Sensation Introduction

Transduction: How external stimuli get turned into electrical activity by sensory neurons

Some types of sensations and their causes

Vision – light

Smell – odour molecules

Taste – food molecules

Hearing – air pressure

Touch – pressure, temperature

Proprioception (kinaesthesia)

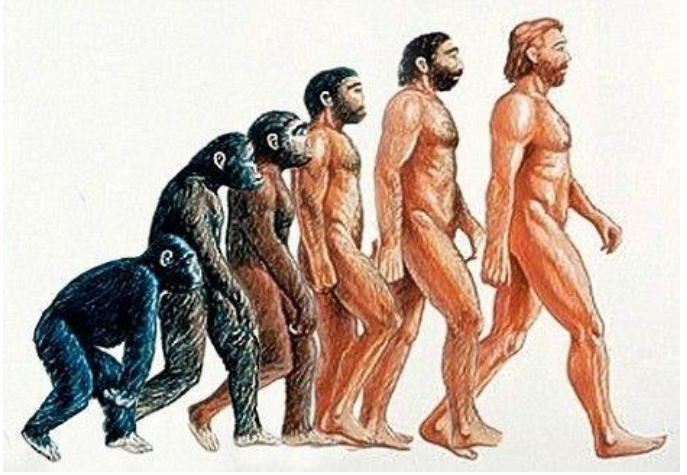
- Sense of self-movement and body position
- In part vestibular – movement of fluid in the inner ear

Some basics

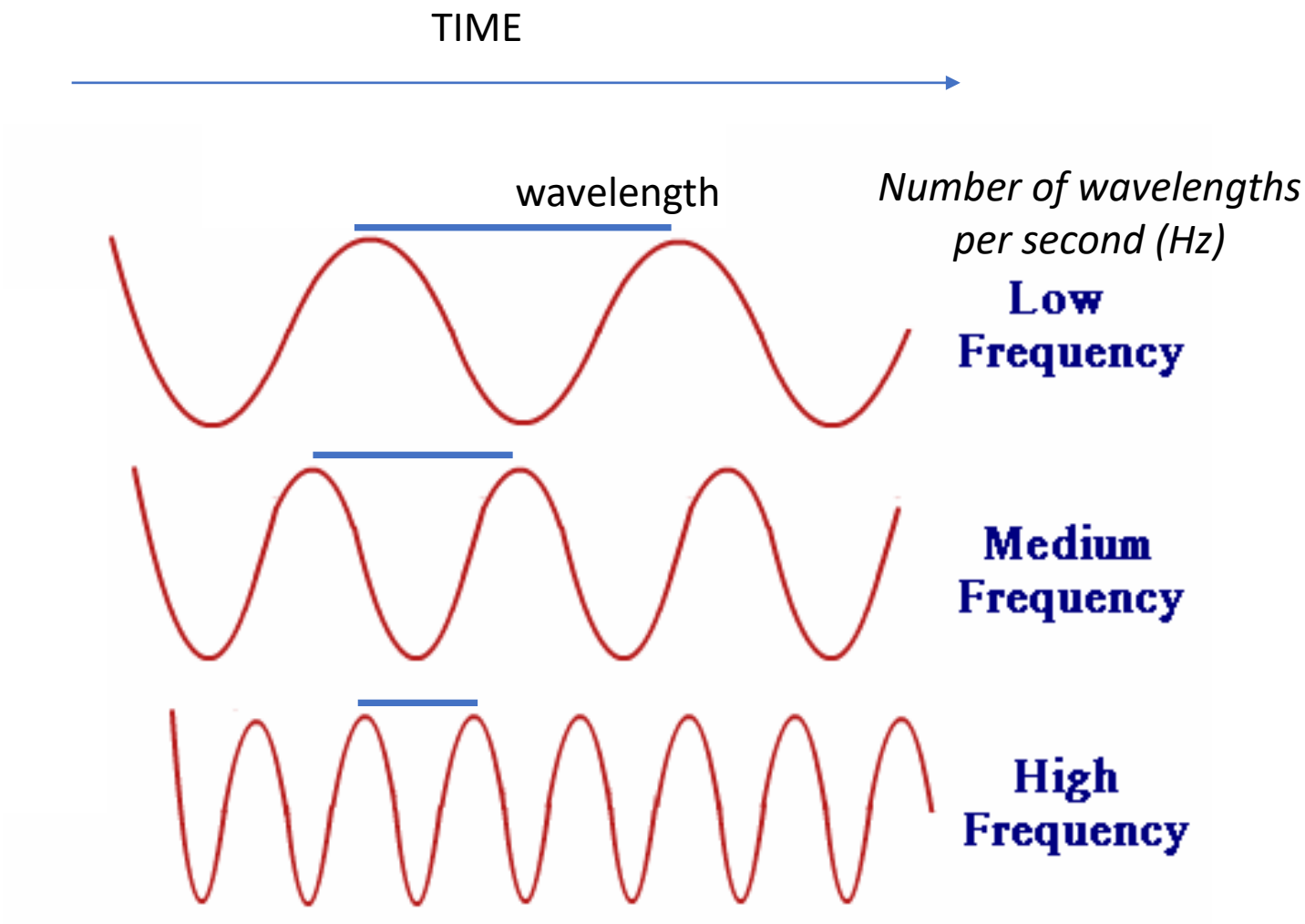
You can think of sensation as a signal/receiver problem

- The signal is what is in the environment (e.g., light, temperature)
- The receiver is you and whatever sense is being affected

The signal must be of some form that you are able to process



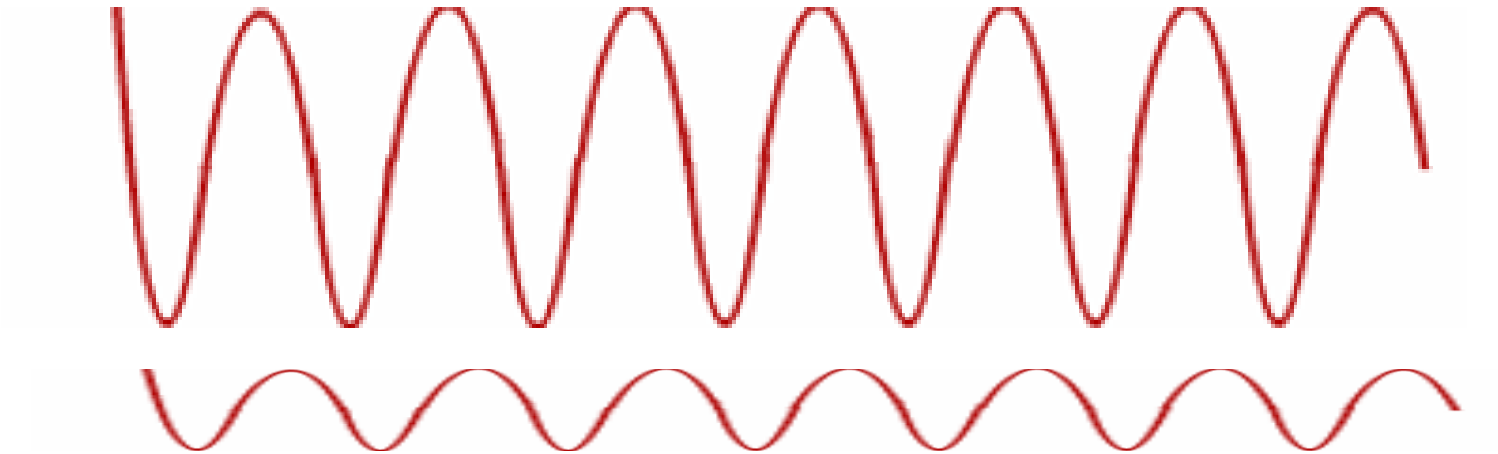
A signal: a dimension they vary on – Oscillation speed



Vision: Light of different frequency

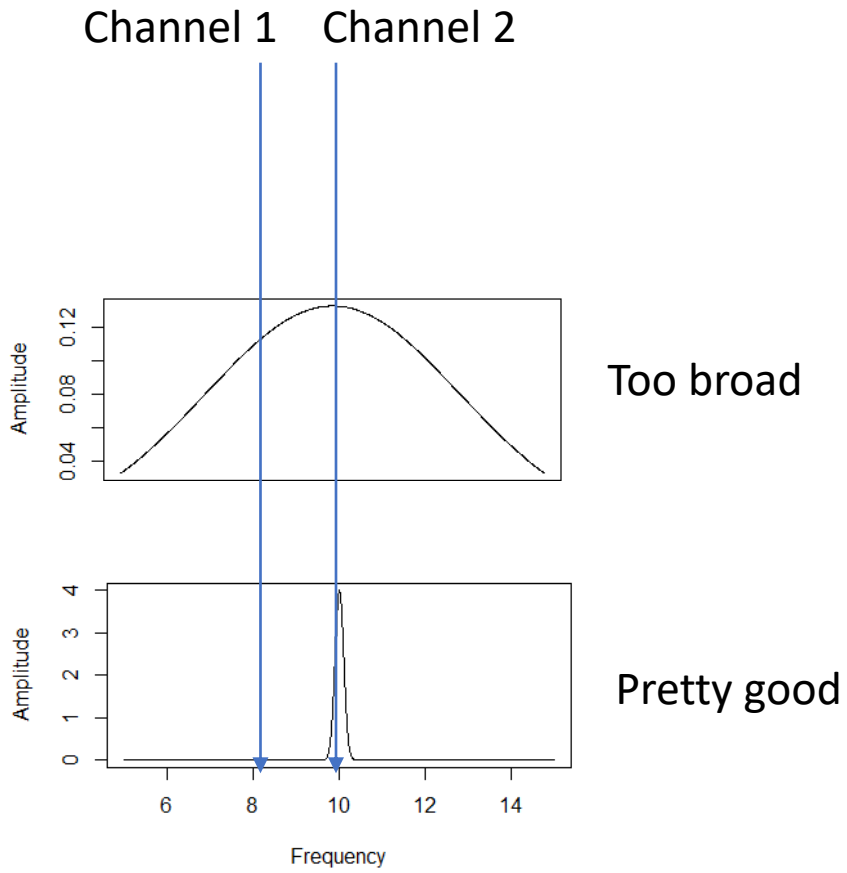
Sound: Acoustic pressure -- Pitch (the shorter the cycles, the higher the frequency)

A signal: Another dimension they vary on -- Amplitude



Vision: The greater the amplitude, the brighter the light (more energy)
Sound: The greater the amplitude, the louder the sound (higher pressure)

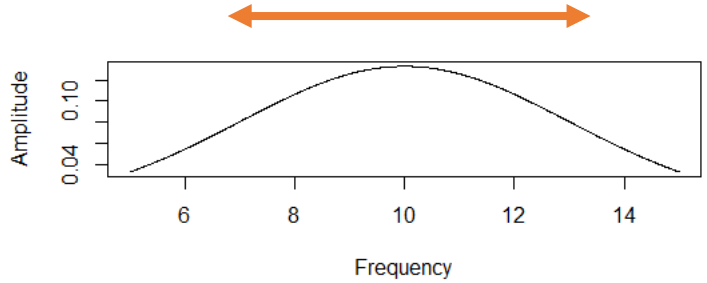
The receiver: A dimension they vary on -- bandwidth



Sometimes it is useful to only receive a very small part of the possible spectrum

Another example: specific neurotransmitters that bind with specific receptors and nothing else

The receiver: A dimension they vary on -- bandwidth

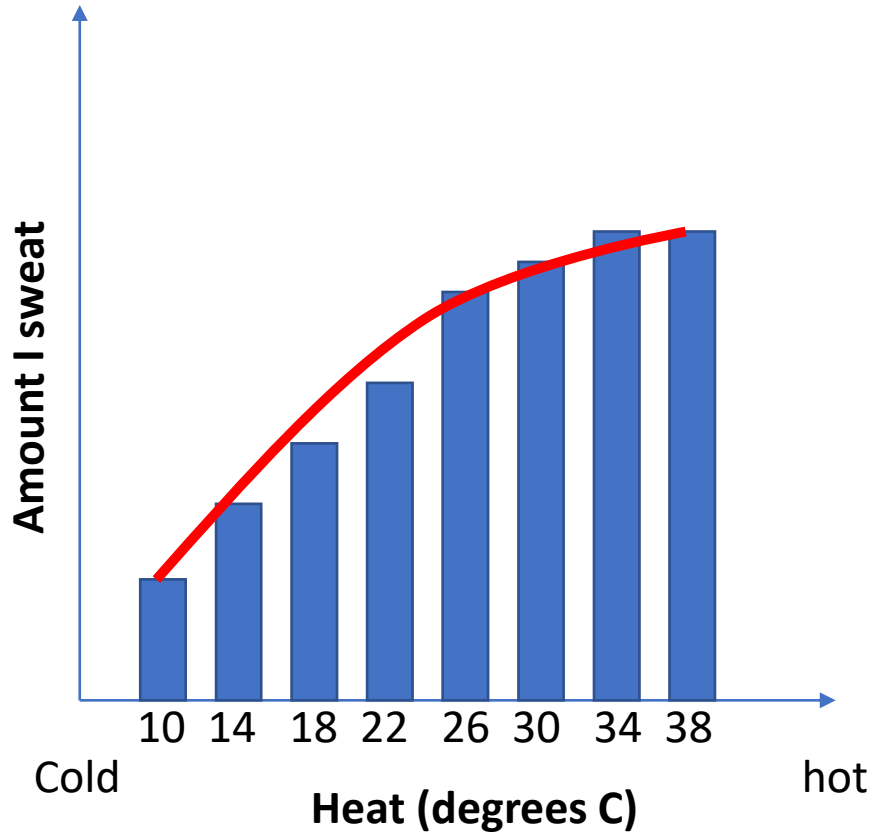


A very wide range of frequencies are dangerous!

Sometimes it is useful to receive a large part of the spectrum
Another example: Hormones, which can affect large numbers of cells

The receiver: Another dimension they differ on

- How much do I sweat based on the heat?



Another example: The chance you will get an action potential based on the amount of neurotransmitter uptaken by the dendrites

The receiver: Another dimension they differ on

How much yellow is there, out of say, 10?