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Study of the relationship between olfactory perception and toxicity

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The senses are the physiological mechanism of perception. Taste and smell are known as "chemical senses" because they perceive chemical substances. Mammals have sensory receptors which receive chemical stimulus from the environment activated by specific molecules. These receptors are known as chemoreceptors and belong to GPCR trans-membrane group (G-protein coupled receptors). An odoriferous compound is able to activate several receptors' types and each receptor can be activated by various compounds. In case that each smell activated a different receptor, we would obtain 350 smell's dimensions at most. This large number of receptors suggests that the olfactory perception space is highly dimensional. It is difficult to determine the dimensions of smell, but there are studies that suggest between 20-30 dimensions. Some authors have pointed out a possible relationship between toxicity and olfactory perception. Studies with newborns suggest that the perception of pleasant odors may be innate. A multivariate analysis carried out to a comprehensive database of numeric odor profiles found that the first principal component could be interpreted as the hedonic dimension (i.e., rejection vs. acceptance). The second component was related to the toxicity of odorants. The present work has studied the relationship between olfactory perception and toxicity using the Atlas of Dravnieks according to Haddad theory. Different statistical methods were applied such as PCA, PLS regression (Partial Least Squares) and MLR (Multiple Lineal Regression). It was found that fruity smell substances are less toxic, while burnt smells tend to be more toxic. These results are consistent with an evolutionary interpretation.

Biography

Raquel Amigo Moreno is a Chemical Engineer, Auditor of Quality Systems, Master in Statistics and Optimization, Master in Bioethics, Master in Bio-banks for Biomedical Research and Master in Health Management. Presently she is a Coordinator for the Biobanco La Fe (Hospital Universitari i Politècnic La Fe, Valencia, Spain). Her work consisted of starting-up and authorization of the bio-bank, its management and legal compliance, establishment of technical protocols, processing of biological samples, certification (ISO 9001:2008), cost optimization, engineering processes, control and monitoring of indicators, etc. She participates in several working groups of the Bio-banks National Platform. She is the Member of ESBB in 2012 and Member of IChemE.

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