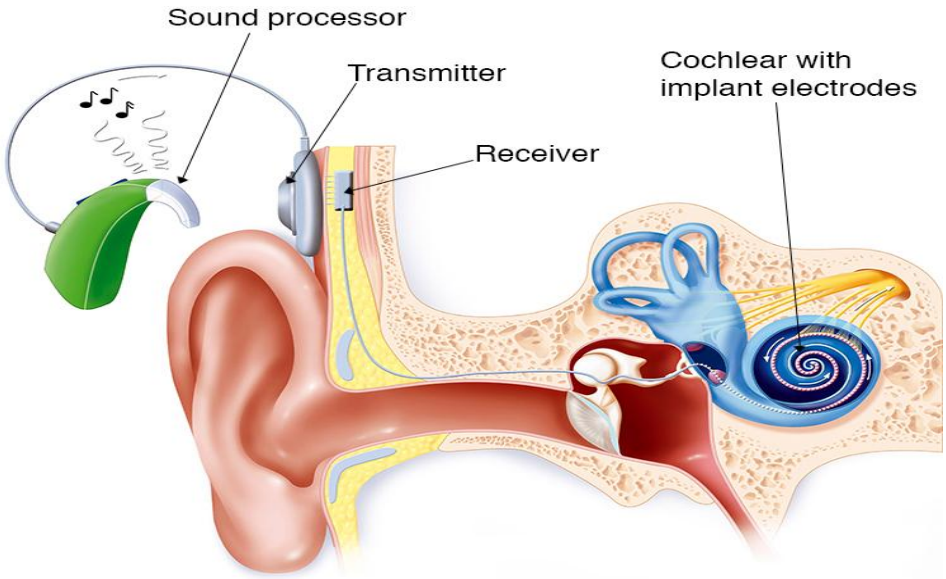
Cochlear prosthesis



This device is used for the patients that had dysfunction of sound transducing apparatus of the middle and inner ear.

It consist of a set of electrodes that are passed into the scalar tympani of the inner ear such that current form these electrodes can stimulate the nerves of the modulus along the center of the cochlea.

Prosthesis that employs single-channel or multichannel system gives that patient sensation of sound when the electrodes are stimulated.

The prosthesis consists of two sections:

1. The implemented stimulation.
2. External microphone and stimulus control unit.

‘

External unit consist of:

1. Microphone: to pick up the sound.

2. Speech processor circuit: to determine when specific characteristics of the picked up sound by the microphone that will be used to control the stimulating electrodes.

A simple form of such a processor is a set of band pass filters arranged such that the output signal from these filters represents the sound intensity in particular pass band as a function of time.

The signal from each pass band then is used to control stimulation such that it simulation is a particular set of electrodes in the cochlea.

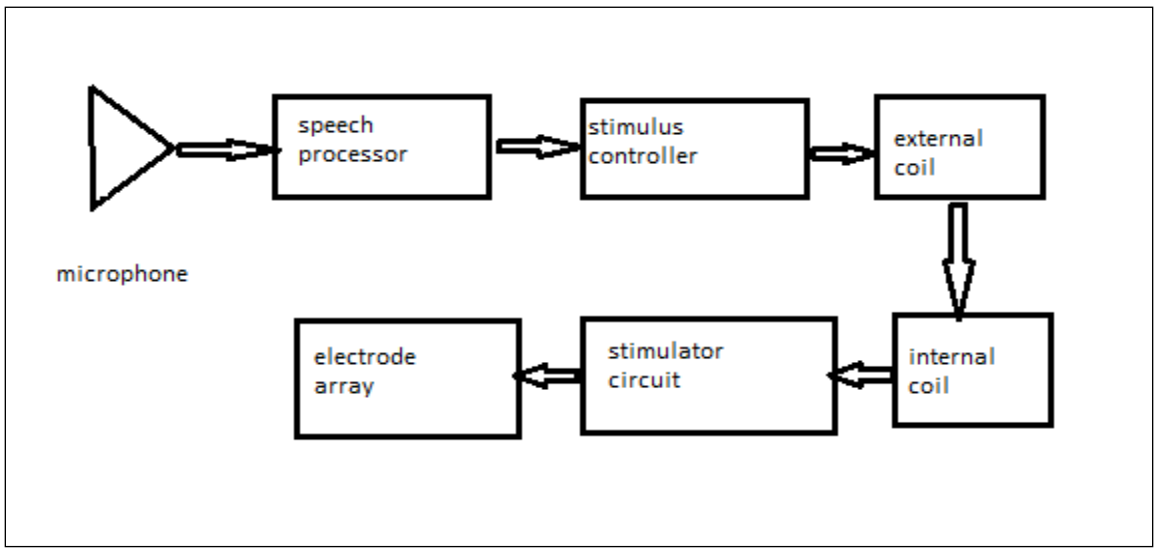
3. Stimulus controller: takes the information from the speech processor and used it to determine a stimulus pulse should be applied to a particular set of electrodes.

4. External coil: takes the output from the stimulus controller circuit, it might be single or multi coil that is applied to the skin behind the ear directly over a similar coil that is implanted under the skin.

5. The input and power supply to the implanted unit come from the internal coil.

6. The stimulator circuit: applies and appropriate electric pulse to the electrode pair selected by the stimulus controller.

7. The electrode array: consist of one or more pair of very small electrode that are placed on a flexible structure that can be assume a spiral shape of the cochlea. Electrodes are positioned such that they face the basilar membrane when the electrodes inserted into the scalar tympani it had been made of fine wires case in silicon.


speech processor
stimulus controller
external coil
microphone
internal coil
stimulator circuit
electrode array