Olfaction is the process by which we identify chemical substances in the environment via the olfactory system. The very first thing that happens prior to scent perception is the binding of the odorants to the odorant receptors which can be encoded by a multigene family. Second, the odorant receptors are also related to the relatively small set of G-protein receptors which were known for decades to be involved in other signal transduction since all receptors from a single family send impulses to a single glomerulus in the olfactory bulb. All similar receptor cells send information to a single, complementary glomerulus. The G-protein then activates adenylate cyclase which will then convert ATP to cAMP. cAMP will then open calcium and sodium channels that will allow extracellular sodium and calcium to enter the cells. The depolarization of the cell will begin an action potential which will transmit the information to the different parts of the brain. From the olfactory bulb, olfactory information will then be relayed to both the cerebral cortex which will handle conscious thought processing, and to the limbic system which will generate emotional feelings. This is also the reason why certain feelings and memories are elicited by the scent of a certain odorants.

The story of the discovery of Buck and Axel is a great example of how molecular biology can be used to understand the molecular aspects of our experience. Linda Buck was born in 1947 in Seattle, Washington. She initially wanted to be a psychotherapist so she took psychology in her undergraduate years. Her interest then shifted especially towards olfaction. He thought that if genes are the links to what we perceive in the outside world, then the understanding of these genes can provide important insight to the mechanisms since it helps us differentiate harmful and poisonous foods from healthy foods. It is currently known that both of the authors are not physiologists, but still, they were able to unravel theundy known odorant receptors and its role on how our brains process odors. The olfactory receptors are the first of the sensory neurons that will be encountered when the olfactory epithelium is located on the lining of the nose and that olfactory transduction involves G-protein linked receptors which causes the olfactory system works. In the nose, the olfactory bulb is a part of the brain that contains glomeruli that are closely associated with the sensory neurons. The sensory neurons can be found in the olfactory epithelium which is the part of the nose in which the olfactory receptor neurons reside.

The Organization of the Olfactory System

The olfactory bulb is the first part of the brain to which olfactory information is relayed. The olfactory bulb contains glomeruli which are closely associated with the sensory neurons. The sensory neurons can be found in the olfactory epithelium which is the part of the nose in which the olfactory receptor neurons reside.

The Minds Behind the Discovery

Richard Axel and Linda Buck were the recipients of the 2004 Nobel Prize in Medicine or Physiology for their study which shed light on odorant receptors and its role on how our brain detects odors. Richard Axel developed a fascination in the problem of perception, and then shows exactly which odorant receptor gene was expressed in the given cell. After multiple trials, Linda Buck was able to come up with experimental data showing that there is high specificity when it comes to signal transduction since all receptors from a single family send impulses to a single glomerulus in the olfactory bulb. Information from the olfactory bulb is then sent to the different parts of the brain.

The Path Towards the Discovery

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The Importance of the Olfactory System

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