

Effects of Chemotherapy on taste.

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Cyclophosphamide (CYP) is one of the most commonly prescribed chemotherapy drug. It is a DNA alkylating agent attacking the guanine base pairs and interfering mainly with the S-phase of the cell cycle. As a chemotherapy drug, it has adverse side effects including loss or alterations in taste sensation. However, little is known about how the taste system is altered by CYP. We are studying the changes in taste perception produced by CYP and whether there is any change in the number and morphology of taste buds. Taste sensory cells within the taste buds have a high turnover rate, hence are thought to be susceptible to the chemotherapy drug treatment. We hypothesize that CYP damages the DNA of taste progenitor cells, causing these cells to die or arrests their cell cycle until DNA repair is completed. This disrupts the normal replacement of sensory cells within taste buds. Taste sensations come back when the cell cycle of these cells resume and taste buds are repopulated with functional cells. We tested this hypothesis using behavioral and immunohistochemical techniques. We trained mice to discriminate between the tastes of monosodium glutamate and inositol monophosphate, then injected the mice with CYP. Afterwards, we tested their discrimination performance for 16 days. We tested the effect of CYP at the cellular level using BrdU as a marker.

Our behavioral results indicate that the performance was disrupted for up to 4 days after injection, then again 9-12 days after injection. This 2-phase disturbance in taste function corresponds to what one would expect when cells are immediately challenged by the toxic effects of the drug causing immense apoptosis and necrosis (phase 1) and the longer term (phase 2) impact of arresting the normal cell replacement cycle in taste buds.