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L-serine and IMP Synergy in T1R3 Knock Out Mice: Does it Exist?

Abstract

Taste is one of our five senses, and a functioning taste system is important for maintaining health and quality of life. Understanding the afferent pathways of taste allows treatment of taste disorders and enhancement of food palatability. Enhancement of food palatability is important because it can allow healthy foods to taste better both for healthy individuals and for individuals with taste systems that have been modified by occurrences like old age or chemotherapy treatment. For aging people or those undergoing chemotherapy treatments, nutrition is essential for recovering and maintaining good health. Umami, or savory, is one of the five basic tastes. Research shows that monosodium glutamate (an amino acid) elicits umami taste by activating the T1R1/T1R3 receptor (Li 2009; Nelson et al 2002), and possibly other taste receptors. Umami, when mixed with other tastants, has been shown to increase the palatability of food. This effect is synergistically enhanced when mixed with IMP (Delay 2000). This experiment examines if this effect is present for other amino acids (L-serine in particular). In this experiment, mice were used to observe if, when mixed with IMP, L-serine (an amino acid) exhibits synergy, a potentiated increase in taste sensation and a characteristic quality of umami taste. Mice that have been genetically altered to lack the T1R3 receptor (known as T1R3 knock-out mice) were used to test if L-serine requires the T1R3 receptor for taste detection and synergy.