

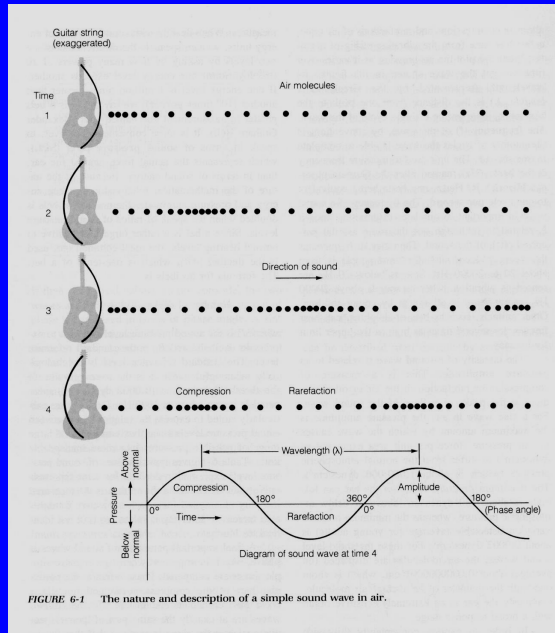
# Audição

<http://www.iurc.montp.inserm.fr/cric/audition/english/start2.htm>

## A Percepção Auditiva

- Estímulo sonoro
- Sistema auditivo
  
- princípios de organização auditiva
- Percepção espacial
- Percepção musical
- Percepção da fala

# SOM



## Som

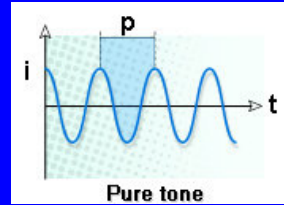
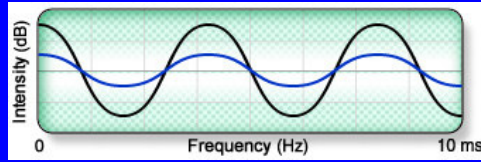
- | Acústica                  | Percepção                      |
|---------------------------|--------------------------------|
| • intensidade sonora (dB) | - <i>loudness</i> (sonoridade) |
| • freqüência (Hz)         | - <i>pitch</i> (tonalidade)    |
| • espectro sonoro         | - timbre                       |

## O DECIBEL

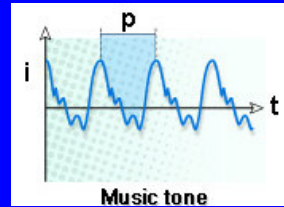
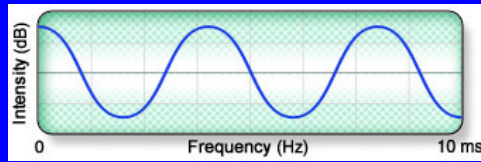
- **Nível de Pressão Sonora (NPS)**
- **$P_0 = 2 \cdot 10^{-5} \text{ N/m}^2$  (limiar da audição)**
- **$\text{NPS (dB)} = 20 \log (P/P_0)$**

<i>Source</i>	<i>Sound Level (dB)</i>
Manned spacecraft launch (from 45 m)	180
Loudest rock band on record	160
Pain threshold (approximate)	140
Large jet motor (at 22m)	120
Loudest human shout on record	111
Heavy auto traffic	100
Conversation (at about 1m)	60
Quiet office	40
Soft whisper	20
Threshold of hearing	0

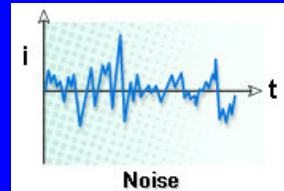
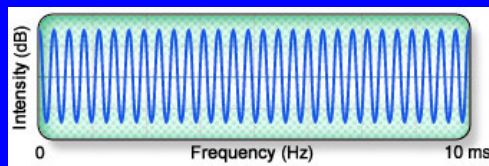
# O Som



Pure tone

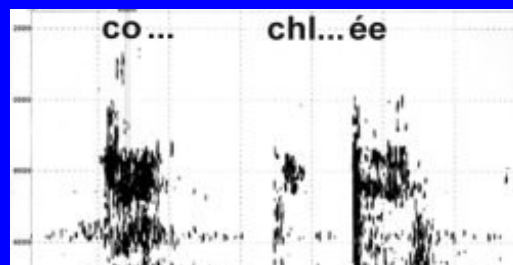
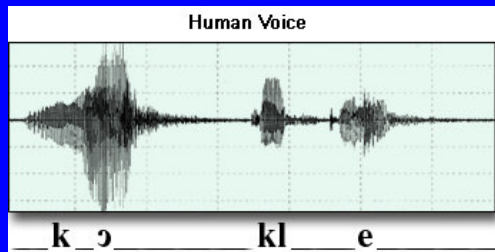


Music tone



Noise

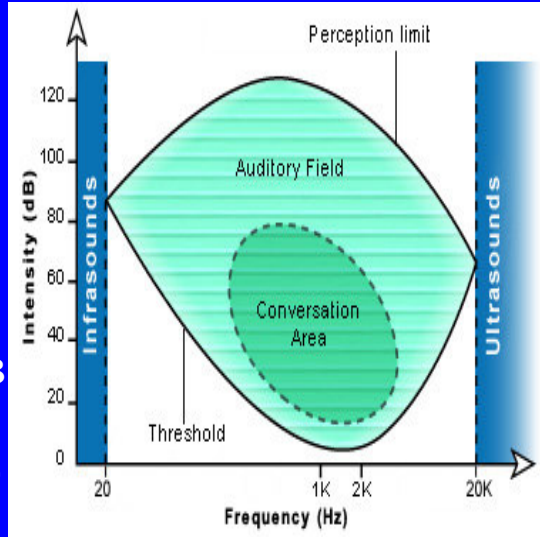
# A voz humana



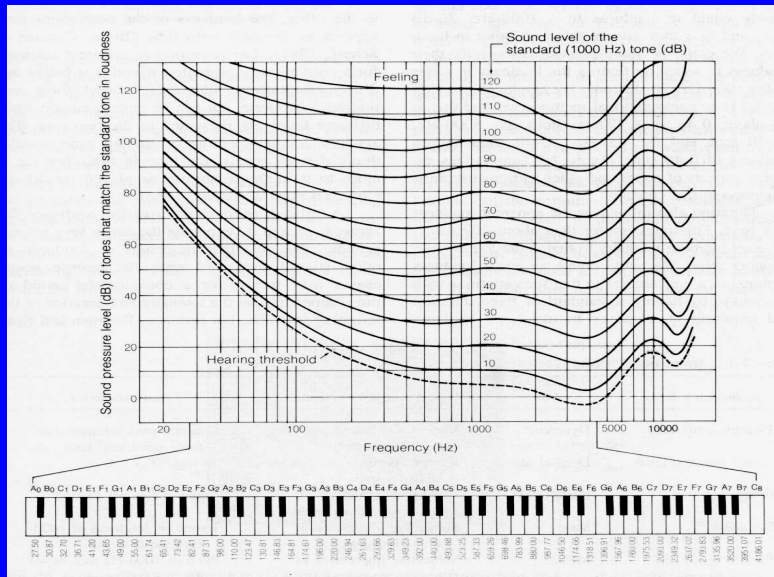
Espectrograma  
ou  
sonograma

## Parâmetros psicoacústicos

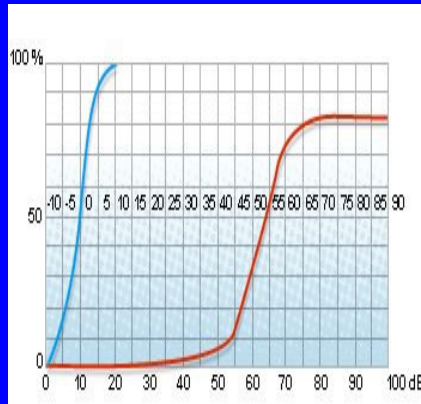
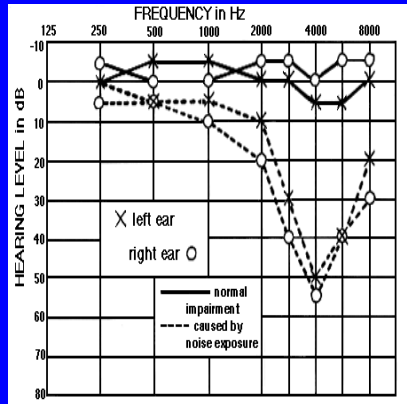
- espectro sonoro audível: 20Hz a 20kHz
- Infra-som <20Hz
- Ultra-som >20kHz
- limiar absoluto para intensidade sonora: quase 0dB entre 1 e 2 kHz
- limiar de dor: 130-140dB



## Igualdade de loudness em função da frequência sonora



# Audiograma e Logaudiograma



# O Sistema Auditivo

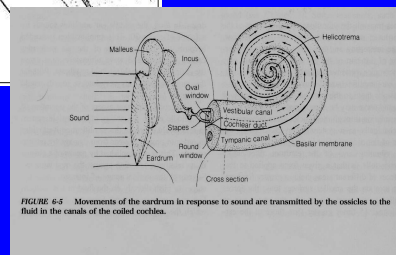
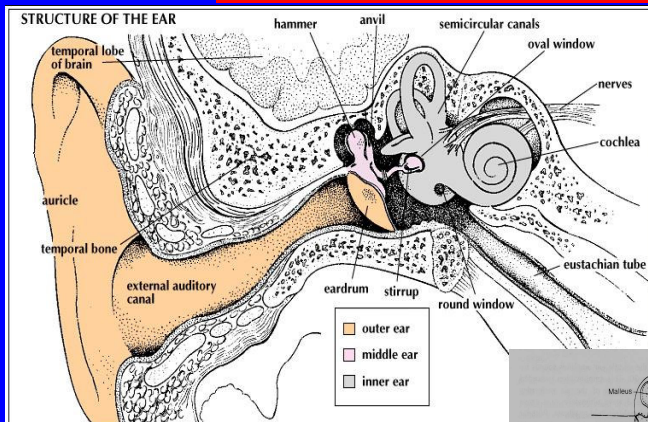


FIGURE 6-5 Movements of the eardrum in response to sound are transmitted by the ossicles to the fluid in the canals of the coiled cochlea.

# Propagação do som na cóclea

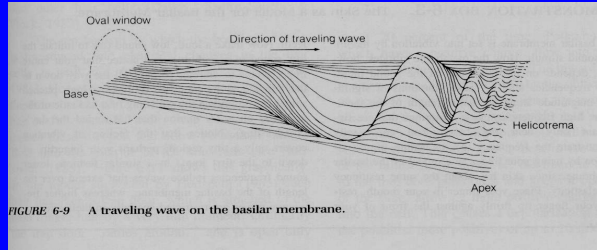
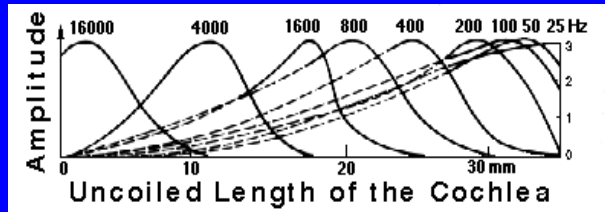
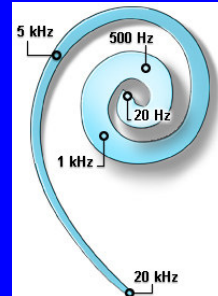


FIGURE 6-9 A traveling wave on the basilar membrane.



# Cóclea

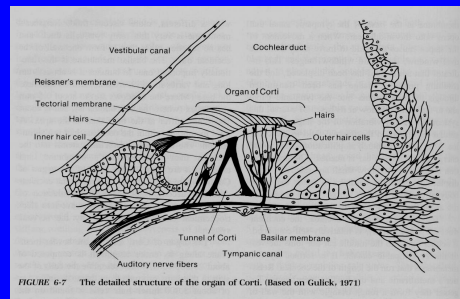
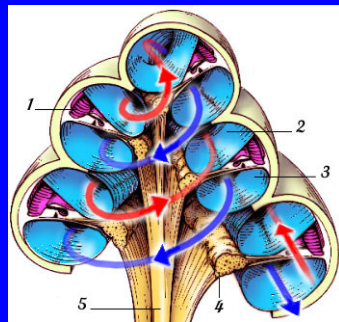
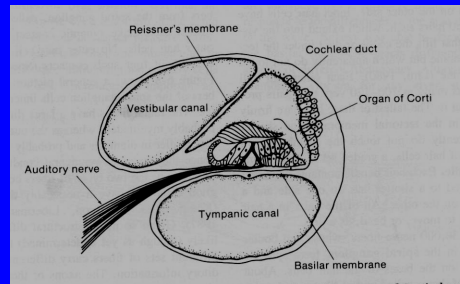
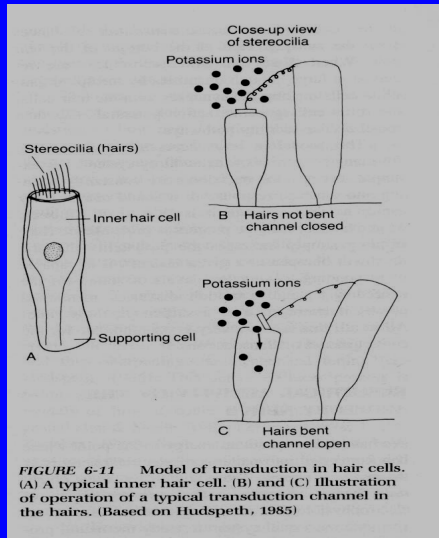


FIGURE 6-7 The detailed structure of the organ of Corti. (Based on Gulick, 1971)

# Transdução nas Células Ciliadas



Orientaçãol

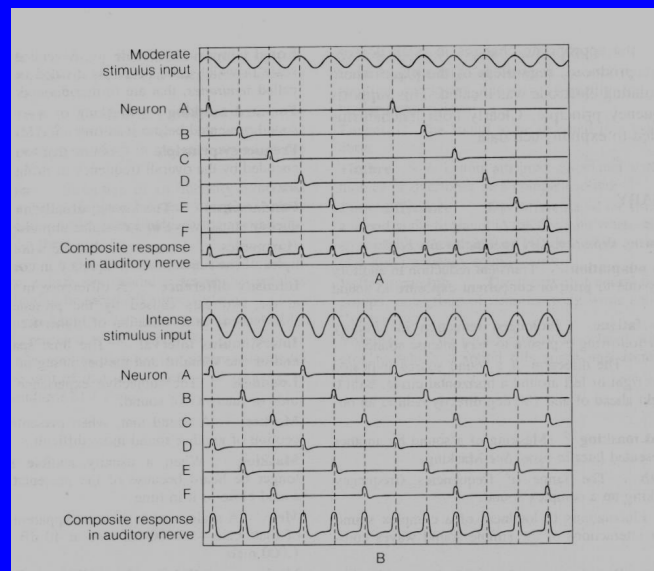
Orientaçãol2

Fase

Sincronia

Volley

# Princípio de Volley





# Vias Auditivas

