Abstract

The existence of racial differences in alcohol sensitivity between Oriental and Caucasian populations has been well documented. The primary manifestation is a highly visible facial flushing (47–85% in Orientals vs 3–29% in Caucasians) accompanied by other objective and subjective symptoms of discomfort. Even among different Oriental groups, subtle differences in the flushing response and alcohol consumption can exist. North and South American Indian populations differ in phenotypes for alcohol dehydrogenase and aldehyde dehydrogenase, but systematic studies comparing degree of flushing, alcohol elimination rates and blood acetaldehyde levels in these populations are lacking. Although flushing does not automatically ‘immunize’ an individual against alcohol use, those susceptible tend to consume less alcohol, at least in Orientals. However, the flushing phenomenon cannot be the sole explanation for differences in incidences of alcoholism among different racial groups. Socio-cultural, environmental and genetic factors also have to be considered. An increased incidence of flushing has been found to associate with a familial risk of development of future alcoholism in a Caucasian population. It remains to be determined whether the same is true in Orientals. Most biochemical investigations of the flushing phenomenon have focused on aspects of alcohol metabolism. Based on recent findings, a convincing mechanism is the higher accumulation of acetaldehyde in flushing subjects because they have an unusual, less-active liver aldehyde dehydrogenase isozyme (ALDHI). The possibility that an ‘atypical’ alcohol dehydrogenase, which is present in 85–90% of Oriental subjects, can contribute to increased blood acetaldehyde levels in flushing subjects cannot be ruled out. Based on results of a small number of pedigree studies which demonstrated familial resemblances in flushing, a pharmacogenetic defect in ALDHI has been proposed to be responsible for flushing. Other possible biochemical mechanisms (e.g. prostaglandins) and genetic defects need to be investigated.