

effects of zinc deficiency on the vallate papillae and their taste buds in rats

周綉珠

Hsiu-Chu Chou

摘要

Abstract

Zinc deficiency is associated with multiple clinical complications, including taste disturbance, anorexia, growth retardation, skin changes, and hypogonadism. We investigated the zinc-deficiency-induced morphological changes in the vallate taste buds of weanling and young adult male Wistar rats. A total of 24 weanling and 30 young adult rats were used. Each age group was further divided into a control group fed a zinc-adequate (50 ppm) diet, a zinc-deficient (<1 ppm) diet group, and a zinc-adequate pair-fed group who were fed the same amount of food as that taken by the zinc-deficient group. Weanling rats were fed for 4 weeks and young adult rats were fed for 6 weeks. The morphometry and morphologic changes of vallate taste buds were analysed using light and transmission electron microscopy. Light microscopy revealed no significant difference in papilla size and morphology among the various groups. In both weanling and young adult rats in the zinc-deficient diet and pair-fed groups, the number of taste buds per papilla (per animal) and the average profile area of the taste bud were significantly smaller than those of the corresponding controls ($P<0.05$). Ultrastructural changes were seen only in the taste buds of weanling rats fed the zinc-deficient diet, with derangement of the architecture of the taste bud and widening of the intercellular space between taste bud cells. The proportion of type I taste bud cells in the taste buds of weanling rats fed the zinc-deficient diet decreased from 59% to 39%, and that of type II taste bud cells decreased from 25 to 12%. No obvious changes in the ultrastructure of type III taste bud cells were observed. The main effects of zinc deficiency in weanling and young adult rats and in adequate diet pair-fed rats were changes in the number and size of taste buds, and fine structure changes in the taste bud cells, especially during the accelerated growth stage after weanling.