

Classification of Receptors

Specificity of receptors

Each type of receptor is very highly sensitive to one type of stimulus for which it is designed, and almost nonresponsive to normal intensities of other types of sensory stimuli (based on the features of receptor proteins and accessory structure). The pattern of signal (e.g., the form of energy) to which a receptor responds in normal function is called its adequate stimulus.

Modality of sensation

The basic types of the sensations we experience (i.e. pain, vision, touch, sound) are called modalities. Qualitative differences of a single sensation are called submodality, such as color of a light, pitch of a tone, taste of sweat, bitter, sour, salty, etc.

Classification

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Humans can experience various principal modalities of sensation such as pain, sight, touch, sound, etc. The transmission of such modalities is conveyed by raw electrical impulses. The human brain is wired in a way in which the modality of the sensation is defined by the position where the nerve fiber ends. For example, if a pain fiber is stimulated, the person will perceive pain regardless of what type of stimulus (heat, electricity, crushing) excites the fiber in all these instances. If a touch fiber is stimulated by electrical excitation or heating of a touch receptor or in any other way, the person will perceive the touch sensation because touch fibers lead to specific touch areas in the brain. In other words, when a specific somatosensory area of the brain is stimulated, it will produce a specific modality of sensation, regardless of the initially-stimulated receptor - as long as the electrical impulse ends in a pain-programmed area, the person will perceive pain, and so on. The receptor *does not* dictate what the brain will understand.

In the same way that modalities are spatially defined in the CNS, submodalities (such as high and low pitched sounds) are also topologically defined.

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Sources

- Lecture Notes: Prof. MUDr. Jaroslav Pokorný DrSc.

Bibliography

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