Umami is unique taste elicited by monosodium glutamate (MSG) and 5'-ribonucleotide monophosphates such as IMP and GMP. Several receptors and transduction mechanisms are proposed to be involved in the detection and transduction of umami, particularly for l-glutamate. However, very little is known about the transduction mechanism of other L-amino acids. The most frequently discussed receptors for detection of umami are heteromers of taste receptor type1, members 1 and 3 (T1R1+T1R3) and a variant of brain metabotropic glutamate receptor 4 (taste-m-GluR4). However the potential contribution of each of these receptors to umami taste transduction is still not clear. One study showed that behavioral preference and nerve responses to umami stimuli in T1R3 KO mice were totally abolished compared to control mice, arguing for the involvement T1R1+T1R3 as the sole receptor in umami response in mice. In contrast, other studies found diminished but not complete loss of umami responses. These data suggest for the involvement of multiple umami receptors. Here, we used calcium imaging of isolated taste sensory cells (TSC) and taste buds to determine if taste cells are responsive to all chosen L-amino acid or a particular subset of them, and to determine if TSC lacking the T1R3 component of the T1R also responds to L-amino acids. Our results indicate that not all TSC responds to all amino acids. Further we also found that cells lacking T1R3 component also responds to some L-amino acids.