Development of an Electronic Nose: Detecting VOC Levels

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Volatile Organic Compounds (VOCs) have come to be considered as genetic biomarkers for different types of cancers. Certain VOCs are linked with multiple types, while others are linked with the development of a single type of cancer. One VOC that is linked with 8 different types of cancers is hexanal (an aldehyde). Studies have shown a significant increase in aldehydes in cancer patients, and can be detected in the breath of an individual after its formation in human tissue. This indicates that the growth of cancer cells in an individual will increase the detectable aldehyde levels within their breath. These levels can be an early indicator of cancer. In order to detect the levels of VOCs in a person's breath, I have developed and trained a device (an electronic nose) to detect these levels. To develop this device, I have used a multichannel gas sensor and a microcontroller board with a display to demonstrate what is being detected and its level. Pairing? this device with a recognition software to indicate what is being sensed and the level it is at, I was able to create a device that can detect VOC levels. This device has serious implications for the early detection of cancer and may provide new information on the development of cancer cells and their association with VOCs.

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